

# Models of Design

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Why discuss?

Overall...

- Interface *Design*

Projects...

- *Design* an Experiment.

- *Design* Software.

- *Design* an Interface.

Knowing something about  
design processes will help!

# DESIGN FACTORS

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What factors influence a design?

- General properties of the human user.
  - ➔ Memory, Perception, Motor skills.
  - ➔ Natural abilities and limitations.
- The characteristics of the user.
  - ➔ e.g., personality, education, etc.
- The user's task.
  - ➔ e.g., stressful, repetitive, etc.
- The interaction hardware.
  - ➔ e.g., screen, mouse, etc.
- The interaction and display methods used.
  - ➔ menus, layout, colors, icons, etc.
  - ➔ strengths and weaknesses of methods.
- The implementation of the methods.
  - e.g., speed, tool selection and use, etc.
- Graphical design.

# Ingredients

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- Needs
  - want
  
- Requirements
  - must
  - testable
  
- Constraints
  - must not
  
- Preferences
  - should
  
- Evaluation
  - quality

# Four Basic Design Activities

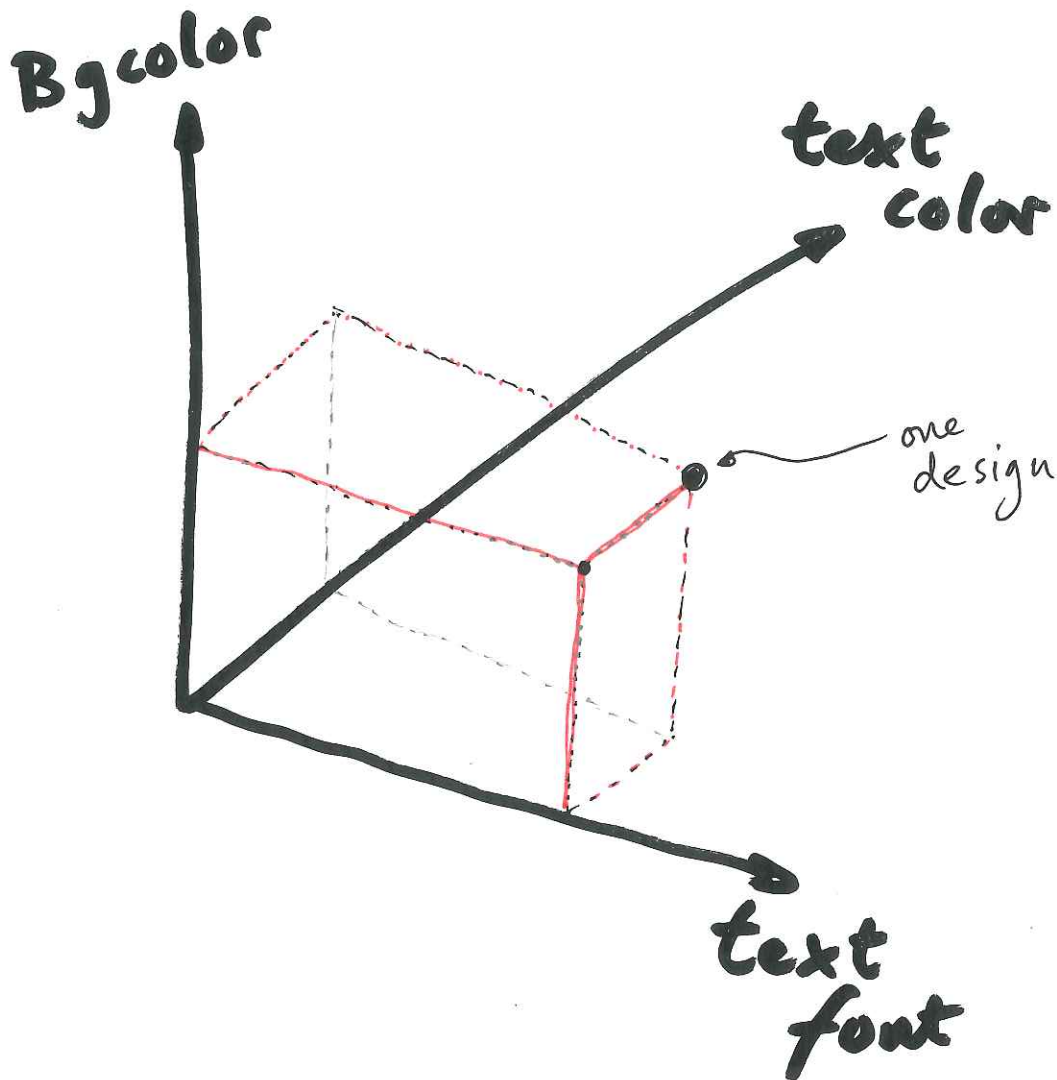
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- Identifying Needs  
and Establishing Requirements
  - ➔ User Analysis
  - ➔ Task Analysis
  
- Developing Alternative Designs
  - ➔ Conceptual Design
  - ➔ Physical Design
  
- Build Interactive Versions of Designs
  - ➔ Different levels of prototyping
  - ➔ Paper, web, VB,...
  
- Evaluating Designs
  - ➔ Metrics, Questionnaires, Interviews,  
Heuristic Evaluation,...
  
- AND Iterate!

