

**DESIGN THINKING: COLLECTION & REVIEW OF LITERATURE ON
DESIGN THINKING FOR STUDENTS OF MANAGEMENT STUDIES**

DESIGN RESEARCH-SEMINAR

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Design Thinking: Collection & Review of literature on design thinking for students of management studies

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A handwritten signature in black ink, appearing to be 'Shri', followed by a long diagonal stroke.

Abstract

Design thinking has become a buzzword in most organisations and institutions over the past decade. This has given rise to multiple educational institutes of various domains incorporating design thinking in their curriculum.

This project examines some of the design thinking courses available to management students across the world.

This study has led to generation of structure for an ideal design thinking course for management students.

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Introduction

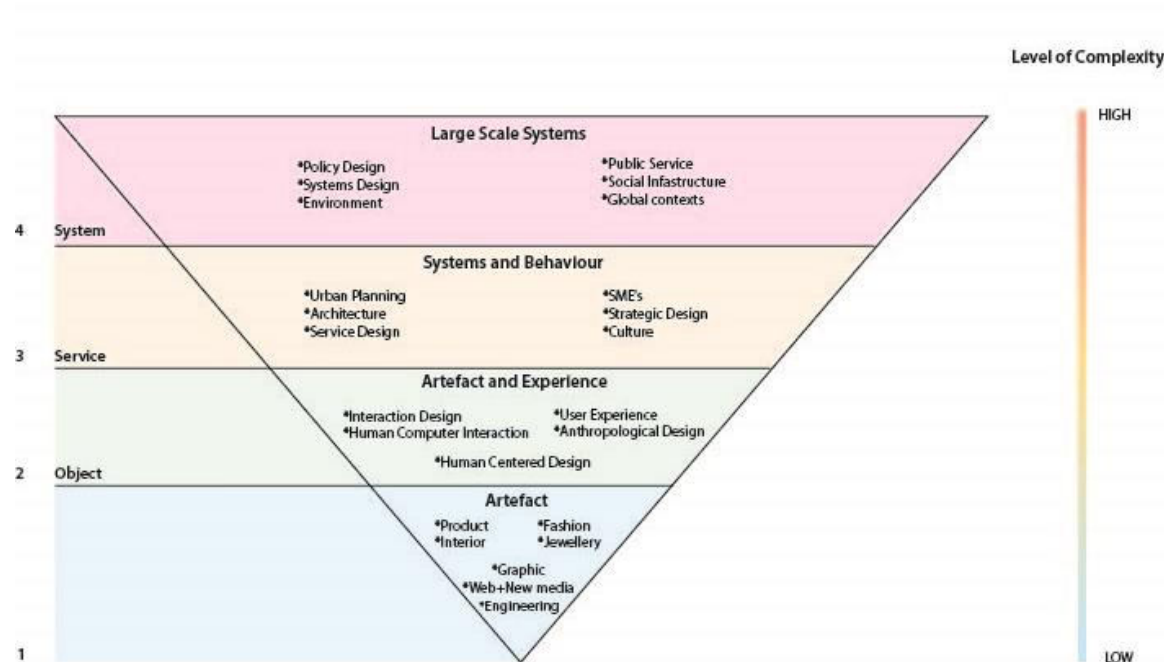


Image source: <https://ithinkdesign.files.wordpress.com/2014/07/typology-of-dt-inverted.jpg>
(as seen on 10.03.16)

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fig 1: Typology of design thinking

The parlance “Design Thinking”, is bandied about a lot these days by institutions and companies in various domains. And each of them have their own set of definitions and processes to justify it. However if we have to start teaching design thinking properly, we need a more structured and refined understanding of it.

The word design has also moved on from the realm of tangible products, to a more intangible design of human artefacts. This opens up a lot of possibilities in various fields. This holds even more true for “Design thinking” as it is considered a structured thought process.

Hence schools of various disciplines are now trying to teach design thinking to students.

In this report we have tried to understand design thinking and its elements, we have also tried to review couple of well known management courses which have a design thinking component as part of their coursework.

The intent of this report is to try and come up with a structured curriculum to teach design thinking to management students.

