

Psychology's New Design Science and the Reflective Practitioner

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INTRODUCTION

We begin the second volume on psychology's new design science by revisiting Donald Schön's analysis of the role of professionals in society, more specifically what it means to be a reflective practitioner within the professional arts. In his well known (1983) book *The Reflective Practitioner: How Professionals Think in Action*, Schön looked across professional camps (architecture, psychotherapy, engineering, urban planners, law, medicine) to discern behaviors, pedagogical methods, and professional quirks that characterize how these domains operate and communicate with their clients, as well as shine a spotlight on their shortcomings—all through the lens of design. According to Schön, all experience is mediated through its design attributes: (a) through the *media and language* used to conduct experiments, (b) a *value system* that directs inquiry, evaluation and reflective conversation, (c) *theoretical orientation* used, (d) and the *frames* or *frameworks* within which professional activities are situated and conducted. Most relevant to this volume, Schön's sociological meta-analysis peered into the future and predicted three possible scenarios for how the professions would evolve:

- *Future 1*— Professionals would continue to function under a “technical rationality” which lays claim to expert knowledge that is mystified in the service of shoring up professional rank/status in a society of elite specialists, working within a system in which distribution of social benefits are unjustly allocated. The ethos of technical rationality and the values it perpetuates are tied to vast institutional resources; technical advancement and efficiency trumps all other goals and values. Technical rationality manifests itself in academic and corporate settings and is defined by Schön as a philosophy of instrumental problem solving made rigorous by the application of basic science to applied science and its techniques. In this view, better technology is the solution to all problems.
- *Future 2* – Professional knowledge would be de-mystified by a new breed of citizen advocates, citizen-practitioners, citizen-planners, citizen-builders, citizen-physicians, who take possession of and dispense expert knowledge more equitably throughout society without licenses, or institutional mandates.
- *Future 3* – The emergence of *the reflective practitioner* in each domain of professional practice which Schön defined as being characterized by: (1) a less autocratic relationship between expert and client (i.e., acknowledgment that the client brings knowledge to the professional relationship and is a partner, not a receptacle of information); (2) experts who understand they have an obligation to communicate their professional process to clients, rather than dispense opinions—in other words conduct reflective conversations with clients, recognizing that meaning-making of the problem context is jointly constructed in the design of

solutions. This in turn, would result in a more equitable distribution of knowledge.

Schön (who died in 1997) couldn't have anticipated the growth of the Internet and mobile media as mediating factors in how professional knowledge, professional education, and professional practice would change—nor could he have predicted that this technical capability would in essence collapse the three distinctions he proposed into another kind of future. Schön's analysis of the professional class still stands as a distinctive voice and enduring critique of the chasm between theory and practice, new knowledge and its application to real world solutions and problems. His work is germane to our topic because his definition of a reflective practitioner precisely encapsulates what new designers of convivial tools¹, novel methods of staging psychotherapeutic interventions with clients, and emerging therapeutic environments are striving to offer.

Schön's perceptive contributions to design science include:

- The concise definition of design as a conversation with materials and a context.
- The realization that much of what professionals do in terms of the evolution of their knowledge and practice is unconscious and intuitive – that is, not captured in text books, nor is it effectively communicated to students in graduate training programs.
- Professionals are primarily artists not exclusive practitioners of scientific methodology in the execution and application of their knowledge.

In terms of our readers, we continue to write for an academic audience of researchers, instructors, graduate students in design and the clinical arts, along with general readers who are interested in exploring the design studio as a context for shaping therapeutic experiences across a variety of domains within psychology. Currently the clinical literature is dominated by three modes of discussion; (1) theory which explores and defines the healing process, (2) techniques of psychotherapy which are authored by clinicians, and (3) case studies by both clinicians and patients reporting on their experiences of recovery. Our book series offers a *fourth conversation*, which includes design reasoning as an established means for applying theory and research to mental health and personal growth.

In the following pages, contributing authors explore the therapeutic encounter as a design challenge. The book is divided into three sections. Below, a brief summary of the contents:

Part I. Design Thinking Under the Influence of Donald A. Schön

¹ Convivial tools as Ivan Illich defined them, pertained to objects that emerged from creative interaction between people that evolved naturally—not the result of industrial production forced upon them. Written in 1973 *Tools for Conviviality* was Illich's searing critique of modern industrial production methods. Illich offered an alternative framework for conducting science, law, language, and material production processes.

If technology is to embody higher levels of creativity and employ principles of human development as a starting place for design, it will be facilitated by the full participation of people with deep knowledge of philosophy and psychology. At the moment, these disciplines are just beginning to consider that they might have an important role to play in shaping technical design. These ‘outliers’ could breathe new life and impart new values into an industrial design economy fixated on robotics and automated systems. As it pertains to mental health and personal growth, the adoption of technology to extend expertise and service delivery holds great potential. In Part I (chapters 1-3), we showcase dedicated clinicians, researchers and writers, who are leaders in incorporating design thinking and the design literature in their work. Chapters 1 through 3 also explore Donald Schön’s theoretical impact, imprint, and persistent influence.

