

concepts of information

introduction: the definitive approach

Concepts of Information

Jan 19, 2011

avoid "laxity in the use of the term"

--Kenneth Sayre,

Cybernetics and the Philosophy of Mind, 1976



Joan

formulaic approach?

impact of (information!) / (people + technology)! across academic disciplines, professions, and cultures.



mark hunter

outsider's view

The School of Information is a site where scholars and students interested in all sorts of social phenomenon work out how information is brought to bear on some interesting problems. No matter what the concept, be it "democracy," "running a restaurant," or "the NBA," there is a sense in which information is essential to animating that concept. Who produces it, who consumes it, what functions does it serve, why is it made available, or obscured? That's what we study. Us and everyone else in all the sciences, it should be said. And so what makes the iSchool unique, and important, is that it also contains some people who are interested in turning this relationship on its head. These people ask not how information produces various social phenomena but, rather, how the social produces information. This interest in information as a concept in itself, an interactive production of the social and physical worlds, is our *raison d'etre*; it needs no further justification.



galen panger

The School of Information is about the challenges and opportunities of the Internet and of the digital era. We aspire to be less of a discipline than a sturdy institutional setting for people from many backgrounds and skill sets to come together and explore this exciting subject matter. We are computer scientists, economists, sociologists, lawyers, designers and more, and many of us bridge two or more of these disciplines. We analyze, diagnose, argue, recommend and build, in our own proportions. In short, we believe that the only way to get our arms around the information revolution is to get everybody in the same building, and under the same roof.



rowyn mcdonald

The School of Information grew out of the school of Library and Information Science. Berkeley dropped the "library" part and entered the 21st century with a focus on information, particularly information technology but also the social and legal issues surrounding information. We're trying both to understand how people use information and to design and build useful, usable information systems. In that sense it's very multi-disciplinary, drawing on theory and methodology from fields including computer science, sociology, business, economics, and law. Examples of areas in which School students specialise include information retrieval, interface design, technology in developing regions, education, and technological standards and policy.



heather ford

Unlike computer science and engineering that focuses on the production of information, or politics and law that focus on the consumption of information, the iSchool provides an holistic perspective on information as a social and dynamic process of both production and consumption. By examining patterns of consumption through the lens of geography, sociology and psychology, we are trying to better understand the impact of information on individuals and societies; by practicing how to better organise, manage and secure information, we are learning how to build more robust, more accessible and more user-friendly information products; and by analysing the entire information ecosystem, we are able to understand how information consumption and production is governed - by law, social norms and code - and to devise innovative ways in which to design solutions to the increasing number of problems that have information at their centre.



dan byler

Everyone talks about the "information age" we live in. That's what the School of Information exists to address. No matter how you define "information", we know intuitively that it makes up the building blocks of all knowledge and commerce. The School of Information studies issues surrounding information from a wide range of academic and professional perspectives. For most people at the I School, the role of technology is central in our study of information.

We're located in the oldest building on campus—but the I School is the newest graduate program at Berkeley. I think this is particularly apt because we study the most ancient human endeavors—knowing and doing—from the perspective of what we can actually build through modern and emerging technologies. In the process, we incorporate design, sociology, engineering, economics, management studies, library science, and more.

Personally, I'm seeking a holistic understanding of technology and knowledge practices to help me build tools that are thoughtful, elegant, and useful. I think the School of Information provides this by combining the humanities with the studies of technology, design, and management.



stuart geiger

Most of the time, I tell people I'm in the School of Information, or alternatively "information science" to more tech/science types and "information studies" to more media or cultural studies types. The most common response I get is "That's cool.... But I don't know what that is." My elevator pitch then begins with mainly a list of things, pretty common in these speeches:

