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Designing a Better Business School: Channelling Herbert Simon, Addressing the Critics, and Developing Actionable Knowledge for Professionalizing Managers

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ABSTRACT Herbert Simon's 1967 article 'The business school: a problem in organizational design' anticipated many of the challenges business schools face today. Critics charge business schools with failing to realize their primary purpose, that is, to produce professional managers. This article revisits what Simon advocated with regard to a core feature of this professionalism, the production of essential management knowledge, and the process of educating people in applying it. With Simon as a guide, this article outlines educational and research interventions to help business schools realize their founding purpose. In doing so, it addresses the distinctive knowledge products that business school research can contribute to the management profession. This article also highlights the key role that evidence-based management and the related practices of design science play in providing a more complete solution to the design problem Simon identified.

Keywords: bounded rationality, business school, design, evidence based management, Simon

DESIGNING A BETTER BUSINESS SCHOOL

> I suggest you get started right now. At the end of the term it will be clear whether you are managers or peasants. (H. A. Simon, 1968)

In his article 'The business school: a problem in organizational design', Herbert Simon (1967) laid out a number of features for designing business schools capable of educating professional managers. Decades later, it is striking how applicable his advice remains in addressing contemporary business school critics. At the heart of both Simon's guidelines and the concerns critics express is whether business schools and their enrolees really aspire to professionalism. Given the resources dedicated to fighting the 'b-school' rankings war, turning students into satisfied customers, and tending to star faculty,

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professionalism would not necessarily seem to be at the top of every business school's priorities (Bennis and O'Toole, 2005). Commentators have called for a return to the founding vision (Khurana, 2007; Nohria and Khurana, 2008) explicated by early business school leaders at Wharton (Sass, 1982), Harvard (Khurana et al., 2005), and Carnegie Mellon (Simon, 1991).

Herbert Simon passed away in February 2001. Being at Carnegie Mellon with him was a highlight of my intellectual life and I am honoured to write in his stead. Late in January that year, Herb stopped by my office wearing a big winter jacket and a Pittsburgh Steeler's knit cap with a hole in it where he'd torn the label off. He asked me to join the dissertation committee of Amy Wenxuan Ding, who would be his last student. If this brilliant man was telling me to help out on a committee, who was I to say otherwise. Two weeks later he died. As 'acting chair' of this dissertation, never believing I might be any sort of substitute for the man himself, the big problem was figuring out what exactly Herb would have advised Amy in her study of scientific discovery, the last big problem Simon tackled. And then we found Herbert Simon was still a real presence to us. Every time Amy and I hit a wall in the theory building or analysis, I would ask her, 'So what would Professor Simon say about that?' Well-prepared as she was, Amy would say 'Professor Simons says . . .' and out came some thoughtful lead as to our next steps. Through Amy's ability to channel Simon, the dissertation processes went smoothly. In this article I hope to channel him once again.

I first lay out Simon's key ideas for designing a professional business school that synthesizes science and practice in both research and education. To make more concrete how these ideas apply, I make use of materials from Simon's archives at Carnegie Mellon University and in particular the syllabi, notes, and readings that he used in teaching business students. This article then reviews the issues that critics have raised and shows how Simon's design features can help resolve them. In this article I will use Khurana's (2007) notion of professionalism in management. That is, to practice by applying general laws or principles to particular sets of facts and to conduct business in adherence to an ethical code with aims that contribute to society and transcend mere profit making (Khurana, 2007, pp. 114–5). Khurana has made a clear and actionable call (Khurana, 2007; Nohria and Khurana, 2008), which I support, for business schools to promote a code of conduct understood and adhered to by their graduates. The central theme developed in this article is that the professionalization of management also hinges on the distinct knowledge products that business school research can offer and the educational system that helps managers to master them. This article describes how evidence-based management and design science are forms of knowledge production that offer a more complete solution to the design problems Simon identified.

SIMON SAYS HOW TO BUILD A BETTER BUSINESS SCHOOL

The mission of the business school, according to Simon (1967), is to offer managers a science-based education they can readily apply. This education should provide a basis for continued professional learning over the course of a manager's career. To do so, the business school would be fully immersed in both science and practice, a feat necessitating a lowering of the barriers between them. Lowered barriers translate into three things: (1)

business school faculty who deeply understand the problems managers face and incorporate problem solving (e.g., client-based consulting projects, product design) into the school's educational experiences; (2) significant faculty research that generates scientific knowledge to improve the world and guide managerial problem solving; and (3) actionable knowledge students acquire that is grounded in both science and the business context. The responsibility for making these accomplishments possible lies with the business school's senior faculty and deans. Simon (1967) foresaw that many business schools would fail at this, but a few well-led and appropriately designed schools might realize his vision.

Facets of a Business School Fully Immersed in Science and Practice

The concept of a business school fully immersed in science and practice is grounded in Simon's belief that the functions business schools perform are comparable to other professional schools in law, education, architecture, or engineering. Integrating science in management, that is to say 'social science,' has been a building block of managerial education since Joseph Wharton in the late nineteenth century (Sass, 1982). Pursuing the same esteem and standing of professional schools like science and law, business schools have long relied on two sources of information and skills: the world of practice (e.g., information about the business environment, managerial tasks and problems, and useful skills and techniques); and the relevant sciences (e.g., the management sciences, economics, psychology, sociology, applied mathematics, and computer science).

