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Strategic by Design

Iterative Approaches to Educational Planning

To come.

by Shannon Chance

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Today's tumultuous economic and political conditions require universities to adapt—fast. Leaders must attend to unforeseen crises, events, and opportunities in ways that align with their core missions, promote their universities' continued existence, and help achieve disparate goals (Rowley, Lujan, and Dolence 1997). Good planning and good plans involve iteration; simple cause-and-effect thinking is no longer enough.

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Universities can—and frequently do—suffer when they use linear, mechanistic thinking (Presley and Leslie 1999; Rowley, Lujan, and Dolence 1998). Leaders can make too many erroneous assumptions about the future. And, when users view strategic plans as fixed road maps, they often fail to recognize the faulty assumptions that hinder their success along the way. They generally fail to harness emerging opportunities as well. To enhance outcomes, planners must ensure there are adequate resources for monitoring and adjusting plans during implementation. Those empowered to monitor outcomes and activities must fully understand the plan's core intentions so they can effectively refine the plan as it unfolds (Allison and Kaye 2005; Holcomb 2001).

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Linear problem solving (as in figure 1) **[cr]** assumes a rational and predictable sequence of events. Models for rational decision making assume that problems are clear and well structured from the start. They require that resources and abilities be determined before designing, and they prevent the designer from introducing new possibilities that present themselves in the course of problem solving (Simon 1973). Higher education's overtly linear, internally-oriented form of planning is more appropriately described as "long-range planning" (Presley and Leslie 1999). Long-range planning is generally more prescriptive and less adaptive than strategic planning and does not provide the mechanisms for quick, purposeful adaptation that could render change efforts more effective.

Figure 1 **Illusion of Design/Planning as a Linear Sequence of Discrete Tasks**

Strategic planning works best when seen as a continuous process of experimentation that allows multiple decisions to emerge on many different fronts simultaneously (Leslie and Fretwell 1996). Chaffee (1985) notes that while strategy formation in the business context actually had three facets (linear, adaptive, and interpretive), higher education has relied almost exclusively on linear models. This has contributed to some of the problems educational planning faces today. Adams (1991) describes three major areas of crisis: (1) definition and identity, (2) intellectual foundation and scientific theory, and (3) utility and success. This article explores many of these issues in an effort to enhance practice.

Iterative Strategy

Pearson (1990) indicates that in higher education, strategy is best used to set direction, focus effort, encourage consistency of effort over time, and promote flexibility. Organizations can respond to unforeseen challenges in advantageous ways when they define a collective vision—and chart a course aligned with that vision—through a truly strategic and ongoing planning process (Barnetson 2001; Cutright 2001; Gordon 2002; Rowley, Lujan, and Dolence 1997; Swenk 2001).

"Iteration," according to Merriam-Webster Online (2009, ¶ 1a), constitutes "a procedure in which repetition of a sequence of operations yields results successively closer to a desired result." Architectural design strategies reflect the sort of non-linear, iterative, and synthesizing processes scholars recommend for effective strategic planning in higher education. Architects synthesize a vast array of concerns. They continually revisit key objectives throughout the planning and implementation (i.e., construction) process. Using iterative thinking, problems are defined over time. As they emerge, they are paired with appropriate solutions (Dorst 2006; Maher, Poon, and Boulanger 1996). The whole of the problem is seldom known at the outset of design.

Metaphors and iterative techniques applicable to educational planning include decision-making spirals, design thinking, interactive learning, improvisation, and chaos theory. This article discusses each, describes the nature of "design" activity, and discusses how the studio format that designers use fosters communication, collaboration, and iterative design thinking. It begins by taking a closer look at today's planning context.

Shifting terrain. Old models were based on assumptions of objective facts, straightforward realities, hierarchical power arrangements, determinacy and linear causality, need for certainty, internal focus, reactivity, and risk aversion (Kiernan 1996; Lincoln and Guba 1985). Although this is still the dominant paradigm, a profound shift is now underway. Many people now view reality as complex, indeterminate, and socially constructed. This emergent paradigm values multiple perspectives and holographic metaphors (Lincoln 1989). Kiernan (1996) says it is marked by 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 activities, corporate interdependence, "virtual" integration, focus on the competitive environment, constant reinvention of advantage, and the creation of tomorrow's markets.

Today, technology, the way we categorize and interpret knowledge, and "the nature of cognition and information processing" (Kunstler 2005, p. 181) are all evolving. Although these shifts have influenced the practice of strategic planning, it seems that universities have been slower to address these changes (or to implement responsive planning methodologies) than other types of organizations. Looking outside the dominant model can help.

The Boyer Commission (1998) describes the importance of preparing students for this emerging context. It recommends using interdisciplinary programs and studio-based class formats to promote holistic thinking and to enhance students' ability to address emergent problems. Techniques used in design education prepare students to think iteratively—to intersperse rational, analytical, and intuitive thinking in the development of places, buildings, and objects that are meaningful, useful, and beautiful (Boyer and Mitgang 1996).

In non-linear design models, such as those used by architects, an overarching concept is established to set the framework. This allows the development of appropriate criteria for decision making. It sets direction and allows for future adjustment in ways that will enhance the design. This technique is helpful for urban planners, policy makers, and educational planners as well as for architects.

Strategic planning also requires defining a comprehensive vision that guides decision making. Rowley, Lujan, and Dolence (1997) define strategic planning as "a formal process designed to help an organization identify and maintain an optimal alignment with the most important elements of its environment" (p. 15). Educational planning is most effective when planners and implementers understand and embrace this vision (Fullan 2001; Kouzes and Posner 1995).

