Modelling knowledge claims of design methods and their steps, and benchmarking these claims

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The challenge

Current design methodology
• there are multiple design methods and tools on the market
• their effectiveness is shown by successful applications
• designers choose among the options by their experience

Future design methodology?
• validation of the effectiveness of methods and tools
• comparison of methods and tools by efficiency
• creating knowledge for choosing among the options
Plan – work in progress

1. Set up a framework for considering efficiency using work by Joan van Aken
2. Sketch work on creating a basis for comparing methods and tools by efficiency
Plan – work in progress

1. Set up a framework for considering efficiency using work by Joan van Aken

2. Sketch work on creating a basis for comparing methods and tools by efficiency

- no gentlemen agnosticism from engineering research
- but still somewhat abstract
Step 1: articulation of the knowledge claims

Joan van Aken: algorithmic claims about particular cases:

For a particular design, method, aim, context, et cetera

• design D realizes aim A in context C
• method M enables finding a design D that realizes A in C, by designers with expertise E

• D realizes A in C
• M enables finding D-realizes-A-in-C by designers with E
Step 1: articulation of the knowledge claims

Joan van Aken: algorithmic claims about particular cases:

For a particular design, method, aim, context, et cetera

- D realizes A in C
- M enables finding D-realizes-A-in-C by designers with E
Step 1: articulation of the knowledge claims

Joan van Aken: heuristic claims about generic cases:

For all designs, methods, aims, et cetera

• $D_1$ realizes $A_1$ in $C_1$
• $D_2$ realizes $A_2$ in $C_2$
• $D_3$ realizes $A_3$ in $C_3$ ...
• $M_5$ enables finding $D_5$-real.-$A_5$-in-$C_5$ by designers with $E_5$
• $M_6$ enables finding $D_6$-real.-$A_6$-in-$C_6$ by designers with $E_6$ ...

• $\{D$ realizes $A$ in $C\}$
• $\{M$ enables finding $D$-real.-$A$-in-$C$ by designers with $E\}$
Knowledge claims about effectiveness

Heuristic claims for all designs, methods, aims, et cetera
• \{D realizes A in C\}
• \{M enables finding D-realizes-A-in-C by designers with E\}

Claims about effectiveness of a particular D and M
• D realizes A in C\textsubscript{1}, and also D realizes A in C\textsubscript{2}, C\textsubscript{3}, …
• D realizes A\textsubscript{1} in C, and also D realizes A\textsubscript{2}, A\textsubscript{3}, … in C

• M enables finding \{D-real.-A-in-C\} by designers with E
Knowledge claims about efficiency

• \{D \text{ realizes } A \text{ in } C\}
• \{M \text{ enables finding } D\text{-realizes-}A\text{-in-}C \text{ by designers with } E\}

Claims about efficiency of a particular D and M

• \(D_1\) realizes A in C,
  but also
  \(D_2\) realizes A in C, et cetera

• \(M_1\) enables finding \{D\text{-real.-}A\text{-in-}C\} by designers with E
  but also
  \(M_2\) enables finding \{D\text{-real.-}A\text{-in-}C\} by designers with E
  et cetera
Knowledge claims about method efficiency

M1 enables finding \{D\text{-}real.-A\text{-}in\text{-}C\} by designers with E but also
M2 enables finding \{D\text{-}real.-A\text{-}in\text{-}C\} by designers with E et cetera

By introducing additional norms (time, effort, recourses, …) one can then benchmark methods in both senses:
• determine which is most efficient
• use one method for improving the other
But is this feasible in design research?

M₁ enables finding {D-real.-A-in-C} by designers with E but also
M₂ enables finding {D-real.-A-in-C} by designers with E et cetera

By introducing additional norms (time, effort, recourses, …) one can then benchmark methods in both senses:
• determine which is most efficient
• use one method for improving the other
A first phase

Fix the generic knowledge claims of steps in design methods
A first phase

Fix the generic knowledge claims of steps in design methods

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<th>Step</th>
<th>Aims</th>
<th>Means</th>
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| Archaeology | An understanding of the past history of the problem situation        | Invite presentations on the problem situation by experts – analyse the role of the problem owner, past attempts to solve it, and what could have happened if another path was taken | Archaeology should capture:  
- Tensions or competing interests and values  
- Flexible and non-negotiable boundaries that can limit solutions |
| Paradox | An identification of the two most competing needs that cannot exist together | Think of tensions and opposing forces that make the problem hard to solve | Paradox should capture opposing needs that prevent the problem owner from moving forward |
| Context | A description of the stakeholders who have been involved with the problem situation and/or will be involved in its solution | Discuss current strategies and values and needs of stakeholders | Context should:  
- Contain powerful or controversial stakeholders  
- Identify significant influences on their behaviour |
| ...    | ...                                                                  | ...                                                                  | ...                                                                      |
Knowledge claims about method steps

$S_1$ enables finding $X$ by designers with $E$
but also
$S_2$ enables finding $X$ by designers with $E$
et cetera

By introducing additional norms one can benchmark method steps and design tools in both senses:
• determine which is most efficient
• use one for improving the other