Chapter 1 - The Debut of the Design Studio in Clinical Training Programs

In Chapter 1, Susan Imholz discusses how the design studio can accelerate innovation in clinical settings, and how new ideas are needed to revitalize the field of mental health. Psychology practitioners can learn from the design literature as they embark on their own path of experimentation with technology as an extension of expertise for both research and clinical practice. The debut of studio settings in clinical training programs is occurring slowly, with the expectation that students be prepared to function in a world that is technologically sophisticated. Donald Schön’s ideas about the role of the studio as an essential component of innovation and creativity can be a scaffold for novice designers from any field. Schön’s admonitions about the limits of ‘technical rationality’ as an approach to education and product development are also discussed. It’s proposed that transfer of new knowledge facilitated by practitioners-in-training interfacing with the institutions they practice in, is a vital avenue for transforming institutional contexts.

Chapter 2 - The Lab, The Studio, The Couch: “Conversational” Settings for Mutually Guided Design Inquiry

In Chapter 2, Edith Ackermann shares her first-hand experiences of life with Jean Piaget in Geneva, and with Donald Schön at MIT. Ackermann draws on her work as a researcher in developmental psychology with Piaget, and, her experience teaching in the Architecture Department at MIT to analyze the potential relevance of the design studio for other forms of mediated transactions, from the lab to the studio, from educational settings to therapeutic interventions. She presents the clinical method of investigation or “conversational” technique long used by social scientists, educators, and health professionals as a window into other people’s minds. The chapter also addresses the relevance of mediated reflective practices in the context of the architectural design studio, based on Donald Schön’s notion of guided inquiry as a design transaction, and Gordon Pask’s conversational theory of mutual attunement. Guided inquiry in the design studio tradition involves two or more players (tutors, tutees) entangled in a web of master-apprentice relations that by definition are asymmetric. What remains at the heart of the design studio experience for Ackermann is play; “the playing around is just as important as the talking about”.

Chapter 3 - Social Research and Development: Possibilities for Reflective Practice in Social Work and the Helping Professions

In Chapter 3, David Moxley remembers Donald Schön for his prescient observations about the

speed of technical change and its consequences. He also notes that Schön recognized innovation processes as a form of social learning early on. Schön championed the importance of metaphor and narrative as a valid interpretive device and an essential element of organizational learning. According to Schön, Moxley observes, the constancy of learning is the only stable system within an organization if it is responding to the demands produced by an ever changing environment. As both an instructor and a consultant/practitioner with many years of experience in both realms Moxley has developed great facility in applying the theoretical literature on managing design innovation to the delivery of human services. Borrowing from the design literature, Moxley's description of *adaptive innovators*, versus *transformational innovators*, compared to *transcendent innovators* provide a useful guide to students, social work professionals, and consultants for assessing the growth potential of the service organizations they work with.

Part II. Convivial Tools: Designing, Evaluating, and Creative Inspiration for Making Healing Environments

One of Seymour Papert's many contribution to the field of learning technology was to flip the classroom as it relates to use of computers: "*children should program the computer, rather than having the computer program the child*"...In this same spirit we are proponents of flipping the mental health care paradigm. In the development of new technologies for mental wellness and personal growth, software applications should be programmed by the user, rather than having experts program the patient or client. What does this mean exactly? It's a value proposition that elevates the user's learning experience above all else. For instance, to the extent that mental wellness and personal growth can be facilitated through educational experiences using technology, users should be able to query their data, or have access to any data that is collected in the process. In Part II (chapters 4-8) we feature five more collaborators who are thinking deeply about the creation of new types of learning/healing environments, and who are stretching the boundaries of traditional clinical practice tools.

Chapter 4 - Designing an Art Therapy App

In Chapter 4, art therapist Nancy Choe shares her journey of developing an iOS-based art app for art therapy use. Nancy's discussion and exploration of new media for psychotherapy was inspired by the abundance of medical and psychological treatment-oriented tools she was seeing in the marketplace—but not for art therapists. Choe chronicles her research into user-experience design (UXD), human-centered design (HCD), and her search for a product development partner. She then models her app development thought process for the reader. This is both an educational tale for prospective designers, and a journey of empowerment. Nancy Choe affirms that innovating is a relationship-based, knowledge-building process.

Chapter 5 - Designing Transcendence Technology

In Chapter 5, Julia Mossbridge defines transcendence technology as a new field that has roots in ancient mysticism, and describes how it is evolving using emerging mobile bio-sensing technology. Julia researched and then classified several communities experimenting and designing self-empowerment tools according to their theoretical/conceptual focus. She then describes the apps/devices and provides additional links for a deeper dive. Julia also presents preliminary case study findings from data gathered using her phone app ChoiceCompass, and discusses some very interesting gender differences in the use of the app. ChoiceCompass uses a measure of heart-rate-variability (HRV) as a 'body compass' for making important life decisions.

Chapter 6 - The Nature of Healing Sound and Its Design

In Chapter 6 John Beaulieu, a musician, tool designer, and sound/music therapist who has years of clinical experience behind him, gives us insights into the healing nature of sound. He's explored the use of sound as a therapeutic medium, and documents recent research that suggests frequencies for healing disease are being scientifically defined and validated in the field of quantum neurology. Despite its use across the ages, beginning with the asclepieia of Greece, sound and music therapy are viewed more commonly as constructive pass times rather than providing physical benefits to humans. As science begins to define and validate what has been considered ephemeral phenomenon, we may be on the verge of a whole new understanding of how sound and electrical frequencies interact with organic material and human biology.