A typology of design thinking (fig. 1) shows that it is used to solve issues in domains having higher complexity. This also shows that a structured tangible process of thinking can be applied in multiple domains if it is inclusive and adaptable.

The study for this project was done with the hope of trying to simplify design thinking as much as possible and getting it down to its bare essentials.

The point of creating a new course structure is to move the management students from current state of just 'knowing' to 'thinking' and acting'.

History

Let there be light (1960-1980)

This period saw the coining of the term “design thinking” and design method movement.

In fact there were distinct ideologies suggested by the four stalwarts, Bruce Archer, Victor Papanek, Herbert Simon and Horst Rittel.

Bruce Archer was of the opinion that computers can never replace design thinking. In 1965 he wrote an article ‘*Systematic Method for Designers*’, he suggested that we need to come up with ways of integrating design thinking with ergonomics, management, cybernetics and marketing.^[1]

Herbert Simon took the scientific approach to understand and document design thought process in his book, *The Sciences of the Artificial* (1969).

He also suggested open ended results to large problems, stressed that understanding the problem by all stakeholders is the biggest recipe for success, and suggested that simulation is the best way to reach a satisfactory solution.^[2]

Horst Rittel on the other hand was of the opinion that a more creative process was required in place of science for unique, open ended and ambiguous problems.

He called them wicked problems and used the term initially in domain of policy planning before it was used in the domain of design.

Ritter was of the opinion that each wicked problem would require a solution process that was unique to that problem.

In 1972, an industrial designer named Victor Papanek published a book called *Design for the Real World: Human Ecology and Social Change*.

This book dealt with the idea of sustainable design. Papanek also suggested that simplifying the complexity would eventually lead to innovation. He felt that the genuine needs of users were always ignored over wants and desires.

It's personal (1980-1990)

This period saw scholars working on the idea of design as a cognitive style, with designer gaining importance.

Nigel Cross suggested that the designer would be the core of the process and would rely more on his/her intuition to solve the problems.

He also suggested that the design process would be about generating creative bridges instead of taking the creative leap. And to build this bridges, he realised analogical thinking would form an integral part of this process.

David Schön in 1983 published a highly influential book titled, *The Reflective Practitioner*. He term for wicked problems was 'swampy lowlands' and stressed problem setting or framing as the most important part of the process.^[3]

Peter Rowe in his book *Design Thinking* (1987) explained the design process for architects and urban planners. He explained how a designer would use facts as well as intuition during the process to shape the solution.

Back to the present (1990-date)

1991 saw the establishment of IDEO, and the beginning of actively using design thinking for business purposes.

The terms "wicked problems" and "design thinking" gained popularity in 1992 thanks to Richard Buchanan and his paper, '*Wicked Problems in Design Thinking*'. He was one of the first people to consider design thinking as a multidisciplinary mindset and connected it to innovation.^[4]

All these theories started a race to evolve methods and processes to achieve design thinking in business, service and design.

Some of the more popular methodologies are, participatory design, user centred design, service design and human centred design.^[5]

Now design thinking has become a buzzword and in the business world people use it in multiple ways to improve the strategy and company value.

However I feel that the core of design thinking should be to add meaningful value to the human life, economics should always come second to the quality of life that we are trying to achieve.

Design thinking

What?

There are multiple definitions of design thinking, depending on the domain and the context.

It can be broadly defined as an encapsulation of thought processes and methods which enables generation of creative ideas/thoughts in order to achieve the desired meaningful output/change.

Design thinking as a concept has continued to perplex people. Design as a field has become so wide and segregated, that the definitions and the processes used keep changing and evolving. This very adaptable nature of the process is one of its biggest advantages.

Currently the most well known source of design thinking methodology is IDEO.

In Tim Brown's HBR article(2008), he defines design thinking as a discipline that 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.^[6]

Elements

Understand/observe/empathise: This allows us to understand all aspects of the system in which we would be applying the design thinking process. Arguably this becomes the second most important aspect of design thinking after 'problem framing'.

