



Whenever we have made a word to denote a certain group of phenomena, we are prone to suppose a substantive entity existing beyond the phenomena, of which the word shall be the name.

—William James,
Principles of Psychology

A brief history of "information"

Geoff Nunberg
Concepts of Information
Jan. 20, 2011



Agenda

What could *information* mean, if anything?

When did *information* start to go squirrely?

A philological digressus

Why couldn't science straighten us out?

Peeling up the rug



Information as a keyword

Alternative
Art
Audience
Behaviour
Body
Bureaucracy
Capitalism
Celebrity
Citizenship
City
Civilization
Class
Colonialism
Commodity
Community
Conservatism
Consumption
Country
Culture
Deconstruction
Democracy
Diaspora
Disability 3

"strong, difficult, and persuasive words..."

Raymond Williams

Words as "compacted doctrines"

The surest sign that a group or society has entered into the self-conscious possession of a new concept is that a corresponding vocabulary will be developed, a vocabulary which can then be used to pick out and discuss the concept with consistency.

—Quentin Skinner, "Language and Social Change"



The McGraw-Hill Companies
BusinessWeek

The scope of "information"

... it's always there when we look for it, available wherever we bother to direct our attention. We can glean it from the pages of a book or the morning newspaper and from the glowing phosphors of a video screen. Scientists find it stored in our genes and in the lush complexity of the rain forest. The Vatican Library has a bunch of it, and so does Madonna's latest CD. And it's always in the air where people come together, whether to work, play, or just gab.

What is it that can be so pervasive and yet so mysterious? Information, of course.

John Verity in *Business Week*, special number on the "Information Revolution," 1994



Stuff n' Symbols...

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...that can effect mighty changes

The McGraw-Hill Companies
BusinessWeek

What gives computers such awesome potential to reshape the world? For starters, all technologies that "process information" (although they were never described in those terms in the predigital era) affect deeply the societies that use them. Johannes Gutenberg's printing press eventually helped reformers to erode the Catholic Church's political power: Books spread knowledge in ways the Vatican could not control.



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The linguistic question: What would you have to assume so that this would all make perfect sense to you??



Does "information" mean anything at all?

"Information is a high-frequency and low-content phrase that permeates our ordinary language without attracting much attention, since its meaning has long eroded."

Pieter Adriaans and Johan van Benthem

"...a sloppy, pseudoscientific catch-all...an "amoeba word... an oracular authority and inspirational text."

Uwe Purksen, *Plastic Words*



Does "information" mean anything at all?

In ordinary usage, is *information*...

Simply "loose" or "sloppy" or "bleached"?

Vague? (like *nice* or *democratic*)

General? (like *structure* or *artifact*)

Polysemous? (like *gossip* or *instruction*)

Ambiguous (like *mass*, *intelligence* or *paper*)



Collocations and Semantic Fields

Collocations listed in OED:

Information revolution, society, age

digital, internet, post-industrial, service

___ science,* theory*

signal, entropy, document, communication

___ technology*

digital, computer, electronic

___ explosion, glut, anxiety*, overload, rich, poor

knowledge, data, content, access

___ architect, officer

knowledge, technology

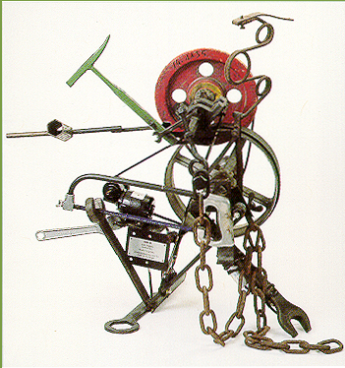
___ storage, retrieval, processing

data, knowledge

(* = items given sep. entries)



Gimcrack concepts

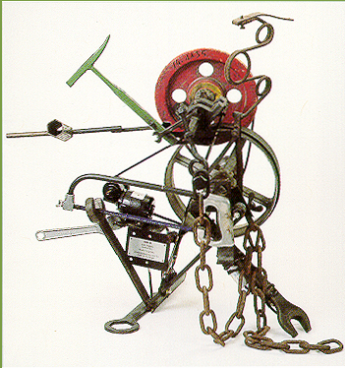


Most accounts of objectivity – philosophical, sociological, political – address it as a concept.... But if it is a pure concept, it is less like a bronze sculpture cast from a single mold than like some improvised contraption soldered together out of mismatched parts of bicycles, alarm clocks, and steam pipes.