Chapter 7 - Illustrating Stories: Using Graphic Novels in Art Therapy Research and Practice

In Chapter 7, art therapist Natalie Carlton gives us a historical review of the use of graphic novels as an expressive medium, shares a personal journey of art making using graphic novel software (Comic Life), and gives a professional assessment of its use in her own clinical practice. This is a medium that has great appeal for children and adolescents in particular. For these age groups, the comic format as an expressive medium is perfectly matched to the developmental phase where play with words is taking on new meaning—personal meaning. The freedom to 'author' and create narratives instead of being consumers of reading material in school is very liberating. It's one of the first great lessons of becoming a reader/writer to learn our own voice and experience are worthy of documentation, and, can be shaped into a visual story narrative that is just as compelling (visually and verbally) as those one reads in school or in the library.

Chapter 8 - Open-source Design: OpenBCI

In Chapter 8, Susan Imholz explores open source tools and platform as a manifestation of reflective practice as defined by Schön, and a life line for clinicians who are beginning to explore technology as an extension of their skills. An interview with OpenBCI founder Joel Murphy articulates the challenges involved in being an open-source company in the health and education marketplace. Imholz acknowledges that creative exploration—or the type of creative exploration we value often comes with a hefty price tag. One way around expensive builds is to join a maker community that values open code sharing, and offers assistance, or barter as a means of bringing new ideas into existence. DIY and maker communities are an important resource for fledgling designers across all fields.

Part III. Summary & Synthesis — Chapter 9, written by Susan Imholz and Judy Sachter, puts the book's overall contribution into perspective. Using Schön's definition of the reflective practitioner in action, we summarize how each of our contributing authors embody his values, traits, and processes in their own work. We restate the goals and objectives of introducing design thinking and design reasoning into the graduate training curriculum for clinical psychology practitioners. Future directions for research and study are mentioned which will focus on curriculum development for the clinical design studio. We touch upon work on our third volume, Psychology's New Design Science and Studio Praxis.

CHAPTER 1

The Debut of the Design Studio in Clinical Training Programs

Susan Imholz

1.0 Introduction

What role does design thinking and design reasoning play in the evolution of any discipline? The history of design might be defined as: (a) an unending exploration of materials, (b) increasing sensitization of architectural and manufacturing impacts on, and relationship to the environment, and (c) an increasing expansion and inclusion of other disciplines as a source of knowledge or inspiration for the creation of objects. So, why shouldn't the domain of psychology borrow and learn from architecture's master-minds as it re-launches its own design science? I use the term re-launch because mental health professionals were once actively engaged in the 'architecting' of healing environments in the 19th century. This exploratory phase declined significantly mid-20th century with the beginning of a government funding crisis and loss of confidence in the quality of care provided by large public psychiatric hospitals and asylums. In its place, small *niche* treatment and recovery centers with very specific therapeutic approaches targeted toward one type of condition/illness have sprouted in the US. The last wave of cultural innovation pertinent to mental health began in the 1960s and 70s when alternative approaches to personal growth took root. These include the rugged vision quest, meditation retreats, and the growth of traditional Asian healing arts of yoga, meditation, acupuncture, and massage as supplements to psychotherapy—all well established participants in the health care community today.

In this opening chapter I return to the work of architecture pedagogue Donald Schön for his insights on how innovation thrives, for his expansive understanding of how design shapes social life and his call to action to all professionals to be mindful of their societal impact. I revisit three topics Schön wrote about at length that hold particular significance to psychology's new design science, with the addition of a summary section:

1. The design studio as an essential component of innovation and creativity;
2. The limits of 'technical rationality' as an approach to education, production, design, and the antithesis of creativity;
3. The hazards of ignoring history and the humanities as a source of knowledge for designing;
4. A summary of Schön's relevance to clinical innovators

The emergence of new technical intermediary objects (apps, games, self-quantifying devices) for psychological and personal growth is contextualized as a cultural shift from talking about emotional issues as the main medium of exchange, to *experiences* that support growth and change as an important addition to clinical tools. I emphasize the benefits of the clinical design studio as an enhancement to academic study in psychology and characterize its (clinical design)

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contribution to the field of engineering and its broader cultural significance. In closing, the chapter returns to Schön's ideas about what it means to be a reflective practitioner, his lasting relevance, and I assess how much has changed since he issued his challenge to academe to modify the role of the professional to fit his description of a *reflective practitioner* in 1983.

1.1 The Design Studio as Intermediary Innovation Space

Schön observed that the studio was an *intermediate zone* which doesn't lend itself to theory and techniques derived from normative professional practices (Schön1985)¹. Clinical professions have the practicum, but this usually involves student internships in established organizations. The design studio, asks what if? It involves learning to frame a problem then solve it based upon considered reflection on possible courses of action.² In short, it places students outside the conventional context of practice in their field and allows them to imagine what doesn't currently exist. This is how innovation starts—the design studio supports the continuous integration of new sphere's of knowledge—psychology, ecology, technology, biosynthesis.³ Knowledge systems have a tendency to become fixed or dogmatic over time, preventing new influences from taking hold. The fluidity of the studio as practice environment loosens this 'fixation effect' (Tseng Moss Cagan & Kotovsky 2008, LeMasson Weil Hatchuel 2010, LeMasson Hatchuel Weil 2011). This intermediary design space allows for experimentation without risking the consequences of failure, or the scrutiny of premature evaluation that might preclude trial balloons.

