The Curse of Creativity

DAVID C BROWN
Computer Science Department
WPI, Worcester, MA 01609, USA
dcb@cs.wpi.edu

Motivation

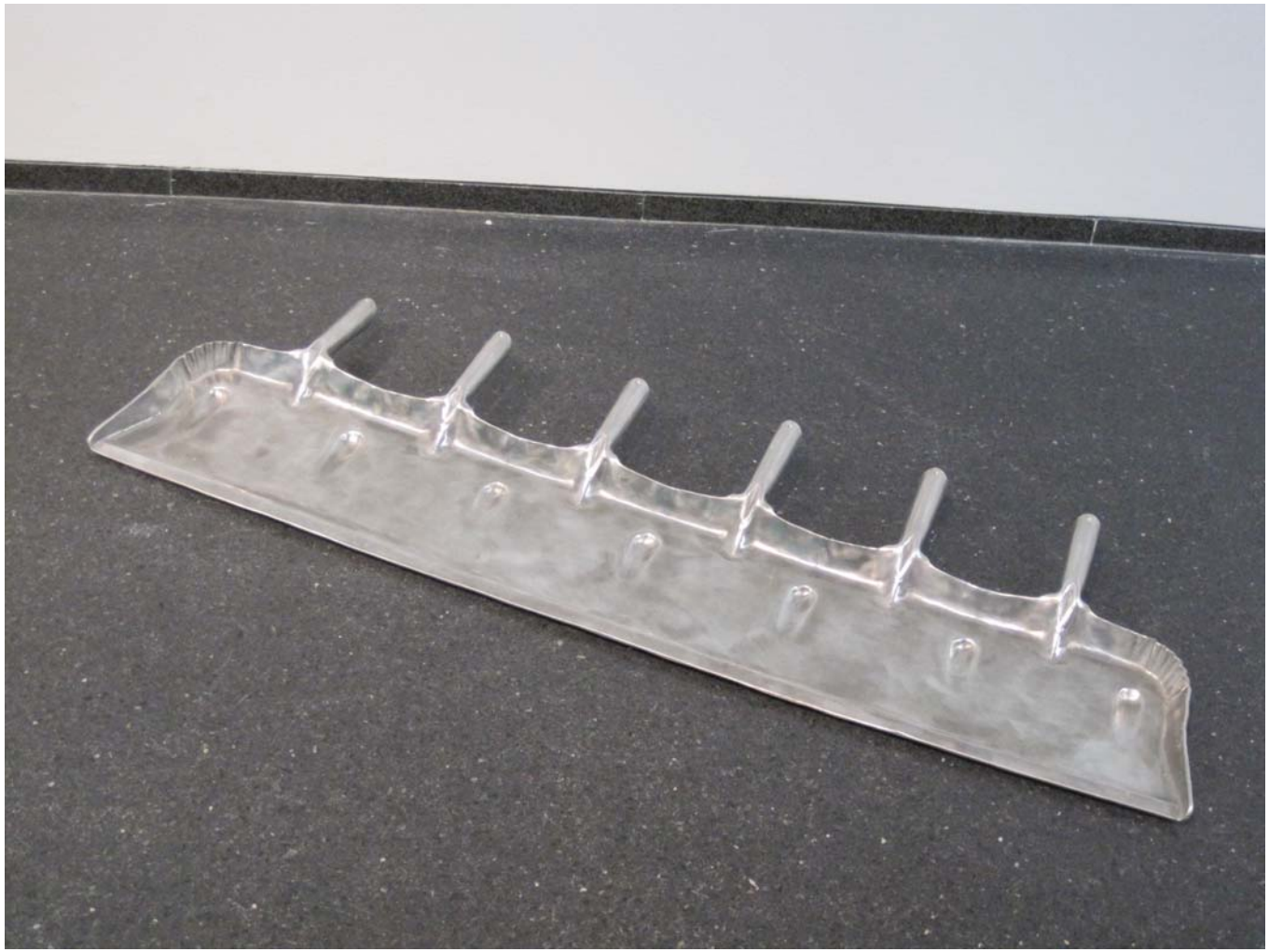
- Computational design creativity is hard to study.