Lorraine Gaston & Peter Gallison, *Objectivity* (2007)



Gimcrack concepts



Gimcrack concepts...

are concepts, not "pseudo-concepts" or "quasi-concepts"... they have an internal structure, but it is inconsistent or incomplete.

are typically ideologically inflected, "persuasive."

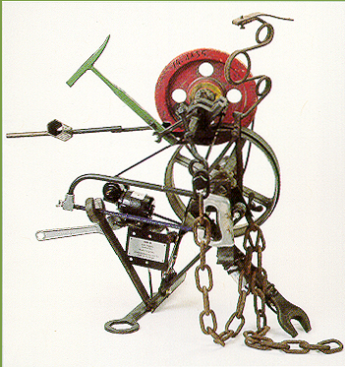
Cf Walter Lippmann on political symbols, which "stand for a truce or juncture between ideas."

Cf "values," "technology," "community," etc.

"[Terms such as] "information society"... seek to catch a fashionable wind and twist it for modish purposes." Daniel Bell



Gimcrack concepts



We can have concepts without words... words merely serve to make concepts easier to access, recall, and communicate...

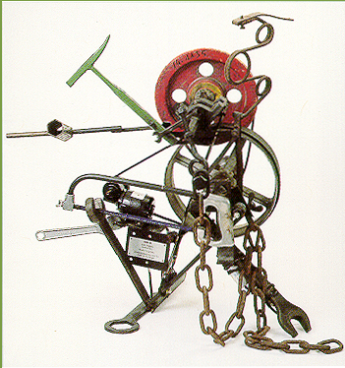
relating to the maintenance of a balance between producing and using carbon, especially balancing carbon-dioxide emissions by activities such as growing plants to use as fuel or planting trees in urban areas to offset vehicle emissions

carbon-neutral





Gimcrack concepts



We can have concepts without words... but gimcrack concepts can exist only when there are words for them

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—William James, *Principles of Psychology*

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carbon-neutral





Looking backward

Retracing our steps...



"Information" defined

II. The imparting of knowledge in general.

4. a. The shaping of the mind or character; communication of instructive knowledge; education... Now *rare*.

a1387 J. Trevisa tr. R. Higden *Polychron.* (St. John's Cambr.) (1876) VI. 33 Fyve bookes com down from heven for informacioun of mankynde.

1736 Bp. J. Butler *Analogy of Relig.* ii. vii. 257 Our Reason and Affections, which God has given us, for the Information of our Judgment and the Conduct of our Lives.

1813 T. Jefferson *Writings* (1830) IV. 182 The book I have read with extreme satisfaction and information.

1851 U. Gregory *Let.* 6 Oct. in F. W. Shearman *Syst. Public Instr. & Primary Sch. Law Mich.* (1852) 579 The literary and scientific institution contributes to the discipline and general information of the mind.

1901 H. Münsterberg *Amer. Traits* iii. 44 The community ought to see to it that both free election and the pedagogical information of the teachers were furthered.



"Information" defined

II. The imparting of knowledge in general.

5 a Knowledge communicated concerning some particular fact, subject, or event; that of which one is apprised or told; intelligence, news.

1390 Robert · · through his wrang informatiounne has gert skaith the said abbot.

1726 Swift *Gulliver* II. iii. ii. 18 It was necessary to give the Reader this Information.

1786 W. Speechly *Treat. Culture Pine Apple* Pref. p. ix, The use of Oak-leaves in Hot-houses is a very important article of information.