Simon (1967) noted that 'the problem of designing the business school organization has only been half solved when the school finds that it has one foot firm planted in each of these systems' (p. 11). 'Every curricular area needs to be organized so that practical management problems are rubbed against economic and psychological theory and mathematical techniques' (p. 13). This rubbing together is intended to create a synthesis. Synthesis here means a convergence of science and practice with these two thought worlds and knowledge domains sharing the same space within the business school from the classroom to the research office, laboratory, and company setting. Only through collocating science and practice in time and space can this synthesis be realized. This synthesis extends to clinical faculty, that is, practitioners who teach in business schools. Simon emphasized that practice faculty need to be *intellectuals*, creating new knowledge by joining understanding of practice problems with science. Think of Michael Beer, Stewart Friedman, Lynda Gratton, Robert Kelley, or Peter Senge. They most definitely are not erstwhile practitioners who 'tell the boys how I did it' (Simon, 1986, p. 7).

As the oil and water of business schools, essential but unstable together, synthesizing science and practice into a coherent whole is an ongoing energy-intensive activity. Unless steady effort and regular practice knead them into each other, each falls into its own silo. Deans and senior faculty must own their responsibility for continually mixing practice and science (p. 12). If their leaders succeed, business schools will differ from the professional environments typical of either practice or science. The business school should resemble neither a trade school nor a physics department, but instead mix scientific knowledge and applied problems in a fashion that students can build on throughout their professional careers. Failing to fully combine science and practice leads to mediocrity

and inability to accomplish the business school's special functions. The well-designed business school makes it easy for researchers and practitioners to spend time together, to really learn the other's concerns, and appreciate their distinctive knowledge. To be of use to practice, academic faculty work on fundamental long-range issues that draw on outside information as well as information from the business, and the kinds of issues that businesses tend to neglect (p. 9).

Note that Simon did not advocate that all business school research be practice-oriented. He relied on faculty judgment in pursuing work that is 'significant' (p. 8). He recognized that there would be no way to recruit first-rate scientists to business schools if all research had to be eminently practical. Scholars must be respected in their discipline to keep conducting the cutting edge research that leads to a better understanding of the world. A well-designed business school is a matter of proportion. Synthesis is successful when some of the professional school's research is used to improve industrial products and processes and some of the problems its scientists work on are based on information about industry or customers. Think of the balanced scorecard approach to performance management where multiple goals broaden a business's focus to include intermediate outcomes (develop people, build capability, acquire new customers) and long-term objectives (innovation, financial growth; Kaplan and Norton, 1997). Its methodology is rooted in accounting and social science research on judgment and motivation, but the problem the balance score card approach is intended to address comes from executives who worked with business school faculty to develop tools to help strengthen their organizations' strategic focus. On the other hand, the foundational research regarding the limits to the number of simultaneous goals that can be effectively managed is pure laboratory science using business and psychology undergraduates as subjects. The happy combination of research that advances theory and research that advances practice is required to achieve the business school's professional mission. Having laid out Simon's ideas for the design of the cultural processes and organizing practices of successful business schools, we next turn to his views on the forms of knowledge they need to both produce and teach.

An Essential Knowledge Product for a Professional School of Business

Near its conclusion, Simon's (1967) article makes a provocative statement:

> A full solution, therefore of the organizational problem of professional schools hinges on the process of developing an explicit, abstract, intellectual *theory* of the processes of synthesis and design; a theory that can be analyzed and taught in the same way that the laws of chemistry, physiology, and economics can be analyzed and taught. (p. 15; italics in the original)

Simon then makes a statement reminiscent of the marginalia that constituted Fermat's proof: 'The bases for such a development cannot be discussed at length here, but I will simply assert with little elaboration that the prospects are exceedingly good at the present time.'

What the heck? Couldn't *JMS* have given Simon more space to write back then? Is it possible that the 'intellectual *theory*' wasn't then sufficiently developed? To figure out what Simon was thinking, let's break the 'solution statement' into two parts. First, he says, business school research needs to produce a well-specified model of how professional managers can make joint use of knowledge from science and practice. (We know from Simon's article that synthesis refers to joint use of practice and science in the designing of a preferred world – that is, good solutions.) Second, we need to be able to teach that model or theory in an explicit, comprehensive fashion (like other well-specified domains such as economics or chemistry). This 'full solution' then has two components: *cultural and organizational practices that sustain a business school's full practice/science synthesis*; and *knowledge products that are unique to business schools*. We have considerable guidance on what Simon thought about cultural and organizational practices. What remains less clearly specified is the nature of the business school's unique knowledge products.