Although still a novel idea, the importance of the design studio as a component of clinical training programs is gaining traction. A prime example is Sofia University's new 'transformative technology laboratory' founded by Jeff Martin, Mikey Siegel and others. This media lab supports students in exploring the notion of being designers of therapeutic environments, services, and devices. It is one of the first hands-on design labs that resides within, or along-side clinical psychology graduate programs. In 2014, Sofia absorbed the former Institute of Transpersonal Psychology (ITP) in Palo Alto which had been an outpost of holistic thought and clinical practice since 1975. According to its' website ITP was founded ...

“to create a school of psychology that would fully prepare psychologists to understand human nature from an approach that transcends the pathological and encompasses the whole human being in the context of culture, physical health, mental health, and spiritual health.”

(www.sofia.edu/about/history)

Perhaps it's perfectly logical that the Sofia University design lab emerged in what was considered one of the most philosophically expansive psychological clinical training institutes. This merger had many critics who believed it badly compromised ITP's original purpose, yet the lab is an exciting development because there are so few academic environments where technical tinkering is counter balanced with philosophical and psychology scholarship in equal partnership.

¹ Schön, D. (1985). The studio: an exploration of its traditions and potentials, p.5.

² Unlike Herbert Simon, Schön insisted that humans never explore *all possibilities*—he didn't believe that people, as a general rule, think in combinatorial ways. --Edith Ackermann

³ IBID, p. 86.

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Whether the theoretical and philosophical aims of ITP can be imbued in technology is another issue—this is key to distinguishing the Transformative Technology Lab from a host of other applied psychology programs.

In his writing on the studio as a pedagogical catalyst, Schön (1985) noted that the professions have a responsibility to do more than entrain students to think like their ‘brotherhood’. Referring to medical schools, law schools, psychotherapists, and architects, Schön proffered that design spaces are learning labs that force people to pay attention to the strangeness of unique cases that escape the categorization of established theories. The studio allows for and engages value-laden questions as well as technical and practical ones. Altogether, the design studio emphasizes process and dialogue over product results or outcomes—stretching our understanding of reality.

Granted, there are many laboratories within psychology programs. Why site Sofia University’s Transformative Technology Lab specifically? *The significance of this example is that it is taking root in an environment steeped in holistic thinking and clinical knowledge. Clinical training programs are the places where deep knowledge resides about the mental health system and they are also the places that have continuously interfaced with the mental health system over time.* Traditionally, few clinical training programs address the design of therapeutic environments—this is relegated to architecture. *The combination of both are essential to spur innovation.*

Other outliers of innovative design activity across psychology disciplines include the Institute for Noetic Sciences and the Institute for Heart Math⁴. The emWave heart monitor (from the Institute of HeartMath) and ChoiceCompass⁵ (made by Julia Mossbridge, Institute of Noetic Science) are examples of new personal growth/mental health promoting devices resulting from a marriage between psychological/biological research and design thinking—with the goal of creating new types of personal learning tools that have never before existed.

Encouraging *all* psychology practitioners to think more deeply about how they can extend their expertise using technology *on their own terms* is a tall order. Scions of architectures emphasize that you must begin with theory as a strong foundation for design. The human computer-interface (HCI) design community has been chipping away at this challenge (Cooper Reiman Cronin & Noessel 2014, Norman 2013, Rogers Sharp & Preece 2011, Moggridge 2007, Dym et al 2009, Cockton 2016). However, there is no circumventing the fact that most psychology clinical training programs don't yet see the benefits of employing technology and design as a means of expanding their reach.

Psychology's New Design Science: Theory & Research (Imholz & Sachter 2014) offered broad design principles for making new clinical tools emphasizing creativity and client collaboration to catalyze object conceptualization in studio settings:

- Construct objects and tools that increase participation and creativity on the part of the client/patient;
- Construct objects and tools that deliver clinical expertise to a wider community of clients/patients who are living in the social world;
- Embed analytical tools in avocations and activities that are enjoyable; Design the

⁴ The Institute of HeartMath is located in Boulder Creek, CA. Rollin McCraty, Director of Research at contributed a chapter to our first book on what he and his colleagues have learned about bio-physiology and emotions.

⁵ Contributing author Julia Mossbridge is the designer of this tool, and she discusses her research in Chapter 5.

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new normal based upon new research instead of using labels and diagnostic categories as design parameters (individualize design goals and objectives).

Defining psychology's design science in this way puts the field on a trajectory of unlimited possibilities for growth and a continuous path of divergent exploration, rather than simply repurposing traditional tests and measures in digital formats. In the chapters that follow, pioneering designers and thinkers who are breaking untrammelled ground share their research and design processes to demonstrate where they have found inspiration and how they are imagining the future.

