

**PhD in Design Program
IIT Institute of Design
2006 Handbook**

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Intention of PhD Work

While doctoral work in design is fairly new, the intention of this work is classic in its viewpoint. It is research oriented and directed to advancing a theoretical foundation for practice with a view to developing better theories, methods and tools.

Doctoral students are expected to explore a variety of research methods and become adept at organizing and evaluating various kinds of research. For those interested in teaching, appropriate teaching experience will be provided.

The dissertation is an original demonstration of research skill directed to answer a significant question in design thereby making a contribution to design knowledge.

The Institute of Design focuses on Design itself from an internal perspective rather than through external viewpoints such as history or criticism. The act of design and planning of artifacts from the viewpoint of human concern is our primary subject of research.

The list to the right identifies skills and knowledge that the candidate will develop while engaged in doctoral work.

Skills for:

- literature search
- collaborative work
- writing
- presentation
- teaching
- network building
- creative thinking
- reasoning
- organizing experiment
- validating research

Knowledge

- ability to construct and assess research
- experience with several research methods
- indepth knowledge in some area

Research

The Institute of Design faculty have identified the research issues they believe are both timely and in which they have an active interest. The matrix below identifies these interests. Subsequent pages discuss and expand on the terms used on the matrix. Not all topics areas are being developed at this time. In general, dissertation research will be defended as theory, method or tool.

Research Matrix

Primary Area	Theory	Method/Principles	Tool
Users & Contexts	User Dimensions Cognitive/Social/ Cultural Context Models of Prototype Use	User Observation Design Survey User Models	User Observation & Analysis
Language & Media of Communication	Multimodal Communication Interactive Media Learning Visual/Visible Language Rhetoric of Design	Image Analysis Visualization Methods	Diagrammatic Representations Simulation & Representation Tools Learning Software
Interactive Systems	Spacio-Temporal Aspect of Interaction	Interactive Systems Model Design & Evaluation Collaborative Process	Remote Collaboration Environment Interaction Design Support Systems Distributed Design & Evaluation Environment Interaction Mode & Design Principles
Strategic Design	Social/Economic Models of Design Innovation Strategies Public/Governmental Policy	“Structured Planning” Assessment & Social Validation Product Planning Strategic Design Planning Project Management Case Studies	“VTCON” “RELATN” Tool Kits for Case Studies Value Assessment Tools for Specification Diagnostic Guidelines for Innovation
Design Systems	Formal Approaches to Theories of Design Models of Design Processes & Knowledge	Problem Identification Design Knowledge Representation & Formation Prototyping & Evaluation Life Cycle Design Framework	Design Support Systems Design Knowledge Systems

Entries in quotations are original contributions by ID faculty.

Definition of Research Terms

Users & Contexts

The goal of research in this area is to develop a systematic and complete general framework that encompasses human use and design process development as interactive partners. This area is ripe for development from both the human use and design process sides — particularly in the areas of overlap. Clarity of purpose should mark information observed or solicited from the user in relation to its usefulness to an unfolding design process.

Other disciplines may lend impetus to the development of particular user-centered design methods, however design needs to develop and refine its own methods that better accommodate design intelligence within its own process particularly from the concept of the user.

Tools in this area are understood to support in detail both techniques of user observation and computer supported analysis of user information.

Theory

User Dimensions — developing systematic recognition of the fundamental and sometimes changeable aspects of human capability and limitation.

Cognitive/Social/Cultural Context — identifying shared or distinctive characteristics at a level of specificity and generality useful to design process as well as overall specification and separation of cognitive/social/cultural factors.

Models of Prototype Use — clarifying various prototype classes and their specific uses in design process.

Method

User Observation — adapting social science techniques to design purposes as well as developing new methods.

Design Survey — collecting and analyzing information as a part of developing intelligence for design development.

User Models — creating a collection and analysis framework for establishing user profiles for specific design problems.

Tool

User Observation & Analysis — developing computer-based systems for overwriting observation data that include various methods for coding, searching, retrieving and analyzing.

Definition of Research Terms

Language & Media of Communication

The goal of research is to develop a comprehensive understanding of the communicative aspects of design. While examining theory from other disciplines, the focus is to look deeply at communication function within design and to develop specific theory.

Methods which serve to analyze, synthesize, classify, stage process development or assess design communication in general or in terms of sub-categories of visual representation such as photographs, diagrams, icons, indices, symbols, three-dimensional models, computer simulations, etc. are possible targets of opportunity.

Tools are specific well-formed instances of structured assistance that develop a particular method or method sub-component in detail using computer technology.

Theory

Multimodal Communication — combining sensory channels and codes to enhance comprehension.

Interactive Media — exploring exchange between objects and persons in which each modifies the behavior of the other.

Learning — encompassing motivation-access-contextualization-comprehension-constructive use-assessment.

Visual/Visible Language — revealing semiotic approaches to visual and textual representations through analysis of their strengths and limitations singly and in combination.

Rhetoric of Design — envisioning “futures” and supporting human agency (decision and action) through prototype demonstrations.

Method

Image Analysis — reading images analytically to improve control.

Visualization Methods — interpreting and transforming visual representation and media according to communication goals.

Tool

Diagrammatic Representation — revealing information through manipulation of data patterns, system relationships, levels of abstraction through selected dimensions of time and space.

Simulation & Representation Tools — developing phenomenal abstractions that reveal principles through manipulation.

Definition of Research Terms

Interactive Systems

The primary concern of this research domain is to understand and facilitate creation of interaction mechanisms between users and artifacts. While the notion of interaction introduces new perspectives and possibilities for design, interactive systems design requires new ranges of interdisciplinary knowledge and methods.

In order to establish a theoretical foundation for developing design methods and design principles, syntactic and semantic structures of "Language of Interaction" are investigated. Spacio-temporal aspects of interaction are critical as a basis for understanding and designing dynamic qualities of user experience. In order to incorporate these new dimensions in the process of interaction design, a coherent group of methods for activities such as observation, description, analysis, modelling, design and evaluation need to be explored. As a result of developing new insights and conceptual frameworks for interactive systems, exploratory design principles and paradigms are also developed and prototyped.

Theory

Spacio-Temporal Aspect of Interaction — investigating spacio-temporal structures of interaction and developing their representation models.

Method

Interactive Systems Model — representing focused aspects of users, interactions and systems in the application form of description for the purpose of design and evaluation.

Design & Evaluation — developing methodological frameworks of process and knowledge for design and evaluation.

Collaborative Process — developing intermediating mechanisms between remotely situated collaborators.

Tool

Remote Collaboration Environment — creating computer-implemented environment to facilitate remote collaboration.

Interaction Design Support Systems — developing computer-integrated systems to allow interdisciplinary approaches for design and evaluation of interactive systems.

Distributed Design & Evaluation Environment — interconnecting geographically and organizationally distributed sites, disciplines, activities and user groups to share knowledge and tools for design and evaluation.

Interaction Methods & Design Principles — developing new mechanisms and principles to facilitate interactive behavior.

Definition of Research Terms

Strategic Design

The Institute of Design particularly emphasizes systematic approaches to develop comprehensive strategies for identifying and solving design problems. “Structured Planning” technique being developed and refined over three decades has been a major driving force for framing the systems planning processes for large-scale complex problems. Strategic concerns of business and societies have also been reflected in the research topics in this area: economic theories of design and framework development for design case studies are examples that address emerging issues of the design discipline in the changing contexts of business, technologies and societies.

Theory

Social/Economic Models of Design — founding new theories of social and economic measures for evaluating design in a business and/or social context.