The overarching concept must provide flexibility and help guide design decisions through an iterative process as the designer/planner continuously addresses new (and often competing) issues. The result should be a well-synthesized design/plan—one that is coordinated, comprehensive, and coherent.

Outdated assumptions of linearity. Strategic planning in the university and business arenas was founded 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 has for business (Rowley, Lujan, and Dolence 1997). Presley and Leslie (1999) and Birnbaum (1988) note that the process wastes time and resources when it is ill formulated.

University governance procedures, stakeholder roles, and educational missions all stand in the way of predicting or enforcing a direct path to reach a desired change. Linear business models inadequately reflect the complex relationships found in higher education (Kerr 1995; Rowley, Lujan, and Dolence 1997). These models work best in the corporate arena, which is largely unencumbered with the requirements of service missions, public accountability, and broad-based buy-in that universities face. Substantive change in higher education often requires agreement from faculty as well as from public legislators. As well, prescriptive, linear models lack the flexibility necessary to align an institution's aspirations with quickly changing opportunities. Nevertheless, universities do face increasing pressure to operate on rational business principles and to create plans for reaching specific, measurable, predefined goals.

Linear models inadequately reflect the complex relationships found in higher education.

Wright (2005) notes that transformational change frequently occurs at the periphery of organizations. It happens through inductive (rather than rationalist, deductive) reasoning as individuals and groups observe patterns in their environment. This, Wright says, calls into question using rationalism as a primary assumption in planning.

It is important to realize that in business, linear models were eventually supplemented and enhanced in ways that educational organizers somehow overlooked (Presley and Leslie 1999). Many educational planners adopted a paired-down, strictly linear approach that is ill suited to the complexities of higher education. Although planning in business was traditionally operations-driven, the business world has updated its strategies. This happened at roughly the same time that academia was adopting the old model.

Looking at corporate planning two decades ago, Goold and Campbell (1990) state that readers of *Long Range Planning* "will be only too well aware that, despite its high promise, strategic planning often makes little contribution to improving a company's performance" (p. 106). In their evaluation of planning outcomes within a number of companies, they find that plans often failed to alter existing momentum, took companies down "the wrong path," or were ignored by the managers who were supposed to implement them.

Another type of problem occurs when planners skirt key issues, as Goold and Campbell (1990) find is common. Companies and schools alike suffer when they avoid the larger picture and limit themselves to working within established practices and frameworks (Christensen, Horn, and Johnson 2008; Collins 2001). Three essential features distinguish companies that successfully "locate and face

up to the central issues," according to Goold and Campbell (1990, p. 107). Such companies (1) take an issue-based approach, (2) communicate early and often regarding the purpose and progress of planning, and (3) use open-ended discussion and brainstorming to identify truly important issues. Their research also shows that people in sub-divisions often do not understand the central office's purpose in planning. This problem is apparent in universities as well as in corporations (Kerr 1995).

In assessing the planning performance of 94 Scottish companies, Reid (1990) finds few positive results. Many failures were due to a lack of vision, creativity, and motivation to gather and interpret information. Strategic management was rarely implemented as intended. Fostering a culture of creative and active involvement in planning is critical to success; modeling behavior and giving employees hands-on experience in strategic thinking are also key (Lauer 2006; McMillan and Carlisle 2007).

Over the years, corporate planners have adjusted their techniques to harness unanticipated opportunities (Presley and Leslie 1999). "Think of your strategic plan as an open architecture that lets you consider and pursue multiple possibilities," the Wharton School (2008, ¶ 20) advises leaders of credit unions today. It cautions that assumptions "are the foundation of any strategic plan, and if they are flawed, the whole plan is flawed. A good plan will recognize the volatility of assumptions and will provide maximum allowance for contingencies" (¶ 20).

> Solving complex, interrelated problems requires a much different type of thinking.

This marks a change from the linear, Newtonian-type, cause-and-effect business techniques that nonetheless still dominate. Old techniques are steeped in mechanical and political metaphors that are orderly and goal driven (Barnetson 2001). They assume tight control is required to avoid eventual breakdown. 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" (Barneston 2001, p. 147). These assumptions did not pan out in business, much less in education where tight control and self-interest are shunned (Birnbaum 1988).

The "rational problem-solving paradigm" (p. 4) is practically useless in intricate planning and design (Dorst 2006). Solving complex, interrelated problems requires a much different type of thinking than solving straightforward problems. Dorst says it is important to understand that

> there may be elements within the process of solving ill-structured problems that can actually be more or less straightforward steps (that can be considered well-structured problems), but that doesn't mean that the solving of ill-structured problems can be reduced to these straightforward steps. There is no evidence to support the claim that both kinds of problem solving are the same. (2006, p. 9)

Emerging planning perspectives. Early explorations regarding the "science of design" developed "strategic monitoring" practices to see if expenditures were effectively yielding desired outcomes. "Strategic management" was then introduced to interpret and communicate the resulting data back into the process. The idea was to improve project delivery as it occurred by adjusting activities in light of emerging discoveries. The techniques were created to regulate development programs funded through the United Nations, but they were largely unsuccessful at the time (Wilson 1997). Since then, a host of perspectives have emerged in the planning profession. The first of these is the formal, rational perspective, which includes well-known techniques like SWOT and STEPE analyses. SWOT assesses strengths, weaknesses, opportunities, and threats, while STEPE identifies external social, technological, economic, political, and environmental aspects that might influence a proposed change initiative. Kennie (2002) identifies others, including the scenario perspective, competitive market positioning perspective, cultural perspective, performance measurement perspective (which includes the balanced scorecard, benchmarking, and business excellence models), sensitivity analysis perspective, and emergent perspective.