This essential business school product is actionable science/practice-based knowledge that is sufficiently specified so that it can be learned in a professional school setting. In the 1960s when Simon's vision for business schools was formulated, the principles of synthesis and design were less well developed. Today synthesis and design principles are actively applied in two related domains that synthesize practice and science, design science, and evidence-based management. Design science (DS) is a discipline that develops formal knowledge to be used in creating solutions to practice problems in the manner of engineering and medicine (Simon, 1996; Van Aken and Romme, 2012). Evidence-based management (EBM; Rousseau, 2012b) is a broad family of approaches to making effective decisions based on the best available scientific and organizational evidence using decision processes that reduce the effects of bounded rationality. Both DS and EBM make use of systematic reviews of scientific knowledge to answer practice questions. DS also uses systematic processes for developing propositions out of practical knowledge and field-testing these to provide guidance to managers. Both also emphasize the importance of artefacts such as decision models and other supports to improve practice. The actionable principles and decision supports developed in the manner of DS and EBM illustrate the kinds of knowledge products business schools are positioned to create and disseminate.

Knowledge of evidence-based and field-tested principles is positioned to form the core of professional management. Skilled performance in management calls upon large amounts of specialized knowledge retrieved from memory (Simon, 1997). Some of its performance involves direct recall of action statements, that can be expressed in terms of 'if . . . and then . . .'. What differentiates students and experienced business people in analyzing business cases in terms of *if, then* propositions is the time they require to diagnose the situation's key features (Bhaskar, 1978). 'If' is a set of conditions or patterns recognized in a practice situation. 'Then' is a body of information held in memory associated with the 'if' that guides how the situation can be addressed. The conditions are premises that are learned like 'what should be done if a situation is novel and unfamiliar' or 'what should be done if people aren't performing to expectations'. Historically such principles were derived from an individual manager's experience, derived from in-class case analysis, or passed on as lore.

In a professional school, we expect that answers to these questions would first be sought in the profession's body of scientific evidence. Skilled performers know the evidence, can recall it from memory, and apply it in an 'if, then' fashion. In the case of what should be done if people aren't performing to expectations, the skilled performer might call up her or his own internalized model of a well-developed theory of motivation such as Porter and Lawler's (1968) expectancy theory, and diagnose whether performance expectations are clear and understood, whether rewards are aligned with performing to expectation and people have the skills necessary to perform appropriately. If expectations are judged to be unclear, then the practitioner knows how to set clear expectations and to test for understanding. (N.B. In my own work teaching evidence-based management, I have had executive participants describe how they have applied such theories (and taught them to their own staff) 20 or more years after learning them; Rousseau, 2012a.) Skilled performers also recognize that when no appropriate prior knowledge seems to apply, they need to shift to a process of search, which can involve new information gathering, experimentation, or tentative steps whose consequences are evaluated (Simon, 1997). The ability to manage decisions is the central skill of managers in Simon's view. It is also the main organizing principle of his courses, for which syllabi and memos sent to his students are available in the Carnegie Mellon archives. Consider what Simon advised his students:

> Ability to make management decisions effective is one of the central skills that distinguishes managers from the managed. An important characteristic of management decisions is that they have to be made under real-time pressures. The most significant real-time pressure . . . is the competition of different decisions for the manager's agenda – for his time and attention. . . . Designing decision making and learning processes well is a highly technical activity that requires the ability to draw upon the growing body of scientific knowledge – empirical and theoretical – about information processing systems. Somehow, as part of your acquisition of skills, you will have to acquire some of that scientific knowledge, and to learn to use it as an integral component of your skill. (pp. 1–2)

Simon's own teaching involved students acquiring knowledge of the affiliated sciences relevant to management practice and learning how to recall and apply that knowledge in appropriate ways. To do so meant helping students acquire decision-making skills by simulating practice conditions: ambiguity, real-time pressures, and competing demands.

> I will not claim for this course that I have done anything but provide you with an experience that you have perhaps not often had – an experience of being set to work in an unstructured situation with little external sanction other than producing from time to time to be self-reflective about your own processes, and perhaps your own discomfort in the situation. I hope that some of you will find that the experience has provided you with some tools for continuing learning, and that it may even produce some worthwhile retrospective reflection. . . . Others of you used the course to provide needed time for other work, or for leisure. The thought does not alarm me. (Simon, 1969)

I argue that explicit principles and decision aids based on a synthesis of science and practice are the core knowledge of a professional business school. Before we consider how these knowledge products and the related skills are relevant to today's business schools, let us first see what we can learn from contemporary critics of business school education.

WHAT BUSINESS SCHOOL CRITICS SAY

Business schools have had critics throughout their existence. Abraham Flexner, whose 1910 critique of medical schools led to their radical reorganization, also addressed business education: 'Modern business does not satisfy the criteria of a profession; it is shrewd, energetic, and clever, rather than intellectual in character; its aims . . . at its own advantage, rather than noble purpose within itself' (Khurana, 2007, p. 132). Since then critics have not agreed on what professional management education should look like and how to achieve it.

Contemporary Critics

Business schools have come under fire from a variety of sources, many from within business schools themselves. The contemporary critics I discuss here are successful faculty in elite business schools. They agree that business schools fail to provide an appropriate professional education. These critiques tend to disagree however on the content of that education and whether business school research contributes to it.

In *From Higher Aims to Hired Hands*, Rakesh Khurana (2007) asserts that business schools have abandoned the professionalization project. His particular focus is their failure to promote managers committed to 'higher aims'. When the first business school, Wharton, was created in 1881, its purpose was to develop responsible business leaders, ethical in their conduct, educated in social science and vocational knowledge, and well informed regarding appropriate business practice, all key aspects of a knowledge-based profession.