# SEARCH

~ Multidimensional

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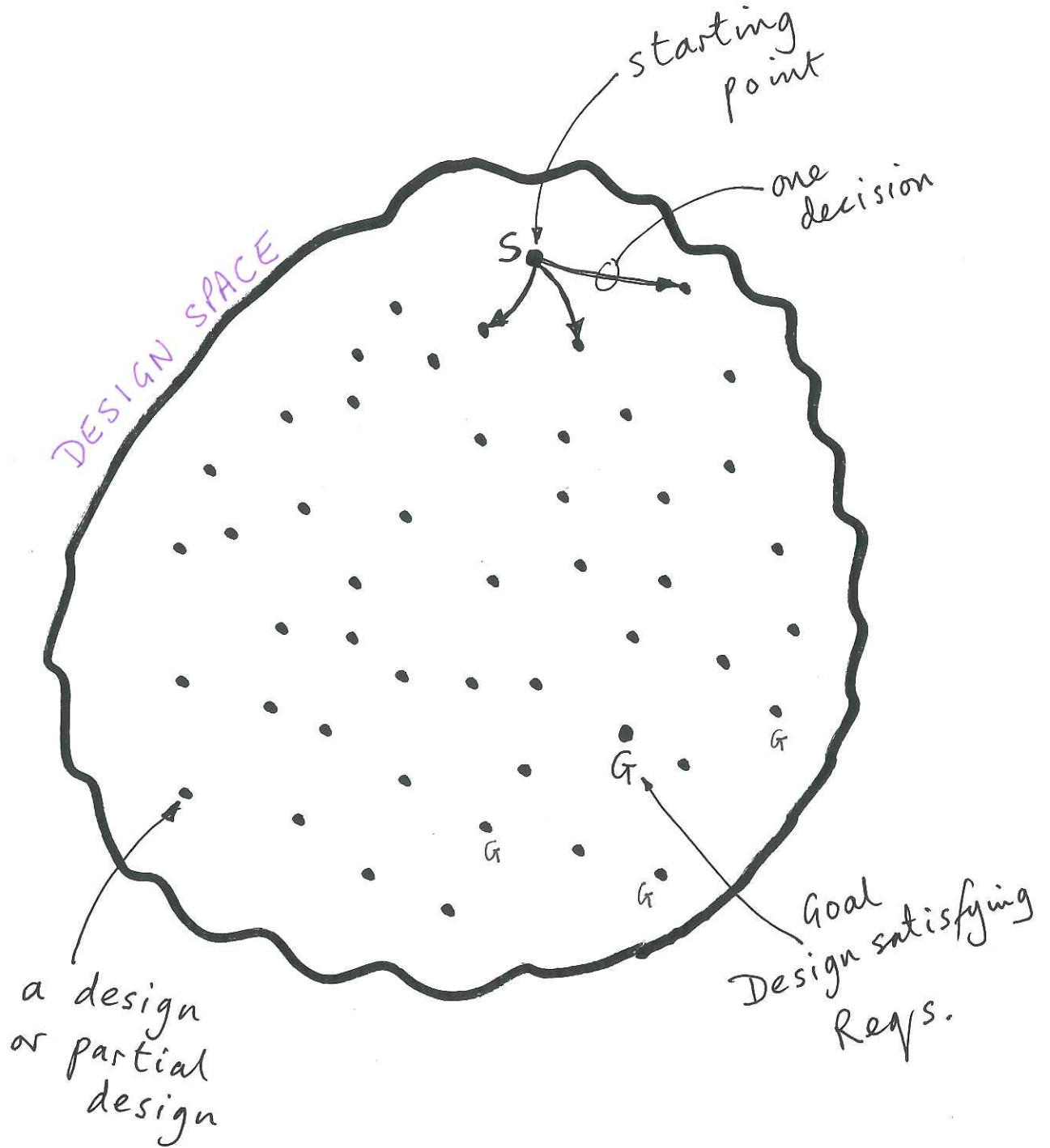


"Parametric"

# SEARCH

~ Space

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# Key Idea

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- Stay conceptual at the start.
  - That is, don't commit too soon.
  - Commitment adds constraints.
  - Constraints prune the search space.
  - Constraints remove possibilities.
  - Maybe including good designs.

“Late binding”.

“Least commitment”.

# Key Idea

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- Generate many alternative conceptual designs!
- Especially if being rewarded for creativity.
- Especially if likely to fixate.



# Key Idea

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- Make evaluation criteria explicit

e.g., cost -- low is good

mass -- low is good

attractiveness -- high is good

⋮

- Criteria should be measurable.
  - ➔ Or at least consistently estimable.

# Key Idea

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- Understand the importance of each evaluation criterion ( $C_i$ ).

e.g., low cost  $>$  high strength

where “ $>$ ” means “is more important than”

- Then you can weight each evaluation by its importance:

e.g.  $\text{Eval} = w_1 C_1 + \dots + w_n C_n$

# Evaluate & Select Designs

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## Concept scoring matrix

		Design1		Design2		Design3	
<i>Attribute</i>	<i>Weight</i>	<i>Rating</i>	<i>Score</i>	<i>Rating</i>	<i>Score</i>	<i>Rating</i>	<i>Score</i>
High Strength	30%	2	.6	3	.9	5	1.5
Low Cost	70%	5	3.5	3	2.1	1	.7
	<i>Total Score</i>	4.1		3.0		2.2	
	<i>Rank</i>	1st		2nd		3rd	

# Key idea:

- Understand uncertainty of evaluation