More and more universities are using the scenario perspective to explore multiple alternatives in the process of planning (Wright 2005). This perspective helps them respond to ever-increasing levels of uncertainty in the environment (Kennie 2002).

Adams (1991) has developed a similar list of planning methods used nationally. He calls them the rational

approach, incremental approach, mixed-scanning approach, general systems approach, and learning-adaptive approach. He shows how each of these five approaches varies with regard to the role of planners, key concepts, locus of power, major methods, implementation, and epistemology. Adams states, however, that all planning theory seems to fall into just two general categories—rational and interactive.

Techniques and Metaphors for Effective Iteration

Goold and Campbell (1990) describe differences between planning and strategy. Corporate planning often involves budgeting, analyzing prospects, and examining assumptions. Strategy, on the other hand, has to do with defining critical issues. As with iterative design, "an essential part of the planning process is to agree on these issues and keep wrestling with them until enough evidence is collected to resolve them" (p. 107). Goold and Campbell call for issues-based planning, which they note "is unlikely to operate on an annual cycle or to have critical set deadlines. Issues-based planning recognizes that issues have their own timetable" (1990, p. 107).

Maher, Poon, and Boulanger (1996) suggest that design typically evolves simultaneously as issues emerge and are identified. As Dorst (2006, p. 10) reports, their empirical research finds

> that creative design is not a matter of first fixing the problem (through objective analysis or the imposition of a frame) and then searching for a satisfactory solution concept. Creative design seems more to be a matter of developing and refining together both the formulation of a problem and ideas for a solution, with constant iteration of analysis, synthesis, and evaluation processes between the two notational design "spaces"—problem space and solution space. In creative design, the designer is seeking to generate a matching problem-solution pair, through a coevolution of the problem and the solution. Creative design involves a period of exploration in which problem and solution spaces are evolving, and are unstable until (temporarily) fixed by an emergent bridge, which identifies a problem-solution pairing. The description of design as the coevolution of problem and solution leads to the uneasy conclusion that, in describing design, we cannot presuppose that there is something like a set "design problem" at any point in the design process.

Maher, Poon, and Boulanger's (1996) work implies that the overarching vision must evolve as the problem itself unfolds. This is consistent with leadership and change theory (Fullan 2001; Kouzes and Posner 1995).

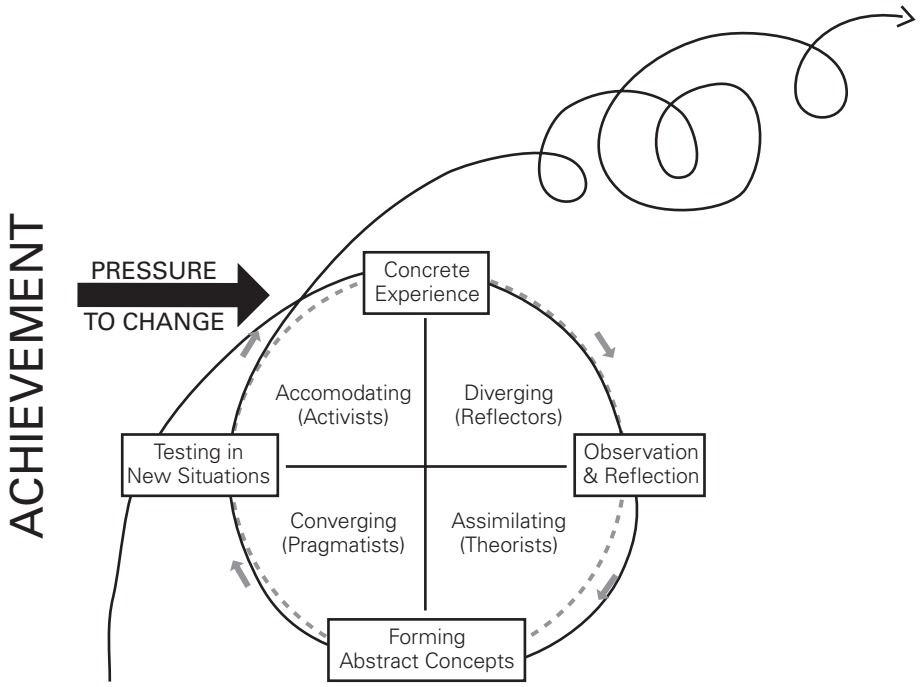
The techniques and metaphors discussed below overlap and extend many of these perspectives and approaches. They are interpreted from the perspective of an architect and educator.

Decision-making spirals. Wilson (1997) recommends improving the practice of "strategic monitoring" by conceptualizing it as a spring-shaped helix. The original aims of strategic monitoring and management were on target, he says, in that they attempted to use ongoing evaluation to enhance programs during implementation. But strategic monitoring and management need to be improved. Visualizing the process as a spiraling feedback loop can help. In this cyclical process, each group of decisions gets revisited in light of new findings.