1852 S. Thomson *Dict. Domest. Med.* 285/1 To use a simile, the brain may be likened to a great central telegraph office, to which the wires—nerves—convey the information from all parts of the body that supplies are wanted.

1956 A. Wilson *Anglo-Saxon Attitudes* i. i. 7, I should be glad of any personal information you may care to provide me with upon this neglected and important young poet.



"Information" defined

II. The imparting of knowledge in general.

- a. The action or fact of imparting the knowledge of a fact or occurrence; communication of news; notification. Now chiefly with modifying word, possessive, or of-phrase.

1601 Wee beseech your Lordships giue vs leaue to referre you for your information in that point to the Journall which herewithall we send

1795 W. Paley *View Evidences Christianity* (ed. 3) II. ii. vi.

194 Difficulties always attend imperfect information.

1877 For the information of members, we publish entire the By-laws.

1694 R. South 12 Serm. II. 113 By way of Information or Notification of the Thing to Him.

1930 Times 15 Mar. 8/6 The talking news-reel is a new vehicle of public information and entertainment.

1954 E. L. Kohler *Auditing* (ed. 2) xvi. 587 Qualifications or disclosures believed necessary for the information of the reader or for the protection of the accountant.

Cf His explanation took an hour.



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~~1795—W. Paley View Evidences Christianity (ed. 3) II. ii. vi. 194—Difficulties always attend imperfect information.~~

1804 J. Larwood Her Emissaries are at the secret spywork of observation and information.

~~1877—For the information of members, we publish entire the By laws.~~

~~1930—Times 15 Mar. 8/6—The talking news reel is a new vehicle of public information and entertainment.~~

~~1954—E. L. Kohler Auditing (ed. 2) xvi. 587—Qualifications or disclosures believed necessary for the information of the reader or for the protection of the accountant.~~



"Information" in the 19th c.

1. The shaping of the mind or character; communication of instructive knowledge; education. Now rare or Obs. [1387] < *inform* "give form to, shape" ("Bildung" sense) from *inform* "give form to"

A woman of mean understanding, little information, and uncertain temper. Jane Austen, Pride and Prejudice, 1813

[The Germans'] object in the university course is not information or education, but training. Scribner's Magazine, 1879.

(cf "for your information," etc.)

2. Knowledge communicated concerning some particular fact, subject, or event. [1450] < *inform* "tell") ("particularistic" or "news" sense)
From *inform* "impart knowledge"

(but not really knowledge, and only when new)



A new facet of information emerges

1. The shaping of the mind or character.
- 2 Knowledge communicated concerning some particular fact, subject, or event.
3. Records of a factual nature, either published, or collected and maintained by public entities or institutions. [GN] ("stuff"/"public" sense)

Vote 6 has always contained about 12 times as much information as it does this year. The detailed information in Vote 6 this year is all put in the form of appendices. Hansard's Parliamentary Debates, 1887

Business must lay hold of modern library methods if they were to keep up with the steadily growing and important mass of printed information. Bull. of the Am. Lib. Assoc. 1913

They give their monthly penny, and we try to give them sixteen -pages of information, two portions of which are illustrated by suitable woodcuts, prepared on purpose. The Cottager's friend, and guide of the young, 1844

This paper, which has ever since been published on the Saturday, contains in its present enlarged form, upwards of a dozen times as much information as in 1725, and is only charged sevenpence. 1833



Where did the new "information" come from?

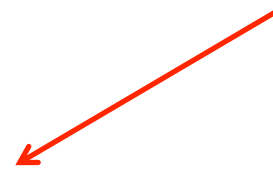
The natural assumption:

information 1

"Bildung/education"

information 2

"particularistic/news"



information 3 InfoAsStuff



What makes information-as-stuff different?

Why isn't Information-as-Stuff just particularistic information in the large?

