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This is the author's version of a work that was submitted/accepted for publication in the following source:

Matthews, Judy H. & Wrigley, Cara (2011) Design and design thinking in business and management education and development. In *25th Annual Australian and New Zealand Academy of Management Conference: The Future of Work and Organisations*, 7 – 9 December 2011, Amora Hotel, Wellington, New Zealand.

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Design and Design Thinking in Business and Management Education and Development

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ANZAM 2011 The Future of Work and Organisations

MANAGEMENT EDUCATION AND DEVELOPMENT

Design and Design Thinking in Business and Management Education and Development

ABSTRACT

Design and design thinking have been identified as making valuable contributions to business and management, and the numbers of higher education programs that teach design thinking to business students, managers and executives are growing. However multiple definitions of design thinking and the range of perspectives have created some confusion about potential pathways. This paper examines notions of design and design thinking and uses these definitions to identify themes in higher educational programs. We present the findings from an initial exploratory investigation of design and design thinking in higher education business programs and define four distinct educational approaches around human centred innovation, integrative thinking, design management and design as strategy. Potential directions for management education programs are presented.

Keywords: design thinking, management education and development, business schools

Management Education and Development

The importance of design thinking for management has been argued in the last decade (Boland & Collopy 2004; Brown 2008, 2009; Dunne & Martin 2006; Martin 2009; Starkey & Tempest 2009). Interest in applying design thinking to management education is strongly influenced by Dunne & Martin (2006) and Martin (2007). Dunne & Martin (2006) describe design thinking as “approaching management problems as a designer approaches design problems, with an open mind”. They contend that “today’s business people need to become designers and give examples where design firms such as IDEO apply their expertise in design not only to high technology issues but also as designers for healthcare organizations”. This approach requires change from traditional work patterns to something closer to a “design shop” where the focus is on the flow of work life, style of work, mode of thinking, source of status and dominant attitude (Dunne & Martin 2006).

Many large successful international firms such as GE, P&G, Sony and Philips, use a design perspective as a problem-solving apparatus across the company. While the importance of design in business has been well established, the contributions of design were best known and valued in innovation including new product and new service development (Utterback Vedin Alvarez Ekman Sanderson Tether & Verganti 2006). More recently design thinking has moved from product and

process design to becoming a key element in company strategy (Camillus 2008; Fleetwood 2005; Verganti 2006, 2008).

Two drivers that have largely stimulated interest in design and design thinking at a company level are, the growing recognition of the potential impact of design and its contribution to successful business practice and the popularity of the notion of design thinking at the business level. Recent research indicates that companies who use design in their business, perform better economically in the marketplace (Cox 2005; Borja de Mozota 2003; Dell'Era Marchesi & Verganti 2010; Moultrie & Livesey 2009; Nussbaum 2006). 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 (UK Design Council 2004).

The research question we are addressing is: what are the characteristics and understandings of design and design thinking in higher education business programs. The paper responds to suggestions (Boland & Collopy ,2004; Starkey & Tempest 2009) regarding the importance of design and its potential contributions to management education. We also respond to an earlier call for design literacy in managers in MBA programs . Formosa & Kroeter (2002) 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 and even in programs that focused on marketing and branding, curricular attention to the principles or theories of design was at best cursory. This paper extends existing literature on business and management education in a number of ways. First, we discuss notions of design and design thinking identifying some different approaches. Second, we investigate some of the higher education programs which include design thinking for students in business and management education. Third, we categorise the programs and approaches based on the information available. Finally we suggest potential directions for management education and development.

THEORETICAL FRAMEWORKS

Design involves purposeful behaviour that is targeted toward certain goals and the creation of solutions. 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. On the contrary, “We all can and do design; we can learn to design better” (Lawson 1997: vii). Herbert Simon contends that everyone who devises courses of action aimed at changing existing situations into preferred ones is a designer (Simon 1996).

Within the academic discipline of design, the notion of design thinking has been of central importance for more than thirty years. Schön (1983) in education and Lawson (1980, 2006) in architecture, 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. Cross (2001) extended this discussion with his reflections around “designerly ways of knowing.” He 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” (Brown 2009). 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” (Lockwood 2010: p xi). More recently, design thinking has moved from product and process design to a key factor in company strategy (Bucolo & Matthews 2010; Carlopio 2009).

To a large extent, the notion of design and design thinking in the business literature has been largely popularized by stories and case studies of work carried by design firms such as IDEO (Brown 2008, 2009; Hargardon & Sutton 1997; Kelley 2001), Design Continuum and frog design (Schilling 2010), that have been working in new product development for decades. In these cases design thinking is

widely understood a human centered approach to innovation that includes “understanding people as inspiration, prototyping, building to think, using stories, having an inspired and inspiring culture” (Brown 2008).

