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Multiple Perspectives of Design Thinking in Business Education

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Abstract: Business education leaders have expressed interest in learning more about design and design thinking and their contributions to better problem framing, problem solving and to generating new solutions. Many business schools have engaged in educational programs with students from multiple disciplines, applying design thinking to business problems around workplace issues. This paper investigates a range of educational programs that teach design thinking to students in business education, at undergraduate and postgraduate levels around the world. We identify four patterns of program delivery that are emerging: human-centered design, integrative thinking, design management and design as strategy and discuss contributions from each. We expect that these four patterns of program delivery will continue and predict an increasing focus on programs around design as strategy in the near future.

Key Words: Design thinking, Design Management, Research, Business Education, Learning, Design as strategy

1. Introduction

Business education is under constant review to provide current and relevant educational programs, particularly at the graduate level, to prepare future managers for changing contexts. In the last decade, business education has been challenged to find new ways of thinking and working that can be applied in situations of complexity, uncertainty and ambiguity and that can look over the horizon to generate new insights and new solutions. Martin claims that the real challenge for managers is getting better at devising clever solutions to wickedly difficult problems [1].

Some early attempts to redesign business education to establish closer ties between business and design were reported in the business press [1]. Three examples identified included joint courses between the Rotman School and the Ontario College of Art and Design; The Illinois Institute of Technology's Institute of Design nine-month-long executive master's degree program in design methods; and Stanford University's \$35 million commitment to launch its 'd.school', for people from large companies and startups to come to learn design thinking. In this article, Roger Martin, Dean and Professor at the Rotman School argued that "Business people don't just need to understand designers better -- they need to become designers" [2].

1.1 Design Thinking and Business

Interest in design thinking at a company level has been influenced by the growing recognition of the potential impact of design and its contribution to successful business practice. Many large successful international firms such as GE, P&G, Sony and Philips, have openly stated using a design orientation and a design perspective for problem-solving across their companies. Recent research indicates that companies who use design in their business, perform better economically in the marketplace [3]. [4],[5],[6]. Research by the UK Design Council on the performance of firms and the impact of design on firms' performance found that over a ten-year period of analysis, the benefits of effective use of design include an improved share price performance and therefore greater shareholder returns [7].

The importance of design thinking for management has also been argued in the last decade [8], [9] [10] and has strongly influenced interest in applying design thinking to management education [11] [12]. Despite this interest in design thinking and its potential contributions to business education, most discussion of the contributions have come from individual cases rather than a broader overview of programs. This paper investigates current educational programs where design thinking is applied to business education, focusing on what approaches to design thinking are found in higher education business programs.

The paper responds to previous suggestions regarding the importance of design and its potential contributions to management education [10]. It also responds to an earlier call for design literacy in managers in MBA programs that surveyed 19 of the top US MBA programs and found not a single one addressed or incorporated design into its curricula in any significant way. "Even in those programs focused on marketing and branding, curricular attention to the principles or theories of design is cursory, at best" [13].

This paper extends existing literature on business education in a number of ways. First, we discuss notions of design and design thinking identifying some different approaches. Secondly we investigate some of the higher education programs which include design thinking for students in business or management education. Thirdly we categorise the programs and approaches based on the information available.

2. Design's Potential for Managers

Design involves purposeful behaviour that is targeted toward certain goals and the creation of solutions. The notion of managers as designers was addressed indirectly in management education by Simon who contends that everyone who devises courses of action aimed at changing existing situations into preferred ones is a designer [14] and also who encouraged managers to be reflective practitioners in their daily lives [15]. Perhaps these notions of managers as designers has more in common with Lawson's view that "We all can and do design; and we can learn to design better" [16]. Here, the goal of design may be to solve a problem that affects one or many people. In the design field, design is not seen as the prerogative of a select few. It is generally

accepted that design thinking is a human centered approach to innovation, that includes understanding people as inspiration, prototyping, building to think, using stories, having an inspired and inspiring culture” [9].

Some of the key tenets of design thinking include: beginning by developing a deep understanding of the user/customer based on fieldwork research; having the users involved early on to get user evaluation of a concept; collaboration with the users and through forming multidisciplinary teams, creating radical rather than incremental solutions and seeking to add value. Above all, the importance of concurrent business analysis is integrated through the process, rather than added on later or used to limit creative ideations [17].