Define/frame the problem: throughout the past few decades, the proponents of design thinking have constantly asserted on the importance of framing the problem. This step forms the core aspect of design thinking. If the problem is correctly defined, it enhances the effectiveness of the process to provide a solution.

Ideate: This stage allows generation of diverse and multiple creative solutions of the defined problem. Various design methods mostly focus of this aspect of the process.

Create/Refine/Repeat: This is a highly iterative process of testing prototypes or proof of concepts for the most viable ideas selected from ideation phase.

Execute: This is the final stage of the process which focusses on testing and

implementation along with validation.

Why?

Why do we need to teach design thinking to students of other disciplines. We have already had a decade of designers treating this knowledge as a privilege which is not shared easily.

Design has now moved from tangible to intangible space and is being recognised and valued by various domains. There is a sudden need for practitioners of other disciplines to understand design thinking.

And since most of disciplines only teach convergent thinking to the students from a very young age, it hampers their ability to 'think divergently specially when they deal with complex or wicked problems.

This brings us to the core of this report. To understand how design is being thought to students of other disciplines and to provide a rough framework for creation of curriculum to teach design thinking.

For the scope of this project we will be focussing on management students.

With the popularity of collaborative and participatory designs, there is an ongoing debate of whether people not trained in design, should be allowed to take and influence design decisions.

However it is now considered good practice to consult and take into confidence the people that we design for, instead of working in silo. The same holds true for businesses. Hence there is a need for the management and support staff in any company to be equipped to understand the real need of the consumer.

Design thinking could be an effective method to add sustainable value to most solutions. Currently it is used in some way or the other in a lot of domains, some of which are: policy making, urban planning, management, service design, system design, architecture, engineering, education and communication.