Innovation Strategies — identifying organizational and cultural factors in management, technology and design to establish strategies for innovation.

Public/Governmental Policy — exploring theoretical frameworks to model the dynamics of economic, technological, social, cultural forces for international and national policies of design related issues.

Method

“Structured Planning” — creating a methodological framework of design information and processes to deal with large scale, complex design problems.

Assessment & Social Validation — developing mechanisms to assess and validate design based on economic and social value systems.

Product Planning — analyzing product development possibilities in terms of technical, social, organizational and economic change. Strategic Design Planning — developing methods for supporting analysis and decisionmaking for setting design policies, strategies and strategic plans.

Project Management — estimating and controlling resources (human, facilities and capital) and progress on complex projects including technical coordination and human/creative coordination.

Case Studies — developing a system of case study frameworks that are useful for design analysis and reflection and that go beyond the specific approaches of other disciplines, like business, and into the essential possibility of learning from cases for design.

Tool

“Structured Planning” — developing tools like VTCON, RELATN, etc.

Tool Kits for Design Case Studies — developing analyses of case studies comparatively or through various kinds of detailed focus or relationship.

Value Assessment Tools for Specification — analyzing and comparing the probability of economic and user satisfaction based on various specification configurations.

Diagnostic Guidelines for Evaluating Innovation — assessing the structural, creative, economic and cultural context within which design organizations innovate.

Definition of Research Terms

Design Systems

This category of research looks into the mechanism of design itself. The goal of this research is to obtain coherent and logical descriptions of models of design processes and knowledge which provide a theoretical and representational basis for developing effective methodologies and methods. In the attempt to build understandings of the nature of design activities, for example, analytical and experimental studies of design cases and formal approaches are complementarily pursued to develop a theoretical framework of design.

A coherent model of design process and knowledge leads to the introduction of an effective methodological framework which is applied to the development of methods and tools in specific interest areas such as design planning, interaction design and communication design. "Structured Planning Technique" with supporting computer programs, now a well established and frequently used method as a planning tool at the Institute of Design, is an example of an outcome from such methodological research.

This domain of research also extends into its application with the development of computer-implemented systems such as the creation of a design knowledge base and a life cycle design support system in order to reflect real world needs and validate proposed theories, methodologies and individual methods.

Theory

Formal Approaches to Theories of Design — developing formal structures for understanding and explaining the general nature of design.

Models of Design Processes & Knowledge — developing models of design processes and design knowledge as a basis for a methodological framework.

Method

Problem Identification — creating methods to search for problems, describe problems and interpret them into a form of design information.

Design Knowledge Representation & Formation — developing representation methods for design knowledge in different design activities and mechanisms to form an accumulated body of design knowledge.

Prototyping & Evaluation — creating concepts and methods of prototype models and evaluation methods for different phases and aspects of design and evaluation.

Life Cycle Design Framework — developing a conceptual and methodological framework for lifecycle design regarding materials, user interactions and design knowledge.

Tool

Design Support System — integrating a variety of special purpose instruments into a unified design creation environment to support various viewpoints, methods, activities and collaborative structures.

Design Knowledge Systems — developing a computer-implemented knowledge framework to support documentation, access, manipulation and accumulation of design knowledge through the incorporation of multiple representation forms as required by different viewpoints and activities.

Faculty Research Interests

Faculty interests shift over time as a result of particular opportunities related to funding, changing interests or changing circumstances. Consequently it is important to get an updated statement of research focus from faculty directly.

Before admission, a PhD candidate is asked to indicate one or two possible research interests. This helps to identify a possible research match and locate faculty with whom the candidate can work. Part of the admission procedure is identifying faculty interested in the student applicant and in the research area. Particular faculty admit the candidate and take responsibility for the research direction and progress of the candidate.

Active Research

Chris Conley

New Product Definition

This umbrella theme focuses on the activities that occur before design and development activities normally begin in new product development. It explores the role of design thinking and expertise in non-traditional contexts like product management, product strategy and marketing, R&D and advanced concept groups. The goal in each of the research areas is to understand the nature and limitations of current processes and to explore how design expertise can improve their performance.

New Product Definition Processes

Currently an ad-hoc and poorly defined activity in many organizations, this research project looks at the information and communication needs of new product definition processes and how design expertise can improve the performance of this critical phase of new product development. Specific issues include what information should be developed in this process; how information can be communicated to cross-disciplinary teams; how diagrams can increase the communication value of new product definition documents; how new product definitions should be documented and how they can change as the identification of an opportunity evolves into a product spec; how

“opportunities” can be best described; what role prototypes play in new product definition processes.

Prototyping Theory, Tools and Methods

Prototyping is a common practice in new product development, but there is little knowledge about how and why prototyping works. This research project seeks to identify fundamental principles of prototyping and enlarge our understanding and application of it to pre-development activities like new product definition and strategy formulation.

Collaboration Methods for New Product Definition

New product development requires the involvement, expertise and creativity of many disciplines. Often called the fuzzy front end, few methods exist to support teams in the front end of product development. Without this support, whichever discipline has the most political weight in an organization often works fairly independently, foregoing the value that other disciplines can provide in the early stages. This research project focuses on how to make teams more effective when ambiguity about what to make next is high. The hypothesis is that design can both open up possibilities and increase clarity of opportunities to help to improve interdisciplinary communication and decision making.

Judith Gregory, Ph.D.

Design Processes

Understanding design practices and processes, especially transdisciplinarity in design; participatory design, alternative and experimental design strategies; changing design practices in relation to interactive and digital media.

Theory

Social theory approaches to design and use of information and communication technologies; debates in philosophy of design.

Health informatics

Design and use of electronic patient records and health information systems, potential uses

of new media in clinical practice and patient care; health information systems in developing countries.

Methods

Developing qualitative research methods (from social theory perspectives) for IS/IT design and for understanding work practices and social interactions through ethnographic research.

Vijay Kumar

Innovation Planning Tools

Early research has identified three main tracks of activity in a typical innovation planning process: 1) understanding users and markets; 2) identifying opportunities and developing innovations; and 3) creating viable business plans to implement the innovations. This research project focuses on a system of structured tools that works across these three tracks. The goal of this research is to explore a toolkit that can add value to all the steps in an innovation planning process — understand users, study the context, identify the patterns, frame insights, explore ideas, conceive plans, create solutions, envision the future and support implementation. This research forms an umbrella theme under which many other specific research projects are structured.

User Insights Database

It is standard procedure during user research for teams working on a project to use databases to organize data gathered in the field. But these databases are created specific to a project and can seldom be used for a second project. Moreover, each team working on a project develops very specific analytical tools and language to describe observations and ideas. The focus of this research project will be on conceiving databases that can be reused across projects and across teams thereby making the innovation process more efficient.

Tools for Insights to Innovations

The process of moving from research to ideation has been a challenge for innovators. While intuition can help for complex problems, innovators need reliable, structured tools and methods to make this transition effective. Analysis tools are needed to see patterns and

extract insights from research data. These insights can then be used as principles to base ideas on. This research project focuses on a set of frameworks, methods and tools that help innovators transition from insights to innovations.

Idea Management Tools

In the synthesis and genesis phases of an innovation process, teams explore many ideas and produce a large number of them at various levels. For innovation teams, the challenging part is to devise an efficient way to organize, compare, cluster, evaluate, share and modify the large number of ideas they produce. Capital allocations and the subsequent success of implemented innovations depend a lot on an efficient idea management system. The focus of this research is to understand how teams and individuals manage ideas and develop an efficient working model for an idea management system.