A. IaS doesn't include spoken utterances etc.

Cf. "A copy of the daily New York Times contains more information than that the average 17th c. Englishman came across in a lifetime." (*"It is estimated that..."*)

There was a time when nearly all valuable knowledge was obtained either through the Latin or the Greek; and, though the principal modern languages contain ten times more information than either of them,.. a knowledge of the two classical languages has been considered an essential part of a liberal education. *The Michigan Teacher*, 1872



What makes information-as-stuff different?

Why isn't Information-as-Stuff just particularistic information in the large?

B. Senses translate differently in other lgs

According to my information

Selon mes informations/ secondo le mie informazioni (pl.)

The information age (society etc.)

L'age de l'information (not l'age des informations)

L'età dell'informazione (sg.)

We need more reliable information.

Ci vogliono informazioni più attendibili. (pl.)

??Ci vuole informazione più attendibile. (sg)



What makes info-as-stuff different?

Why isn't laS information just particularistic information in the large?

C. They aren't the same kind of thing. Cf

How much information is there in the world?

How much truthful information is there in the world?

?"This isn't just the age of information but the age of reliable information."



Features of Information-as-Stuff

- IaS usually belongs to public, commercial, or institutional life.

"A letter from your old acquaintance, the housekeeper at the Grange," I answered.... She would gladly have gathered it up at this information, but Hareton beat her. *Wuthering Heights*, 1847

Cf "personal information"



Features of Information-as-Stuff

- IaS usually belongs to public, commercial, or institutional life.

Connection of information to the state





Features of Information-as- Stuff

laS generally presumes a fixed medium of storage or transmission: "present" in the world; can be transferred from one medium to another.

laS is morselized/measurable/commodified

"N times as much information" etc.



Features of Information-as - stuff

IAS is "plausible in itself" –

The intelligence that came from afar possessed an authority which gave it validity. Information, however, lays claim to prompt verifiability. The prime requirement is that it appear 'understandable in itself....' It is indispensable for information to sound plausible. Walter Benjamin, "The Storyteller"



Where did the new "information" come from?

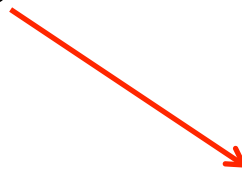
What actually happened:

information1

"Bildung/education"

information2

"particularistic/news"



information3 InfoAsStuff

"Effect for cause" Cf horror, a curiosity, fright, a sensation etc.



An easy confusion



Examples of *information* = "edification, education"

Susan was growing very fond of her, and though without any of the early delight in books which had been so strong in Fanny, with *a disposition much less inclined to information for information's sake*... —Jane Austen, *Mansfield Park*.

I would not be hurried by any love of system, to underrate the Book.... Great and heroic men have existed, *who had almost no other information than by the printed page*. — Ralph Waldo Emerson, "The American Scholar"

'Was he handsome?'—'She believed he was reckoned a very fine young man.' 'Was he agreeable?'—'He was generally thought so.' 'Did he appear a sensible young man; *a young man of information?*'—Jane Austen, *Emma*

You will... receive much entertainment from Horace Walpole's letters, *and also considerable information* – shall I add edification? *The Living Age*, 1844



"Information by the Book"

Presumption of a public passively imprinted in the image of the texts that are imposed on it. (Certeau)

An age of "informational" institutions and practices

Museums, public libraries, expositions, works of reference, newspapers...

Census and blue books





"Information by the Book"



Presumption of a public passively imprinted in the image of the texts that are imposed on it. (Certeau)

An age of "informational" genres, institutions and practices

The ideology of literacy: the "**informed electorate**"

"[To the free library] we may hopefully look for the gradual deliverance of the people from the wiles of the rhetorician and stump orator.... As the varied **intelligence** which books can supply shall be more and more widely assimilated, the essential elements of every political and social question may be confidently submitted to that **instructed** common sense upon which the founders of our government relied."

J. P. Quincy, 1876



Ca. 1900: The basic tension

Information as that which imparts knowledge of the world (information = that which informs)

Information as a commodity: factual representations produced by the expansion of the media, corporations, and the modern state.