Design thinking for problem solving

Designers seek outcomes that are desirable for users, viable for the client, and feasible within technical and design constraints. Design thinking is applied to problem solving situations, around the concept of *wicked problems*, drawing on Rittel’s initial description of social planning problems as indeterminate (Churchman 1967; Rittel & Webber 1973) and subsequently developed by Buchanan (1992). Buchanan created a new conversation around wicked problems in design, arguing that designers deal with problems that are ill defined, so that the creative re-definition of the problem is part of the professional skill. Recently, even some strategy problems have been labelled as wicked problems, for example, if the problem involves many stakeholders with conflicting priorities, if it changes even as solutions are attempted, and if there’s no way to evaluate if the remedies will work (Camillus 2008).

Lawson (1997) contends that design problems may be the most important type of problems to investigate because so many professionals get paid for designing things (products, systems, etc). Within the conception of design understanding, it is well understood that there is more than one right way. A design attitude, as distinct from a decision attitude, means designing or bringing about alternatives. Here the concern is with finding the best possible, given skills, time and resources - it is taken for granted that design will require the invention of new possibilities. In contrast to a design attitude, is a decision attitude “where the manager as idea generator who gives form to new possibilities”. From a design perspective, Lawson argues that “each project is an opportunity for invention that includes a questioning of basic assumptions and the resolve to leave the world a better place than we found it”. Similarly “A design attitude views each project as an opportunity for invention that includes a questioning of basic assumptions and a resolve to leave the world a better place than we found it” (Boland & Collopy 2004: 9).

The generative nature of design thinking in developing new solutions is not limited to business settings and there is a wealth of literature regarding the application of design thinking to social innovation. Brown & Wyatt (2007) discuss how design thinking can lead to hundreds of ideas and, ultimately, real world solutions that create better outcomes for organizations and the people they serve.

Design thinking applied to business strategy and business transformation is sometimes described as integrative thinking (Cooper Junginger & Lockwood 2010). This approach to design thinking centers on innovation and business transformation, the discovery of unmet needs and opportunities, and the creation of new visions and alternative scenarios. A core element of design thinking is its ability to capture new knowledge, whereby practitioners might differ in their technique and tools (Bucolo & Matthews 2010) but it will be the combination of applying design tools with a strong understanding of organisational innovation that identifies the strategic value of design thinking. A summary of approaches to design thinking is presented in Table 1.

[Insert Table 1 here]

We now turn to the research question regarding the characteristics and understandings of design and design thinking in higher education business programs for management education and development.

METHODOLOGY

Using internet search engines, business literature and research reports, research was conducted into educational programs, courses and units and course content 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 but rarely the scope of the program and its week by week learning activities was posted online in a few minor cases. Many 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.

Two types of searches were conducted over a period of four weeks to obtain information about design and business and management education. The searches of international and Australian universities examined programs and courses around innovation and entrepreneurship as well as general management and education programs. Contact was also made with professionals in the field to check the nature and accuracy of our findings. The programs identified will be discussed in terms of their common characteristics and an illustrative summary of some of these courses is presented in Tables 2-5.

FINDINGS

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

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 conceptualised as a specific way of evaluating and using design methods by non-designers. Nussbaum (2004) summarises these processes as: Observation, Brainstorming, Rapid Prototyping, Testing, and Implementation. 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 visualisation, 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 visualisation.
5. Importance of **concurrent business analysis integrated through the process** rather than added on later or used to limit creative ideations.

The non-linear iterative processes used in human-centered design usually begin with an initial defining of the problem, followed by exploration of the user and the design space, generating possibilities through brainstorming, building prototypes that are then tested, often a number of times, and the findings used to refine the problem resolution, as illustrated in Figure 1.

Insert Table 2 here

Insert Figure 1 here

Integrative Thinking

The second category of courses includes the notion of Integrative Thinking, defined as “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” (Martin 2009). 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?

Integrative thinkers approach these four steps in a very specific way. As shown on the diagram below, in step one they consider more features of the problem as salient to its resolution; they consider multi-directional and non-linear causality between the salient features; they are able to keep the ‘big picture’ in mind while they work on the individual parts of the problem; and they find creative resolutions to the tensions inherent in the problem’s architecture (Martin 2010).

[Insert Table 3 here]

Insert Figure 2 here

This designer's approach to solving problems, or the integrative way of thinking and problem-solving, can be applied to all components of business. “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” (Martin, 2010). 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™.

