

Changing the subject — One way of measuring trust in information

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1. TARGET NOTION: TRUST

For the purposes of two recent student projects hosted at SICS, we defined a target notion based on *trust* in lieu of topical relevance. Specifically, the studies in question examined the effects of using annotation software viz Annozilla [2] and cooperation, contrasting paired test subjects to subjects working singly[1].

The studies were empirical, and based on a laboratory-style setting, where subjects recruited by notices posted in university halls were invited to work on a set number of tasks designed to be somewhat realistic in style but completely unrelated to any previous interest or activity on the part of the subjects. This research note discusses the target notion of *trust* defined for the student projects.

Most evaluations of information retrieval or information seeking presume the existence of some topic-related measure related to topical relevance. The everyday notion of topical relevance has been operationalised and formalised to the quantifiable relevance of TREC-like studies. This formal target notion of “relevance” is an effective tool for focused research. Much of the success of information retrieval as a research field is owed to this formalization. But relevance, in the form it is operationalised, has drawbacks.

Trying to extend the scope of an information retrieval system so that it is more task-effective, more personalized, or more enjoyable will practically always carry an attendant cost in terms of lowered formal precision and recall as measured by relevance judgments. This cost is not necessarily one that will be noticed, and most likely does not even mirror a deterioration in real terms – it may quite often be an artefact of the measurement metric itself. Instead of being the intellectually satisfying measure which ties together the disparate and vague notions of user satisfaction, pertinence to task, and system performance, it gets in the way of delivering all three.

In the studies referred to here, while the focus of the studies was investigating annotations and cooperative behaviour, respectively, they shared the common target notion of *trust*.

2. WHAT TO TRUST OR NOT?

How might one be able to establish whether the subjects trusted the information? While the measurement of trust is a research field in itself, and well approached with caution, these two student projects took the simple approach of asking the subjects themselves.

The subjects were presented with a web-based questionnaire which gave them two topics in turn each with a sequence of questions on the topic. The subjects were asked to find materials on the internet that pertained to the questions and to indicate whether they trusted the results or not. The topics were purposely chosen to be somewhat contentious and of current interest – both reflected recent discussions in the mainstream news media. This was to ensure that the topic itself would transcend the obvious – a vapid topic would not hold the intellectual tension necessary for trust or distrust.

3. MEASURING THE EFFECT OF TRUST

In order to measure trust, after completing each of the two topics, the subjects were given a paper questionnaire to fill out. A simple breakdown of answers is given in Table 1. While most users were somewhat careful about assuming they had found all information on the topic, and not entirely trusting as to its various qualities, a non-insignificant number of users indicated that they had modified their opinion on the topic for both queries¹ and a somewhat larger number of subjects reported learning more about a topic.

Results from the student projects were mainly qualitative, but included the findings that subjects working in pairs were more likely to report learning more about a topic and reported higher level of trust in the found sources, while they retrieved fewer documents – which presumably reflects the benefit of cooperation and the attendant overhead effort associated with cooperative discourse. If the target measure had been topical relevance, the results would likely have shown a lowered recall for the cooperative condition. That specific data point would not significantly have improved the understanding of cooperation.

¹This included, for the Aspartame question, unreported in the table, the test leader.

Aspartame					
	1	2	3	4	5
know	4	15	2	1	0
interest	0	3	6	6	7
learn	0	2	7	7	6
change	9	6	7	0	0
facets	2	6	9	4	1
trust	1	6	10	4	1

Echelon					
	1	2	3	4	5
know	14	5	2	1	0
interest	0	6	7	3	6
learn	1	4	8	6	3
change	12	6	3	1	0
facet	5	9	7	0	1
trust	0	7	11	3	1

Table 1: Self-reported aspects of trust in web sources for information

Crosstabulation was inconclusive, given the relatively small number of respondents, but showed e.g. that the user with the greatest previous knowledge did still change opinions for one of the topics.

4. CONCLUSIONS

Given controversial questions that interested them, subjects performed experiments with enthusiasm and reported that the experiment had influenced their state of mind. This forms an implicit test of trust in the retrieved material. While the respondents reported a medium, to low-medium range of trust in the materials, and did not believe they had found all pertinent facets of opinion pertaining to the topic, they still adjusted their opinions on the matter to some extent and reported having learned about the topic.

This attempt at evaluating trust both by explicit question and by indirect effect on the respondents' state of mind gave rise to a number of questions. Setting ethical questions aside, the methodological issues are non-trivial. Firstly, editorial: how might one find questions that are suitably interesting (in this case, the students spent several days on formulating and testing questions, until they settled on the suitably provocative ones). Secondly, technical: how could this type of test be distributed to a larger number of respondents, and how can the results be calibrated to provide a stable and generalisable conclusion?

5. REFERENCES

- [1] Djuna Franzén. "Det är klart det är lättare när man är flera!" : en undersökning av samarbete inom informationssökning och tilltro till dokument på Internet. Number 256 in Uppsatser inom biblioteks- och informationsvetenskap. Institutionen för ABM, Uppsala universitet, Uppsala, 2006.
- [2] Åsa Johnson. Tillit på webben – Annozilla som förtroendeingivande verktyg. Number 2006:21 in Magisteruppsats. Institutionen Biblioteks- och informationsvetenskap, Högskolan i Borås, Borås, 2006.

Table 2: Post-topic questionnaire (Translated from Swedish.)

Did you have any previous knowledge of the topic?	
None	Know this topic very well
Did you find the topic interesting?	
Not at all	Very interesting
Did you learn more about this topic by completing this task?	
Nothing	A lot
Did you change your opinion on the topic after completing this task?	
Not at all	Completely new opinion
Did you find most facets and most different points of view for this topic during your session?	
No, one perspective only	Yes, all points of view
Do you trust the information you found?	
Not at all	Yes, fully

Table 3: Topic 1: The artificial sweetener Aspartame (Translated from Swedish.)

1. What is Aspartame made of, and under what other names has been used for the same product?
2. How many times sweeter than regular sugar is Aspartame?
3. In what types of product is Aspartame used in Sweden?
4. What company had latest the sole rights to manufacture Aspartame?
5. Is using Aspartame products a good method to attain weight loss?
6. Is Aspartame safe to ingest?
7. Is Aspartame approved for human use all around the world?
8. When was Aspartame first approved as a food sweetener?
9. How high ADI-value does Aspartame have?
10. Does ingesting Aspartame cause side effects?
11. Are there categories of people who should not use Aspartame?

Table 4: Topic 2: Personal integrity on the internet (Translated from Swedish.)

1. What two international treaties protect international communication?
2. What are the five intelligence agencies that have signed the UKUSA agreement?
3. What is TIA, total information awareness?
4. Echelon is a global, digital communication tapping system based in the US. How does it work?
5. How has the EU acted with respect to Echelon?
6. To which e-mail program does the NSA have the encryption keys?
7. What automobile corporation claims to have lost a major order to General Motors due to NSA communications intercepts?
8. What did Hans Buehles do in Iran in 1992?
9. What did Kjell Ove Widman do at Crypto AG?
10. Does Sweden participate in Echelon in any way?
11. Can a private individual avoid being tapped by Echelon?