In addition to the Sofia University clinical studio environment, it has to be acknowledged that the studio experience has been an essential part of the graduate school training in the expressive therapies (art, music, dance, psychodrama) and creative arts therapies for many years. In these clinical graduate programs the focus on creative thinking as a foundation of the therapeutic relationship, and, exploration of many kinds of media (including video and digital media) has been ongoing but without featuring the design literature as core cannon or context⁶. We deliberately sought out creative arts therapists as collaborators who are focused on new media for this volume; two contributing authors are art therapists, another a music therapist.

What has been beyond the scope of almost all clinical psychology programs of all kinds is the idea that training and practice includes the design of therapeutic environments. If it occurs at all, this discussion is usually limited to the formation of a private practice.

The notion that practitioners can question the structures, organization, and delivery of services within the institutions where they work and contribute to environmental metamorphosis is still inviolable. Introducing the technical studio, design thinking, and design reasoning into the graduate curriculum changes this explicitly, expanding the limits of professional expertise.

1.2 The Limits of Technical Rationality as an Approach to Design

Schön's (1983) description of technical rationality was effusive and expansive. Here, I summarize his definitions and then taper the discussion considerably. I expound on the deleterious effects of technical rationality as it persists today—particularly as it relates to the quarantine of psychological knowledge.

In broad strokes, Schön began *The Reflective Practitioner* by identifying a 'crisis of confidence' beset by professionals mid-20th century which, by his pen, included architects, engineers, law, social work, psychotherapy, and urban planners. He observed that the circumstances in which all of these highly skilled members of society work is inherently unstable due to accelerating technological change. This reality, even more relevant today, places new burdens on the professions to adapt to technical advancements, resulting in a crisis of confidence among the public and between professionals themselves. The roots of this growing skepticism, according to Schön, was fueled by cynicism about the value of professionals' contributions to society, ethical questions about their ability to monitor their cohorts, and the ability to act in the public interest rather than self-interest (p.13-15).

More narrowly defined, Schön described technical rationality as a philosophy of instrumental problem solving made rigorous by the application of scientific positivism and its techniques

⁶ Note from Edith Ackermann: The focus in clinical programs has been on conversational theory, and discourse analysis.

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(p.21, 1983). It is the dominance and totality of technical rationality that is notable for Schön—it affects and exerts its power on:

- ➔ scholarly writing
- ➔ a preoccupation with increasing specialization
- ➔ the implicit nature of institutionalized relationships
- ➔ research practice
- ➔ professional curriculum across the professions

In short, he characterized it as a paradigm that may have outlived its usefulness as an approach to innovation. Post mid-20th century, Schön detected a new awareness of the limits of technical rationality among his colleagues at MIT and this discontent centered on difficult and messy case problems which required unique solutions in architecture, engineering, and medicine:

“Technical rationality does not work as a strategy when there is no agreement on ‘ends’ or the outcome of an intervention...when there are conflicting paradigms of professional practice, as are found in the pluralism of psychiatry, social work, or town planning” (p.41,1983)... [and] where there is contention over multiple ways of framing the practice role, each of which entrains a distinctive approach to problem setting and solving...when practitioners do resolve conflicting role frames, it is through a kind of inquiry which falls outside the model of technical rationality” (p.41-42, 1983).

Today, Schön’s version of technical rationality and instrumental reasoning is still firmly entrenched in academia and corporate contexts, it may be even more exacerbated—and less questioned. Technical rationality as a philosophy and approach to production has an agenda and value system all its own; much of psychological knowledge has been side-lined in deference to the prime directive of the application of basic science to applied science⁷. The knowledge-bottleneck is bidirectional, since engineers and industrial designers reduce psychological expertise to a consulting function, *not* the theoretical foundations or knowledge for prototyping. I categorize this schism as one between creative design informed by psychological principles, and the dominance of machine learning as a subject or object.

Both commercial and academic settings are preoccupied with imbuing robots with human characteristics—a one way transfer of knowledge, or machine mimicry. This form of artificial intelligence and engineering is of limited use to artists, educators, clinicians, and many software designers who are interested in amplifying human creativity or creating new types of learning environments that have never before existed. For these creative practitioners, product design must start from deep immersion in theory of human development and theories of mind with the goal of enhancing human talents.

I pondered this form of design bias as an epistemological divide while still a graduate student at MIT. My adviser, Seymour Papert, challenged me to find out how engineers differed from artists from a clinical perspective to better understand what epistemological difference is. I set about the task by interviewing graduate students at MIT from two different departments; the arts

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Schön, D. (1983). *The Reflective Practitioner: How Professionals Think in Action*. New York, NY: Basic Books, p.24.

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(film/video) and engineering (architecture machine group). Here's what I learned: the two groups had very different life goals, verbalized different sources of motivation and satisfaction for academic studies and career choices, they also perceived their role in the world differently. The artists were interested in using their technical skills as a means to an end (i.e., the creation of a narrative that expressed their unique perspective on things). Additionally, they stated distinctly internal and self reflective sources of motivation for their choice of a career. The engineering students wanted to be technical architects because they liked the idea of solving "hard" problems—problems that had clear and objective criteria applied to the evaluation of their efforts—success could be measured, and success or failure was an obvious outcome of their design approach. The engineering students' source of motivation for career choice was decidedly external, including recognition and rewards by their community of practice, and the satisfaction of knowing that their software/device/engineering project contributed to progress in their chosen field.