Well, nobody really knows what it is, and that's what's great about it. Everybody is tackling some kind of issue related to people and technology, but everyone has their own interests and methods of studying or implementing them. So we have people from how Facebook is changing social relationships, to the future of Internet regulation, to why Wikipedia works, and if mobile phones are part of the solution to poverty in Africa. But we have people from pretty much every discipline in the social sciences, computer sciences, and humanities, and a lot of people from those fields are building new tools and platforms to support science, journalism, business, law, healthcare, education, and pretty much anything else you can think of.



florian gall

“Information is a message bearing a certain meaning. This message might be delivered explicitly, maybe in form of a conversation or a written work, or it has to be implicitly constructed by perceiving events and facts, and making statements about them. Information influences our actions as it is the basis for drawing conclusions, making decisions and predicting future events.

Formally, information is data put into context; for instance, the number “3.1415” would be raw data, but the statement “ $\pi = 3.1415$ ” is a piece of information.”



Jen King

O Information,
Your essence still eludes us.
We will keep tweeting.

iSchool, who are you?
Meeting of many fields.
Why not ask Google?

140 characters or fewer:
The iSchool bridges the disparate disciplines of compsci and the social sciences to bring a human-centric approach to solving info problems.

overview

new fields, new definitions

information theory

information science

economics

i-schools

information & society

new fields, new definitions

· new fields

information theory

information science

economics

i-schools

information & society

"The logic of definition is nowhere more crucial than with respect to the name of a field of scholarly enquiry...The name of the field maps out **essential characteristics.**"

--Alvin Schrader,

"In Search of a Name," 1984

"Science begins when the meaning of the words is **strictly delimited.**"

-- L. Brillouin,

Science and Information Theory, 1962

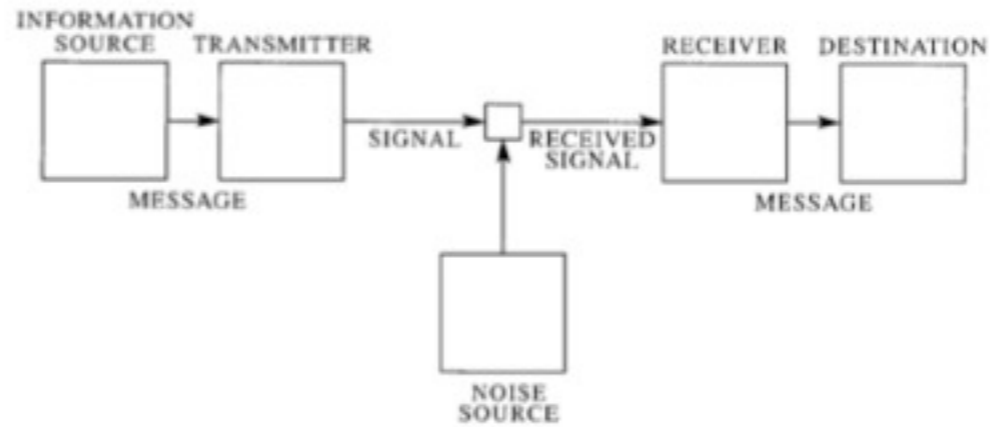
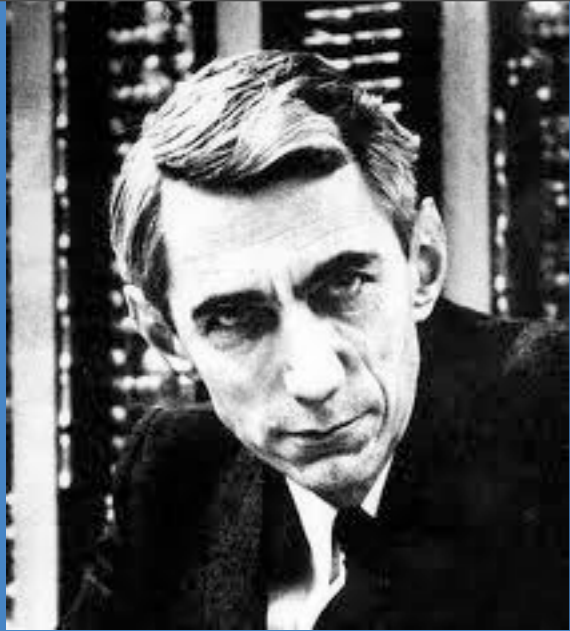