Khurana, trained in sociology and organizational behaviour, points out that self-interest and economic benefit are the raisons d'être in much of business school education today as in business practice. This self-interest extends to faculty whose self-serving research is too removed from the needs of practice. He charges the Association of Academic Colleges and Schools of Business (AACSB) with some responsibility for this drift in business school mission, given AACSB's less than mindful count 'em up' approach to evaluating faculty research (number of published articles) and teaching quality (percentage of faculty with PhDs). He acknowledges the absence of an agreed-upon core body of knowledge, a persistent problem since the early founding of business schools. At the same time Khurana aligns himself with earlier critics, noting Bennis and O'Toole's (2005) complaint that discipline-oriented faculty produce research with little utility to practice, as well as Mintzberg's observation that faculty and their students have little in common in terms of shared experience and interests. Seeking a renewed focus on higher aims, Khurana recommends that business schools better prepare individuals for management practice by promoting their personal transformation beyond the cognitive level. To become a professional, managers should adopt not just a role, but also an appropriate professional identity (p. 371).

'Rethinking the MBA' by Srikant Datar, David Garvin, and Patrick Cullen (2010), academics with backgrounds in accounting, general management, and strategy is a market-oriented critique of business schools. The critique is framed as a reaction to the difficulty in filling seats in MBA classes and the rising mistrust of business schools in the wake of the recent financial crisis. Their response is to assess the market for business school education by interviewing deans and business executives, the latter largely senior members with some responsibility for recruiting. They also consider industry data on trends in graduate business education and provide composite portraits of curricula at leading MBA programmes. They conclude that business schools are losing favour as a source of talent for key industries and corporations. As one dean put it: 'If I look back at the 1960s and 1970s, new students were really ahead of practice' (p. 79); 'Much less cutting edge knowledge comes from MBAs' (p. 80). In effect, MBAs are too analytical and not sufficiently action-oriented, short on critical management skills in dealing with politics and power in actually executing decisions (p. 92).

Datar et al. (2010, p. 7) recommend business schools do three things to better develop effective leaders and entrepreneurs. First, re-evaluate what is being taught (knowing). Second, shift their curricula to focus on skills, capabilities, and techniques (doing). Lastly, help students develop the values and beliefs that form managers' worldviews and professional identities (the 'being' component). The three elements, in line with the professional development of military officers and physicians, would enable business professionals to exercise better judgment in applying knowledge to practice (p. 104), Datar, Garvin, and Cullen downplay the role of science and research in business schools, arguing that research is a means of legitimating business schools within the modern university (p. 76), rather than a fundamental value. This downplaying of cognitive knowledge is consistent with their call for more attention to the doing and being aspects of professionalism.

Jeffrey Pfeffer, trained in organizational behaviour, advocates a decidedly different position (Pfeffer, 2011; Pfeffer and Fong, 2002). Agreeing with the need to professionalize management, Pfeffer (2011) observes that lawyers need to pass the bar exam and that physicians require continuing education. At the core of these professions is the dependence of effective practice on awareness of advances in knowledge. Pfeffer and Fong observe that 'all that is required is for business schools to model themselves more closely on their other professional school counterparts and less on arts and sciences departments' (p. 93). Business schools should focus on phenomena and problems of enduring significance in their research, and to build and evaluate curricula based on how well they prepare students for the profession in which scientific knowledge is a mainstay.

Pfeffer assigns part of the problems of business school education to the failure of corporations to recognize the value of research. Noting that research increases the value of the education certain business schools offer (Armstrong and Sperry, 1994), Pfeffer sees business schools as more responsive to corporate demands than to the ostensive mission of professionalization. Datar, Gavin, and Cullen bear out Pfeffer's critique by grounding their own in what recruiters and business leaders believe to be important. In contrast, Pfeffer advocates that corporate stakeholders and the public should have assurances that managers are able and willing to draw on knowledge outside their own.

The conclusions these three sets of critics draw follow closely two a priori positions from which they launched their critique: the validity of what corporations seek from business schools, and the relevance of scientific knowledge to the education they provide. Datar and colleagues are pro-corporate in their market-focus and say little about research, except that 'more needs to be done to build useful and useable models that bridge the gap' between the research and knowledge needs of practising managers (p. 78). More critical with respect to practice, Khurana and Pfeffer see business education as a means to improve management, making it more ethical (Khurana) and more effective through the use of scientific knowledge (Pfeffer).

Criticisms in Context

The views of critics regarding the appropriate content of business education turn out to be tied to their own disciplinary backgrounds. The strongest advocates for the centrality of science aside from Herb Simon come from organizational behaviour (OB) and its affiliated fields: industrial and organizational psychology and human resources (Latham, 2009; Locke, 2009; Rousseau, 2012a). All have a long history of cumulative research, where scholars regularly conduct meta-analyses and related syntheses to establish the evidence for 'what works' (e.g., Locke, 2009). Far less agreement on the contribution of science exists, for example, in strategy (Madhavan and Mahoney, 2012), a field where norms support novelty and lend less support for cumulative research of established findings and evidence of what works. OB professors more regularly incorporate science into their teaching than do faculty from strategy (Charlier et al., 2011).