To summarize, the two groups had distinctive problem solving approaches, tactics, and strategies that fit their goals and personalities. Engineers, as a generalization, don't care to research an issue ad nauseam, the sooner they can narrow the scope of a problem and begin work on solutions, the happier they are. They are convergent thinkers. The main job of the engineer is to make something that works. The iterative nature of the engineering enterprise has as a goal to improve performance specifications. Artists, on the other hand, have a distinctly internal locus of control; they design and create from what they personally judge to be important subject matter, they are divergent thinkers who explore novelty, difference, and the culturally topical. The iterative nature of film-making is less about improving upon the last film, and more about expanding one's range of subjects for study and expression.

By comparison, artists, clinicians, psychologists, and educators have a high tolerance for ambiguity, which allows them to hold several competing theories in mind, testing each one for efficacy in regard to its value for clients/students as practitioners. Converging upon one approach is not essential to their methods or practice. They are primarily divergent thinkers whose main goal is to create an emotional holding environment conducive to psychological growth that is highly individualized. The iterative nature of psychotherapy is the subtext/substrate of human growth and development; it is not pegged to expected outcomes. Clinicians' thought processes, therefore, have attributes of both artists and engineers as we have previously defined them.

Experimental psychologists and neurologists are now mapping the allocation of brain resources across brain regions during creative versus non-creative tasks with fMRI and EEG technology. These studies show that real differences exist in brain processing for creative tasks (Chapter 8 addresses new research in this area), confirming that people engaged in creative pursuits are using their brains differently.

In Table 1 below, definitions of convergent and divergent thinking are presented as value propositions. These categories are offered as subjective attributes that are malleable and dependent upon the task or project at hand. As a community of practice, engineers have a strong bias and preference for convergent thinking. I am not waging an attack on a particular cognitive style. Rather, I am concerned with how a predominant mode of thought or bias has manifested in the institutional marketplace and in graduate training programs.

Edgar Schein uses these same terms—convergent and divergent—to describe the knowing-doing 'gap' (Schön 1983, p.45), which is an altogether different interpretation. He characterized the corpus of basic and applied sciences conveyed to students as 'convergent' knowledge, whereas praxis is 'divergent' knowledge or "the ability to take a convergent knowledge base and

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convert it to the unique requirements of the client in practice” (p.45, 1983). Schön lamented that the problem with Schein’s concept was that convergent/divergent knowledge is neither defined as theory or technique, and therefore remain somewhat mysterious categories.

Table 1.
Divergent vs. Convergent Thinking

<i>Divergent Thinking</i>	<i>Convergent Thinking</i>
Sustainable diversity; design based upon accommodating an infinite variety of individual differences in thinking, feeling, and acting in the world. Designing the new normal rejects a ‘one size fits all’ production model.	Selective diversity, enhance or replace faulty objects (mechanical devices, or thoughts and feelings), the creation of normative solutions, based upon averages and collapsing differences.

In his final analysis, Schön (1983) wrote: *what’s missing in most professional training is an emphasis on reflection-in-action*. This, he proposed, can be remedied by elevating the role of the design studio in graduate programs. The studio is the intermediary zone where creativity can be applied, intuitive insights can be shared, exceptional cases examined, and value-laden questions can be raised to enhance problem solving and product design. These activities also result in expanded consciousness of what’s possible. The design lexicon now includes; human-centered design, cognitive design, and sustainable design in nascent form. Design theory, technical engineering methods, developmental, clinical psychology and psychiatry *are* intertwining at a snail’s pace. Accelerating this integration in academia will likely result in a blaze of creativity, contributing new kinds of collaborative software architecture based on nurturing relationships.

If we are feeling the pinch of efficiency and instrumental reasoning as it has been applied to our daily lives and the devices and technical interfaces we interact with—there is a reason—most are devoid of psychological knowledge by design. The good news is we have the ability to change it. As psychology programs increasingly introduce design as subject matter into their education curriculum, they will be affirming the clinician’s identity as capable ‘maker’ of therapeutic environments who has something important to contribute to the culture at large. In Schön’s concluding remarks on technical rationality he too called for a new epistemology:

“Let us then consider the question of professional knowledge; let us stand the question on its head. If the model of technical rationality is incomplete in that it fails to account for practical competence in “divergent” situations, so much the worse for the model. Let us search instead for an epistemology of practice implicit in the artistic, intuitive processes which some practitioners bring to situations of uncertainty, instability, and value conflict” (p.49, 1983).

Many in the engineering sciences have already relegated the history of philosophy and psychology to the dust bin thinking it has no enduring relevance. This is a guiding principle of technical rationality as Schön defined it (translating basic science research into applied science ⁸). Nevertheless, a rising generation of psychology practitioners and entrepreneurs are finding it to

⁸ Schön, D. (1983). *The Reflective Practitioner: How Professionals Think in Action*. New York, NY: Basic Books, pp21-24.

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be a rich source of inspiration for infusing new values into our lopsided technical architecture and technical interfaces giving rise to more convivial tools discussed in Part II of this book. By disregarding the depth of our historical record we lose the thread of ideas that contribute to complexity of thought, and by extension the complexity of design.