Modern Times: Information in its subdiscourses



"Information" starts to get squirrely

"Until World War II, [*information*] referred to the personal act of acquiring knowledge.... But during the war, "information" got redefined as something quantifiable that could be collected, moved, and processed."

Business Week

The traditional meanings of the "action of informing" and "knowledge communicated concerning some particular fact, subject, or event" expanded dramatically with the development of electronic computers, satellite communications, and new information disciplines in the United States after World War II."

Ronald R. Kline, "The Emergence of "Information Technology" as a Keyword, 1948–1985"



Information as a term of art

Post-WWII, *information* becomes a term of art in numerous fields, with various meanings

cybernetics, information theory & statistics

philosophy

(information science & documentalism)

economics

cognitive science, AI, linguistics

sociology

management science, systems theory

(biology, physics, etc.)



The Advent of 'IT'

Technology from late c.18 to mean "The branch of knowledge dealing with the mechanical arts and applied sciences"; from early c20 for "the product of such study."

Information technology from 1950's to denote mathematical techniques that utilized the computer to assist, or even replace, mid-level management.

By 1970, IT denotes chiefly hardware and systems

Information technology is defined here as the technology of sensing, coding, transmitting, translating, and transforming information. More specifically, we are interested in the newest elements of technology—the computer and the program written for it, data-transmission networks, and sensing and translating devices such as optical scanners. Thomas Whisler, *Information Technology and Organizational Change*, 1970



The rise of "technology"

When we refer to one of these complex systems as a technology, the material component more often than not serves as the tacit referent. But ... the whole system, apart from the hardware, is so inclusive, so various—its boundaries so vague as to defy exact representation.

N.b most dicts lack entry for technology = "hardware"

Whereas the term mechanic (or industrial, or practical) arts calls to mind men with soiled hands tinkering at workbenches, technology conjures clean, well-educated, white male technicians in control booths watching dials, instrument panels, or computer monitors. Whereas the mechanic arts belong to the mundane world of work, physicality, and practicality... technology belongs on the higher social and intellectual plane of book learning, scientific research, and the university.

Leo Marx, "Technology: The Emergence of a Hazardous Concept," 2010



20th-century ramifications

"news" sense → surprisal sense (= informativeness) (bits, bandwidth, redundancy and compression)

5 c. As a mathematically defined quantity divorced from any concept of news or meaning; spec. one which represents the degree of choice exercised in the selection or formation of one particular symbol, message, etc., out of a number of possible ones, and which is defined logarithmically in terms of the statistical probabilities of occurrence of the symbol or the elements of the message.

1949 W. Weaver in C. E. Shannon & W. Weaver The word information, in this theory, is used in a special sense that must not be confused with its ordinary usage · · . In fact, two messages, one of which is heavily loaded with meaning and the other of which is pure nonsense, can be exactly equivalent, from the present viewpoint, as regards information.

1953 J. B. Carroll. Information (in the special sense required in communication theory) may be measured in bits.

1956 L. Brillouin Information is a function of the ratio of the number of possible answers before and after. · · This definition cannot distinguish between information of great importance and a piece of news of no great value for the person who receives it.



20th-century ramifications

"coded" information: information present in natural sequences, communicated to machines etc.

5 d. Separated from, or without the implication of, reference to a person informed: that which inheres in one of two or more alternative sequences, arrangements, etc., that produce different responses in something, and which is capable of being stored in, transmitted by, and communicated to inanimate things. Information in this sense may at the same time be, or be regarded as, information in sense 5c.

1937 Discovery The whole difficulty resides in the amount of definition in the [television] picture, or, as the engineers put it, the amount of information to be transmitted in a given time.

1953 J. D. Watson & F. H. C. Crick In a long molecule many different permutations are possible, and it therefore seems likely that the precise sequence of the bases is the code which carries the genetical information.

Note: no entry for naturalistic information in the philosophical sense; i.e., the information inherent in a footprint.