Fig. 1—Schematic diagram of a general communication system.

definitive

new fields

• information theory

information science

economics

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information & society

"Information relates not so much to what you do say, as to what you could say ... a measure of one's freedom of choice when one selects a message"

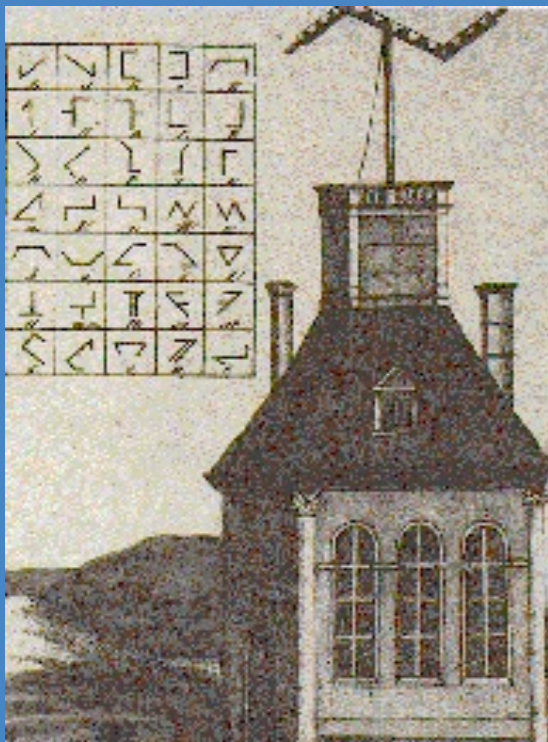
-- Claude Shannon,

The Mathematical Theory of Communication,

1949



precursors



"these machines have generally been established for the purpose of **transmitting information** during war"

-- Charles Babbage, *On the Economy of Machinery and Manufactures*, 1832

"A universal wire system [for the] **electrical transmission of intelligence** (written or personal communication)."

--Theodore Vail, Bell Systems Annual Report, 1910





antecedents

new fields

• information theory

information science

economics

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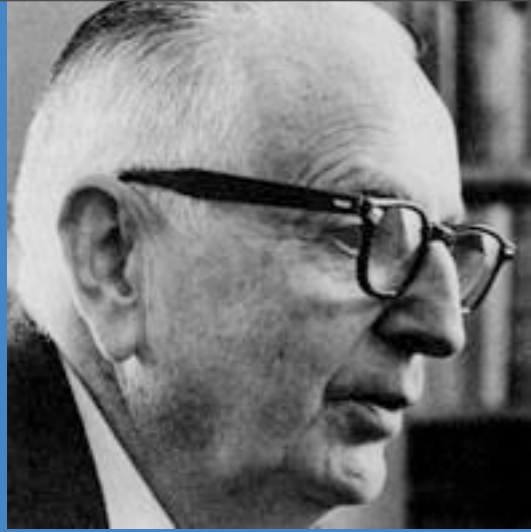
information & society

"[I]nformation is a very elastic term ... a more specific meaning ... the sender mentally selects ... At each selection there are eliminated all of the other **symbols** which might have been chosen ... more and more possible **symbols sequences** are eliminated ... the **information** becomes more precise ... Inasmuch as the precision of the information depends upon what might have been .. reasonable to hope to find in the number of these sequences the desired **quantitative measure** desirable ... to eliminate the psychological factors involved and to establish a **measure of information in terms of purely physical quantities.**"

-- R[alph] V.L. Hartley, "Transmission of Information,"

Bell System Technical Journal, 1928

Cofl 2011-- Introduction 15



communication to control?

