Systems & Systematic Design
Tracing the Evolution of Design Methodology at the Institute of Design 1965 - 2010

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An Analysis by Jay Doblin

- **Beaux Arts**
  The traditional art school model

- **Purism**
  A top-down model directly transmitting ideals

- **Experimentalism**
  A bottom-up model resynthesizing individual exploration and experience

- **Commercialism**
  The uniquely American market-oriented skills training model

1945 - 1955
HfG Hochschule für Gestaltung Ulm

- *Bauhaus successor school in Ulm.*
  Key founders: Max Bill, Inge Scholl and Otl Aicher
  "Design problems of the industrial society of the future"

- *Faculty and student statistics:*
  
  - Staff Instructors: 21
  - Workshop Leaders and Technical Instructors: 10
  - Guest Instructors: 216
  - Visiting Lecturers: 12+
  - Total Student Enrollment: 640

*Background*

*Post-WWII European Design Education*

A German "new Bauhaus"
**Post WW-II European Design Education**

A German "new Bauhaus"

**HfG Hochschule für Gestaltung Ulm**

- **Illustrious faculty**, including:
  - Max Bill
  - Josef Albers
  - Johannes Itten
  - Walter Peterhans
  - Tomàs Maldonado
  - Otl Aicher
  - Frei Otto
  - Hans Gugelot
  - Konrad Wachsmann
  - Herbert Ohl
  - Horst Rittel
  - Bruce Archer
  - Gui Bonsiepe
  - Herbert Lindinger
  - Karl Gerstner
  - Abraham Moles

- **Search for a new educational balance**
  - Craft vs Technology
  - Theory vs Practice
  - Science vs Design
  - Art vs Science

1953 - 1968
Background

Design Education – IIT Institute of Design

Altering Course

Contributing Influences

- **ICSID Vice Presidency 1960-61**
  International Council of Societies of Industrial Design

- **Review of 23 schools 1963**
  Federal Republic of Germany

- **Presidency IDEA 1963-64**
  Industrial Designers Education Association (USA)

Information-based Design

Design based on research, systematic methods and the information obtained with them

1955 - 1965
Background

Design Education – IIT Institute of Design
Design Methods

A New Course in the Application of Design Methods

- **Alexander’s Method**
  Architect Christopher Alexander (Harvard, UC Berkeley): design problems as graphs

- **Systems Engineering Projects**
  Mechanical Engineer Dwight Baumann (and others at MIT): cross-discipline teams and project-oriented teaching

- **Computer Software**
  Alexander and Marvin Manheim (MIT): HIDECS2 and HIDECS3 computer programs

1965 - 66
Governmental / Institutional
1 Theater, 3 Transportation Systems

Laboratory for the Performing Arts
Commodity Transportation System
Personal Transportation System
Regional Transportation System

- Alexander’s method (augmented)
- Hierarchical condensation algorithm
- VTCON2 computer program

Spring 1967
Industrial
Ocean Resources Development System

Hydrospacce

- Selected schools competition
  ARMCO Steel

- Journal article
  Marine Technology Society Journal

- Observations, Force-tendency statements
- Design Implications
- Decomposition algorithm
- VTCON3 computer program

Fall 1968
**Event**

*Design Education – IIT Institute of Design*

Undergraduate Curricular Changes

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**Course Types to Improve Access to New Subjects**

- **Theory Courses**
  
  Lecture courses on design theory and methods: 2 credits

- **Minor Application Courses**
  
  One-afternoon workshop courses on specialized design topics: 3 credits

- **Major Application Courses**
  
  Two-afternoon workshop courses on primary design topics: 4 credits

- **Senior Thesis**
  
  Summary complete project with written component: 4 credits

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*Fall 1968*
Institutional
Design Education Facility

IIT Institute of Design

- Funded Grant
  ESSO Foundation

- Problem Element document format
- Interaction measure
- RELATN computer program
- Diagramming following conceptual synthesis
- Cycled planning process

Summer 1969
Getting Around

- **Multi-discipline** "Urban Systems Project"
- **Demonstration Project**
- **Grid cities**

- Integration of design / non-design disciplines
- Planning course / communication course handoff
- Multi-media communication

Spring/Summer/Fall 1970
Graduated Development of Complexity

- **Products**
  5th semester major course:
  products as artifacts with emphasis on form and functionality

- **Environments**
  6th semester major course:
  products in environments with emphasis on human factors

- **Systems**
  7th semester major course:
  products in systems with emphasis on systematic design

Fall 1972
Governmental / Institutional
Ocean Surveying/Monitoring/Collecting System

Living Sea Project

• Design for Home Production
• Self-Produced Research Tools

• "Structured Planning"
• Constraints, Objectives, Directives
• Functions, Function Structure
• Action Analysis
• Design Factors

Fall 1977 / Spring 1978
Institutional / Commercial
K-5 Educational Support Systems

