Conceptual Distance Matters When Building on Others' Ideas in Crowd-Collaborative Innovation Platforms

Joel Chan¹, Steven P. Dow², & Christian Schunn¹
Learning Research and Development Center, University of Pittsburgh
Human-Computer Interaction Institute, Carnegie-Mellon University

BACKGROUND

- Others' ideas are potential sources of inspiration
- HOW TO FACILITATE COLLABORATIVE INSPIRATION?**
 - Does **conceptual distance** of the source from your target domain matter?

NEAR

FAR

VS

- Prior studies mixed: We examine this question at better scale (N observations, time scale) than prior studies

DATASET

Social innovation: e-waste, accessibility in elections, urban community decline...

12 challenges
1,190 contributors (many designers/domain experts)
2,245 inspirations

707 concepts

110 shortlisted by expert panel for further development

Contributors cite sources

Concepts described with text, augmented with pictures

METHODS

- Model concepts' underlying topics using Latent Dirichlet Allocation, input = text
- Distance = (reverse) cosine between inspirations' and problem description's topic proportions

NEAR

Bicycle turns e-waste into copper
LDA = .05, Human = 5.8

waste materials recycling recycled material	waste e recycling electronics electronic	bike bicycle transportation bikes roads
.	.	.

FAR

Emotional accounting
LDA = .01, Human = 1.4

connect people face connected connecting	back pay money give receive	measure impact performance good index
.	.	.

- Good fit with human judgments, both continuous (1-6; $r = .50$) and binary (near/far; $r = .51$)
- Good separation between challenges, $d = 4.34$, concepts vs inspirations, $d = 0.32$

MAIN HYPOTHESIS

/ feedback, source quality
Shortlisted: Yes or no?

↑
Conceptual **distance** of sources from problem

RESULTS

Better success if you build on **any** source (controlling for feedback), $\beta = .31$.

Better success if you prefer more **near** than far sources ($\beta = -.38$, $p < .01$), controlling for feedback and quality of sources

- Effect most prominent in change from mid-low (near $\approx$ far) to mid-high (far $>$ near) mean distance
- Robust across authors and challenges

IMPLICATIONS

- Good to build on ideas
- Good to build more on ideas conceptually **near** to problem; or even **mix** of near and far
- Facilitates deep/iterative search?
- Design interfaces to help contributors find related concepts from prior/other challenges?