Design thinking and management

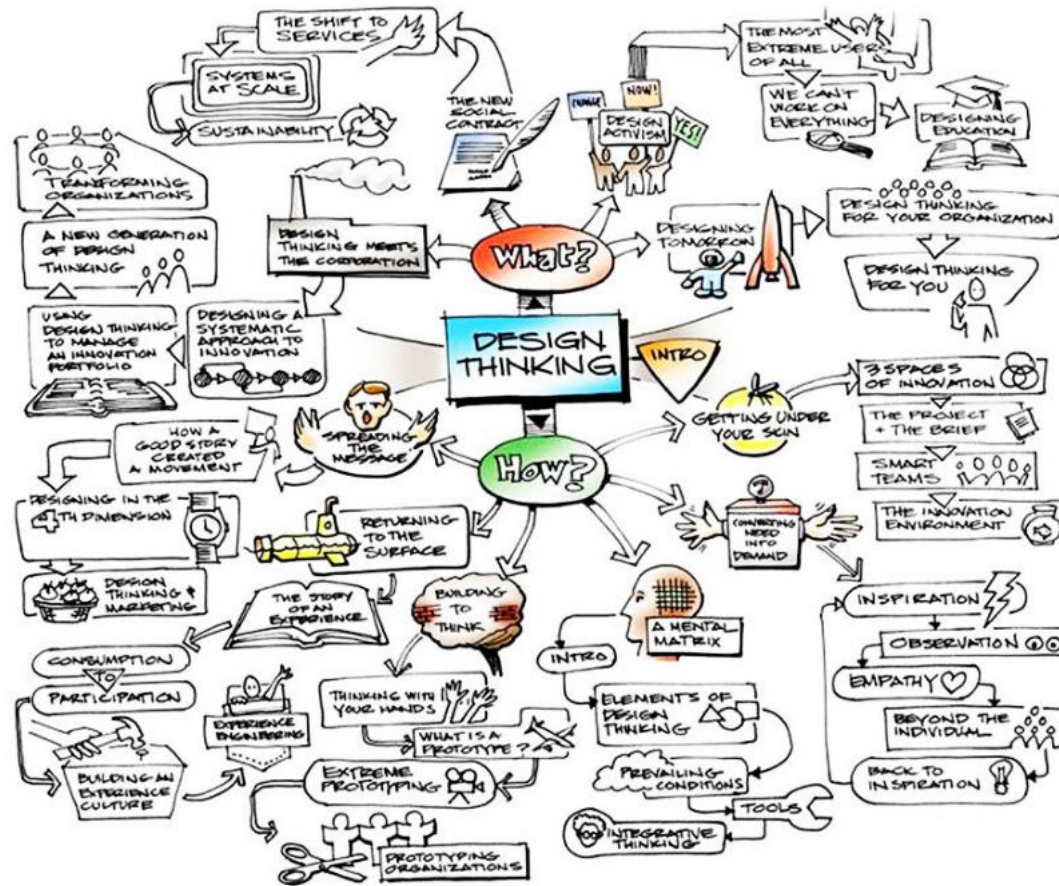


Image source: <https://mynewdesign.files.wordpress.com/2012/12/ideo.jpg> (as seen on 20.05.16)

Though design thinking started as a problem solving approach and later a multidisciplinary mindset for innovation.

Currently design thinking is widely used to solve business problems and to generate business strategy. And the most abundant modern day material about design thinking for organisations has been influenced by two books *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation* (Tim Brown, 2009) and *The Design of Business: Why Design Thinking is the Next Competitive Advantage* (2009).^[7]

Both these books move away from the idea of design thinking as a cognitive style to considering it as a process which leads to innovation in organisational framework.

At the time where popular management methods were staggering under the load of over analysis, design thinking offered a novel way to tackle the same issues. This has led to the current times where design thinking is considered and important organisational resource.

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fig 2: the wide range of design thinking (Brown, 2009)

Design 101: the B-school way



Image source: <http://cardious.com/weblog/post/540/> (as seen on 20.05.16)

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fig 3: most students of other disciplines still struggle with the apparent lack of a linear process, just like the guy in the cartoon above.

Most business schools teach problem solving using a very linear, structured, rigid and analytical approach.

Though this approach works extremely well for clearly and completely defined problems, it fails when we try reach fuzzy or complex ill defined or open ended problems. This is the area where design thinking is one of the most effective ways, as it focuses on holistic approach to understanding and problem setting.

Since design process is rarely rigid and structured, most management students struggle to find and understand the 'process'. The shift from convergent to divergent thinking does take time and the design thinking courses are expected to prepare these students to think on a broader spectrum before funnelling for a solution.

Also, most design school have structured their courses so that the students learn by doing. A similar project based learning approach does help in stead of the age old passive learning process.

The major issue in teaching design thinking to management students is dearth of faculty trained to teach it.

We have tried to look at some of the most popular business schools which provide design thinking related courses in the world.

Existing popular design thinking courses in B schools

Art college centre of design/INSEAD (Pasadena, California, USA /Fontainebleau, France or Singapore)

Program: MBA(INSEAD)

Course: Strategies for Product and Service Development

Instructor: Prof. Manuel Sosa

Course Description: This is an elective course offered as a part of exchange program between Art centre and INSEAD. The course teaches methods/tools to integrate various functions of a firm like strategy, marketing, design and manufacturing in order to solve strategic and product development challenges through innovative as well as viable solutions.

Teaching methodology: Apart from learning methods and tools, the course takes a project based learning approach. The class is divided in teams of five or six student (one team member will be a design student from Art College Centre of design).

These teams then work on all aspects of development process while working on a feasible idea to satisfy market opportunity identified by that team. The teams work from the stage understanding the user needs and defining the problem to building a functional prototype.

California College of the Arts (San Francisco, California,USA)

Program: MBA in Design Strategy

Course: Innovation Studio

Instructors: Lisa Solomon, Susan Worthman and Raffi Minasian

Course Description: This is a studio course which allows the students to use design techniques, tools and methods to design product or service

solutions. Students then have to effectively communicate these solutions verbally, visually and experimentally.^[8]

Teaching methodology: The teaching methodology focusses on providing hands-on and project based learning. The class is divided into teams and then the students try to understand all aspects of developing a solution while working on the chosen project. The projects are based on a theme which changes every semester. This allows the course to incorporate emerging domains.