This type of monitoring is formalized in the architecture profession, where it is known as "construction administration." It constitutes one of the five Basic Services provided in the *Standard Form of Agreement Between Owner and Architect* (American Institute of Architects 1997). A job is typically staffed by a licensed architect designated as the project's official construction administrator. The construction administrator observes the construction process to help ensure that the building meets the design's intent. This role is just as important in educational planning, but organizations seldom appoint specific individuals to do this work or provide them with the resources and authority to respond effectively (Allison and Kaye 2005; Holcomb 2001). The actual results of educational planning are seldom known (Presley and Leslie 1999).

According to Kolb's (1984) model, making complex decisions requires four distinct types of thinking. Figure 2 **[cr]** merges two of Kolb's models with the spiral described by Wilson (1997) and ideas posed by Sanford (1962). The circle at the lower left of figure 2 [cr] represents Kolb's decision-making model with corresponding "learning styles" shown in various quadrants.

Figure 2 **Spiral Planning Model that Incorporates Kolb's (1984) Decision-Making Model with Ideas Posed by Sanford (1962) and Wilson (1997)**



One can enter the decision-making process at any point on this circle, but must cycle through periods of concrete experience, observation and reflection, abstract conceptualization, and active experimentation in order to develop appropriate, well-synthesized responses (Kolb 1984). Designers are constantly integrating new ideas and repeating the decision-making cycle. For complex designs, they cycle through the phases hundreds—if not thousands—of times.

Effective leadership and planning—that which keeps an organization on course despite challenges—works precisely this way. Figure 2 **[cr]** illustrates a process of integrating feedback over time. Decision-making cycles happen at different scales, and sometimes they overlap or require multiple iterations. The double loop in figure 2 **[cr]** represents the development of a prototype prior to implementation.

New opportunities and challenges exert "pressure to change." In studying behavior among college students, Sanford (1962) finds that a stimulus is usually required before a person feels motivated to change. The person needs adequate preparation and support to meet the challenge. Organizations resist change in a similar fashion and many require an external impetus to change (Fullan 2001).

Interestingly, Kolb (1984) asserts that most people tend to want to work in just one quadrant of his model; however, design education itself exerts pressure on students to rotate through all four modes of thinking. Good design requires all these types of thinking, and a given design is continually changing and evolving as a result. Kolb developed this model to describe experiential learning; Birnbaum (1988) says that universities, too, should learn from experience.

Interactive learning. Interactive or "cybernetic" learning organizations monitor their environments, consider incoming data in light of their normal operating procedures, and—when they recognize underperformance or significant deviation—take action to avoid hardship (Barnetson 2001). This can mean altering their activities, goals, and/or organizational structures (Birnbaum 1988). Cybernetic learning implicitly requires an organization to determine its core values and develop reference points for use in monitoring. Unfortunately, cybernetic thinking requires higher levels of self-discipline and self-evaluation than organizations typically display.

Figure 3 **Phillips' Diagram of Client's Perception of Architectural Design Value**

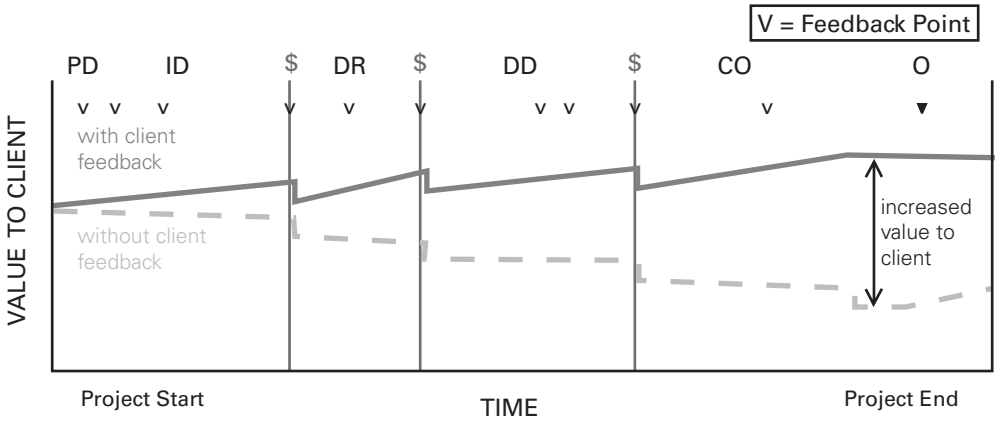
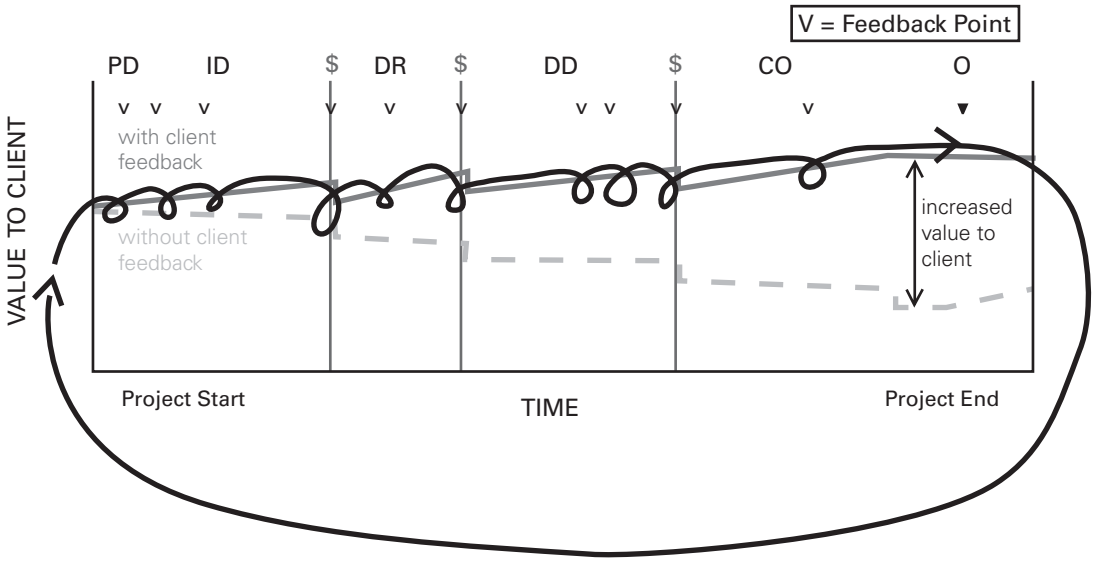