20th-century ramifications

→ "processed data"

5 e. Contrasted with data: that which is obtained by the processing of data.

1970 Data is sometimes contrasted with information, which is said to result from the processing of data.

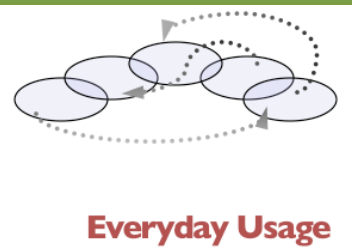
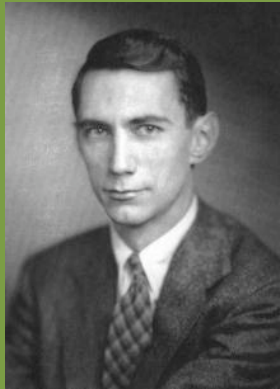
2001 The process already has a name—datamining••. This means ‘the extraction of implicit, previously unknown and potentially useful information from data’.

A familiar hierarchy:

Data are facts and statistics that can be quantified, measured, counted, and stored. Information is data that has been categorized, counted, and thus given meaning, relevance, or purpose. Knowledge is information that has been given meaning and taken to a higher level. Knowledge emerges from analysis, reflection upon, and synthesis of information.



Information as a term of art



Information theory has, in the last few years, become something of a scientific bandwagon. Starting as a technical tool for the communication engineer, it has received an extraordinary amount of publicity in the popular as well as the scientific press. In part, this has been due to connections with such fashionable fields as computing machines, cybernetics, and automation ... Applications are being made to biology, psychology, linguistics, fundamental physics, economics, the theory of organization, and many others. ...What can be done to inject a note of moderation in this situation? Claude Shannon, 1993



Disputing "information"

But subdiscourses take varying approaches to defining "information"

The limited influence of information theory.

Information theory is alive and well in biology, engineering, physics, and statistics, although one rarely sees Shannon's information theory in contemporary psychology articles except to the extent of the late John W. Tukey's term *bit*, which is now a permanent word of our vocabulary. Duncan Luce, 2001

The mathematical theory of information ... is irrelevant [to computation] although computer programs are often said to be information-processing mechanisms.
Aaron Sloman



Variation in conceptions of Information

Popular (folkloric) vs. technical/scientific conceptions of information — but lines are fuzzy

- "Information" as a category of everyday discourse
Can you give me some information about dehumidifiers?
- "Information" in discussions of public discourse & policy, education, journalism
- "Information" as a theoretical notion in philosophy, information theory, CS, cognitive science & linguistics, informatics, economics, political science, public policy, business & management, etc.
- "Information" as a theoretical notion in genetics, biology, physics, etc.



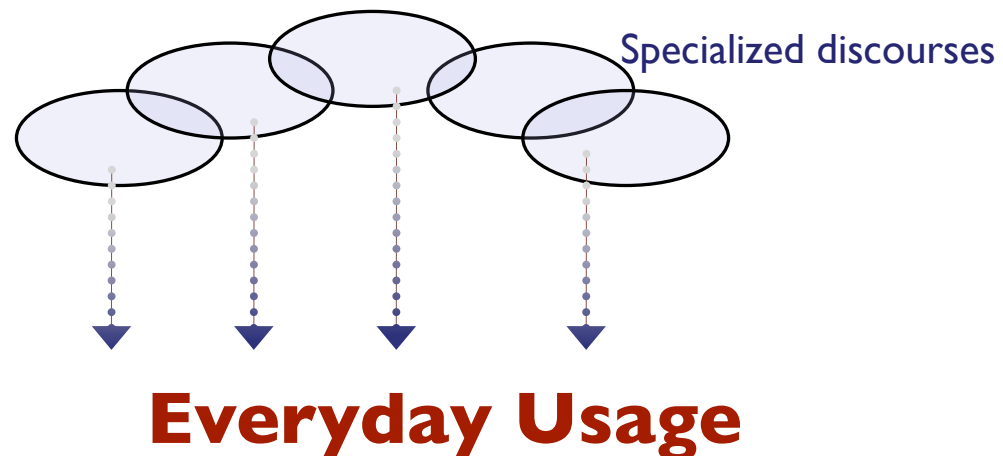
Language and its and subdiscourses



Semantic trickle-down:

Cf recent histories of *alienation*, *bureaucracy*, *conformist*, *ethnic*, *identity politics*, *peer-group*, *status symbol*, *economic*, *schizophrenic*, *psychopath*...