Research's relative contribution to teaching differs across the professional business school curriculum. An almost completely science (evidence)-based curriculum in HR, OB, or marketing, for example, is far easier to accomplish than in strategy. The more established fields are better positioned to help managers learn relevant problems and solutions for later recall and adaption for use as a good deal of their research has been codified for use in education and management practice (e.g., Armstrong, 2010; Locke, 2009). In newer and less cumulative fields, the fundamental knowledge available may be better used to prepare managers to diagnose circumstances and address novel problems. At the same time, if it the scientific maturity of fields influences how these are taught, the emphasis on science in teaching can be expected to change as a field's evidence base develops.

A more contentious question is how much emphasis there should be on developing skills corporate leaders think are important. I am not saying ignore the market. I am advocating that business schools educate their stakeholders. I concur with Khurana and Pfeffer that business-as-usual is a poor normative standard for management education. Medical students aren't trained to do what current doctors do. They are trained to practice in the best ways we know. Business schools need to renew their commitment to *professional* education. Doing so means shooting for the highest standards of professional management practice in the knowledge, skill, and fundamental beliefs business schools teach. This focus is consistent with the knowing, doing, and being aspect of professional training advocated by Datar and colleagues (absent the institutional controls non-existent

in management). In effect, it is in developing the highest quality knowledge, habits of mind, and ethical conduct so that individuals become, in Simon's terms, 'managers and not peasants'.

DESIGNING A BETTER BUSINESS SCHOOL TODAY

> Design is . . . the principal mark that distinguishes the professions from the sciences. Schools of engineering, as well as schools of architecture, business, education, law, and medicine, are all centrally concerned with the process of design. (Simon, 1996, p. 111)

A design can be defined as a representation of a system or process to be realized (Van Aken, 2004, p. 226). Using design terms, we can say that professional schools train their students to understand how the world works (the actual) in order to help them realize better outcomes than currently occur (the preferred). Simon's full solution to the problem of realizing the business school's mission to provide professional education to managers requires new design efforts at two levels: (1) the building of a business school organization and culture that achieves the consummate science/practice synthesis; and (2) the propagation of the knowledge products from its research throughout the professional manager's education. Simon's (1967) article thoroughly describes the cultural qualities of this well-designed business school. It says less about *how to* realize that culture or the knowledge products it is intended to produce. The present section addresses how to develop the appropriate business school culture and its knowledge products. As such it details the preferred qualities of the knowledge products from business school research, and illustrates a design tool for turning that research into core educational content: the organizational learning contract.

DESIGNING THE BUSINESS SCHOOL IN LINE WITH ITS PROFESSIONAL MISSION

Universities and the departments in them are difficult environments to promote culture change, hence the saying 'it is easier to move a cemetery than a faculty'. Their members are socialized and rewarded simultaneously by two powerful and distinct institutions: the university and the discipline to which they belong. Universities and their departments, including business schools, are educational organizations, particularly concerned with their reputations, their students, and the resources that keep them afloat. Disciplines are communities made up of many social networks with varying access to status and resources. Many disciplines simply do not reward or even respect scientists who are working on solving the problems of practice. Prestigious publications are their academic currency. Publications tend to involve new theory or a methodological breakthrough – discouraging efforts to assess what we can already know from research at hand or to identify what works in practice, when and where. At the same time, theoretical and methodological advances can be good for practice. After all, the goal of science is to improve our understanding of the world. For the most part today, helping make sense of the evidence to better inform teaching and practice is not part of the scholar's job description. This is part of the business school culture that must change.

Interventions to change an organization's culture commonly involve three processes: selection, adaptation, and attrition (Schneider, 1987). Selection entails recruiting faculty excited by the distinctive opportunity to create multiple forms of knowledge and pursue the mission of developing genuine management professionals. I agree with Simon that discipline-based faculty training is not a problem per se. If the environment that newcomers encounter in business schools fails to differ from a research school, the problem is not with the person hired, it is with the setting created by their leaders and senior faculty. A more threatening selection issue for the business school is the hiring of adjuncts and practice faculty that only teach what they learned on the job or rely on pop management notions to animate a class. Adjuncts and practice faculty must contribute intellectually to research and management professionalism. They need to be part of the synthesis.

Adaptation reflects the broadest array of interventions; those altering the school's values, norms, and day-to-day practices. It changes how members think and behave. For a science/practice, synthesis, time, support, and opportunity must be provided for scholars to become familiar with practice, practitioners, and practice problems. It is not enough for just the faculty to engage in research. Because research is essential to a profession's knowledge base, its key participants, including professional managers and soon-to-be managers (students), need to have the opportunity to collaborate on and participate in research. Physicians and nurses regularly participate in drug trials and in clinical studies during their education and after. A recent innovation that facilitates student and manager involvement in research and the development of intellectual practitioners is the growing number of high quality executive doctoral programmes (e.g., the Weatherhead School at Case Western University (USA), Cranfield School of Business (UK), and the School of Management at Hong Kong Polytechnic University). These programmes develop advanced management practitioners (e.g., executives, consultants, business owners) by training them in theory and research methods and by guiding them in problem-focused research (Salipante and Smith, 2012). The research they produce can increase the perceived relevance of research findings for managers, further expanding their use of research. Promoting problem-focused research through alternative doctoral programmes brings new insights to faculty, broadens the available management research, and up-skills advanced practitioners. The knowledge such efforts produce adds to the stock of practice-tested findings. Designed well, such interventions lead to the gradual reduction in distrust of the applied character of the business school.