Keiichi Sato

General Design Theory/Methodology and Its Application.

Research in general design theory and methodology can provide a generalized foundation for developing domain-specific design methodologies. This research takes an axiomatic approach and investigates structures and representation of basic concepts and knowledge used in design. Results of the research will be applied as theoretical and methodological mechanisms to the formation and development of principles and methods specific to the areas of research described above.

Design Knowledge Representation: Multi-Aspect Design Information Framework

Design Information Framework (DIF) is a representation and structuring mechanism that attempts to link information and concepts used throughout the lifecycles of design processes, from capturing information and understanding problems to developing prototypes and evaluating solutions. Because it is a generalized framework for information representation and interpretation, DIF provides

a platform to bridge between different disciplinary views, methods and activities; sharing design resources; tracing chains of design rationale; developing methods and tools; and accumulating design knowledge. Methods and tools will be developed based on DIF in the areas of user studies, prototype specification, scenario generation, evaluation and remote collaboration.

Physical interaction and re-configurable interface: system/ product/ interface architecture

Physical objects carry rich information that function as triggers and sources for association, interpretation and imagination; thereby enriching our experience. This project intends to develop a conceptual and methodological framework for designing physical interface/ product/system with re-configurable architecture. Re-configurable architecture of a system, product and interface provides creative, exploratory and self-learning mechanisms that accommodate individual users' preferences, different ways of use or wide ranges of use contexts. This concept introduces a new dimension to interaction design that allows users' involvement in exploring interaction methods that better fit their own needs. It also encourages a wider range of users including disadvantaged users to engage in creative and collaborative activities across physical space and media space.

Interactive knowledge representation environments

Embedded technology, networking and media technologies provide information delivery in a wide range of forms at any location of user activities. Application areas of such systems are abundant including interactive knowledge management environments, interactive exhibits/ learning environments, automotive information environment, networked products, command and control interfaces as well as typical human-computer interaction with information systems. Yet the dynamic nature of information presentation such as presentational motions is not well understood and description mechanisms and design

methods have not been established. In this research area, several critical research topics are addressed: 1) fundamental understanding of dynamics/motions of information presentation, 2) representation methods for dynamic information presentation and interaction, 3) methods for spatio-temporal representation of knowledge in context, and 4) methods for embedding knowledge into physical objects and environments.

Model-Based Representation of Cultural Factors in Interactive Systems Design

Understanding the cultural factors of users and contexts is critical to meet people's needs and expectations for interactive systems. Yet, it is not easy to represent and describe cultural factors in a way conducive to the design process. This research attempts to develop model-based methods for capturing and representing cultural patterns of human-artifact formation into a description mechanism for interactive systems design. Semiotic models of objects and activities are also explored.

**Past faculty
advisors in the
doctoral program**

John Heskett
Professor of Design, Hong Kong Polytechnic

Charles L. Owen
Distinguished Professor Emeritus, IIT
http://www.id.iit.edu/people/faculty_bios/owen.html

Sharon Poggenpohl
Professor of Design, Hong Kong Polytechnic

Doctoral Study Sequence

With MFA/MDes

Research & Course Work	Semester 1	Semester 2	Semester 3	Semester 4	Semester 5	Semester 6
* Research Sequence	3					
* ID 685 Seminar	3					
* ID 691 Dissertation	3	3	8	12	11	11
* ID 510	3					
* ID 511	3					
* ID 598	3	3	3			
* ID 572						
* Psych 545						
Electives			3		3	
Semester Credit	12	12	14	15	11	11
Transfer	32**					
Accumulated Credit	44	56	70	85	96	107

Benchmarks

Research Activity	Join research group Identify research topic	Develop dissertation proposal	Develop a research plan Develop a pilot study	Perform research	Perform research	Complete dissertation
Exams		Take qualifying exam	Take language exam & comprehensive			Oral defense
Documentation		Develop bibliography & research summary	Publish a journal article	Publish a journal article	Deliver a conference paper	Complete dissertation
Advisors	Primary dissertation advisor	Secondary advisor	External advisor & Reader			

* Required Courses
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** Credit by title from an American university or evaluation of transferrable credit from a foreign university with a maximum of 32 credit hours.

Doctoral Study Benchmarks

The significant benchmarks that note progress in doctoral study are discussed briefly in order of their appearance.

Research Group Upon entry into the doctoral program, the candidate will be asked to join a research group in order to contribute to ongoing research and easily access the work already done or in progress. The dissertation topic is expected to be influenced by this experience.

Research Topic The research topic is developed under the direction of the primary advisor. Identification of the topic often relates to ongoing research and promotes the development of a research bibliography and research summary that are essential to the identification of a research question worthy of answering.

Qualifying Examination The qualifying examination usually takes place at the end of the 2nd semester of doctoral study, when all coursework has been completed. All faculty with whom the candidate has studied are invited to submit questions regarding the course work the student has taken. The purpose of the qualifying examination is to demonstrate breadth of knowledge in design. An examination is prepared with from 9 to 12 questions. The student can select to answer 8 to 10 questions. Answers are limited to a 500 word discussion. Diagrams are welcome adjuncts to the text. The student has a week in which to write the examination. A deadline for submission of the examination will be clearly noted on the exam. Following faculty examination of the answers, a meeting will be convened to get clarification from the student and engage in feedback on the answers.

Dissertation Proposal The dissertation proposal is developed under the direction of the primary advisor. The purpose of the proposal is to lay out the issues for investigation and to map out the process of development. The proposal is submitted in the 2nd semester and needs agreement from at least a panel of two advisors. As the work develops a full complement of advisors will be added. The initial proposal may change based on investigation

or the discovery of new research and development possibilities. Agreement on the viability and feasibility within the given time frame and resources as well as the significance of the dissertation proposal is essential for continuing doctoral work. (For further detail on the elements of the proposal, see pages 29-31 in Appendix 1.)

Language Examination The language examination usually takes place in the 3rd semester of doctoral study. The student can select from French, German, Japanese or Russian languages. The purpose of the examination is to demonstrate access to another language in which untranslated research may be available. An appropriate article or book chapter in the selected language will be delivered to the candidate for translation. The goal of the translation is to access the academic content of the material — it is a test of reading comprehension. The language examination is a take home test which is returned within the specified time.

Research Plan The research plan is prepared during the end of the third semester or the beginning of the fourth. The research plan lays out the nature of the original research the candidate will undertake including: its purpose, method and analysis. A small pilot study should be run to smooth out procedures and validate the focus.

If experimental work with human subjects are part of the research plan, the plan must be presented and approved by IIT's IRB (Internal Review Board). (See Appendix 2 for a sample IRB.)

Comprehensive Examination This examination consists of three parts: 1) a written proposal that includes a summary of existing research, a bibliography, identification of the research on which this work will be based, identification of theoretical underpinnings, the research plan itself, expected results and schedule of research; 2) a formal presentation to the advisory panel, followed by 3) an oral examination and approval or needed

amendment to the overall plan. In general this examination is intended to be a rigorous review of the level of competence achieved by the student as a result of the entire program of graduate study (except for the dissertation) as approved by the advisory panel and specified in the program of study form. Beyond the research plan, the student will be asked to demonstrate subject knowledge and familiarity with various research strategies.

Dissertation The dissertation is the culmination of doctoral work and is the most significant and complete communication of ideas and research. It will be organized and reorganized, written and rewritten, under the supervision of the primary dissertation advisor. However, all members of the advisory panel must be satisfied with the document. Every effort must be made to be accurate and communicate clearly in both the writing and presentation of visual material. It is a mistake to not work closely with the advisory panel as the formal document is taking shape. Early feedback and agreement can save difficult and time consuming work later. The dissertation is not complete until it passes the oral defense and all corrections have been made to the document.