1.3 The Hazards of Ignoring the Humanities as Inspiration for Design

Schön tells us all experience is mediated through five design attributes;

- through the *media and language* used to conduct experiments,
- a *value system* that directs inquiry,
- *evaluation* and reflective conversation,
- a *theoretical orientation*, and
- the *frames* or *frameworks* within which professional activities are situated and conducted

We have an abundance of variables for assembling design methodology. There are many media and linguistic vocabularies to choose from, numerous values systems and theories to choose from, and multiple perspectives with which to frame a problem. The richest source of our literary and historical lineage in sheer volume of written words is found in the humanities. Contrast this variety of thought with technical rationality as a starting place for product design, and its narrowness and dominance is glaringly evident.

If design reasoning appears as a hallmark of an evolving discipline, perhaps clinicians are overdue in embracing the design literature. In their analysis of the history of design science from the mid-1800's to the present Le Masson, Hatchuel, & Weil (2011) surmised that creativity appears to be a key driver of design advances in methods and theory. Contrary to the belief that design is primarily driven by mechanization or technical rationality which Schön suggested, Le Masson and colleagues place the experts' professional development at the center of the product development activity and identify creativity as the driver of progress. Le Masson's perspective also confirms that the need for making more sophisticated tools, knowledge capture processes, and organizational structures emerges as a feature of a maturing discipline. *Putting creativity at the heart of evolving design practices is not a common view; it is the most far-reaching and optimistic framing of design science and its contribution to all other disciplines.*

Of all professions, architecture and high-end designers have been most successful at bending technology to serve their aesthetic preferences and artistic visions. These advantages have traditionally accrued to the very rich, while consumer products (e.g., homes, cars, appliances, clothes) retain throw-away status, or things in need of periodic upgrade. In America, the myth of progress embedded in this treadmill of trash has more to do with fad, fashion, and re-branding the future rather than improvements in the quality of stuff. Currently, the dominant drivers of "the Internet of things" offer more of the same. The *Technium*⁹ as market engine has chiefly been in service to two masters—consumerism, and profiteering. Design methods that have human harmony and happiness as core values imply we will do more with less. This alternative view is gaining traction amidst a growing environmental crisis. Here and now, we are concerned with the lack of harmonious sensibilities in the builders of interactive technical architectures and its impact on how we define therapeutic encounters.

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The author and designer Kevin Kelly's word for the technical artifice we inhabit.

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Critical to a focus on psychological and mental health, is the fact that therapeutic environments have worsened over the last half century. In a recent conversation with Dr. Otto Kernberg¹⁰ about the future of clinical practice he quickly noted that therapeutic environments—hospitals, clinics and places where the mentally ill are treated—have deteriorated over the last 25 years¹¹. Designing new tools that have never before existed in the arena of mental health and personal growth might offer important solutions to improving services. One of the last conceptual innovations in architectural design of mental health care facilities was invoked by the Menninger Hospital in Topeka Kansas. There, the notion of bringing the community into the hospital—also known as milieu therapy—was attempted with a goal of replicating or normalizing life in a hospital setting. Today, the reverse paradigm is now the leading edge of innovation—bringing or seeding psychological expertise in communities via mobile networks beyond and outside of traditional hospitals and clinics. This undertaking might also result in living more artfully, encourage the growth of an inner life based upon the development of creativity, expanding consciousness, and healthier relationships, without the stigmatization of seeking mental health services.

On the other hand, healthcare at the government and corporate level is currently consolidating power and influence rather than encouraging broad avenues of innovation and experimentation outside traditional medical delivery systems. The US government is predicting a significant increase in the use of technology as a care delivery pipeline. What this means for mental health treatment remains to be seen, with a host of legal (HIPPA) prohibitions in place concerning the use of digital media.

Returning to Schön, if all experience is mediated through five design attributes (*media and language*, a *value system* that directs inquiry, an *evaluation system*, a *theoretical orientation*, and the *frames* or *frameworks* in which professional activities are situated) then clinical academic programs need to expand their definition of professional education to include all of these aspects. Schön's recommendations to the professional community as to how to become a reflective practitioner include:

- view clients as collaborators in professional consultation as a reflective conversation;
- de-mystify professional knowledge as being the purview of experts, and unknowable by clients;
- incorporate the client's knowledge and learning experience in the professional relationship, and acknowledge its value in shaping solutions;
- value creative outcomes and new solutions in the relationship, acknowledging that neither party reigns over the other.

Schön's directives apply these same principles as a starting place for design fabrication for: urban

¹⁰ Currently DeWitt Senior Scholar and Professor of Psychiatry at Weill Cornell Medical College in New York City, and former Clinical Director of the Menninger Hospitals in Topeka, KS.

¹¹ Large costly mental institutions were closed in the 1970's and 80's with the promise of replacing them with group homes and community mental health centers. However, these environments never materialized to meet the needs of American citizens. We know that failed commitments to social programs on the part of civil government nationwide are in part responsible for huge numbers of homeless people across the nation.

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planning solutions, design of medical and clinical solutions, design of engineering products and services, and design of education programs. Imagine these guidelines in use by health insurance companies who provide you with care—how different would your healthcare experience be? How would the look and feel of technical interfaces change if they reflected these values? We have a long way to go to realize these objectives.