new fields

• information theory

information science

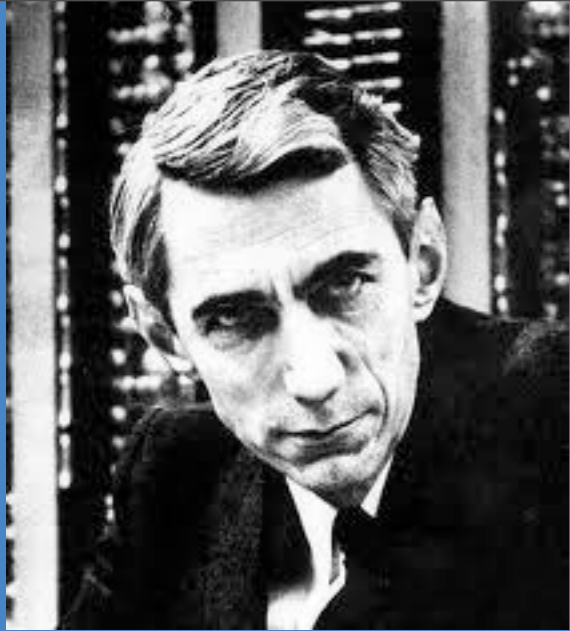
economics

i-schools

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"The word **communication** will be used here in a very broad sense to include all the procedures by which **one mind may affect another**. This, of course, involves not only written and oral speech, but also music, the pictorial arts, the theatre, the ballet, and in fact all human behavior ... one which would include the procedures by means of which one mechanism (say automatic equipment to track an airplane and to compute its probable future positions) affects another mechanism (say a guided missile chasing an airplane)."

Warren Weaver, *The Mathematical Theory of Communication*, 1949



call for specificity

new fields

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information science

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"[B]asic results [of information theory] are aimed in a very specific direction ... not necessarily relevant to such fields as psychology, economics, and other social sciences, ... not a trivial matter of translating words to a new domain"

-- Claude Shannon,
"The Bandwagon," 1956

ancestral voices

new fields

information theory

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"Computer and Information Sciences Program"

University of Pennsylvania, 1959

"Information ... is a category word, for there
are many kinds ...
[information is] recorded marks"

Symposium on Education for Information Science,
1965

ancestral voices

"Information ... **is a process** which occurs within a human mind when a problem and data useful for a solution are brought into productive union"

--A.G. Hoshovsky & R.J. Massey,

"Information Science:
Its Ends, Means, and Opportunities," 1968

"[data] that which is recorded as symbols from which other symbols may be produced" ... [information]

"**the result of processing** of data, usually formalized processing."

--R.M.Hayes, "Information Science in Librarianship," 1969

new fields

information theory

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for decision makers

new fields

information theory

· information science

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"For national decision makers, no better alternative is at hand than to accept the unifying concept of information ..."

William H Read,

"Information as a National Resource," 1978

economic decision making

new fields

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information science

• economics

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"I propose we get rid of the duplication of 'knowledge and information.' There are those who insist on distinguishing 'information' from 'knowledge' ... The specialist in 'information theory' [ie Shannon] uses the word, as he frankly admits, in a 'rather strange way' ... but it is not what is commonly meant by 'information.' ... *Webster's Dictionary* defines 'information' as 'knowledge communicated' Hence, in the ordinary uses of the word, **all information is knowledge.**"

-- Fritz Machulup,
Production and Distribution of Knowledge, 1962

Cofl 2011-- Introduction 21

i-ndecisive?

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"Information is hard to define and impossible to see, but it is everywhere. ...

"It is the thing that moves within and between people and technology making them interesting ...

"...where people and technology meet ... that is where the information exists."

-- Wobbrock et al,

"Exploring the Future of i-schools," 2010



HMI?
How Much Information?

new fields

information theory

information science

economics

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information & society

information is ...