Oral Defense The oral examination takes place when the dissertation document is complete, i.e., all research and analysis is complete and the theoretical, methodological or tool development is demonstrable in some tangible way. This document has been carefully read by the dissertation advisory panel. A public presentation of the work precedes the oral examination. The oral examination is conducted in private by the advisory panel and the doctoral candidate. The candidate will be asked questions regarding the dissertation and is expected to vigorously defend the work.

Advisors

Design often crosses disciplinary boundaries whether between sub-categories of design itself or between design and other distinct disciplines such as sociology, business and engineering. It is unlikely that a single advisor will have sufficient intellectual resources and experience to guide a design dissertation, thus an advisory panel of four appropriate faculty members is assembled to guide the dissertation development in various ways. The roles of the four advisors follow in the order in which they join the advisory team.

Primary Advisor The primary dissertation advisor is instrumental in the admission of a doctoral candidate and shares research interests with him/her, guiding the candidate through literature, experts, issues and questions that frame the discourse in the area. Their role is to help the student examine the state of research in general and theory, method and tool more specifically in this topic area in order to help identify and frame an original research contribution. The primary advisor will guide the dissertation process and be alert to conferences, article submissions and other short-term activities that might advance the candidate's thinking and research. (Identified at acceptance, before semester 1.)

The primary advisor has responsibility for the following:

- schedule the course of study
- help select conference and publication venues
- form the advisory committee
- convene advisory committee meetings
- organize and run the comprehensive examination
- schedule the public presentation of the dissertation and the oral defense

Secondary Advisor The secondary dissertation advisor is also actively helping to shape the candidate's work and shares a substantial interest in the research topic. Should the primary advisor be unable for whatever reason to continue guiding the dissertation, the secondary advisor will take over in order to provide

continuity of direction and to minimize disruption and conflict in development. (Identified in semester 2.)

External Advisor The external advisor brings specific expertise and guidance to the dissertation from another disciplinary perspective. This advisor is not usually added to the dissertation advisory panel until the work is quite focused and a research plan is ready for approval. Selection of the external advisor is based on specific need for academic expertise from specific viewpoints critical to forming a rigorous and consistent quality for the dissertation. The primary and secondary advisors will work with the doctoral candidate to secure an external advisor. From a practical standpoint, the time needed to secure this advisor should not be minimized. As the research focus is sharpening, taking courses with potential external advisors should be considered as a way to become better acquainted with their expertise and position on issues. (Identified in semester 3.)

Reader Advisor The fourth member of the advisory panel is the last to join. By this time the dissertation is well underway. The role of this member is to be an intelligent reader, to look for clarity of language use and logical development of the dissertation argument and evidence. The reader ensures that a jargon-free communication results and that adequate visual resources, whether diagrammatic, documentary or other, complement the presentation. (Identified in semester 5.)

These four advisors are the panel for the oral examination. They are the final judges of the dissertation's contribution and completeness.

Publications

Typical sequence of formal and informal publications:

- Bibliography
- Research summary
- Journal article
- Conference proceeding
- Journal article
- Dissertation

Publication Ethics The importance of accurate attributions and giving credit for ideas not necessarily formally documented cannot be overstated. Familiarize yourself with the concept of “fair use.” The scholarly reputation you are building for yourself reflects also on your advisors, the department and the university within which you work. Nothing is more damning than sloppy scholarship and taking credit for ideas that are not yours. Acknowledge those who help you through directing you to as yet unexplored research or who read your work critically and suggest improvements.

Do not fail to cite your own related publications as this is a method by which you establish your stake and expertise in the field. Likewise, do not fail to cite your colleagues and advisors as this establishes the expertise of your department and university.

Publication Requirements Doctoral candidates are expected to identify the knowledge that underpins their work (bibliography), to present a cogent review of the existing literature and issues (research summary), to write a minimum of two refereed articles in respected academic journals related to their dissertation and to complete the dissertation prior to their oral examination. The importance of codifying knowledge through writing, publishing and presenting in appropriate venues cannot be overestimated. Conference presentations are strongly recommended as a way to get external feedback and validate the work.

Articles submitted to journals and conferences that relate to your dissertation research carry not only your name but also that of your primary advisor.

Bibliographies Bibliographies are important resources for building the knowledge base on which new work will reside. Annotated bibliographies are expected as they not only inform others about the significance of the material but function to provide detail and increased remembrance of the importance of the material at a later time. It is undesirable for a dissertation to restate all preceding contributions

in detail, thus internal citations to key books, articles and authors, to significant conceptual or theoretical debate and where to find them streamline the dissertation and anchor the ideas in a bibliographic resource. The research bibliography should be published as a collaborative effort on ID’s database on the web (<http://ir.iit.edu/id>).

Research Summaries Research summaries identify the key ideas that have been developed in an area, what ideas researchers think are ripe for further development, what conflicting ideas remain unresolved, what connections have recently been forged between this research and that of another discipline. It is important for summaries to both hit the highlights with bibliographic back-up and present the latest ideas and work published. Organization of the summary is not necessarily chronological but may be better organized by research sub-themes. An effort should be made to publish the research summary in an appropriate journal. In any event, the research summary should be available on the ID intranet.

Co-authored Articles Co-authored articles with a dissertation advisor or a research team are expected as the doctoral candidate participates in various research programs or begins to solidify sections of their dissertation. It is expected that the doctoral student will publish an article or two about their dissertation work prior to its completion. The dissertation advisors (primary and secondary) should review these articles for accuracy, perhaps co-authoring and assisting the candidate in finding appropriate publication sources as necessary. (Pages 25-28 in the Appendix 1 contains a list of appropriate journals for dissemination of design research.)