Sensory Workshop

- 1st Prize Education Category
  ICSID 1st International Student Competition

Playscape

- 3rd Prize
  International Rehabilitation Engineering Design Competition

Spring 1979
Commercial Sports Store Customer Service System

Kinetics

- 2nd Prize
  Walker Group Interior Design Competition, New York

- CHART1 computer program

Fall 1981
Project

Commercial Multi-climate, Multi-culture Housing System

House of the Future

- *Grand Prize*
  1st International Osaka Design Competition

- *Book*
  House of the Future

- INFORM computer program
- Report format

Fall 1982
**Geo/Graphic**

- **Demonstration Project**
  Alternative Model for a Chicago Bid

- Planning team handoff to designing team

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**Fall 1984 / Spring 1985**
Institutional
Habitat Utilities and Logistics System

Space Station

• Commissioned project
  NASA / Johnson Engineering Company

• Defining Statement forms
• Abstraction ladder synthesis

Fall 1985
Ocean-deployed Resource Extension Systems

Institutional / Industrial

Aquatecture

• Grand Prize
  3rd International Osaka Design Competition

• Selected Concept
  ID International Design Review

Projects

• Multiple project integration

• [www.id.iit.edu/620/](http://www.id.iit.edu/620/)

Fall 1986
Institutional / Industrial
Ocean-deployed Resource Extension Systems

Aquatecture
Floating Fields

- **Grand Prize**
  3rd International Osaka Design Competition

- **Selected Concept**
  ID International Design Review

- www.id.iit.edu/620/

- Multiple project integration

Fall 1986
Institutional / Industrial
Ocean-deployed Resource Extension Systems

Aquatecture
Crossroads in the Sea

- **Grand Prize**
  3rd International Osaka Design Competition

- **Selected Concept**
  ID International Design Review

- Multiple project integration

- [www.id.iit.edu/620/](http://www.id.iit.edu/620/)

Fall 1986
Aquatecture
Patterned Energy

- Grand Prize
  3rd International Osaka Design Competition

- Selected Concept
  ID International Design Review

- Multiple project integration

- www.id.iit.edu/620/

Fall 1986
Projects

Institutional / Industrial
Ocean-deployed Resource Extension Systems

Aquatecture
Mobile Offshore Industry

- Grand Prize
  3rd International Osaka Design Competition
- Selected Concept
  ID International Design Review

- Multiple project integration
- www.id.iit.edu/620/

Fall 1986
Project Phoenix

- **Grand Winner**
  Environmental Technology
  "1991 Year’s Greatest Achievements in Science and Technology"
  Popular Science

- **Selected Concept**
  ID International Design Review

- Computer-graphic conceptual prototypes

- [www.id.iit.edu/619/](http://www.id.iit.edu/619/)

Fall 1988
Governmental / Industrial
Climate Change Mitigation Systems

Project Phoenix
Fire Replaced

- Grand Winner
  Environmental Technology
  "1991 Year’s Greatest Achievements in Science and Technology" Popular Science

- Selected Concept
  ID International Design Review

- Computer-graphic conceptual prototypes

- www.id.iit.edu/619/

Fall 1988
Climate Change Mitigation Systems

Project Phoenix
Fire Reversed
Desert Regreening

- Grand Winner Environmental Technology
  "1991 Year’s Greatest Achievements in Science and Technology" Popular Science

- Selected Concept
  ID International Design Review

- Computer-graphic conceptual prototypes

- www.id.iit.edu/619/

Fall 1988
Climate Change Mitigation Systems

Project Phoenix
Fire Reversed
Floating Wetlands

- **Grand Winner Environmental Technology**
  "1991 Year’s Greatest Achievements in Science and Technology" *Popular Science*

- **Selected Concept**
  *ID International Design Review*
  - Computer-graphic conceptual prototypes

- *www.id.iit.edu/619/

Fall 1988
Urban Environmental Integration System

Galleria Chicago

- Demonstration Project
  State Street Mall Chicago

Fall 1988
Commercial
K-12 Educational Support System

Kore Computer

- *Demonstration project*
  Apple Computer
- *Book Chapter*
  Design for Integrity

- Means/Ends Analysis
- Ends/Means Synthesis

Fall 1990
Industrial / Commercial Telecommunication Production System

TV Command

- Demonstration project
  Sony
- Book Chapter
  Design for Integrity

Fall 1991
Argus

- Demonstration project
  Hewlett Packard

- Book Chapter
  Design for Integrity

Fall 1991
Design Education – IIT Institute of Design
Curricular Revisions

Commitment to Research

• Research and Teaching PhD Degree
  First U.S. PhD in design

• Terminal Professional MDes Degree
  Two year program terminating in a demonstration project

• Theory Courses and Workshops
  Eight-week, 1½-credit theory courses;
  Sixteen-week, 2 or 4-credit workshop courses

Fall 1991
Nanoplastics

• **Finalist**
  3rd International Forma Finlandia Competition

• Future projections for society based on science projections

• [www.id.iit.edu/618/](http://www.id.iit.edu/618/)

**Commercial**
Future of Plastics in Home Systems

Fall 1992
Commercial
Lighter-than-Air Transport System

Aerotecture

- Bronze Prize
  6th International Osaka Design Competition

• www.id.iit.edu/397/

Fall 1992
Institutional Inter/Intra Institutional Service Systems

Chicago Museum Campus

- **Demonstration Project**
- Field Museum
- Shedd Aquarium
- Adler Planetarium

- Formatted System Elements
- Solution Element and System Element Properties and Features
- System Element interaction

