Collective Cognitive Authority: Expertise Location via Social Labeling

Terrell G. Russell unc@terrellrussell.com
School of Inofmration and Library Science
Renaissance Computing Institute
University of North Carolina at Chapel Hill

http://arxiv.org/abs/1204.3353

Abstract

The problem of knowing who knows what is multi-faceted. Knowledge and expertise lie on a spectrum and one's expertise in one topic area may have little bearing on one's knowledge in a disparate topic area. In addition, we continue to learn new things over time. Each of us see but a sliver of our acquaintances' and co-workers' areas of expertise. By making explicit and visible many individual perceptions of cognitive authority, this work shows that a group can know what its members know about in a relatively efficient and inexpensive manner.

Problem

- The Internet has delivered a great democratization, everyone has a voice.
- But now the flood of opinion demands some filters.
- I would like to filter on authority, for those I do not already know.

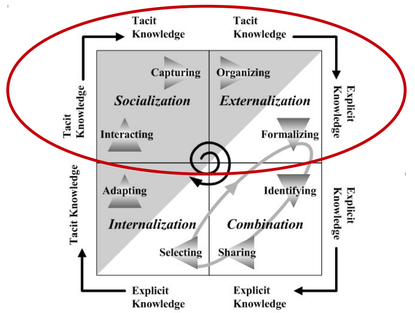
- I want to know who knows what.

Background

Cognitive authority is the foil to administrative authority (Wilson 1983). Administrative authority is that which one has through rank or position. Cognitive authority is that which is granted to you by others because of what they think you know about.

Cognitive authority is a subjective measurement and should be respected as such. There are no right answers to questions of cognitive authority, although, when taken collectively, an assessment of it can be seen as a barometer of one's standing among peers.

Making a collective assessment visible, bringing the tacit individual knowledge into the realm of the explicit, and performing a sanity check on that assessment is the thrust of this paper. This work shows that a group's evaluations of an individual's areas of expertise can be gathered and potentially serve as useful loose credentials; loose credentials that may be useful when more expensive or heavyweight reputation cues may not be viable.



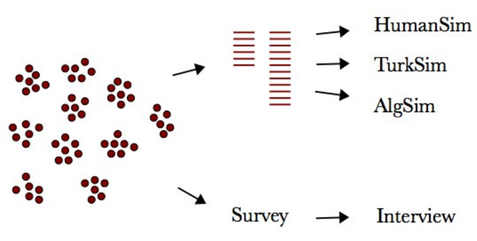
Nonaka's SECI model
Nonaka 1991 proposed a continuous cycle of knowledge creation between Tacit and Explicit knowledge. This study sits across the top two quadrants and attempts to externalize a group's opinions about its own expertise.

Methodology

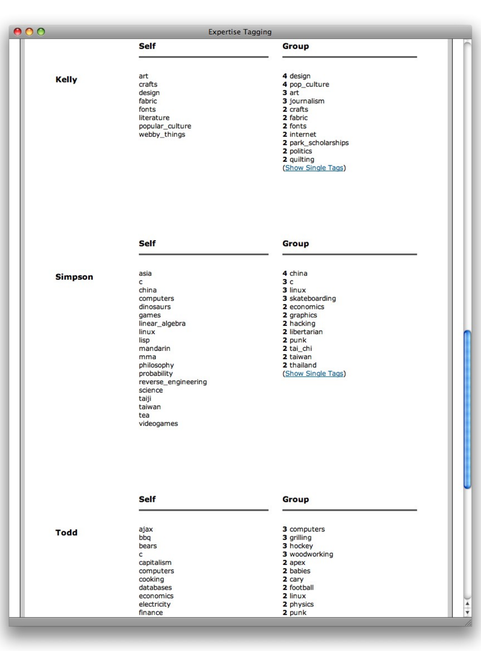
This study had 10 different groups totaling 64 individuals, mostly coworkers, use free text keywords to label each others' areas of expertise. The participating groups consisted of members from a family retail business, a dentist's office, two distributed software development groups, a museum education staff, a writer's network, a legal non-profit, a global engineering firm, an academic faculty group, and an academic administrative office.