Design thinking and innovation are also described as stages of inspiration, ideation and implementation [18]. Design thinking is fundamentally an exploratory process and design as a process develops solutions within constraints. Brown argues that design solutions need to meet three constraints: what is desirable (what makes sense to people and for people), viability (likely to become part of a sustainable business model) and feasibility (what is functionally possible for the foreseeable future).

Within the academic discipline of design, the notion of design thinking has been of central importance for more than thirty years. This focus also appears in both education [15] and in architecture [16], in their respective ways describe and reflect upon *how designers think*. Lawson, for example, claimed the design process includes formulating, moving, representing, evaluating, and reflecting. This discussion was extended with reflections around “designerly ways of knowing.”[19], where Cross called upon design scholars to recognise that design practice does indeed have its own strong and appropriate intellectual culture, and to avoid design research with notions imported from either the sciences or the arts.

Design thinking can be described as “a discipline that uses the designer’s sensibility and methods to match people’s needs with what is technically feasible and what a viable business strategy can convert into customer value and market opportunity” [18]. Design thinking is generally referred to as “applying a designer’s sensibility and methods to problem solving, no matter what the problem is - a methodology for problem solving and enablement” [17].

Design thinking applied to business strategy and business transformation is sometimes described as integrative thinking [20]. Their focus on design thinking centers on innovation and business transformation, which involves the discovery of unmet needs and opportunities, as well as creation of new visions and alternative scenarios. The notion of design and design thinking in the business has been largely popularized by stories and case studies of work carried by design firms such as IDEO [9][18][21][22], Design Continuum and frog design, usually around notions of new product development.

Three aspects of design thinking that have particular relevance to management education: cognitive, attitudinal and interpersonal [10]. For example, cognitive

processes include such as abductive thinking which can be understood as ‘forming an explanatory hypothesis’, being open to new ideas and conjectures. Another cognitive process strongly demonstrated in design is the visualization of a problem as a system of structures, patterns or events and the impacts of changes on the system components as well as on system as a whole. In addition, designers use rapid prototyping to test out new solutions and learn by doing, identifying weaknesses and making modifications and corrections along the way.

Designers also display attitudinal differences to many managers [10]. Designers see constraints as an impetus to creative solutions, rather than rigid barriers and see each problem as an opportunity for invention, perhaps similar to entrepreneurs [23]. In the interpersonal arena, designers bring a deep understanding of user perspectives and potential user needs gathered through detailed observation and reflection, and designers engage in collaborating with peers [10]. In addition, the ongoing cycle of design thinking which begins with process of generalization (Induction), generating ideas (Abduction), predicting consequences (Deduction) which is then tested and the process is repeated is useful for managers [10].

3. Research Approach

Using internet search engines, business literature and research reports, a search of educational programs, courses and units and course content was conducted across a selection of universities to investigate how design and design thinking is being taught to students in business around the world. Some information was available online in different forms. For example, often a unit synopsis was available online to describe briefly what and how learning objectives were assessed. In a few examples the scope of the program and its week by week learning activities were posted online. Some searches required a direct contact with the university to discover the details of content and activities of the program. By investigating the content of curriculum and focusing on international business schools or interdisciplinary units including business, the following results were attained.

Searches were conducted to obtain information about design and business and management education. The search of international programs and the search of Australian universities examined programs and courses around innovation and entrepreneurship as well as general management and education programs. An illustrative summary of some of these courses is presented in Tables 2-4.

4. Design Thinking and Business Education

It is apparent from this overview of educational programs and courses that design thinking, usually based on principles of human-centered design, forms the core of all of the programs. The general principles of these educational programs targeted at undergraduate and postgraduate levels are to bring together students from multiple disciplines to work together on common problems, developing multiple perspectives on problem or opportunity situations. Workplace projects working in group on authentic tasks through consultation with industry partners around workplace

problems are common features of these programs. Perhaps previous research [13] that expressed disappointment in the lack of design and design approaches for managers arose from the focus specifically on MBA programs rather than a broader view of management programs. On the other hand our overview did not find many MBA programs that included design thinking, so to some extent their concerns may be still current.

Australian universities show some early experimentation with design thinking, often within units on innovation where interest in design thinking may be of longstanding interest, such as in new product development. Within Australian business schools there is some recognition that the area of design thinking in business is a growing and necessary field and some initiatives have begun. Some business schools are using symposiums (Swinburne) while others are creating new units to accommodate MBA programs around design thinking (University of Technology, Sydney). Some universities deliver corporate education programs around design thinking through consultants.