Figure 4 **Adaptation of Phillips' Diagram of Client's Perception of Architectural Design Value**



Planning models that integrate learning, analysis, and creative response enhance the ability of an organization to survive in a competitive and dynamic environment (Swenk 2001). They prepare organizations to address challenges, crises, and surprise opportunities that can overwhelm traditional ways of coping with change and destroy established systems (Rowley and Sherman 2001).

Architect Mike Phillips and his group have developed a strategic communications tool that enhances the process of collecting and incorporating client feedback into a firm's daily process. Phillips, who manages operations for an architectural design firm, presented the tool and a diagram to describe its operation (similar to figure 3) **[cr]** at a 2008 conference of the American Institute of Architects in Richmond, Virginia.

Phillips integrates client feedback throughout his firm's design process. In figure 3, **[cr]** the lower (dashed) line shows that with typical client service (i.e., without client feedback), client satisfaction often declines across the course of a project.

To improve value to the client, Phillips' firm uses concise e-mail surveys that allow it to collect client feedback throughout the course of the project. Data collection points are indicated with Vs in figure 3. **[cr]** The upper (solid) line illustrates how incorporating client feedback increases the client's perception of the firm's value. Without collecting client feedback, the client's level of satisfaction often drops at each point where cost estimating is provided (represented by $). Collecting feedback allows the firm to continually refine its working process to meet client needs. Employees learn to adjust course quickly as issues emerge.

Phillips developed customized software to collect and analyze client feedback. The software instantly alerts staff to issues and helps them track changes over time. It also can identify staff strengths and thereby encourage continued success. Phillips says the system encourages proactive approaches and open communication between client and designer.

Phillips' data show that clients whose feedback is collected and incorporated in the design process have a much higher regard for their designer. This level of perceived value produces stronger satisfaction in both client and designer. Phillips indicates that it provides a "greater chance for continued contractual involvement" (pers. comm.). In other words, clients know that they have received a valuable service and are more likely to return with future projects.

By superimposing decision-making spirals on Phillips' model (as shown in figure 4), [cr] it is easy to visualize how this client feedback tool improves both immediate and long-term performance. What Phillips' firm learns from feedback on any single project can inform future work, as depicted by the sweeping arch that brings the process full circle. This is especially applicable for projects with similar clients or building types. The big loop represents one large-scale turn of Kolb's (1984) cycle; it is amplified by many smaller turns of the cycle.

Skilled architects understand how to deal with shifting expectations, codes, and environmental and political contexts. They continuously synthesize new information and integrate various components and concerns throughout the design and construction of complex objects. This type of synthesis involves feeding new data through the loop of prior decisions to enhance continuity.

Service firms that seek to increase their value to clients work constantly to improve their understanding of their clients through continued feedback, says Phillips. The success of this feedback process is determined by the speed and dexterity of staff members. Phillips finds that there is always some degree of adaptation to client feedback. He attributes this to "the positive reward of future favorable feedback" (pers. comm.).

Design thinking. Formal research on the activity of design dates back almost half a century (Bayazit 2004). Those who study this activity are called "design researchers." They seek to understand the methods that designers use, describe these methods scientifically, and replicate them in humans and in computers. Design research investigates how humans compose, arrange, structure, and value things and systems—and how they assign purpose and meaning (Archer 1981).

The field's first studies sought to identify rational criteria for decision making, but understanding cause-and effect thinking represents just one small part of this work. Over time, design researchers have investigated user participation in the design process, collaborative and multidisciplinary design techniques, the science of management, cybernetic practices, computer-aided design, evaluation of building performance, and the cognitive aspects of design activity (Bayazit 2004).

Existing theories about how individuals develop expertise in a given area indicate that the way novices work varies tremendously from the way experts do. Dorst (2008) says we "need to abstract from the complexities of real-life design in order to create models and theories"