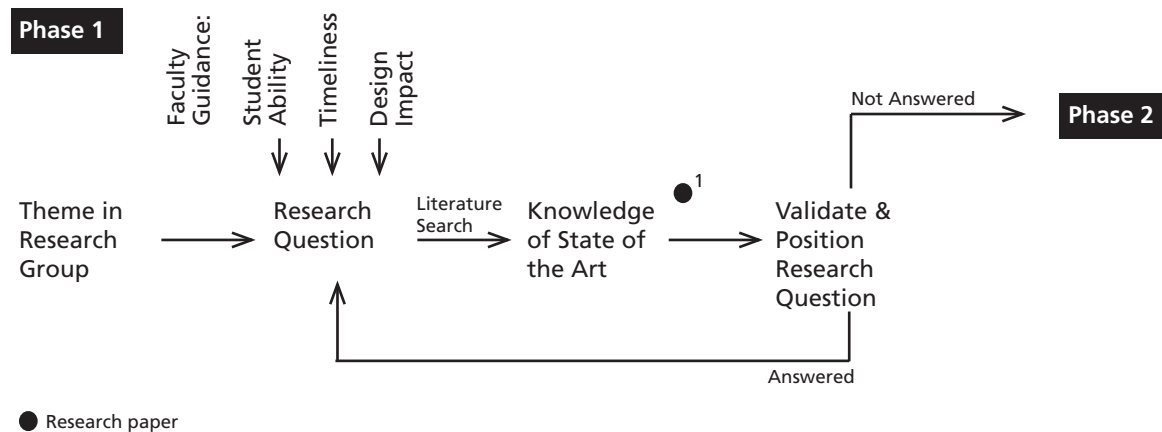
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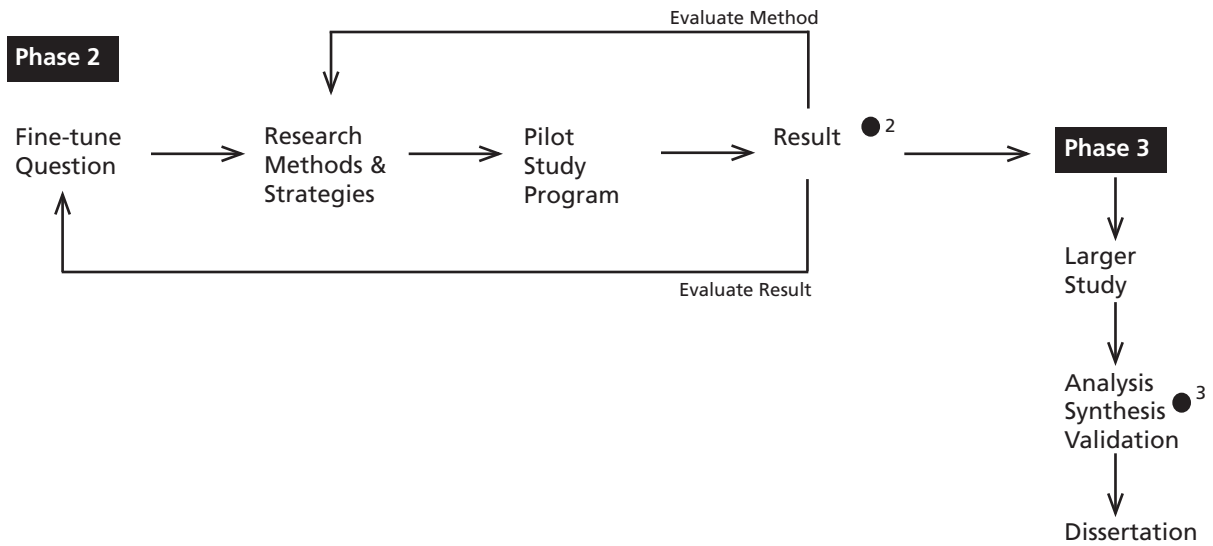
**Modelling
Dissertation
Research**

Based on faculty interest and skill, models of dissertation research are being developed. Doctoral work at the Institute of Design is based on an internal view of research needs in design; it seeks to develop knowledge that improves design performance in the world. Three models are in use: 1) an empirical model with two variations, experimental work and case studies; 2) theoretical work; and 3) methodological work. All these models share a similar first phase with the subsequent two phases diverging according to research focus. Of these four possibilities, two are well developed and presented here; they are empirical/experimental research and methodological research.

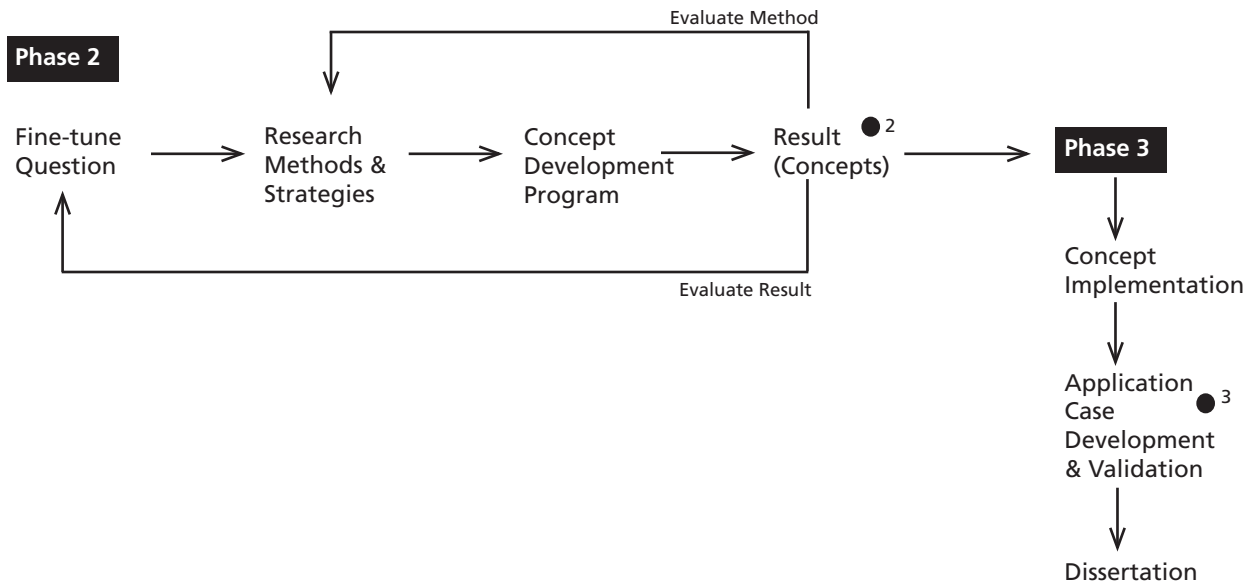
Shared Model of Phase 1



Empirical/Experimental
Research Model
Phases 2 & 3



Methodological
Research Model
Phases 2 & 3



Preparing a Research Plan

- Research question
- Research method
- Pilot study

Before getting too deep in a specific research question or method, it is wise to present a research plan to your advisory panel. At this point the dissertation proposal has been accepted and secondary research is complete. There are three parts to the research plan: the research question(s), the method by which it will be answered and a pilot study.

Research Question The nature of the question necessarily indicates the nature of what constitutes an acceptable answer. The question will inevitably move from general to more specific and from abstract to concrete as the goal becomes focused. It is useful to consider how the question implies certain methods and possible answers. Because the question is setting the stage for original research, framing the question precisely takes time and it is necessary to carefully consider methods and outcomes. It may be advisable to go back and forth among questions, methods and potential answers, all stemming from the same idea, until a good fit is achieved.

At this point the goal of developing a theory, method or tool should be clear. Any of these goals require evidence with the research undertaken expected to produce believable and convincing evidence. Determination of the fundamental focus of the dissertation (theory, method or tool) influences what are appropriate methods for the original research. Question, method and evidence or outcome need to be an integrated unit.

Research Method Depending on the nature of the question, whether it is directed to the development of theory, method or tool, a research method(s) should be selected. It will be necessary to examine various research methods — qualitative, quantitative, comparative — in terms of their feasibility and logics. Exploration of methods and selection of one may alter the research question somewhat. Methodological requirements must be clearly understood as a poorly executed method equals no method at all.

When settling on a method, take a look at other studies that have used this approach to

gain some practical perspective. Analyze the strengths and shortcomings of the method. This is often the moment when having an outside advisor from another related discipline is useful to critically review your ideas regarding the question, method and outcome.

Pilot Study Work closely with your advisory panel to design a pilot study. The pilot study is an abbreviated use of the method with appropriate but limited participants. This activity yields practical information regarding such issues as: the design of experimental materials, control of the physical setting, adequacy of data collection systems, analytical strategies and unanticipated problems with the research situation.

After running the pilot study, a critical review of the procedure and its results should allow a fine tuning of the method. It is at this point that your advisory panel should meet informally to discuss the research plan and offer any suggestions regarding its change.

Research Plan When the advisory panel agrees to the research plan, the next step is to prepare the documents for IIT's Internal Review Board (IRB). This step is a requirement for all studies using human participants. (The IRB forms and discussion regarding their requirements are in the Appendix 2.) Once the IRB has approved the research plan, it is a matter of execution. While much work remains to be done, the uncertainty that marked earlier stages of the dissertation "search" is over. Now careful, consistent development of the research becomes the goal.