"Information is a subset of data

"data ... artificial signals
intended to convey meaning...

"information ... data that is
delivered for use by a person...

"... data, the "raw material" of information.

"... we measure information
each time consumers use it.

"... traditional information ... from media that
preceded the home computer era."

Roger Bohn & James Short, *How Much Information?* 2009



information & society

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society

The endless cycle of ideas and action

Endless invention, endless experimentation

Brings knowledge of motion, not of stillness

Where is the life we have lost in the living?

Where is the wisdom we have lost in knowledge?

Where is the knowledge we have lost in information?

-- T.S. Eliot,

"Choruses from 'The Rock,'" 1934

directions of the wind is that the (reduced) high-level barometric reading exceeds the (reduced) low-level reading when the wind blows at about the rate of 5 miles an hour. The reverse is always true when the speed of the wind exceeds that rate, on the one hand, or is extremely small, on the other. This seems to indicate an increase of pressure in air-currents which ascend the mountain, and so may explain the fact that the top of the mountain is frequently clear, while dense cloud is being constantly formed at a short distance above it.

— On June 27 a scientific expedition, headed by Professor Lee, instructor in biology at Bowdoin College, sailed from Rockland, Me., for Labrador. Of the seventeen members of the party with

necessity less than the true average rate per day, because every day that a bottle lies undiscovered on the beach counts on its time of drift, the apparent elapsed time being thus too great and the average drift per day too small. It is proposed to continue the publication of bottle papers as often as possible, not only for the Atlantic but for other oceans, and masters of vessels and others interested are urged to co-operate with the hydrographic office in collecting as complete data as possible regarding this general subject. Any reliable reports of long drifts of bottle-papers, or any other floating objects, will be of interest in this connection, and the accumulation of such data may add considerable useful information to our knowledge of the general drift of ocean currents.

information & society

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"information is a pattern or design that rearranges data for instrumental purposes, while knowledge is the set of reasoned judgments that evaluates the adequacy of the pattern for the purpose ...

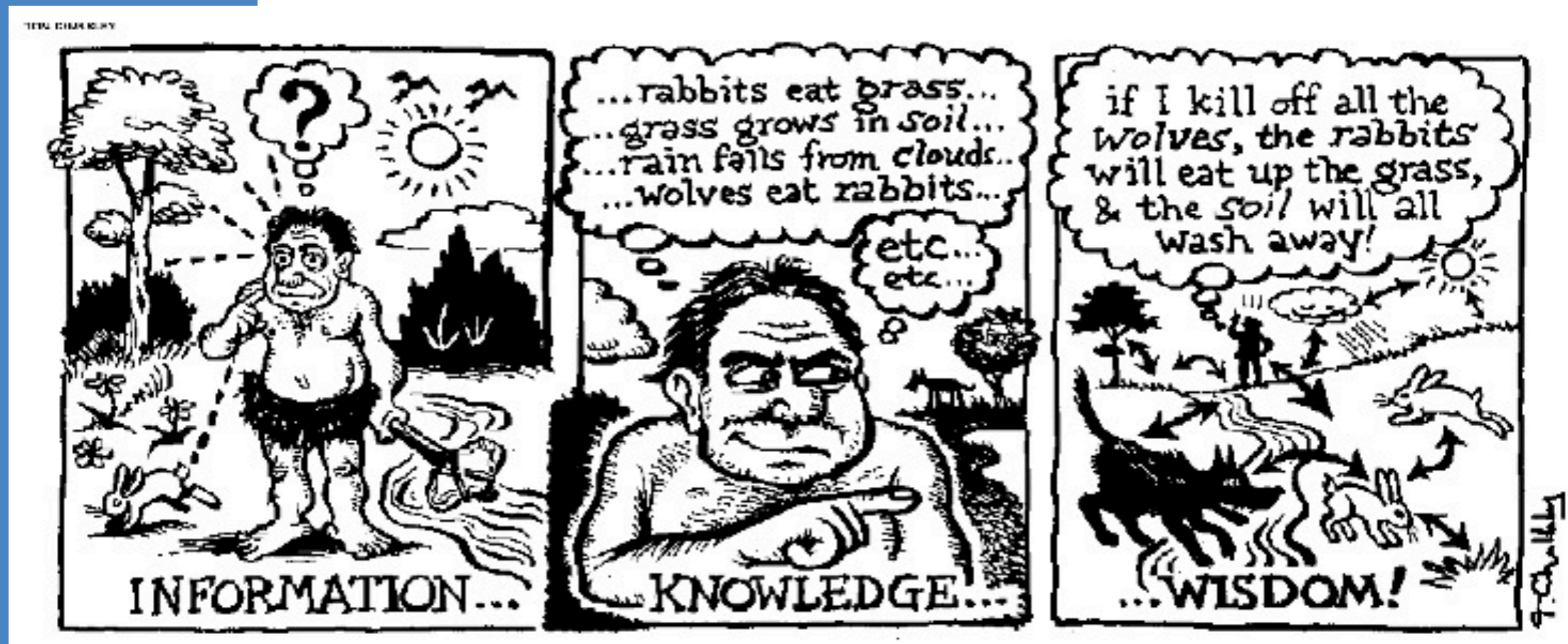
"knowledge and information are becoming the strategic resource and transforming agent of the post-industrial society

