Evaluation, When and How

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Evaluation: How Much Evaluation Is Enough?
Panel, VIS13

Wrestling with the question

- in private: ponder on case-by-case basis
  - as an author
  - as a reviewer
- in public: series of 4 meta-papers

"She generally gave herself very good advice, (though she very seldom followed it)."
- Lewis Carroll

- process and pitfalls *Dagstuhl07*
- nested model of design and validation *InfoVis09*
  - NM revisited: blocks & guidelines *BELIV12, Inf Vis Journal 13*
- design study methodology *InfoVis12*

Evaluation: broadly interpreted

[A Nested Model for Visualization Design and Validation. Munzner. TVCG 15(6):921-928, 2009 (Proc. InfoVis 09).]

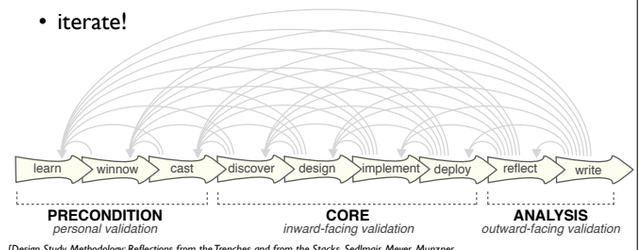
problem domain:
observe target users using existing tools
data/task abstraction:
encoding/interaction technique:
justify design wrt alternatives
algorithm:
measure system time
analyze computational complexity
analyze results qualitatively
measure human time with lab experiment ("user study")
observe target users post-deployment ("field study")
measure adoption

- mismatch: cannot show technique good with system timings
- mismatch: cannot show abstraction good with lab study

When to evaluate?

"Begin at the beginning and go on till you come to the end; then stop."
- Lewis Carroll

- at the end, to show you got it right: *summative*
- as you go, to make it better: *formative*
- iterate!



[Design Study Methodology: Reflections from the Trenches and from the Stacks. Sedlmair, Meyer, Munzner. IEEE TVCG 18(12): 2431-2440, 2012 (Proc. InfoVis 2012).]

Victories and challenges: I

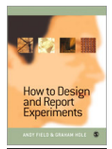
- evolving sophistication: the user study pendulum swings
- we've come a long way!
  - no user studies at all
  - a few dubious ones, lacking rigor
  - some good ones appear
  - rigorous studies are common
- but pushes to change culture often overshoot...
  - some reviewers expect all papers to have user studies
  - some authors do user studies without understanding why or how

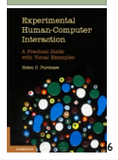
http://www.biologycorner.com/resources/pendulum.jpg

User studies: tricky to do right

"If you don't know where you are going, any road will get you there."
- Lewis Carroll

- many ways to go wrong that are not obvious from reading finished papers
  - ideal: collaborate with experts... several times!
- good resources
  - How to Design and Report Experiments, Andy Field & Graham Hole, SAGE
  - Experimental Human-Computer Interaction, Helen Purchase, Cambridge Univ Press





Victories and challenges: II

- significance testing with controlled experiments
  - we've moved beyond "my friends liked it"
  - new frontier: multiple regression for comparison

    [Cognitive measurements of graph aesthetics. Ware, Purchase, Colpoys, and McGill. Information Visualization, 2002. 1(2): p. 103-110.]
  - new frontier: thinking beyond time and error
    - qualitative vs quantitative
      - different axis from lab/field
    - BELIV workshops
      - 06 AVI, 08 CHI, 10 CHI, 12 VisWeek

BELIV 2012
BEYOND TIME AND ERRORS: NOVEL EVALUATION METHODS FOR VISUALIZATION
October 14-15, 2012

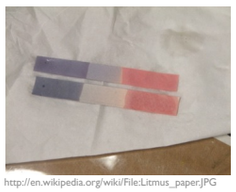
Victories and challenges: III

- post-deployment studies with target users
  - we've moved beyond "I'm the only one who's used it"
  - new frontier: post-adoption studies
    - Seven Scenarios: only 5 out of 800!

      [Empirical Studies in Information Visualization: Seven Scenarios. Lam, Bertini, Isenberg, Plaisant, and Carpendale. TVCG 18(9):1520-1536, 2012.]
    - what happens after you get that first paper out?...

Of course...

- ... you should evaluate your work
  - use appropriate methods!
- ... you should **not** have a user study in every paper
  - avoid litmus test and cargo cult thinking



http://en.wikipedia.org/wiki/File:Litmus_paper.JPG

http://blog.bhargreaves.com/wp-content/uploads/2010/04/cargo-cult.jpg