Figure 5 **Design Strategies Rubric by Crismond (2008)**

PHASE OF DESIGNING	WHAT BEGINNING DESIGNERS DO	WHAT INFORMED DESIGNERS DO
I. Explore the Challenge	**Premature Decisions** – make choices too soon, after reading brief.	**Delay Decisions** – hold off from making decisions until exploring the challenging.
	Skip Research – and instead start posing solutions immediately.	**Do research** and **information searches** about the problem.
	Do **few** or no early **investigations** or conduct **confounded experiments**.	Do **valid tests** to help designers learn quickly about the design.
II. Generate, Build & Communicate Ideas	**Idea Fixation** – get stuck on their first design ideas that they won't let go of.	Practice **Idea Fluency** – via sketching, brainstorming & rapid prototyping.
	Describe & sketch devices that would not work if built.	Use words, drawings & models to explore design ideas and show how parts connect and work together.
	Have a generalized, **unfocused way** to view tests and troubleshoot ideas.	Use **diagnostic vision** to focus attention on problems & troubleshoot ideas/devices.
III. Test & Evaluate Solutions, Reflect on Practice	**Ignore** or pay too much attention to pros or cons of ideas without also thinking of **benefits & tradeoffs**.	**Balance** systems of **benefits & tradeoffs** when **making** design **decisions**, & use rules of thumb to make choices.
	Design in **haphazard** ways, working on whatever problems emerge. Do design as a set of steps done once in **linear order**.	Do design as a **managed, iterative process**, using feedback to improve ideas. Strategies used in any order, as needed.
	Do **tacit** designing with little self-reflection & monitoring of actions.	Practice **reflective thinking** by keeping tabs on design work in a meta-cognitive way.

(p. 5). Scholars in many fields have developed stage theories to describe the progression from novice to expert. A learner who begins completely naïve of a subject can progress through levels defined as novice, advanced beginner, competent, expert, master, and can even hope to become visionary (Dreyfus and Dreyfus 1986). Although each level represents a distinct way of looking at issues, a designer can actually approach different issues from different levels of expertise within a single project (Dorst 2008).

Crismond incorporates novice-to-expert thinking in a rubric he disseminated at a design educators' conference in 2008 (see figure 5). **[cr]** The rubric operationalizes the design process by defining a low-level design skill and comparing it with a higher-level design ability. Each row represents a contrasting pair of statements about a specific type of strategy.

The design strategies rubric defines critical phases in the design process (left-hand column) and provides criteria for assessing an individual's learning progression from novice (middle column) to competent (right-hand column). It can also be used to assess a student's performance (Chance 2009).

Crismond teaches science educators, but he designed this rubric to work in settings where people are engaged in all types of creative work. It is applicable to artistic and scientific design, he says. David Dirlam, a pioneer in the development of rubrics, describes this as a "very solid two-level rubric" (pers. comm.).

Dorst (2008) endorses the type of analysis involved in constructing such tools. He insists that the activity of design needs a major overhaul itself. He calls for a revolutionary and emancipatory paradigm shift in design.

To achieve this, researchers must investigate both design expertise and design practice in a move "towards a new science of design" (Dorst 2008, p. 11).

Improvisation. Chaffee (1985) notes that the most powerful strategic plans 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. This metaphor should include a future-oriented vision.

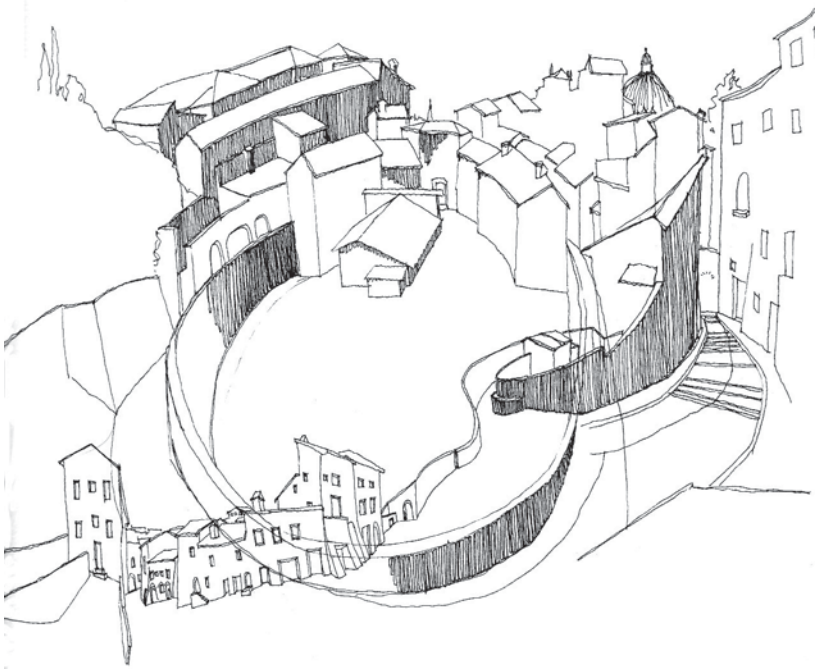
Improvisation represents one way to creatively integrate social, political, and consensual dimensions into planning (Adams 1991; Hamilton 1991; Inbar 1991). Inbar (1991) defines improvisation as a "process of generating rapid acts that relate different types of knowledge toward the accomplishment of determined visions" (p. 65). This non-linear mode of interpreting and responding is discrete from the typical behaviors of programming and planning; it requires thoughtful, purposeful action. It is not, Inbar says, to be confused with simple or systematically randomized response.

Skillful improvisation represents a complex problem-solving activity. Success in this endeavor is linked to subjective interpretation, the individuals' or organization's abilities, and the use of memory (Dorst 2006). The author's interpretive sketch (see figure 6) [cr] provides a physical example of improvisation. The drawing depicts a sports arena in Assisi that was converted to housing. Both the sketch and the place evolved over time. The final drawing reveals three different perspectives of the place (or three separate points of view). In it, a story seems to unravel… a story embedded in the place and retold through the act of drawing.