Remember that the Research Plan is a primary element in the Comprehensive Examination.

Residency Requirements

A two year residency is required by the university. During this period the student completes class work, engages with a research group and defines and makes considerable progress on a dissertation research. We strongly encourage continued residency beyond this period. It is critical that the dissertation be well underway with milestones for its development clearly marked, if a change in residency is necessary. While it is best to remain in residency until the degree is completed, a change in residency should be considered only when the core of the research and analysis is complete. A change is least disruptive if only the writing remains to be done.

Occasionally unforeseen circumstances, such as illness, family crisis or other unavoidable circumstance, detour a candidates' continuous work on dissertation. A leave of absence is possible under these circumstances, but should be limited to as brief a time as possible. Formal written agreement to the leave of absence is necessary.

Students should complete all course work and the bulk of their dissertation hours as full-time students taking 15-16 credit hours per semester. This will normally take six semesters to complete the 116 hour requirement (if transfer credit is at least a minimum of 20 hours). At the point when a student has less than 16 credit hours of dissertation left to complete, he or she should register for that number of hours divided by the minimum number of semesters that they and their advisor agree will be needed to complete the degree. For the final semester, the student can be a part-time student. International students should be aware that the F1 visa status can be maintained under the above condition by filing a permission for Less than Full-Time Study from the international student office.

After six years, if the candidate has not completed the doctoral program, they must petition for additional time and outdated courses on the student's program of study must be revalidated. The petition must include a detailed plan for completion of the degree.

Appendix 1

Completed Dissertations

We encourage new doctoral candidates to examine the dissertations of previous candidates who have successfully completed the degree as a way to familiarize themselves with existing doctoral research achievements from this program.

Further, building on existing knowledge is key to sound development of new knowledge. In this way new knowledge is put into a context that reinforces its contribution and importance.

Dissertations can be borrowed for reading through faculty advisors.

1995	Kuohsiang Chen	Form Generation and Style Association
2000	Ding-Bang Luh	A Screening Model for More Innovative Ideas in the Early Stages of the Innovation Process
2000	Charles Bezerra	Evolutionary Structural Planning
2000	James Melican	Describing User-Centered Designing: How Design Teams Apply User Research Data in Creative Problem Solving
2001	Peter Storkerson	Cross Mode Communication in Multimedia
2002	Carlos Teixeira	Design Knowledge and Business Innovation
2002	Sakol Teeravarunyou	An Approach to User Knowledge and Product Architecture for Knowledge Lifecycle
2002	Praima Chayutsahakij	User-Centered Design Goal Setting: The Interplay between Use Research and Innovation
2002	Chujit Jeamsinkul	Methodology for Uncovering Motion Affordance in Interactive Media
2002	Izabel Falcao de Rego Barros	Design Strategy for Innovation and Organizational Effectiveness
2003	Melanie Joh	Resource-Based Design Competency Evolution Conditions in Corporate Design Organizations
2003	Youn-Kyung Lim	Design Information Framework for Integrating Multiple Aspects of Design
2004	Napawan Sawasdichai	User Goal-Based Approach to Information Search and Structure on Web Site
2004	Suzan Boztepe	Product Adaptation: A User-Value-Based Approach

Bibliographic Format

At the beginning of secondary research, it is wise to begin immediately to capture the necessary information. The Institute of Design research community has been developing a research database at <http://ir.iit.edu/id>. This is a searchable site with many valuable references. We continue to grow and maintain this site, consequently we expect you to contribute material. The database is most effectively used and contributed to with a modern java-enabled browser.

To submit bibliographic information to this site, there is a template at http://ir.iit.edu/id/input_categories.html

It is essential that the copy of the bibliography submitted to the database contain only the fields described on the template. These fields are:

Entered by (your name, last name first)
Article Author (last name first)
Article Title
Journal
Book Author
Book Title
Location Publisher
Volume
Number
Month
Year
Pages
ISBN
ISSN
Annotation
Contents
Key Words

A few of the last entries in the list above require some explanation.

ISBN is the unique reference number given a book and is found on the page containing publication information.

ISSN is the unique reference number given a journal and is found on the page containing publication information.

Annotation can consist of your comments on the book or article or a quoted statement that gives a good overview or abstract of the material. If you are quoting someone please use quotation marks so the attribution is clear. The database is a public resource on the internet so attribution is a necessity.

Contents is the list from the table of contents. Sometimes the contents alone is sufficient to give a clear overview of the work.

Keywords are four or five terms that you think indicate the general nature of the material in the book or article. Your keywords will be reviewed as the system for accessing information in the database is dynamic and growing.

To examine your contributions to the database, search using your last name as the keyword.

Important web addresses:

To search: <http://ir.iit.edu/id>

To contribute: http://ir.iit.edu/id/input_categories.html

Journal List

The following list of journals is a guide only, it is not comprehensive. In selecting a possible journal for publication of your work, it is best to examine the journal, review its mission and see what it has published recently. Correspondence with the journal's editor is often wise, as he or she can direct you to upcoming special issues, notify you about manuscript requirements, and even indicate if the subject of your paper is of interest. Not all of the journals listed below are peer reviewed. Most journals have websites with sample articles and information for potential authors.

Design Journals

ARTIFACT

The journal Artifact is an international peer-reviewed academic journal dealing with design.

Published annually by Routledge Press
Editorial offices: artifact@karch.dk
English - Denmark, peer-reviewed

Design Issues

Not peer reviewed but selected by a team of editors, this journal's focus is on history, theory, and criticism in design.
Published three times annually by MIT Press
55 Hayward Street, Cambridge, MA 02111
Editorial offices: 412 268 6841
English - US, not peer-reviewed

Design Management Journal (DMI)

Provides articles and case studies exploring how product, communication and environmental design are important resources for every organization. Founded in 1987, it is published quarterly by the Design Management Institute Press
101 South Street, Suite 502, Boston, MA 02111
Editorial offices: 617 338 6380
English - US, not peer-reviewed

Design Studies

This is a journal that approaches an understanding of design through comparison

across domains of application — it covers engineering, product design, architectural design, planning, computer artifacts and systems design.

Published by Design Research Society
Table of Contents by email: cdsubs@elsevier.co.uk
English - UK

Estudos em Design

Published quarterly by the Brazilian Association of Design Education, its objective is to provide for exchange of information between academics, students and professionals in the design field. Participants include national and international scholars and institutions who wish to reflect on and publish their design thinking.

Email: edesign@rdc.puc-rio.br
Portuguese/Spanish/English - Brazil

Journal of Design Communication (JDC)

This is a scholarly, refereed publication with the objective to promote communication among educators and researchers in the design disciplines who are involved with sketching, drawing, verbal and written communication, CAD, internet, multimedia and other design communication tools. They publish research in applications of design communication to education and practice in the design disciplines.

English - US

Journal of Product Innovation Management

This is the leading academic journal devoted to the latest research, theory and practice in new product and service development. Published bi-monthly, it is a benefit of membership in PDMA.

Research in Engineering Design

This is an international journal that publishes research papers on design theory and methodology in all fields of engineering, focusing on mechanical, civil, architectural and manufacturing engineering. Targeted to professionals in academia, industry and

government, it emphasizes the underlying principles of engineering design and discipline-oriented research where results are of interest or extendable to other engineering domains. General areas of interest include: theories of design, foundations of design environments, representations and languages, models of design processes and integration of design and manufacturing.

Visible Language

Published three times a year, this is an interdisciplinary, international, peer-reviewed journal that explores visual communication from many perspectives.