Carnegie Mellon University
(Pittsburgh, Pennsylvania, USA)

Program: Master of Integrated Innovation for Products & Services
(Pittsburgh Campus)

Course: Integrated Product Development

Instructor: Peter Boatwright, Eric Anderson and Levent Kara

Course Description: Since the program is offered as a collaboration between CMU College of Engineering, School of Design and Tepper School of Business through Integrated Innovation Institute, it allows students to form interdisciplinary teams to work on industry sponsored projects. These projects are directed by an interdisciplinary faculty team as well. The course consists of four modules namely, identifying, understanding, conceptualizing and introducing a product opportunity,

Teaching methodology: The interdisciplinary students team learns tools and methods of understanding needs and wants of the market, defining the requirements of the product, creating concepts to satisfy user needs and then provide a functional solution with refined form and marketing plan. The course also expects the students to communicate various aspects of projects through presentations and report.

Case Western Reserve University
(Cleveland, Ohio, USA)

Program: MBA

Course: Design in Management:
Concept and Practices

Instructor: George Buchanan

Course Description: The course tries to teach designing as a managerial activity leading to organisational strategy by incorporating various aspects like technology, relationships, materials etc. It also reviews the four orders of design found in most firms (communications, environments, interactions and products).

Teaching methodology: The students are encouraged to take up ill-defined and ill structured problems from within the organisations. They are then expected to create value for the organisation by providing an innovative solution to the given problem. The students are then expected to give a presentation outlining clients current situation, opportunities, along with design requirements. The focus is on providing unexpected value to the client through innovation.

Delft University of Technology
(Delft, the Netherlands)

Program: Masters in Strategic Product Design

Course: Design Theory and Methodology

Instructor: Dr. C.M. Coimbra Cardoso

Course Description: The course takes a more reflective approach to understand design methodology by understanding how a designer thinks and behaves during design process. It expects students to develop their own process by reflection and critical study of designers and design methods.^[9]

Teaching methodology: The course consists of a series of lectures and assignments followed by discussions. The assignments are related to 3 major topics:

- reflection of students own design process
- Comparing systematic models of design and literature on problem solving while analysing the design process
- Interviewing two professional designers about the aspects of designing

Cranfield University/University of the Arts London (Cranfield, U.K., London, U.K.)

Program: Master's in Design in Innovation and Creativity in Industry

Course: Managing Innovation and New Product Development

Instructor: Prof. Keith Goffin

Course Description: The course starts with understanding the need of innovation in various sectors, and then focusses on building an innovative strategy. This is done by creating customer centric ideas, new product development and understanding how and internal process of an organisation along with its people and culture affect innovation.^[10]

Teaching methodology: The students are given lectures and assignments where they are expected to understand nature of innovation by identifying relevance and potential of it in an organisation. They are also taught to critically evaluate the tools and techniques of managing innovation and how to apply these in business situations.

Hasso Plattner Institute of Design/D. School (Stanford, USA)

Program: MBA

Course: Creativity And Innovation

Instructor: Tina Seelig and Rich Cox

Course Description: The course uses the invention cycle model as a framework and explains how to implement ideas by teaching aspects of imagination leading to creativity, innovation and entrepreneurship.

Teaching methodology: The course follows an experiential learning style and expects students to learn about invention cycle through a series of case studies, workshops, field trips and team projects. The focus is on identifying opportunities in the problem in order to generate an innovative solution.^[11]

Indian Institute of Management, Ahmedabad/National Institute of Design (Ahmedabad, India)

Program: Post-Graduate Programme in Management (PGP)

Course: New Technology Applications, Design And Business Models (NTADBM)

Instructor: Rakesh Basant, Jignesh Khakhar, Deval Kartik and Vinai Kumar

Course Description: This course is done jointly by NID and IIM students in a project base settings. The course focuses on interactions or linkages between design, engineering and management and teaches strategic management of the same. course would focus on the issues relating to the development of new applications and business models around existing technologies for commercialization by existing firms and through new ventures.^[12]

Teaching methodology: The course tries to teach using intra-group and inter group learning during the course of a project. The Groups are multidisciplinary, consisting of students from PGP (IIMA), Strategic design management (NID) and new media design (NID). The projects also focus on development of new applications of existing technology along with a business model for the final proposed solution.