To encourage collaboration, a well-designed business school values ideas and intellectual change. It does not fall back on mindless counting to evaluate faculty performance: How many single authored papers? How many 'A' publications? Big ideas count more than paper numbers. If a business school values collaboration across disciplines or with industry, there is no reason to give demerits for papers with lots of co-authors. In fact, it is probably far better to count citations, patents, and products – that is, the use to which research is put – in multiple outlets. Impact is likely to be enhanced with more time spent in the field becoming familiar with issues and doing research. It is not at all surprising, as Rynes et al. (1999) report, that article citation rates are related to the amount of time authors spent in organizations gathering the data.

Problem formulation matters and takes time. Tenure clocks may need to be longer or other bases of contracting with faculty used. Research is more time consuming when several questions are to be answered at once, a common feature of the science/practice synthesis. Such practices enlarge the kinds of research questions faculty undertake as many fruitful questions come from practice. These are a few basic ways of promoting practice/science synthesis through the business school's reward and promotion systems.

Attrition is the third facet of building a culture of shared beliefs and values. Simply put, not everybody is happy or capable in a science/practice environment. Its dynamic – that is, it is not usually a one-person show – and the fact that much of its research may be discipline-oriented, can put purists off. Some attrition based on lack of fit is a sign that a culture is coming into being. Ultimately the success of that culture will be evident in the quality of the knowledge it produces and its capacity to educate managers in it.

Developing and Teaching the Preferred Form of Knowledge

Knowledge products. At the core of professional management education is knowledge that is actionable (allowing learners to practice, thereby improving their understanding and skills), science-based where validated theory and findings exist, and informed by field tests in actual practice. Regardless of its origins, acting on this knowledge incorporates business facts and contextual knowledge to make it more workable.

This knowledge exists in two primary forms. The first is field-tested knowledge that can be acquired, recalled, and adapted as appropriate – that is, explicit guidelines that take the form of 'if, then' propositions. This actionable knowledge can combine knowledge from both science and practice, such as the principle, 'If goals are unclear, set specific goals (science) using information about the situation to identify meaningful, challenging yet achievable goals (practice conditions)'. It can also be tested in practice without yet having a base in scientific evidence when there is a need for guidance but as yet too little systematic scientific evidence. Validated scientific evidence meets a higher standard. Such knowledge is valuable in itself in the form of specific declarative statements of fact (e.g., challenging goals lead to higher performance than do your best goals). Such well-established scientific findings become potentially more useful to practice when subject to the practice-oriented criteria of external validity or generalizability, cost/benefit considerations, and the relationship to actual practice conditions (e.g., measurability of goals, goal consensus, etc.; cf. Rousseau, 2012a).

At the same time, managers, like physicians, often must act on whatever knowledge is available. Design science-based knowledge tested in practice, and I do mean *tested* and not just experience-based, is one reason why thoughtful practice faculty are important to the business school, particularly in new or under-researched areas. Take the case of start-ups spun off based on university research. Little systematic research exists on the subject. The design science approach of articulating practitioner beliefs and testing them in practice has been applied to the problem of how to foster and support such ventures (Van Aken and Romme, 2012; Van Aken et al., 2007). Results suggest the importance of access to university facilities, a team having the right mix of skills, and a quality network of managers, investors, and advisors, among other things (Van Burg et al., 2008).

Both the findings of design science as well as its methods are essential to preparing management professionals to make good decisions and solve problems well.

An aspiration in professional education is to ground all propositions in research so that their premises comport with what we know about the world and test them in practice so we know they work. The world and practice are too complex for management, or medicine or engineering, to ever fully realize this ideal. This is not a reason to aim lower, however. 'If, then' propositions exist already in business education. As Robert Dammon, the 9th dean of the Tepper School of Business (formerly the Graduate School of Industrial Administration), in which Simon taught, comments:

> (A)cademic research does make its way into the classroom here at Tepper. What is 'relevant' for business often times is misunderstood by practitioners. They look at the academic journals and can't make heads or tails of the sophisticated methodologies and models that are used to scientifically address business issues. Because they can't understand the methodologies, they deem the results to be impractical. The analytical models and methods are used to make sure that the results actually follow logically from the assumptions. Without the models, how do we know that 'if x, then y'? Just because the models and methodologies are simplifications and abstractions of reality, doesn't mean that the results are irrelevant for business practice. The intricate details of academic models are not the focus. Rather, our teaching is aimed at providing students with a better understanding of the importance of academic research for the effective management of business. (Personal communication, Robert Dammon, 24 January 2011)

The second kind of knowledge product is at a meta-level: how to diagnose or make sense of situations that are novel or more complicated than those appropriate to the explicit principles professionals learn. The challenge is how to help managers respond when faced with situations not aligned with their knowledge base. This entails approaches for solving a complicated problem, such as breaking it in simple parts if possible or applying complex system thinking when the nature of the situation is more dynamic and complex. Research findings by Sarasvathy (2001) and Weick and Sutcliffe (2006) offer evidence-informed responses to situational uncertainty, including mindful processes that investigate several options simultaneously in order to identify what seems most appropriate. One thing an actionable knowledge approach to teaching makes clear: professional management education needs to be grounded in frameworks that adequately represent the array of circumstances learners will face. Thus, attention to specific practice conditions is essential in helping management learners identify knowledge likely to be relevant and appropriate its use.