Institute of Design, IIT 350 N. La Salle St., Chicago, IL 60610

Editorial office: 312 595 4921

Abstracts of all articles searchable at www.ir.iit.edu/id also journal information at

www.id.iit.edu/visiblelanguage

English - US

Related Academic Journals

Cognition, Technology & Work

This journal focuses on practical issues of human interaction with technology in the context of work and working conditions. It aims to publish research that normally resides on the borderline between people, technology and organizations, such as how people use information technology, how experience and expertise develop through work and how incidents and accidents are due to the interaction of these three domains. Thus the study of people at work is examined from a cognitive systems engineering and socio-technical systems perspective.

Communications of the ACM

Established in 1957 this is the vehicle in which ACM members communicate their research findings and ideas. It covers both existing and emerging technologies; it is dedicated to serving a broad audience of

computing professionals through its coverage of advancing arts, sciences and information technology applications.

Published monthly by the Association for Computing Machinery (ACM)

1515 Broadway, New York, NY 10036

Office: 212 869 7440

www.acm.org

English - US

Harvard Business Review

Published ten times annually by Harvard Business School Publishing, its focus is original research and firsthand perspectives from business educators and practicing managers.

Selection is by editorial decision or invitation.

60 Harvard Way W-230, Boston, MA 02163

www.hbsp.harvard.edu

English - US, not peer-reviewed

Human Factors: The Journal of the Human Factors and Ergonomics Society

This is published quarterly by the Human factors and Ergonomics Society. Peer reviewed, it presents original papers of scientific merit that advance knowledge with regard to a systematic consideration of people in relation to machines, systems, and environments.

1124 Montana Ave., Suite B, Santa Monica, CA 90403

www.hfes.org

English - US

IEEE Transaction on Systems, Man, and Cybernetics

This journal includes cybernetics, computational intelligence, communication and control across humans, machines and organizations at the neural level and at functional levels as well. Topics include: vision, neural networks, genetic algorithms, fuzzy systems and robotics. It is published quarterly by the IEEE Systems, Man, and Cybernetics Society

3 Park Avenue, 17th Floor, New York, NY

10016-5997

www.isye.gatech.edu/ieee-smc/

English - US

Information Systems Journal (ISJ)

This journals aims to promote the study of

and interest in information systems and to publish articles that reflect the interdisciplinary nature of the subject. Articles are welcome on research, practice, experience, current issues and debates. It seeks to integrate technological disciplines with management and other areas such as psychology, philosophy, semiology and sociology. Papers reporting on research conducted using any appropriate research method are acceptable although ISJ has built its reputation by publishing qualitative research. Practitioners are also welcome contributors.

Journal of Computing and Information Science in Engineering
American Society of Mechanical Engineers
infocentral@asme.org
Editor: Jami J. Shah, Professor & Director,
Design Automation Lab
Department of Mechanical and Aerospace Engineering, Mail Code 6106
Arizona State University
Tempe, AZ 85287-6106
E mail: jami.shah@asu.edu

Journal of Documentation
Peer reviewed and published bimonthly by Aslib (The Association for Information Management), this journal focuses on research and practice relation to the recording, organization, management, retrieval, dissemination and use of information in systems of all kinds.
Editorial correspondence: A.M. Adams,
Science Library, Queen's University Belfast,
Lennoxvale, Belfast BT9 5EQ, Northern Ireland, UK
Email: j.doc@qub.ac.uk
English - UK

Journal of Research in Science and Teaching
The journal of the National Association for Research in Science Teaching, it publishes reports for science education researchers and practitioners on teaching, learning and policy. Scholarly manuscripts of interest include but are not limited to: investigations employing qualitative, ethnographic, historical, survey, philosophical or case study approaches; position papers; policy perspectives; critical reviews of literature; and comments and criticism. Fundamental aspects of the design domain are examined from design activity and experience to cognition and methodology to values and philosophy.

Sloan Management Review
Published quarterly by MIT Sloan School

of Management, this journal bridges management research and practice. Much focus is now on e-commerce and the internet.
PO Box 55254, Boulder, CO 80322
www.web.mit.edu/smr-online/
English - US

Systems Research and Behavioral Science
This journal publishes original articles on new theories, experimental research and applications relating to all levels of living and non-living systems. Its scope is comprehensive, dealing with systems approaches to: the redesign of organizational and societal structures; the management of administrative and business processes; problems of change management; the implementation of procedures to increase the quality of work and life; the resolution of clashes of norms and values; social cognitive processes; modelling; the introduction of new scientific results; etc. The editors especially want manuscripts of a theoretical or empirical nature that have broad interdisciplinary implications not found in a journal devoted to a single discipline.
Universal Access in the Information Society (UAIS)

An international, interdisciplinary refereed journal that solicits original research that addresses accessibility, usability and acceptability of information society technologies by anyone, anywhere, at anytime and through any media and device. Universal access refers to the conscious and systematic effort to proactively apply principles, methods and tools of universal design in order to develop information technologies that are accessible and usable to all citizens, including the very young and the elderly, those with disabilities, thus avoiding the need for a posteriori adaption or specialized design. The journal's unique focus is on theoretical, methodological and empirical research of both a technological and non-technological nature, that addresses equitable access and active participation of potentially all citizens in the information society.

Online Journals

Chronicle of Higher Education
www.chronicle.com/
English - US

Design Philosophy Papers
This online journal has interest in architecture and products, objects and structure, economics and politics, human agency and the agency of designed objects.

www.desphilosophy.com
English - Australia

First Monday
www.firstmonday.dk
A peer-reviewed online journal
English

International Journal of Innovation and
Technology Management (IJITM)
www.worldscinet.com/ijitm/ijitm.shtml
New peer-reviewed online journal; first issue
March 2004.

Journal of the American Society for
Information Science and Technology
This is a forum for new research in information
transfer and communication processes in
general and in the context of recorded
knowledge in particular. Concerns include the
generation, recording, distribution, storage,
representation, retrieval and dissemination of
information, as well as its management and
social impact. With a strong emphasis on new
information technologies and methodologies
in text analysis, computer based retrieval
systems, measures of effectiveness, the search
for patterns and regularities in measures
of existing communication systems, the
orientation is toward quantitative experimental
work. However, significant qualitative and
historical research is also welcome. Special
topic issues are also seen.
[www3.interscience.wiley.com/cgi-bin/
jabout/76501873/ProductInform
ation.html](http://www3.interscience.wiley.com/cgi-bin/jabout/76501873/ProductInformation.html)
English - US

Journal of Design Research
www.jdr.tudelft.nl
New peer-reviewed online journal with a focus
on social sciences and design; this journal also
does themed issues.

Journal of Digital Information
www.jodi.ecs.soton.ac.uk
This is a peer-reviewed online journal.

Research in Engineering Design
An international journal publishing papers on
design theory and methodology in all fields of
engineering with a focus on mechanical, civil,

architectural and manufacturing engineering.

Research Issues in Art, Design and Media
<http://www.biad.uce.ac.uk/research/riadm/>

Listervs

PHD-DESIGN@JISCMAIL.AC.UK

Other Resources

Qualitative research information — an
excellent site at
[www.trochim.human.cornell.edu/kb/contents.
htm](http://www.trochim.human.cornell.edu/kb/contents.htm)

Research Training Initiative run by Darren
Newbury in the UK at
[www.biad.uce.ac.uk/research/guides/index.
html](http://www.biad.uce.ac.uk/research/guides/index.html)

Gateway to online resources at
[www.educ.dab.uts.edu.au/
informationexplorer/Index.html](http://www.educ.dab.uts.edu.au/informationexplorer/Index.html)
Resource Center for Cyberculture Study at
www.com.washington.edu/rccs/

List of accessible digital archives at
www.eprints.org/

International Directory of Design at
www.penrose-press.com/IDD/pub/theor/html
This is a multilingual site listing design theory
journals according to country of origin.