- The focus has been on extreme non-routine design cases.

i.e., start with the hardest!

blue sky research

Very Creative Artifacts



Very Creative Artifacts

“Theoretical” Creativity

- Formal theory.
- Conceptual space “transformed”.

- Transformational creativity allows “radical newness”.
  - i.e., what wasn’t possible before.

“Perceived” Creativity

- People detect and evaluate creativity.
- Varies by who judges.
- Judgment includes many factors.

- People can judge *degrees of creativity.*
  …Exotic & extreme creativity.
  …Mundane creativity.

Exotic?

Mundane?

More Mundane?

Anti-blue sky

- Start with the easiest!
- Try to generate mundane creativity.

- Gently transform routine design methods.
- Investigate impact of changes on judgement of creativity.

Ingredients of Routine Designing 1-13

1. Basic Synthesis
2. Criticism
3. Decomposition
4. Evaluation
5. Execution
6. Ordering
7. Patching
8. Planning
9. Recomposition
10. Retraction
11. Selection
12. Situation Recognition
13. Suggestion Making

Ingredients in DSPL

Basic Synthesis	Step
Criticism	Constraint
Decomposition	Plan
	Task
	Step
Evaluation	Sponsor
Execution	Plan execution
Ordering	Plan
	Task
	Step
Patching	Redesigner
Planning	Plan
	Plan Sponsor
	Plan Selector
Recomposition	Plan .
Retraction	Backtracking
Selection	Plan Selector
	Step
Situation Recognition	Plan Sponsor
	Step
	FHs
Suggestion Making	Suggestion

Ingredients of Creative Reasoning A-Q

A. *Novelty*
B. *Domain Knowledge*
C. Heuristic knowledge
D. *Constraints*
E. *Combinations*
F. *Associative reasoning*
G. *Suppressing inhibitions*
H. *Abstract and imprecise descriptions*
I. *Alternative methods*
J. *Critical assessment*
K. *Problem recognition*
L. *Concept expansion*
M. *Analogical reasoning*
N. *Visualization*
O. *Meta-reasoning*
P. *Least commitment*
Q. *Forgetting*

Matching creative and routine designing

- Modify ingredients of routine design.
- Consider 1-13 against A-Q.
  - **Modify** 1. Basic Synthesis **to impact** A. Novelty
  - e.g., Try avoiding common combinations of values
- Assume no new design agents.
- New mechanisms can be “called”.
- Need to exploit meta-knowledge or meta-reasoning.

187 Possibilities for Modifications

	Synth	Crit	Decomp	Eval	Exec	Order	Patch	Plan	Recomp	Retr	Sel	Recog	Sugg
Novelty	y	y		y			y				y	y	y
Domain	y	y	y	y			y	y			y	y	y
Heuristic		y	y	y			y	y			y	y	y
Constr.		y		y									
Combin.							y	y	y		y	y	
Assoc.		y						y	y		y	y	
Suppress		y	y	y				y	y	y	y	y	y
Abstract	y	y						y			y	y	y
Alt.	y		y			y	y	y			y	y	y
Assess		y		y				y			y	y	
Recog.		y					y				y	y	y
Expand									y				
Analogy	y		y			y	y	y					
Visualiz.		y											
Meta.	y	y	y			y	y	y			y	y	y
Least C.	y		y		y								
Forget		y											

Creative Design: Conclusions

- Goal of transformational creativity is important.
- Fuelled by large scale reasoning methods.
  - e.g., analogy.
- *But supported and enhanced by smaller scale reasoning.*
- Use Routine Design basis.
- Focus on perceived creativity.

- Many more opportunities for interesting research into creative design systems.

Ballpoint pen 1

Mundane Creativity? 4

Mundane Creativity? 5

Mundane Creativity? 6

Mundane Creativity? 10