"Lately there ain't been much work on account of the economy"





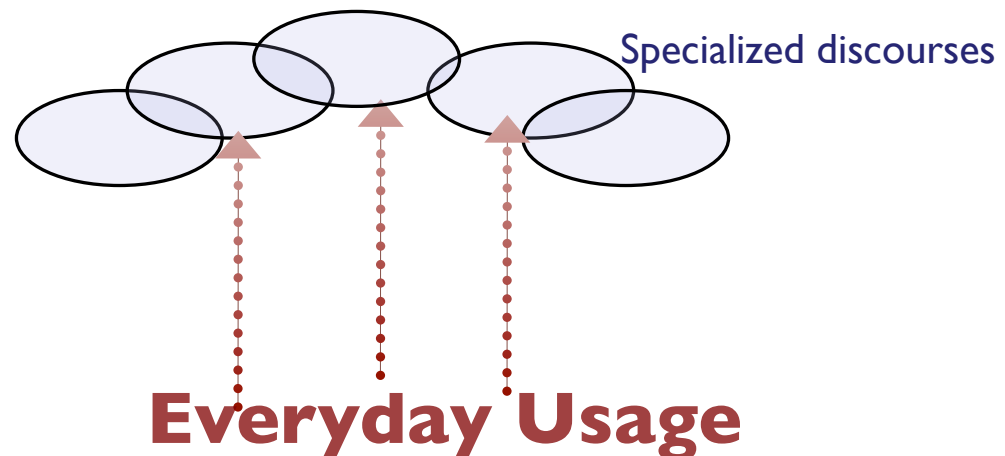
Language and its and subdiscourses



Words percolate up the ivory tower

”Technicalization” of vocabulary:

Cf modern development of *community*, *wealth*,
depression (econ. & psych.)



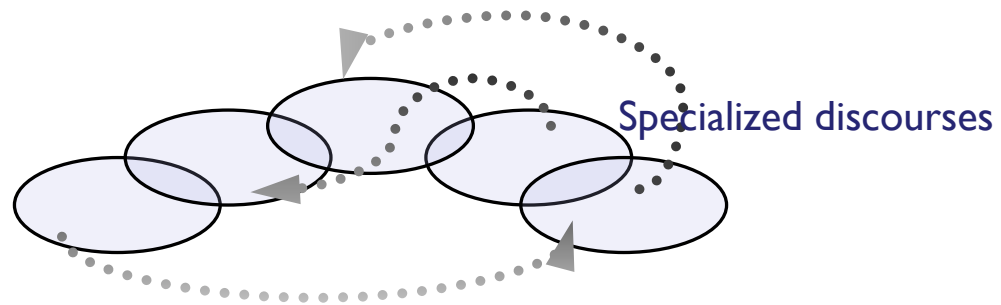


Words spread among subdiscourses



Words circle round the ivory tower
(*Wanderwörter*)

Cf recent histories of *network*, *formalism*, *community*,
information, *recursive*...