Daniel Bell, "Social Framework" 1979

cp "Such data may add considerable useful information to our knowledge"

Science, 1891

popular wisdom



well defined?

1. form of energy
2. form of property
3. form of commodity
4. a process of change in internal mental state
5. mathematical property which reduces uncertainty
6. knowledge
7. scientific knowledge
8. scientific information
9. science information
10. data
11. facts
12. communication
13. meaning
14. message content
15. perception
16. consciousness
17. mental impression
18. physical transmission signals.

for thursday

Week 1

20 Jan: I-School information: Exercise/discussion

- Members of the [ischools caucus](#) define themselves in terms of information, but they may understand that term in different ways. Look at the web sites of the Berkeley iSchool and at least two other members of the caucus and see how the term "information" is understood, either explicitly or implicitly. (Note that in a number of places, such as Indiana, Rutgers, and UC Irvine, the unit that most closely corresponds to the Berkeley iSchool will be one department or section of the school, which will go by the name of "informatics" or some such, as distinct from other departments of computer science, statistics, communication, journalism, etc. that are included in the same school or faculty.) How do differences in the understanding of information -- which very likely will be vague -- correspond to differences in the schools' curricula and research programs? What commonalities are there?

sloganeering?

"on pourrait dire que la communication, c'est la transmission et la propagation d'une information. Or une information, c'est quoi ? C'est pas très compliqué, tout le monde le sait : une information, c'est un ensemble de mots d'ordre. Quand on vous informe, on vous dit ce que vous êtes sensés devoir croire. En d'autres termes : informer c'est faire circuler un mot d'ordre. Les déclarations de police sont dites, à juste titre, des communiqués ; on nous communique de l'information."

-- Giles Deleuze,

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"A crucial distinction is made by Mr. Roszak [in the *Cult of Information*] between information, or data, and knowledge, that semantic embarrassment which computer zealots at best ignore and at worst disguise, calling it by such misnomers as 'knowledge systems.' Computers may excel at processing data. But, unlike humans, they are incapable of the original thought of which knowledge is created."

New York Times, 1987
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information as property

"The proper way to treat copyright is to make it exactly like real-estate in every way."

--Mark Twain to Rudyard Kipling, 1888

"No good case exists for the inequality of real and intellectual property."

--Mark Helprin, "A great idea lives for ever. Shouldn't its copyright?" 2007

"arbitrary and fictive distinctions between types of property,"

--Irving Horowitz, *Publishing as a Vocation*, 2011