

Rapid Design

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Research: Integrating Virtual & Physical Prototyping

- NSF-funded, multi-disciplinary, multi-university project
 - Carnegie Mellon, Stanford, Berkeley
 - design, computer graphics, simulation, and manufacturing researchers
- Goal
 - enable automatic generation of parts by exploring the mapping of the design description into the manufacturing plan

Research: Integrating Virtual & Physical Prototyping

In the proposal, we said we would test the research by using the virtual and physical prototyping tools in an undergraduate design class.

We learned a lot by doing so!

Education: Rapid Design Class

Design is a metaphor for learning. In the process of creating a design, one creates and compiles the knowledge necessary to realize the design.

Indira Nair
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Education: Rapid Design Class

Introduction to rapid design through virtual and physical prototyping. The course covers:

- the design process**
- problem solving methods**
- interdisciplinary team work**
- current industrial practice for rapid prototyping**
- manufacturing process capabilities**

The course has no prerequisites and no lectures.

Course Activities

- Design Games
- Toy Dissection
- Computer labs
- Newspaper structures (design/build)
- Reports on rapid manufacturing processes
- Short-form MBTI
- Team work exercises
- Design exercises
 - Role Mole - glasses
 - Garfield - 6 pack holder
 - Toy transporter
- Design, prototyping, and testing of K-12 outreach activities

Education: Rapid Design Class

In Rapid Design, students learn to *fail quickly*

- a physical prototype is always due within a few days of the assignment
- the physical prototype can be
 - functional
 - aesthetic
 - ergonomic

Education: Rapid Design Class

Students learn to ask

- What's the simplest experiment I could do to find out whether my design will work?

The process of making the experiment, which is usually a prototype, helps them in the abstract - concrete - abstract cycle.

Reflection - Action - Reflection

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- Design is a reflective conversation between the designer and the design

Reflection - Action - Reflection

Major themes

- Conceptual design as discourse between designer and design
- importance of simulation in conceptual design
- design synthesis is not driven solely by form
- evolutionary refinement of design