Teaching actionable knowledge. To teach actionable knowledge effectively means that a business school's *teaching practices* in themselves need to be evidence-based. Business schools commonly fail to use what we know about teaching effectively (Goodman and O'Brien, 2012; Pfeffer and Fong, 2002). Based on reviews of the evidence-base for effective teaching (Ambrose et al., 2010), a number of core practices are important to effective professional management education. The first is to have a clear model of what

learners should be able to do when a course, a term, or a programme of study is complete. Identifying the kinds of actionable knowledge and level of mastery expected are important to mapping course content and evaluating appropriate outcomes. A close look at the material to be learned by faculty from different backgrounds helps identify more alternative and possibly more effective ways to structure it. It also can call attention to threshold concepts that unless grasped make it impossible for learners to progress (Ambrose et al., 2010). Faculty members are often so versed in their subject that they cannot appreciate why learners find it difficult.

The second is a 'two-fer', a set of interventions that act as a reinforcing bundle of learning. The key idea is that individuals should learn to think critically. This entails awareness of human decision biases and cognitive limitations including bounded rationality. At the same time, an essential intervention has to be undertaken to prepare students to acquire management knowledge based on social science: countering their existing naïve or false beliefs. Unlike technical subjects such as marketing or accounting, students, like lay people generally, hold many false beliefs that fall in the domain of behavioural science knowledge. Business schools have not done a good job of correcting these false beliefs (Rynes et al., 2002). These include notions that money is the primary motivator, older people can't learn, leaders are born rather than made, etc. If we fail to help students unlearn false beliefs, their capacity to acquire valid knowledge is diminished.

Management education prepares students to recall, use, and adapt what they have learned when they are practising managers. Simon's research repeatedly called attention to the limits of unaided decision making (Simon, 1997). In this regard, to use actionable knowledge well, we need to familiarize students with the decision aids and other cognitive repairs essential to good management practice (Heath et al., 1998; Larrick, 2009). Just as checklists and decision routines are core to effective medical practice (Gawande, 2009), decision aids help managers to structure their thinking more effectively (Larrick, 2009; Zanardelli, 2012). The reason for practising their use in professional education is that decision aids do more than facilitate memory. Decision aids can improve the professional practice of managers by helping managers recognize distinct features of the problems they face and provide insights into their judgments and blind spots. One basic decision aid is a logic model, which specifies the input→activity→output pathway that represents assumptions about cause and effect. So in a hospital setting where infection rates are a concern, or a training programme where skill transfer is poor, a logic model helps individuals lay out the assumptions they are making and the knowledge they rely upon in solving these problems (Larrick, 2009; Zanardelli, 2012). Students educated to use logic models become more aware of their own biases and limited information, a practice that can have a lifetime of value.

In the classroom, I have found it useful to adapt the logic model framework used in design science. The most powerful 'if, then' design propositions follow the so-called CIMO logic (Denyer et al., 2008). In such propositions a field-tested evidence-based solution to a problem is presented, by specifying its Context, the action undertaken or Intervention, the causes or underlying Mechanisms that produce the outcome, and then the Outcome. This logic model reminds students that in professional practice one purpose of science is to specify why something occurs, and thus specifying the causal

mechanism requires the practitioner to engage in critical thinking and the use of professional knowledge. The C–I part of the model incorporates practice and contextual knowledge to make a solution actionable and helps identify appropriate result indicators. Reinforcing the application of scientific knowledge in this fashion helps make the manager's thinking more explicit, prompts critical thinking, and encourages both feedback from others and learning. Just imagine if the norms of managerial practice shifted towards an emphasis on the use of clear logic and evidence. There would be more pushback than we see today when ad hoc or 'intuitive' decisions don't work out – much in the same way that physicians who treat patients using non-evidence based therapies are vulnerable to peer scrutiny and lawsuits.

Last but not least, intellectual challenge and excitement are needed for education to be of a high quality. This can be done by actively engaging the learner to acquire knowledge in ways that can be sustained in his or her future practice. This excitement can be activated by fully involving students as participants in the business school's pact with science and practice. It is to realize this pact, in the form of an organizational learning contract, to which we now turn.

Organizational Learning Contract

To realize a culture of science/practice synthesis and base business education on the actionable knowledge it produces, a new pact is needed regarding what faculty, students, and other administrators expect of each other. An organizational learning contract (OLC) is a design tool that calls the attention of important parties in educational settings to the critical behaviours and contributions required of them. An OLC is an explicit statement of their duties, responsibilities, and expectations about how, where, and when learning will occur (Goodman, 2011). The OLC has proven effective in transforming education in other professions, particularly engineering. It serves the role of a tool (i.e. a boundary object) that helps various groups of people to come together and create a shared understanding regarding their task or mission (Christiansen, 2005).