Design Management

The third category of programs can be described as Design Management (Borja de Mozota 2003, 2006), 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 Borja de Mozota, 2006, p 21). 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).

[Insert Table 4 here]

Insert Figure 3

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, to present a whole of organisation approach to design as a strategic as well as an 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 (Camillus 2008; Carlopio 2009; Bucolo & Matthews 2010). Many of the programs here are at the post graduate MBA and executive education level and delivered as workshops through partnering arrangements with companies.

[Insert Table 5 here]

Insert Figure 4

DISCUSSION

It is apparent from this overview of educational programs and courses that design thinking, usually based on principles of the human-centered approach to design, forms the core of all of the programs.

Indeed, Liedtka & Ogilvie (2010) ask “What would be different if managers thought like designers, and their answer is empathy, invention and iteration” (Liedtka & Ogilvie, 2010; p 6).

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 groups on authentic tasks through consultation with industry partners around workplace problems are common features of these programs. Perhaps Formosa & Kroeter’s (2002) disappointment in the lack of design and design approaches for managers arose from their focus on MBA programs rather than a broader view of management programs. On the other hand our overview did not find many MBA programs which included design thinking, so to some extent their concerns may be still current.

Australian universities show some early experimentation with design thinking, often with in units on innovation where interest in design thinking may be of longstanding interest. Within Australian business schools there is some recognition are realising 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).

International programs 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.

Dunne (2010) compares positive design and integrative thinking and contends that while there is a great deal of common ground between positive design and integrative thinking, the two approaches are different in character. He argues that although both approaches generate solutions to problems, “where integrative thinkers use assertive inquiry and causal modeling to understand the models of others, positive designers work by questioning and observing users, and using trial solutions to reframe the problem” (Dunne 2010, p 209).

Design thinking has been embedded in product design for many decades and more recently has been applied to system design. Design thinking and its application is not limited to large private sector companies. Both small companies (Ward Runcie & Morris 2009) and the public sector have been experimenting with these approaches to find new ways of developing solutions to complex problems. For example public sector organisations are looking at new ways of increasing innovation and are experimenting with ‘Deep Dive’ (IDEO, 1999) workshops. The growing popularity of design thinking is reflected in the growing number of articles (often unpublished) about the potential of design thinking and Deep Dive experiential workshops for developing new ways of thinking

LIMITATIONS

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 developing alliances within or across universities to experiment with programs. Furthermore, many of the existing courses and programs are adapting and changing to respond to increased demand from industry.

CONCLUSIONS AND FUTURE WORK

The potential contributions of design and design thinking for management have been well argued in the last decade from management theorists (Boland & Collopy, 2004; Brown 2008, 2009; Dunne & Martin 2006; Martin 2009; Starkey & Tempest 2009) as well as design academics (Formosa &

Kroeter 2002) and design at a strategic as well as operational level has contributed to successful business performance.

Many programs are established to bring together students from a range of disciplines at the undergraduate and graduate levels to learn design methodologies and apply them to workplace projects. Multiple approaches to designing educational curricula, from Formosa & Kroeter's (2002) four-part proposal of required and elective MBA courses to deliver an understanding of what design is and ways to leverage this resource in corporate strategy and decision making, to the Stanford d School experience, at Stanford or at their associated institutions, or the Darden School's application of design thinking to business school classes (Liedtka & Ogilvie 2010).

The number of these programs is increasing and will doubtless take on new forms. We can expect the core approach of human centred design plus the reframing of business issues into opportunities for new business or strategic renewal to increase. The popularity of this design driven approach in the marketplace may prove too fast for business schools and we may see initiatives in the Strategy as Design and Design as Strategy space taken up by experienced designer business leaders. With few exceptions, management education has added design thinking and design methods into current programs through building alliances with design schools. The challenge for business schools is to incorporate such notions and methods into more integrated formulation and delivery and we suggest such initiatives are more likely to occur in the contested space of executive education programs.

