Exploiting the dynamics of weak signals

Compensating for Information Filtering in searching for weak signals in Science and Technology that are relevant to Technology Enhanced Learning

Christian Voigt, <voigt.cmc@gmail.com>
Centre for Social Innovation
Linke Wienzeile 246
1150 Wien Austria

Ambjorn Naeve
KTH Stockholm, Sweden

Paul Lefrere
Knowledge Media Institute
Open University, Walton Hall
Milton Keynes UK

Abstract: This paper explores "the difference that may come to make a bigger difference" (ie the future effects of information). It uses insights gained in a European project, TELMAP, which is exploring possible Education Futures.

With hindsight, it is sometimes possible to reach consensus on what counts as noteworthy individual events and/or wider trends that together were significant precursors to today's world. Such events and trends are often called Weak Signals, which emphasizes the Magnitude dimension of the signals. Useful extra insight can be gained from considering the shape of the first- and second-degree polynomials that best approximate the behaviour of the signal over time.

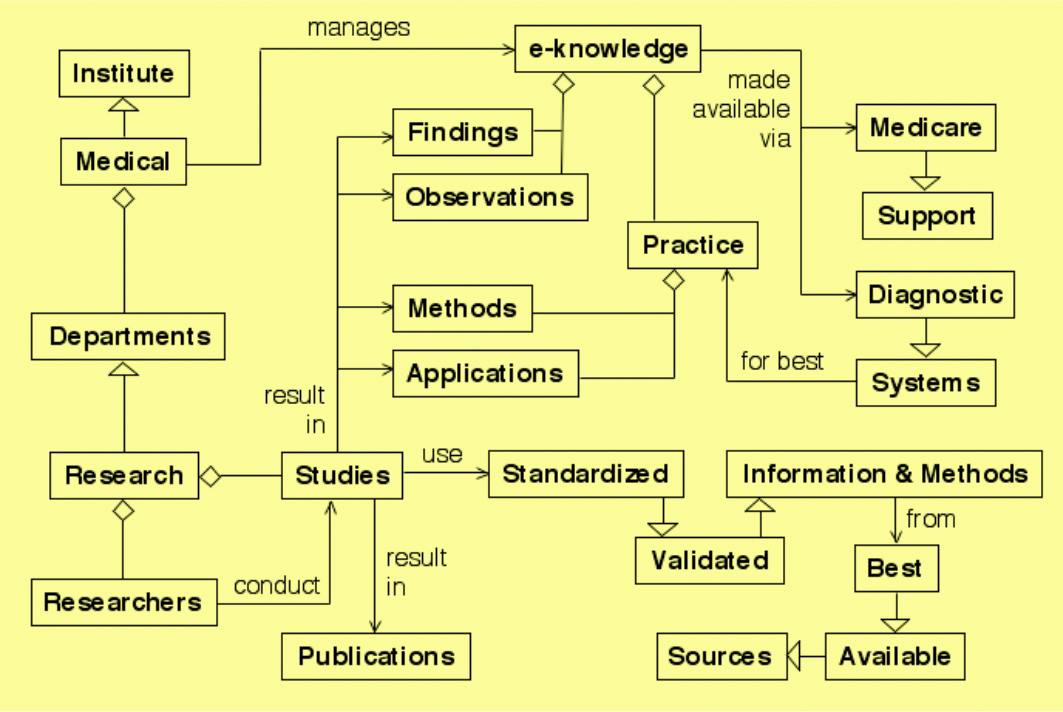
Hindsight may also show us that we are poorly calibrated in information terms: we ignore some weak signals that turn out to be important, and we pay too much attention to other events and trends, concurrent with the weak signals that we spotted, that seem of comparable importance early on, but gradually turn out to be less important. What ideas and approaches might help us to enhance our ability to discriminate between *Valuable Weak Signals* (that are helpful in anticipating the Future that eventuates), and *Unreliable Weak Signals*? (The latter are like 'Fool's Gold' to ill-informed people, who may confuse them with Valuable weak signals, and so may make over-optimistic estimates of the likelihood of a future-that-never-happens.)

We consider some case examples and end with speculation.

The examples consider boundaries between innovations in science, technology and technology-enhanced learning, which highlight some of the issues and opportunities that arise in appraising multiple sources of information, covering multiple domains. In particular, we consider two approaches: data mining in social and professional networks and the structured contextualisation of interview

data from domain experts. The latter, more qualitative, information is meant to provide a benchmark to see how and where computational and human interpretations diverge. The integration of both approaches aims to help observers of candidate weak signals to compensate for deliberate or unrecognised over-selectivity and bias in choosing sources of information; noticing items of information from those sources; and using processes for making sense of that information.

In conclusion, we speculate about possible combinations of analytical services and information bridges, within the Open Research paradigm, that could circumvent or minimize the effects of undesirable externally-imposed personalization and/or other forms of filters that could hinder the adoption within TEL, Technology Enhanced Learning, of innovations in Science and Technology.



(This picture of "Open Research" was published on p. 23, Figure 17, of Naeve, 2005; it is a placeholder for a 2011 version of the picture, which will appear in the full version of the paper and will include Compensatory Information Filtering elements and dynamics)

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References

Day, G. S., Schoemaker, P. J. H., Snyder, S. A. (2009). "Extended Intelligence Networks: Minding and Mining the Periphery", in P. R. Kleindorfer, Y. J. Wind and R. E. Gunther, (Eds), The Network Challenge: Strategy, Profit, and Risk in an Interlinked World.

Hiltunen, E. (2008). “Good Sources of Weak Signals: A Global Study of Where Futurists Look For Weak Signals”, Journal of Futures Studies, vol. 12(4), 21-43.

Ilmola, L, Mustonen, A. K. (2003). “Filters in the strategy formulation process”, Journal of Universal Computer Science, vol. 9(6), 481-490.

Lefrere, P. (2011). Using Information (and Exformation) to Inform Action, in Ramage, M., Chapman, D., (Eds), Perspectives on Information, Routledge Studies in Library and Information Science.

Naeve, A. (2005). The Human Semantic Web – Shifting from Knowledge Push to Knowledge Pull, International Journal of Semantic Web and Information Systems (IJSWIS) Vol 1, No. 3, pp. 1-30, July-September 2005. http://kmr.nada.kth.se/papers/SemanticWeb/HSW.pdf

Naeve, A. (2011). A Primary on Communicative Modeling and Disagreement Management, TEL-Map Deliverable D1.1, Jan, 2011. http://telmap.confolio.org/apps/index.html#4.822

Pariser, E. (2011). The Filter Bubble. The Penguin Press.

Sunstein, C. (2001). Republic.com. Princeton University Press.

Voigt, C., Unterfrauner, E. & Kieslinger, B. (2011). Identifying Weak Signals in Expert Discussions of Technology Enhanced Learning. eChallenges e-2011 Conference. Florence: October 2011.