A cursory analysis of the above mentioned courses reveals that these courses can be segregated into two major groups.

One group tries experiential learning in a multidisciplinary team setting consisting of both management students and designers. These courses depend on the complimentary skills and collaborative approach.

The other group focuses on learning and analysis of various design methods and tools and tries to teach the same through case studies and a project. Also all the courses considered for this report focus on understanding and problem identification as well as try to emulate design school environment of experiential project based learning.

Though major part of design thinking course is spent in understanding the process and tools, since it requires skills of observation and empathy, students have a tendency to get bewildered by a apparent lack of process. The major need is to make sure that design thinking tools also supplement the analytical skills which management students develop.

Most business schools teach problem solving using a very linear, structured, rigid and analytical approach.

Though this approach works extremely well for clearly and completely defined problems, it fails when we try reach fuzzy or complex ill defined or open ended problems. This is the area where design thinking is one of the most effective ways, as it focuses on holistic approach to understanding and problem setting.

Since design process is rarely rigid and structured, most management students struggle to find and understand the 'process'. The shift from convergent to divergent thinking does take time and the design thinking courses are expected to prepare these students to think on a broader spectrum before funnelling for a solution.

Also, most design school have structured their courses so that the students learn by doing. A similar project based learning approach does help in stead of the age old passive learning process.

The major issue in teaching design thinking to management students is dearth of faculty trained to teach it.

Design 101: the right way?

It is not easy to teach design. In fact the unlearning required from the student while learning design is immense. Though most management schools do a very good job of teaching design, the ambiguity in the design process might be too overwhelming. This holds especially true for students who come from a background of convergent learning styles. Though the ideal solution would be to have multidisciplinary teams in the course(designers included), this option may not be viable for all management schools as it requires an active collaboration with design and technical schools.

Also, there should be a vigorous shift from passive learning and teaching style to a more active project based learning. This calls for some restructuring of pedagogy followed by most management teachers. It would be more favourable if the course could have design faculty collaborating with management faculty to create and monitor the course.

Also since design thinking courses are still electives in most management schools, there is a tendency among students to undervalue or misunderstand the importance of these courses.

Most business schools encourage the competitive spirit among students and this usually extends to the grades that they receive. Since design has many intangible elements, students get anxious about the way they are graded in such courses. There is also a need to make the grading systems and learning outcomes very clear.

Ideally a design course should start with putting the students at ease, while explaining the basic aspects of divergent to convergent thinking and the advantages of apparently vague problem statements.

The course should then move to explaining each aspect to design thinking process (understanding, problem framing, ideating, refining and executing). The grading should be done on the basis of presentations (with stress on visual representations of employed thought process).

Then the class should be divided into multidisciplinary groups and themes should be provided for problem framing.

Once the ideation process starts the faculty should ensure that the groups don't fall into converging too quickly (or in some cases not being able to

converge at all). Care should also be taken to ensure that the ideations are as diverse as possible and not incremental in nature.

During the prototyping and refining stage, students should be encouraged to work on refining the concepts and testing them. Faculty should explain that failing quickly and moving on to the next concept at this stage also helps in creating a great solution.

The final execution of the product should again have a holistic view and should also provide value propositions and proposal for revenue channels.

The grading should be done on the basis of presentation, report, business model and the functional feasibility as well as economic viability of proposed solution.

A design thinking course for management students should ideally be as follows:

Course structure:

Module 1: Design thinking and its core aspects. Understanding the process and its importance.

Module 2: various designed tools and methods (brainstorming, kano charts,

mind mapping, role playing, ethnography etc)

Module 3: Case studies of good and bad applications of design thinking. A critical review of the general process and defining one's own personal process.

Module 4: Presentation on themes and formation of groups

Module 5: group project

Module 6: development of business models and final presentations.

Grading system:

20% class participation
50% group project
30% individual assignments and presentations

Learning outcomes:

At the end of this course students would be equipped to
1: display understanding of design thinking and its use for innovation within and without the organisational framework.
2: demonstrate awareness of user and market needs as well as interrelations within complex system
3: generate innovative solutions

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