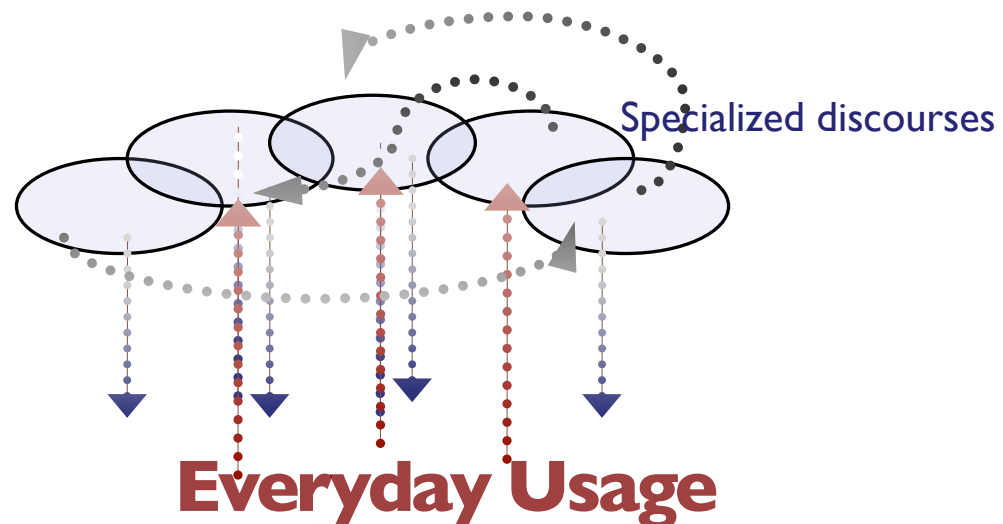


Everyday Usage



Words move in all directions at once

What does a given use of *information* owe to the requirements of the discipline, the influence of neighboring disciplines, and the general understanding of the word?





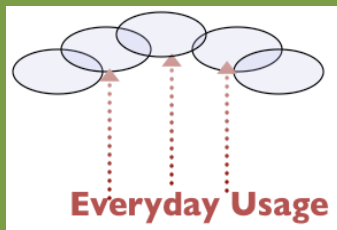
From Everyday Usage to Science...

But *which* ordinary-lg sense of "information" do researchers take as a point of departure?

Two (or so) technical understandings of *information*:

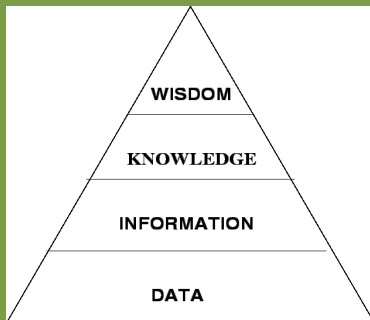
I. "Selectional" definitions of information: "that which reduces uncertainty" (Information theory, philosophical/ecological, some economists; also genetics etc.)

Drew on "particularistic" sense of *information* as "knowledge communicated"; i.e., information as "informative"; information as a given.





From Everyday Usage to Science...



But *which* ordinary-lg sense of "information" did theorists take as a point of departure?

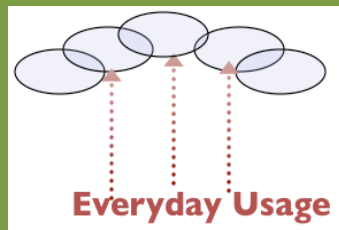
Two (or so) technical understandings of information

2. "Information processing" defs of information: AI, "Information society" research, Information systems theory, management science, other economists, etc.

Draw on "stuff" sense of *information* as "constructed representations" (e.g. like published records).

Information as a product.

The particular role of "information technology"





... and back to everyday usage again

Specialized accounts of *information* in turn color and enrich the popular conception:

Information as fundamentally computational
the glowing phosphors of a video screen.
& "natural"

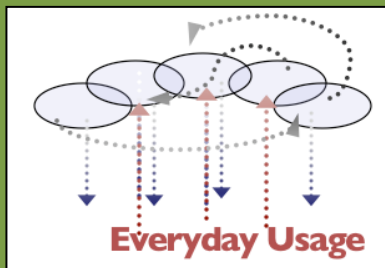
Scientists find **it** stored in our genes

Information as precisely quantifiable

Information as fungible

the computer's ability to reduce all conventional information forms into one big digital stew

Information as an index and a commodity



But the fundamental gap remains...