Spring 1999
Eco-Choices

- **Demonstration Project**

**Environmental Stewardship Organizations**

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**Governmental Environmental Awareness and Action System**

**Project**

Spring 2000
Governmental Disaster Preparation/Response/Recovery Systems

Safe Earth

- Demonstration Project
- Disaster Management Agencies

- Rescue
  - ExRo
  - Video camera with live feed to rescuers
  - Two-way voice transmission
  - Wings
  - Spider legs
  - Crash-resistant body
  - Files or walks into debris impossible for human or animal access
  - Records situation under debris
  - Transmits visual information to rescuers
  - Transmits voice to instruct + calm victims

- Evacuation
  - SafeStop
  - Disaster-proof structure
  - City-loc
  - Ascending + descending observation deck
  - Provides easily accessible, clear destination for communities during evacuation
  - Serves as a tourist attraction during non-disaster situations

- Warning
  - Active Smart Messaging System
  - Multi-media warning system
  - Defined, clear, actionable warnings
  - Provides warning of impending disasters to individuals on wireless devices
  - Provides warnings according to personal preferences such as language
  - Allows confirmation of threat
  - Provides best actions to take

- DSR Lab
  - Research and testing facilities for disaster-related products + technologies
  - Product development lab
  - Develops products + technologies that make disaster preparedness simple and affordable
  - Facilitates collaboration between victims + designers

Spring 2000
**Access to Justice**

- **Commissioned Project**
  National Center for State Courts

- **Book**
  *Access to Justice. Meeting the Needs of Self-Represented Litigants*
  
  - Shared authority for direction
  - Integration of disciplines

**Project**

**Governmental State Courts Information Services System**

**www.id.iit.edu/727/ Spring 2001**
Governmental Advisory Recommendation Planning System

Planning for Innovation

- Demonstration Project
- Governmental Commissions

- Planning the design of a planning system
NGO Institutional
Process Evaluation Systems

Design for the World

- **Commissioned Project**
  Design for the World

- **Special Commendation**
  ICSID Design for the World, Barcelona

- System evaluation techniques

Spring 2003
IDI/C

- Demonstration Project
  - IIT
  - Chicago
  - The international design community

Fall 1990 / Spring 2003
International Design Institute for Chicago

IDI/C

- Demonstration Project
  - IIT
  - Chicago
  - The international design community

Fall 1990 / Spring 2003
IDI/C

- Demonstration Project
- IIT
- Chicago
- The international design community

Fall 1990 / Spring 2003
Commercial Cloud Network Computing System

Project Infusion

- **Finalist:** Work category 1st International INDEX Awards Copenhagen

- [www.id.iit.edu/614/](http://www.id.iit.edu/614/) Fall 2003
HealthNet

- Finalist: Body category
- 1st International INDEX Awards
- Copenhagen

- www.id.iit.edu/616/

Fall 2003
Institutional
International Sport Scoring System

InterPlay

• **Finalist: Play category**
1st International INDEX Awards Copenhagen

• [www.id.iit.edu/598/](http://www.id.iit.edu/598/)

Fall 2003
Evolutionary Housing

- **Finalist:** Home category
- 1st International INDEX Awards
- Copenhagen

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- [www.id.iit.edu/594/](http://www.id.iit.edu/594/)
- Fall 2004
Entry: Community category
1st International INDEX Awards
Copenhagen

www.id.iit.edu/553/

Fall 2004
Design Thinking

- **Demonstration project**
  Local, State and National Governments

- **Four Projects**
  Education
  Research
  Campaign
  Demonstration

- Integration of design planning with policy planning

- [www.id.iit.edu/552/](http://www.id.iit.edu/552/)
Massive Change

- Demonstration project
  Chicago Planning Commission, Department of Environment

- Adapting to a Hotter, Drier World
- Design Strategies for a Wetter World
- Massive Change: Living in a World with Rising Seas
- Urban Adaptivity To Climate Change

- www.id.iit.edu/550/

Fall 2006
Rethinking—Designthinking—Health Care

• Commissioned Project
  Robert C. Pew II

• Recommendation 2008
  Presidential Candidates

• www.id.iit.edu/824/

Fall 2007
Governmental Environmental and Infrastructural Systems

Chicago: Vision for the Future

- Next 100 Years Burnham Plan Centennial

- www.id.iit.edu/827/

Fall 2008
Commercial
Self-Sufficient Housing System

Future Living

- 2010 International traveling show
d3 Natural Systems "Housing Tomorrow"
- 2010 Bronze Award
  International Design Excellence Awards IDSA

www.id.iit.edu/1021/

Fall 2009
Structured Planning
Tools for Planning

The Structured Planning Process 2010

- tool kit
- information handling process

The projects viewed here in summary are from 109 conducted in the years between 1965 and 2010. Many have full reports, and all since 2003 (including some digitized earlier reports) are in .pdf form at the Institute of Design web site.

All will become part of the IIT Archive.