Chaos theory. Chaos theory can be used to identify patterns within systems that initially appear chaotic. The main tenets of chaos theory involve self-similarity, strange attractors, and self-organization; they are highly applicable to planning for higher education (Swenk 2001). Cutright (2001) proposes that planners adopt chaos theory as a metaphor to help overcome the limitations inherent in the rationalist, machine metaphor.

Like Crismond's (2008) design strategies rubric, chaos theory recommends using a diagnostic approach to troubleshooting. University planners can use this theory to help pair problems with solutions. Chaos theory purports that certain types of issues (problems and solutions)

Figure 6 **Author's Interpretive and Improvisational Sketch of Assisi, Italy**



naturally gravitate toward one another in a self-selecting way. Since these issues do not necessarily appear compatible, they are described as "strange attractors." Birnbaum (1988) explains that university leaders can limit which attractors are allowed to contact one another by sending issues to separate committees (or "garbage cans"). Complementary forces can be brought together for cultivation. Swenk (2001) explains:

> Strange attractors organize the 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. (p. 41)

Principles of self-organization run counter to assumptions that (a) tight control is necessary to prevent breakdown, and (b) organizations should expend considerable energy to remedy the obvious symptoms of a problem.

In Naples, Italy, urban planners have put chaos theory into practice. They use it to plan for "unanticipated events outside the control of an ordinary planning system" and describe it as an effective way of developing planning strategies "to deal with external uncertainty and shocks that transcend the imagination of policy-makers" (Torrieri, Concilio, and Nijkamp 2002, p. 95). Potential but unpredictable volcanic eruptions are just one source of concern in the area.

McMillan and Carlisle (2007) studied this theory in the university context. They note that while individual humans adapt effectively, humankind has not yet channeled such adaptive capabilities into organizations. Their research involves observing and analyzing activities and outcomes of major change initiatives, such as the one successfully conducted at the United Kingdom's Open University between 1993 and 1997.

McMillan and Carlisle developed a "transition model" based on chaos theory and its close relative, organizational complexity theory. They used their model to help unleash "the power of informally networked groups" at Open University (McMillan and Carlisle 2007, p. 590). Their model enhanced outcomes by engaging various groups. These groups helped pair problems with solutions (thus aligning strange attractors) in ways that the original planners had not foreseen. Informal networks of people developed creative ways of meeting goals and fostering change. The transition model helped remove "the artificial distinction between strategy formulation and implementation in practice" (McMillan and Carlisle 2007, p. 590).

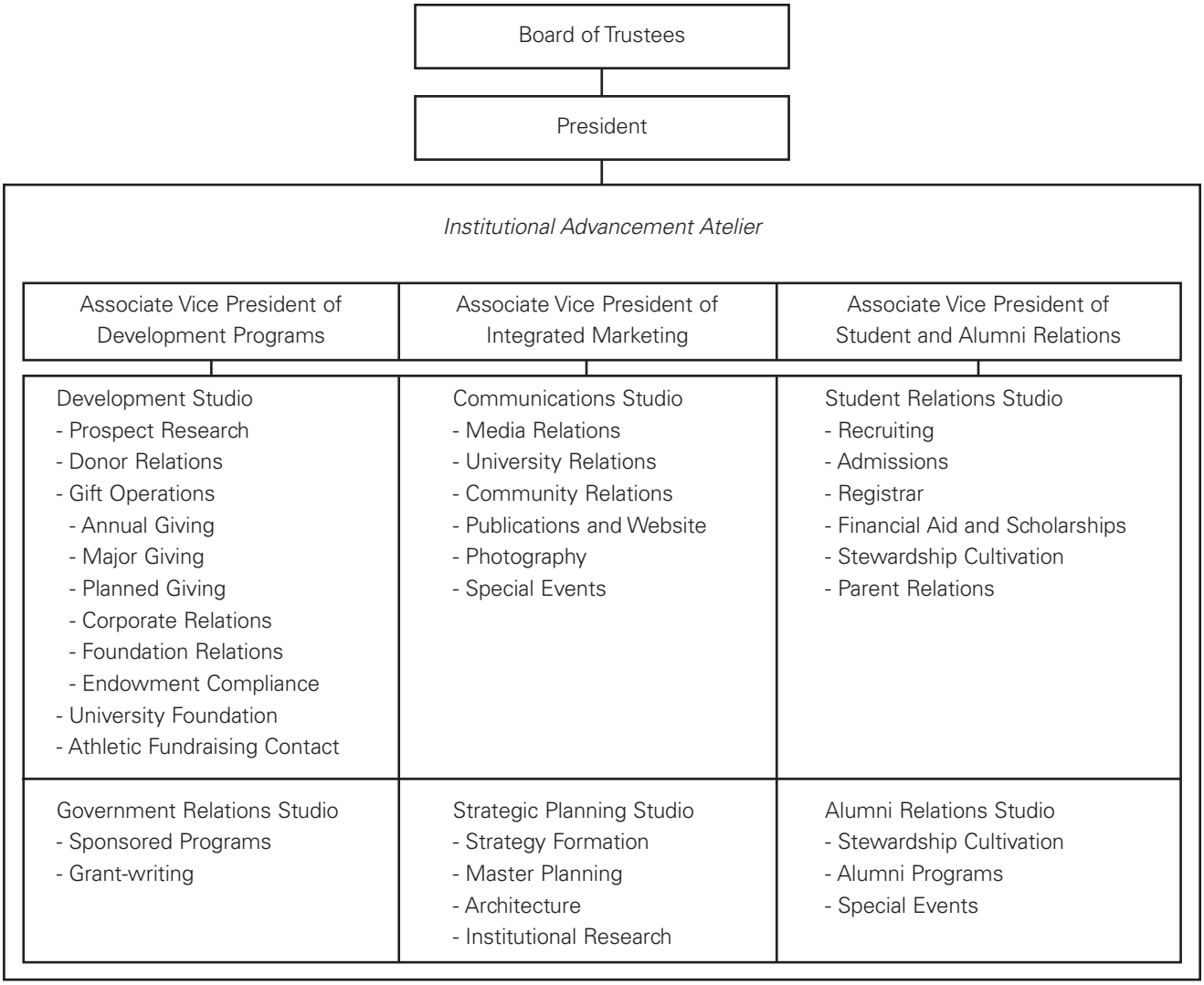
Design studio model. Context is important in implementing change initiatives. Investigating the context in which designers work can help us understand how they deal with changing parameters and create new environments. Dorst (2008) calls for more research in this area. He insists that understanding the science of design will require investigating the object of design, the designer or design team, the process, and the context in which the activity occurs "as far as it impacts upon the activity" (Dorst 2008, p. 5).