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Other Useful Resources:

Human-Centered Design Toolkit: <http://www.ideo.com/work/human-centered-design-toolkit/>
 Design Thinking Toolkit for Educators: <http://www.ideo.com/work/toolkit-for-educators>
 Cumulus <http://www.cumulusassociation.org>

Table 1. Design Thinking

Approach	Author	Details	Examples
Design thinking includes: empathy, integrative thinking, optimism, and collaboration to transform the way a company develops products, processes and strategy	Brown (2008)	Design thinking uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity.	Design thinking can transform the way a company develops products, processes and strategy
Design thinking uses the abductive thinking of designers, and actively to look for new data points, challenges accepted explanations, and infer possible new worlds	Martin (2009)	Evidence showing that creative thinking in a business is required for success. Examples of companies such as Apple, IBM focusing on what occurred before and after design thinking was adopted.	Case studies of popular corporation's process and journey but lacks in clear instructional directions to modify business
Design thinking integrates human, business and technology factors in the problem identification-solving and design process.	Meinal & Leifer (2011)	Design thinking comprises human-centred methodology combining expertise from design, social sciences, engineering and business. It blends an end-user focus with multi-disciplinary collaboration and interactive improvements to produce intuitive products, systems and services.	Exploration of the design thinking process, by describing the development and application of design thinking

Table 2: Human Centred Innovation Approach to Design Thinking

<i>Human Centred Innovation</i>				
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	UG	CEO's Postgraduates, undergrads	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	Post Grad & Executive Courses		IDEO connection as they are all graduates of Stanford
Hasso-Plattner Institute School of Design Thinking	ME310 Design Innovation	PG		Modelled from Stanford course
Aalto University	International Design and Business Management program	PG		Industry projects - partnering with Stanford University
University of St Gallen http://dthsg.com/what-is-design-thinking/	ME310 Design Innovation	Post Grad Executive Education		Human centred approach. Industry Partners

Table 3: Integrative Thinking Approach to Design 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 of Management offer students and industry opportunity to solve complex challenges and unlock business ideas. Strategy and Business design focus.

Table 4: 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	Post Graduates	Emphasizes many modes of learning and stresses communication (oral, written, and visual) and collaboration. Most student projects in the program are group-based and students learn to work with others from a variety of 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 Crafts: HDK with School of Business, Economics and Law at University of Gothenburg	Masters in Business and Design: a closely connected 2-year Masters program.	Post Graduates	The programme is designed for students and professionals who have different educational backgrounds but a common interest in working strategically with design. The programme focuses on a process in which people can contribute their different roles and experiences and will exercise 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	Post Graduates and Executive education	Two-year program created to bridge the disciplines of design and business management. Participants come from a variety of disciplines, including industrial design, interior design, graphic design, fashion design, communication and 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;

Table 5. 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

FIGURES

Figure 1. Design thinking (Modified from Meinal &Leifer, 2010)

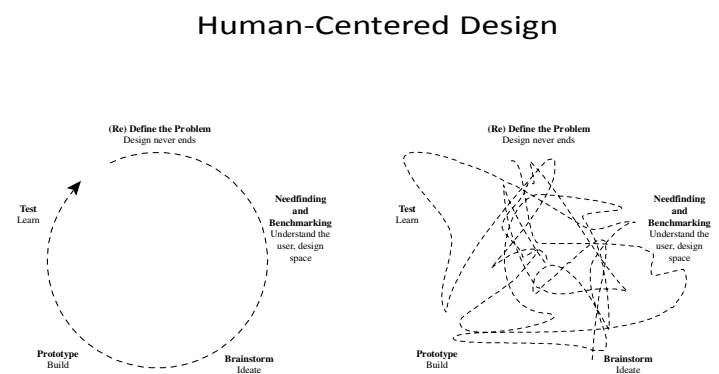


Figure 2. Integrative thinking – combining design thinking and decision making (adapted from Martin, 2010)

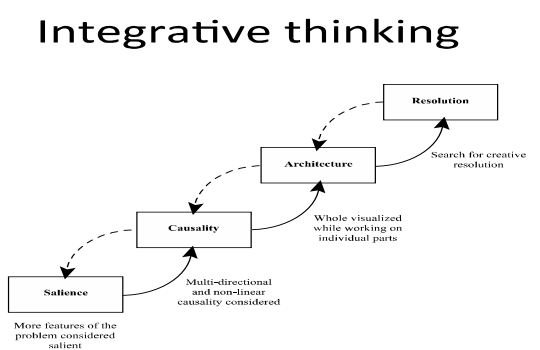


Figure 3. Design Management (Modified from Borja de Mozota, 2006)

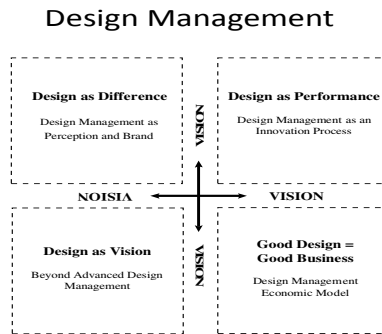


Figure 4. Design as Strategy – (Modified from Liedtka & Ogilvie, 2010)

Designing for Growth