International programs on design thinking are delivered by partnering of courses, programs, and sometimes even universities, where universities and business schools from Toronto to Paris are taking up new collaborations with design schools. Some of the partnerships developed between business schools and design schools have been encouraged and nurtured by involvement with and membership of Cumulus, a global association of Art and Design Schools focused on art and design education and research. Cumulus is a forum for partnership and transfer of knowledge and best practices and currently consists of 176 members from 44 countries.

Design thinking and its application is not limited to large private sector companies. Small and medium sized companies [24] and the public sector have been experimenting with these approaches to find new ways of developing solutions to complex problems. Design thinking has been embedded in product design and more recently in system design. The growing popularity of design thinking is reflected in the growing number of articles (often unpublished) about the potential of design thinking for developing new ways of thinking in business contexts.

Many universities appear to have programs where students are exposed to design thinking, in classroom situations, workshops and around problem based issues. From the review of all data, four areas of categorization emerged: Human-Centered Design, Integrative Thinking, Design Management and Design Strategy. These categories are described in some detail below. The first and perhaps most well-known is Human-Centered Design.

4.1 Human-Centered Design

Human-Centered Design is defined as focusing on people or customers and their needs and not specific technology conditions. Innovation occurs at the intersection of business, technology and people and through this intersection radical, new experience innovation is produced. The user is the one to decide if a product or a service should exist or be established. This approach is strongly supported by design companies such

as IDEO and the Stanford d-school, where design thinking is conceptualized as a specific way of evaluating and using design methods by non-designers. These processes are summarized as: Observation, Brainstorming, Rapid Prototyping, Testing, and Implementation [25]. The key tenets of design thinking used in these programs are:

1. to develop a deep understanding of the customer based on fieldwork research.; an empathic approach getting out in the real world with consumers, open collaboration even co-design; observational research ethnographic methods watching, listening, discussing and seeking to understand. “Start from a seeking to understand point of view”
2. having the users involved early on – get user evaluation of a concept. Collaboration with the users and through forming multidisciplinary teams...radical rather than incremental and seeks added value.
3. accelerate learning through visualization, with hands - on experimentation creating quick prototypes, to fail quickly and frequently, so learning can occur.
4. Prototypes such as sketches, mock-ups, stories, role-playing or storyboards make the intangible tangible and visualization.
5. Importance of concurrent business analysis integrated through the process rather than added on later or used to limit creative ideations.

Table 1. Human-Centered Design

Human-Centred Design				
University	Course or Unit	Program	Audience	Description
Stanford University <i>in partnership with</i> Alto University University of St Gallen; Hasso Plattner Institute	ME310 Design Innovation	Under Graduate	CEO's Postgraduates, undergraduates	Multi university project based 1 year long; Global student team of 6-8 Teaching innovative methods and processes
Stanford University D-School (UK)	ME310 Design Innovation	Graduate & Executive Courses		IDEO connection as they are all graduates of Stanford
Aalto University, Finland	International Design and Business Management program	Graduates		Industry projects - partnering with Stanford University

University of St Gallen http://dthsg.com/what-is-design-thinking/	ME310 Design Innovation	Graduate Executive Education		Human centred approach. Industry Partners
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4.2 Integrative Thinking

The second category of courses includes the notion of integrative thinking - “the ability to constructively face the tensions of opposing models, and instead of choosing one at the expense of the other, generating a creative resolution of the tension in the form of a new model that contains elements of the both models, but is superior to each” [11]. Martin describes decision-making as involving four steps: the first one is *salience*: what do we choose to pay attention to, and what not? In this initial step, we decide which features are relevant to our decision. The second step is *causality*: how do we make sense of what we see? What sort of relations do we believe exist between the various pieces of the puzzle? The third step is *architecture*, during which an overall mental model is constructed, based upon our choices from the first two steps. The final step is *resolution*: what will our decision be, based on our reasoning?

This designer's approach to solving problems, or the integrative way of thinking and problem-solving, can be applied to all components of business, where “Great design is characterized by a deep understanding of the user, creative resolution of tensions, collaborative prototyping and continuous modification and enhancement of ideas and solutions” [26]. The Rotman School of Management with the Dean Roger Martin and Heather Fraser, Director of the Business Design Initiative, offers a program that merges the practices of business and design at the Strategy Innovation lab, DesignWorks™.