Since Simon's time, business schools have become somewhat more complicated with greater influence from administrative functions previously not well developed, including placements, internships, and the student experience of advising and support. These activities add other administrators and staff to the business student's learning environment and its interface with the external environment (e.g., recruiters, rating organizations, etc.). Tension between science and practice in today's business school requires ongoing management by more than senior faculty. A well-designed organizational learning contract creates a pact among faculty, administrators, and students, helping to manage tensions between science and practice.

The basic elements of the OLC are the Learning Outcomes (i.e., meta-skills students learn and results to be accomplished), Learning Environments (i.e., the means and settings in which learning occurs), and Learning Practices (i.e., the mechanisms to implement and sustain the OLC). Professional schools use a variety of learning environments to support multiple forms of learning, including the classroom, project-based learning, peer teaching, the studio/laboratory, internships, and so on. A key feature is that across these settings, students learn how to learn (Goodman, 2011). In Illustration 1,

Illustration 1. Sample organizational learning contract for professional business education

Parties: Students, Faculty (research/practice), Dean and Senior Leadership, Administrators, Practitioners Affiliated with Business School

Our School's Core Practices (all parties engaged in to various degrees)

Professionalism: Commit to practice based on best available knowledge.
- Code of conduct that is lived by all (Everyone knows the Code and can explain it to others)

Collaborations across disciplines and with practice
- Scholars are engaged with practice, practice problems, and practitioners
- Practitioners are engaged with science, scientific problems, and scientists
- Students and administrators are engaged with both

Critical thinking
- We're the people in room asking What's the evidence? Why do we think this?

Insistence on use of science and facts
- In teaching, designing practices, solving problems, implementation, and administration
- Ongoing data gathering to evaluate mission success

Advancement of science, active intellectual contributions to profession and education, and advancement of practice
- Research that is of significant scientific and practical value
- Supports systematic reviews of what is known and what we still need to learn to guide teaching, research, and practice
- Students and alumni participate in and collaborate on research

Learning Environments (Multiple settings to aid student learning and ease its transfer)

Classroom: The learning process and its content are models of professional practice

Science/Practice Commons: Opportunities, venues, and tasks create joint interactions

Projects: Practical problem solving using scientific and practical knowledge

Internships: Use of student skills, advance their learning goals

Simulations: Use of student skills, support their learning

External Contacts: Intellectual contributions to profession, businesses, alumni, associations

Administrative Practices: Business school leaders and managers model use of evidence from science and organizational facts in decisions, policies, practices, and interactions

Outcome Examples (Monitored for purposes of feedback and redesign)

Student skill development (pre/post-tests for courses and curricular activities)

Student skill use – internship, alumni

New applications – faculty/student development of patents, interventions, products, decision aids

Teaching based on best available evidence from science and practice

Introduction of new science/practice-based teaching content

Significant scientific research – citations, awards, impact on business education and practice

I provide a hypothetical example of a business school's OLC that takes producing professional managers as its mission. Regardless of whether it is written or implicit, the OLC is created out of the commitments the school's leaders and members share for achieving its mission. In existing business schools, making new expectations explicit is important since some existing beliefs need to be unlearned. The OLC provides a basis for guiding decisions, developing processes of selection, adaptation, and attrition, and evaluating their effects. In various institutions of higher education, OLCs have provided a way for evaluating whether new programmes are accomplishing their intended results. They provide a way of recruiting new faculty attracted to the school's distinctive mission and help to re-orient veteran instructors and administrators to the changing environment in which they work (Goodman, 2011; Goodman and Beenen, 2008).

Sustainability is a key issue in inaugurating new learning contracts (Goodman, 2011). Energy levels and commitment are often high at the start. This motivation can change as new faculty members join and other demands are placed on the school. A fundamental question is whether the school sustains and adapts its OLC or lets it drift over time. For this reason, an explicit OLC is useful for claiming and focusing attention over time. It also is easier to periodically evaluate whether the business school is on track towards realizing its mission by assessing the extent of agreement on the OLC and its day-to-day practice. Playing with alternative solutions, evaluating their results, and acting on what's learned is at the heart of the process of design (Van Aken and Romme, 2012).

CONCLUSIONS

Management is merely one of the newer professions to confront the need to prepare people to learn and use the best available relevant knowledge. A variety of alternatives will undoubtedly result from any concerted effort to redesign business education in line with knowledge from both science and practice. Bringing key parties together to formulate and implement an organizational learning contract provides scaffolding for the process of re-energizing the business school's professional mission.

At the same time, the professional education of managers needs to prepare them for a lifetime of updating their knowledge as both the base of scientific knowledge and evidence from practice develop. We need to systematically look into how other professional schools support their graduates to update their practice over time. This may include such basic supports as providing alumni with access to the business school's online libraries (Werner, 2012).

Professionalizing management is not an end in itself. It is a means to improve the practice of management. The greatest opportunity to fundamentally change management lies in the education of new generations of managers. The professional business school needs a new learning contract with its constituents, one dedicated to providing its students with the opportunity to live the vision that is a profession of management. Without exposure to effective management practices in the business school environment, few learners will be able to imagine things differently. I may have spent a bit too much time trying to channel Herbert Simon, but I can imagine Simon telling us:

I suggest you get started right now. It will soon be clear whether you are committed to professionalizing management or merely selling snake oil.

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