In architectural education and professional practice, the design studio provides an environment that promotes critical and iterative thinking. The Boyer Commission (1998) indicates that format fosters "problem-solving, teamwork, and co-operative learning" (p. 15). Studio-based education offers a unique way of teaching students that can and should serve as a model for educators in other disciplines (Boyer and Mitgang 1996).

The "design studio" is much more than a location. It is a laboratory for exploration and for solving problems in context. Studio classes involve hands-on experiential learning. They help students integrate art and science in the process of planning. The design studio is a specialized type of classroom in which students learn strategies for designing all sorts of objects, buildings, environments, and events. This model requires students to operate in the upper range of Bloom's taxonomy from their first moments of schooling (Bloom et al. 1956). Bloom and his co-authors identify knowledge, comprehension, analysis, application, synthesis, and evaluation as progressively complex dimensions of knowing. Since the design studio helps transfer to students the ability to address complex and shifting problems, it provides a model for teaching critical, contextual, and iterative thinking to planners as well.

Chance (2008) explains that the studio format promotes quick and creative action. It can help overcome the types of limitations inherent in hierarchical organizations, in which bureaucracy can suppress invention, pluralism, and the collaborative construction of new knowledge. The design studio has been used since the Renaissance as an open and connective way of working that deemphasizes hierarchy and fosters creativity and ingenuity. In this sense, the design studio is a type of experimental design laboratory or artisans' workshop.

Figure 7 **Chance's (2008) Organizational Chart for an Institutional Advancement Atelier**



The studio functions much like an open newsroom in which people work in a large open space to actively refine and communicate a message. Likewise, workers in the design studio seek to envision, create, and communicate. The aim in both is to produce meaningful objects.

The design studio model can be used to enhance collaboration and creativity in various university functions, not the least of which is institutional advancement. Institutional advancement involves such activities as strategic communication, fund-raising, and student and alumni relations. Chance (2008) suggests that universities might excel by creating a studio for strategic planning (as depicted in figure 7). **[cr]**

The strategic planning studio could be part of an integrated and collaborative institutional advancement studio (or "atelier," as studios are called in many parts of the world). The strategic planning studio could involve strategy formation, master planning, architecture, and institutional research. It could work alongside a communications studio charged with media, university, and community relations; publications and Web sites; photography; and special events. Together, these two studios would aim to achieve integrated marketing. They would conduct their work in close consultation with studios for development programs as well as for student and alumni relations.

Conclusions

Existing data indicate that university-level planning has suffered from linear thinking. Such 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. Because of a host of differences between the business and education sectors, linear business models inadequately address the complex variables found in higher education (Presley and Leslie 1999; Rowley, Lujan, and Dolence 1997; Shahjahan 2005; Swenk 2001). Conscientious tailoring is necessary to address these variables in ways that complement the needs and characteristics of universities and their various programs.

Jackson and Ward (2004) emphasize that the process of developing knowledge in areas where levels of agreement are low and uncertainty is high—or where situations and contexts are emerging or transient—requires continual renegotiation. This is true in educational planning as well as in architectural, landscape, urban, and product design.

When academic organizations fail to understand this and instead adopt paired-down business models, they neglect to integrate a comprehensive range of strategies. Paradigmatic shifts as described by Kunstler (2005), Lincoln and Guba (1985), and Kiernan (1996) have influenced the way that corporations develop, implement, and monitor strategic plans. Scholars emphasize that universities have not integrated enough of these methods in their own planning practices. Most universities limit their planning and decision-making processes to the most straightforward, linear business approaches.

> Institutions that define and employ new paradigms will reap the highest educational and economic benefits.

Rowley, Lujan, and Dolence (1998) 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 say it is not enough for institutions to simply shed mechanistic and deterministic traditions—the greatest rewards will accrue to institutions that are conscientiously, and consistently, proactive.

Helpful precedents for non-linear planning already exist on university campuses that offer studio-based curricula. Planning strategies employed in architecture and other design programs incorporate non-linear, iterative, synthesizing processes. The studio format itself requires high-order thinking in even the earliest classes; as such, studio-based curricula can serve as models for preparing educational planners to develop and implement responsive, well-synthesized plans. Universities can—and should—learn from the design studio example. Doing so can improve their strategic planning processes and foster critical thinking and adaptive learning among students, faculty, and administrators in all fields.

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