1.4 Conclusions

It's interesting to note that design theorists are primarily responsible for opening up a dialogue about the nuances of 'control process issues' in the production of things that make up our environment, and 'fixation effects' which inhibit the exchange of cross disciplinary expertise. It is the design community that consistently critiques the way in which our technologies compromise or enhance our quality of life, not (for the most part) psychologists, engineers, or educators. It is the design community which is now championing the idea and growth of human-centered-design as a necessary counterbalance to technical rationality, and the commercially driven corporate engineering/production methodology and its values.

Schön's analysis of the professional class still stands as a distinctive voice and enduring critique of the chasm between theory and practice, new knowledge and its application to real world solutions and problems. In terms of placing where innovation will flourish, we predicted four areas for disseminating psychological tools for mental health and personal growth will dominate: schools, the ICU approach, artistic expression, and self-directed exploration (Imholz & Sachter 2014). Below, I characterize each opportunity, highlighting both creative possibilities and potentially dark consequences:

- The likelihood that future K-12 learning environments will make self reflection and behavior analysis a part of the daily school day for students is one context. How this can be done in such a way that it expands creativity for students, rather than become a vehicle for bureaucratic control and segmentation of desirable vs. undesirable behavioral traits? Only by expansive participation of the professional psychology community can we be assured that creative tools prevail, rather than imposing thought-control propaganda (aka behavior control techniques). It's much easier to enforce rules and regulations upon children, rather than nurture an internalized sense of guiding consciousness in each individual. If psychotherapeutic intervention becomes 'solution driven' it will no longer have much to do with self-exploration or personal growth.
- The 'ICU' platform or approach is one where diagnosis of psychological health or mental illness becomes increasingly bound to expensive technology infrastructure that provides brain scans, virtual reality platforms, cloud-based treatment forums, and biofeedback monitoring—only accessible through the medical-industrial complex similar to the concept of an intensive-care-unit. This model fits most comfortably into our existing healthcare system but may be the death-knell for personal creative exploration and ownership of one's data.
- The convergence of art and artistic expression. The art world continuously resolves individual differences considered aberrant into a new normal. It's also a vibrant context for experimenting with technically driven psychological tools and interfaces. The art world has a long tradition of intuitively front running societal change and will increasingly be showcasing new UI designs.
- Putting collaborative (preferably open-source) platforms in place that put

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biofeedback devices and new types of learning experiences (including games that address emotional and mental health) into the hands of many at relatively low cost. Leading the way are cognitive-behavior therapists and self-quantifiers, but there is ample opportunity for every discipline of psychology to participate in the design of new mobile technology if they choose.

Psychology clinicians of one kind or another are involved in three out of four of these settings. This represents a huge challenge for graduate training programs to incorporate design thinking as subject matter. Nature abhors a vacuum—as do bureaucrats. We don't want politicians, policemen or bureaucrats making policies about uses of technology pertaining to human development, personal growth and mental health without the involvement of the professional psychology community. But this is precisely what will happen if the lack of interest/knowledge in design and the use of technology as an extension of clinical knowledge persists. Schön was mindful of a faceless technocracy that seeks to grow and advance itself by injecting control systems where it finds little opposition.

The Enduring Optimism of Donald Schön

The design literature provides an important bridge to experts in any field who are beginning their journey of design thinking and making. In my final assessment of Schön's relevance for clinicians, it is his plea to professional practitioners to reclaim their status as designers of future worlds, and to innovate with compassionate ideals which seem most relevant to our book. Professionals in all branches of psychology must strive to think beyond implementing other people's ideas when it comes to uses of technology.

The Reflective Practitioner is still 'a standout' because Schön's perception of his role reached so far beyond the boundaries of architecture as to be meaningful to *all* teachers, builders, and artisans. His touch stone was the teleological driver of design. He gave us permission to question the unquestionable. His observations also reflected a level of honesty about the political and economic system we live in rarely put into words by the professional class. As Ford Professor of Urban Studies and Education at MIT, Schön lived at the epicenter of technical rationality as an approach to life, he was clearly uncomfortable with certain aspects of it, yet he felt that it could be fixed with the addition of a rigorous program of reflective-action *insitu*. Has MIT as an institution grown a conscience over the past 30 years that embodies these values? I believe Schön did impact the academic culture—but perhaps not the type of transformation he might have wished for.

My opinions and observations part with Schön on his assessment of how to 'humanize' technical rationality as a dominant philosophy. My research and experience has led me to believe that the reflective practices Schön described are more character traits (which determine career choice), rather than values or sensibilities that can be taught. Therefore, it is only by collaboration across domains that we can expect to see reflective practitioners emerge in any field.

Many recent books on design theory have been published that address aesthetic values, ethical considerations, and the social values that shape interface/object construction; none acknowledge the absence of divisions of psychology that could be contributing to discussions of 'making things'. This is the unique contribution of our book. We frame the debut of the design studio in clinical psychology training programs (of all kinds) as an opportunity to improve mental healthcare and encourage genuine innovation, but also predict its positive influence on design architecture across other domains.

Psychology's new design science encourages *all* psychology practitioners to think more deeply about how they can extend their expertise and reach using technology *on their own terms*. Forging a more humanistic design sensibility, currently missing from engineering, is only going

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to be possible when the keepers of psychological knowledge become empowered as designers.

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