Networked Digital Library of Theses and
Dissertations
www.ndltd.org
This is a repository of electronic theses and
dissertations.

Search Engine Guide
www.searchengineguide.com/
This site provides a directory of thousands of
specialty search engines, daily news about

Guideline for PhD Proposal Preparation

Adapted from Charles Owen's 1997 paper, "The MS Thesis and PhD Dissertation in Design"

Research Interest Area

The first step in the development of the dissertation is determining an area of interest. This was established before entry into the PhD program. Once in the program, participation in a research group also helps orient the candidate to possible focused areas of interest. The primary advisor is another source for direction.

The dissertation topic should address several issues: the subject should not appear to be so difficult that it is unlikely that useful work can be done; it should not appear to be so easy that any results that can be projected seem to be trivial; it should be within the capacity of the advisor and committee to supervise; and it should, if possible, take advantage of some insight that suggests a direction in which to begin the research.

A subject can be quite specific at this time. In fact, it is often useful to project an area of interest to potential final results in order to think about the consequences of the research. But it is important to step back from hard objectives in the early stages of investigation so that information not previously known can have an impact as it is uncovered. The results of discussions, therefore, should be an "area of interest" with relatively wide latitude for maneuvering.

Background or Secondary Research

Given a subject, the task now is to establish what has been done by others in the fields covered by the area of interest. The primary tool for research is the library (with related information retrieval resources). Before beginning, however, the student should establish a good reference system to record notes, store photocopies and save complete bibliographic information. At this time it is a good idea to consult at least a few publications on the preparation of report and dissertation manuscripts for ideas on techniques and formats (particularly footnote and bibliographic formats so that information need be collected only once). *The Chicago Manual of Style*, published by the University of Chicago Press, is an excellent guide for this purpose. With the

recording process in place, reading can progress as a serendipitous exploration.

After a few weeks of collecting information, the usual revelation is that much more has been done by others than was expected. This is normal (maybe a universal reaction) and should not be the cause of undue anxiety. The guiding question for the researcher at this point becomes, What is the real problem? By reading broadly and constantly looking at the material with this question in mind, the researcher eventually should become aware of some tightly focused area that has major potential for new work. As tentative answers to the guiding question are posed, questions to verify the answers will suggest more specific research.

Closure in the research stage is marked by a good grasp of the research question and a solid understanding of the work that has been done in areas related to it. As a rough guideline, when the bibliographic citations for any interesting paper are almost all papers and authors the researcher has already reviewed, the groundwork has probably been well done.

The Proposal

From the time an area of interest has been selected, the next formal goal for research is the dissertation proposal. The purpose of the proposal is to focus research well enough that a decision by the primary and secondary advisors can be made on the quality of the research intention and the likelihood of its success. For the advisor and the committee to be able to approve a proposal it is necessary to have enough information to be able to see the usefulness of the investigation and have some sense of how it is going to proceed. For the candidate to provide this information, it is necessary to conduct enough research to be relatively certain of what has been done in the area of interest and what might be a useful contribution. It is, of course, not necessary to have an answer, but it is important that there be a good idea of the direction in which to proceed.

The proposal provides the vehicle for organizing

what is known and what may be legitimate research questions and directions. A proposal has three parts: introduction, table of contents and bibliography.

The introduction should be the introductory chapter for the dissertation, just as it may appear in final form. Writing this chapter forces the researcher to consider larger aspects of the research question — why it is an opportunity and what value there is in exploring it. For the primary and secondary advisors, this section of the proposal addresses the quality issue, allowing them to weigh the usefulness of the projected work against other efforts that might be contemplated.

The table of contents section is an annotated structure of the dissertation. In form, it should have the standard entries described in the thesis/dissertation manual including all chapter titles and subheadings, however, it should be expanded in the proposal with a paragraph or so of annotation to explain what is expected to be discussed. Following this format forces the researcher to think out the plan of exposition. Since it is impossible to do more than a perfunctory job of this without solid preparation, the accomplishment of this task requires the completion of significant background research. Presented with a well worked-out table of contents, the advisors have a good view of what has been examined, what its meaning is for the project, and (to some extent) where the project is headed. While it is seldom fully clear what the final result of the work will be, it is usually clear enough to support a judgment on the topic, possible procedures and directions.

The third part of the proposal, the bibliography, should also be annotated. An annotation of a few lines establishes the content and its value to the project. Doing the annotation requires the researcher to seriously assess the references scanned, and in the process, abstract, generalize and focus them through a viewpoint — all important in developing an appreciation of the problem. Through the bibliography, the advisors are able to estimate the

quality and thoroughness of the research. (The annotated bibliography becomes part of the ID Database and is a PhD requirement.)

Once the proposal is accepted, a research summary should be written to encapsulate the current state of the art, debates and possible research directions. This should be published either in a journal or on ID's website to establish the stake the candidate has in the research to follow. (The research summary is a PhD requirement.)

At this point it may not yet be clear where the final research product is heading, whether to theory, method or tool. As the investigation continues and a research plan is developed, the goal should become self-evident.

Articles

As an intermediate goal between the proposal and the completed dissertation, it is valuable to have a major writing goal that will mark a milestone accomplishment. A paper (or, better — papers!) written for a journal or conference fulfills this need and has several other significant virtues.

A primary virtue is the crystallization of research and development of it into a finished product. Writing a paper of the quality necessary for publication is not as difficult as writing the dissertation (it is much shorter) and it forces information and ideas to a level of clarity that makes a major contribution to the development of the end result. Expanding the ideas discussed in a paper into the full presentation of a dissertation is much easier than doing the latter from scratch.

Since the paper continues the closure process initiated with the proposal, it also helps the advisor and committee to follow the development of ideas. To the extent that the paper covers the full scope of the dissertation, this may be a major contribution to obtaining final approval of the work.

Two other virtues of writing a paper are the

paper's importance for the advancement of the field and usefulness to the candidate's future plans. Published papers are the principle means by which disciplines grow and expand their bodies of knowledge. Dissertations, as bound artifacts in the university library, do little to expand knowledge. It is the information from them, distilled and reported widely, that promotes change. For the candidate whose work is published, there is recognition by the professional community, the chance to establish relationships with others who are interested in the work and the opportunity to use the credentials established by publishing for the advancement of a career. (Two published papers are a PhD requirement.)

IIT Forms List for PhD Candidates	Stage	
	Registration	Registration forms signed by appropriate officials
	Approval of program of study	Form 401 signed by faculty advisor and academic unit head
	Language examination	No form required
	PhD comprehensive examination	Forms 301 and 309
	Fulfillment of PhD residency	No form required
	Application for graduation	Form 527
	Appointment of dissertation examining committee	Form 301
	Preliminary PhD dissertation approval	Form 501A
	Final dissertation comprehensive examination	Form 309
	Final PhD dissertation committee approval	Form 501B
	Dissertation fee	Bursar's receipt
	PhD dissertation approval by the thesis examiner	Form 501B
	Completion of courses and other requirements	Listed on form 401
	Fulfillment of all financial obligations with the university	Registrar will mail details in October and April
	Commencement (attendance is voluntary)	Registrar will mail diplomas 4-6 weeks after semester grades are reported
	Diploma	

Appendix 2