Table 2. Integrative Thinking

University	Course or Unit	Program	Description
University of Toronto Rotman School of Management	Foundations of Integrative thinking Business Design Business Innovation Lab	MBA Executive Education Workshops	Designworks run by the Rotman School offers students and industry the opportunity to solve complex challenges and unlock business ideas. Strategy and Business design focus.

4.3 Design Management

The third category of programs has been described as Design Management [27], where research on design-oriented European SMEs became the basis of a model for design as differentiator, integrator, and transformer and good business (summarised from [27]). These four forms represent different roles for design. 1. Design can be a

differentiator, where design is a source of competitive advantage on the market through brand equity, customer loyalty, price premium, or customer orientation; 2. Design as *integrator*, where design is a resource that improves new product development processes (time to market, building consensus in teams using visualization skills); design as a process that favors a modular and platform architecture of product lines, user-oriented innovation models, and fuzzy-front-end project management; 3. Design as *transformer*, where design is a resource for creating new business opportunities; for improving the company's ability to cope with change; or (in the case of advanced design) as an expertise to better interpret the company and the marketplace to 4. Design as *good business*, where design is a source of increased sales and better margins, more brand value, greater market share, better return on investment (ROI); design as a resource for society at large (inclusive design, sustainable design).

Table 3. Design Management Approach

University	Course or Unit	Program	Description
Politecnico Di Milano	Design Thinking	Masters of Strategic Design	Incorporates the value design has to offer business
Lancaster Institute for the Contemporary Arts	Design Thinking and Research Methods	Master of Sustainability, Innovation and Design	Develops design-literate professionals for creative roles in industry capable of contributing to innovative solutions for a sustainable future
California College of the Arts	Masters in Design Strategy	Graduate	Emphasizes many modes of learning and stresses communication (oral, written, and visual) and collaboration. Group student projects encourage students learn to work with others from diverse backgrounds and across many time zones and locations. Students from many disciplines, including various forms of design, engineering, operations, marketing, management, organizing, and other of change-making forms in the world.
University of Gothenburg School of Design and	Masters in Business and Design: a closely	Graduate	The programme is designed for students and professionals with diverse educational backgrounds but a common

Crafts: HDK with the School of Business, Economics and Law at University of Gothenburg	connected 2-year Masters program.		interest in working strategically with design. The programme focuses on a process in which people can contribute their different roles and experiences and with the ability to understand what the others are saying and utilise one another's knowledge.
Pratt Institute, New York, focused on the special needs of design leaders managing design firms or managing design teams in creative industries.	Masters of Professional Studies in Design Studies	Graduate and Executive education	Two-year program created to bridge the disciplines of design and business management. Participants from a variety of design disciplines including information design, interactive media design, and architecture. The curriculum is designed to develop strategic management skills in six study areas related to design management: operations management; financial management; marketing management;

4.4 Design as Strategy

The fourth category of programs can be described as Design as Strategy or Strategy as Design. This category is relatively ill-defined and largely under construction, employing the principles and processes of human-centered design and components of strategy such as Porter's activity maps[28], to present a whole of organization approach to design as a strategic as well as operational process with the purpose of creating sustainable competitive advantage. In this category, design activity concerns the whole of the product-system, integrating the products, services and communication strategies with which a company presents itself to market and sets itself in society, giving form to its strategy [29],[30],[31]. Many of the programs here are at the post graduate MBA and executive education level and delivered as workshops through partnering arrangements with companies.

Table 4. Strategy as Design

University	Course or Unit	Program	Description
University of Technology Sydney	Strategy by Design	Executive Education Workshops	Create strategy innovations by using the models and tools successfully used by designers to solve business problems

5. Conclusions

Our preliminary research has identified strong collaborative initiatives that are developing in many educational institutions, from direct delivery of design programs in business education to collaborative ventures between institutions to complement studies. In addition, amalgamation and the formation of new institutions that include teaching in both design and management separately as well as together are occurring.

This research is an early attempt to provide a preliminary mapping of some of the higher education business programs that include design thinking in their offerings to business and management students. Some universities have long delivered in this space internally or through connections with specialist programs. This dynamic field appears to be in constant change as institutions develop internal capability bringing schools of design and business together or develop alliances within or across universities to experiment with programs, and many of the existing courses and programs are adapting and changing to respond to increased demand from industry.

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