Results were shared back into the group and made visible, and the process was repeated for up to five total rounds. The resulting product was an aggregated, weighted list of words associated with each person's areas of expertise.

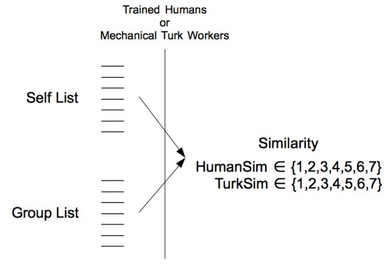
Based on the Delphi model (Dalkey 1963, Luo 2009), the participants were presented with what their group had said about them and had the opportunity to update (by adding, removing, or abstaining) their list of keywords about their own areas of expertise.



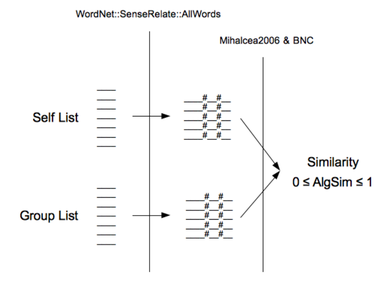
Study Design
10 groups, their Self and Group lists about each participant, and the three types of similarity ratings. There was also a survey and a set of interviews which captured context and sentiment.



Sample Results
Group members labeled both their own and their group members' areas of expertise. Collectively, a picture emerges of each members' projected knowledge. These banks of words were then analyzed for similiarity by both trained human coders as well as Amazon Mechanical Turk workers.



Trained Human coders and Mechanical Turk workers
Word lists were rated on a similarity scale. Sets of words were rated higher if the rater agreed with the statement: "I think these lists describe similar concepts and ideas."



Algorithmic Similarity
The word lists were also evaluated using the WordNet database and a similarity algorithm originally designed for sentence similarity. It uses a "bag of words" technique and therefore ignores word order and weighting.

H1 As the social fact of what a person knows is collectively molded by the group, a consensus will appear and converge.

Supported

The data supports that this method provides a baseline for concluding that a group's opinion about a person's areas of expertise can give good information. A consensus appeared, was agreed to by the individual being labeled, and somewhat converged over time as the language and norms of the group were negotiated in a shared space.

This finding comes with the caveat that the participants knew one another well enough or had enough experience with one another to feel the data being provided was of good enough quality. When conducted outside of well-known groups, this finding may not hold as both participant identity and the promise of future interactions are not as strong.

H2 Group members will have confidence in this system and exhibit increased trust in one another.

Partially Supported

This hypothesis was found to be partially supported. Participants did have confidence in the system to collect and then report the type of information they were expecting it to report. They thought the data would be quality data and they trusted it for what it was.

However, they did not report that the trust in the data carried over to increased trust in the other participants. The study design forced the group members to already be acquainted with one another and have existing working relationships. This means that the participants began the study with a fairly high degree of trust. This study provided no support for the idea that participants' trust levels increased because of the exercise.

Conclusions

Results are most relevant to group members who are not as "established" (i.e. new members).

Results are complementary and should be deployed alongside or integrated into existing knowledge management infrastructure.

Results need to be accompanied by guidelines for interpretation. Raw word lists are not enough.

References

Dalkey, N. C. and Helmer, O. (1963). An experimental application of the delphi method to the use of experts. *Management Science*, 9(3):458–467.

Luo, L. and Wildemuth, B. M. (2009). Delphi studies. In Wildemuth, B. M., editor, *Applications of Social Research Methods to Questions in Information and Library Science*, chapter 10. Libraries Unlimited, Westport, CT.

Mihalcea, R., Corley, C., and Strapparava, C. (2006). Corpus-based and knowledge-based measures of text semantic similarity. In *Proceedings of the National Conference on Artificial Intelligence*, volume 21, pages 775–780. AAAI.

Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1):14–37.

Wilson, P. (1983). *Second-hand knowledge: An inquiry into cognitive authority.* Greenwood Press, Westport, CT.

UNC SCHOOL OF INFORMATION AND LIBRARY SCIENCE

renci RESEARCH \ ENGAGEMENT \ INNOVATION