NAS 501 Research Methods and Scientific Ethics

Chapter 4: Information Literacy

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If I ask you a question about your area of expertise, how do you prepare your report?

Where do you start to search ?

Make a list of your steps.

Do not share them with anyone?

“More new information has been produced in the last 30 years than in the previous 5000.”

Reuters Magazine (1997, March/April)

“The amount of new information stored on paper, film, magnetic, and optical media doubled in three years..”

How Much Information, 2003, http://www2.sims.berkeley.edu/research/projects/how-much-info-2003/execsum.htm#summary

In a study of 500 sites used by Colorado high school students to do research, only 27% of the sites were judged to be reliable for academic research!

Ebersol, Samuel, “Uses and Gratifications of the Web among Students,” Journal of Computer-Mediated Communication, 6(1): September 2000, www.ascusc.org/jcmc/vol6/issue1/ebersole.html

Colhoun, Alexander. "But - - I Found It on the Internet!" Christian Science Monitor. 25 April 2000: 16.

Everyone can search – so what's the problem?

- Overuse of Google
- Horizontal information seeking
- Navigation
- Viewing time
- Squirreling behaviour

(Squirreling : The storing of something when in abundance against a time when it will be scarce)

- Only accessing full-text when available online (ignoring print even when it's the only source)

Information overload

Personal information overload - personal stress and loss of productivity at work

Organizational information overload - overall productivity of the organization

'information fatigue syndrome' (IFS)

Influence of overload

- **time is wasted** - 38% of managers
- **decision-making is delayed** - 43% of respondents
- **distraction** from the main tasks - 47% of respondents
- **stress** –

  42 % leading to tension with colleagues, loss of job satisfaction, illnness

  61 % reduced social activity

  60% tiredness

Information overload recognised as a critical problem

Reuters Business Information (1996). Dying for Information? An Investigation into Information Overload in the UK and Worldwide. London: Reuters.
Reuters Ltd. (1998). Out of the Abyss: Surviving the information age. London.

The Solution?

- Speed things up?
- Pack in more and more content?
- Add more technology?

The Solution?

- Discourage Web Use?
- Pre-select resources?
- Filtering?

Filtering – The Solution?

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Information Literacy

Information Literacy

- Information literacy (IL) is a set of abilities requiring individuals to "recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information."

Resource:

Association of College and Research Libraries (ACRL).(2003) Information Literacy Competency Standards for Higher Education. [Online]. Available: http://www.ala.org/ala/acrl/acrlstandards/informationliteracycompetency.cfm

IL depends on many other skills

- Information Literacy
- ICT skills – Media literacy
- Literacy (Reading, Writing, Numeracy, Other basic skills)
- Oral Communication (Speaking, Listening)
- Reasoning (Thinking Skills)
- Traditional literacy
- Visual Literacy
- Media literacy
- Computer literacy
- Network literacy

Not only

Skills and competencies

But also

Attitudes and behaviours

IL Indicators

- Ability to access information efficiently and effectively
- Ability to evaluate information critically and competently
- Ability to use information accurately and creatively

Information Literacy Process Models

The 7 pillars of Information Literacy

IDENTIFY

- Able to identify a need for information

ASSESS

- Able to assess current knowledge and identify gaps

PLAN

- Able to construct strategies for locating information and data

GATHER

- Able to locate and access the information and data they need

EVALUATE

- Able to review the search process and compare and evaluate information and data

MANAGE

- Able to organise information and data and apply the knowledge gained

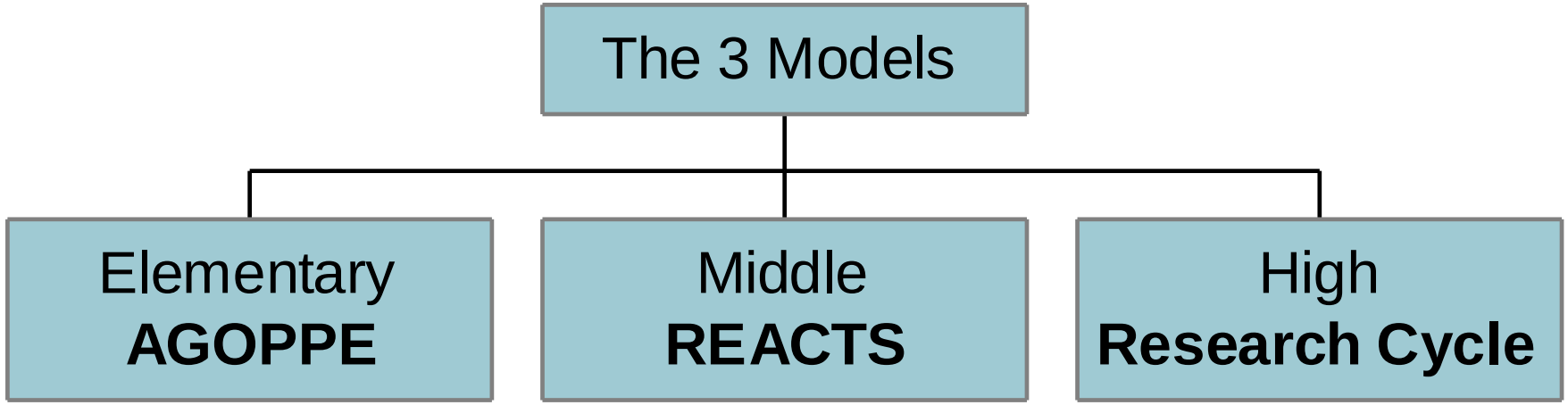
PRESENT

- Able to present the results of their research, synthesising new and old information and data to create new knowledge and can disseminate it in a variety of ways

12 Sampling Models

- 5-As
- 8Ws of Information Inquiry
- AGOPPE
- Big6
- Building Blocks of Research
- FINDS
- Information Search Process
- I-Search
- Pathways to Knowledge
- The REACTS Taxonomy
- Research Cycle
- Super 3

Narrowed Down




Report
Synthesize
Evaluate
Sort & sift
Essential Question?????
Revise quesions
Evaluate
Gather info
Revise plan
Synthesize
Develop research plan
Which city? Which product? Which poet? Acid rain? Trade deficit?
Gather again
Sort & sift again
List subsidiary questions
Sort & sift again
Gather again
Synthesize
Revise plan
Revise quesions
Evaluate

High: why Research Cycle

- A more complex model
- Non-linear process encourages higher level thinking
  - More skill= less linear
- Prepares students for college and real world
  - a more accurate and realistic representation of research process
  - Student produces info NOT consumes info
- Emphasis on questioning
  - Have to reassess and rethink the research question throughout the process
  - Leads to cycling through model before reporting

Questioning
Planning
Gathering
Sorting & Sifting
Synthesizing
Evaluating
Reporting

(McKenzie, 2000; Information Age Inquiry, 2006h)

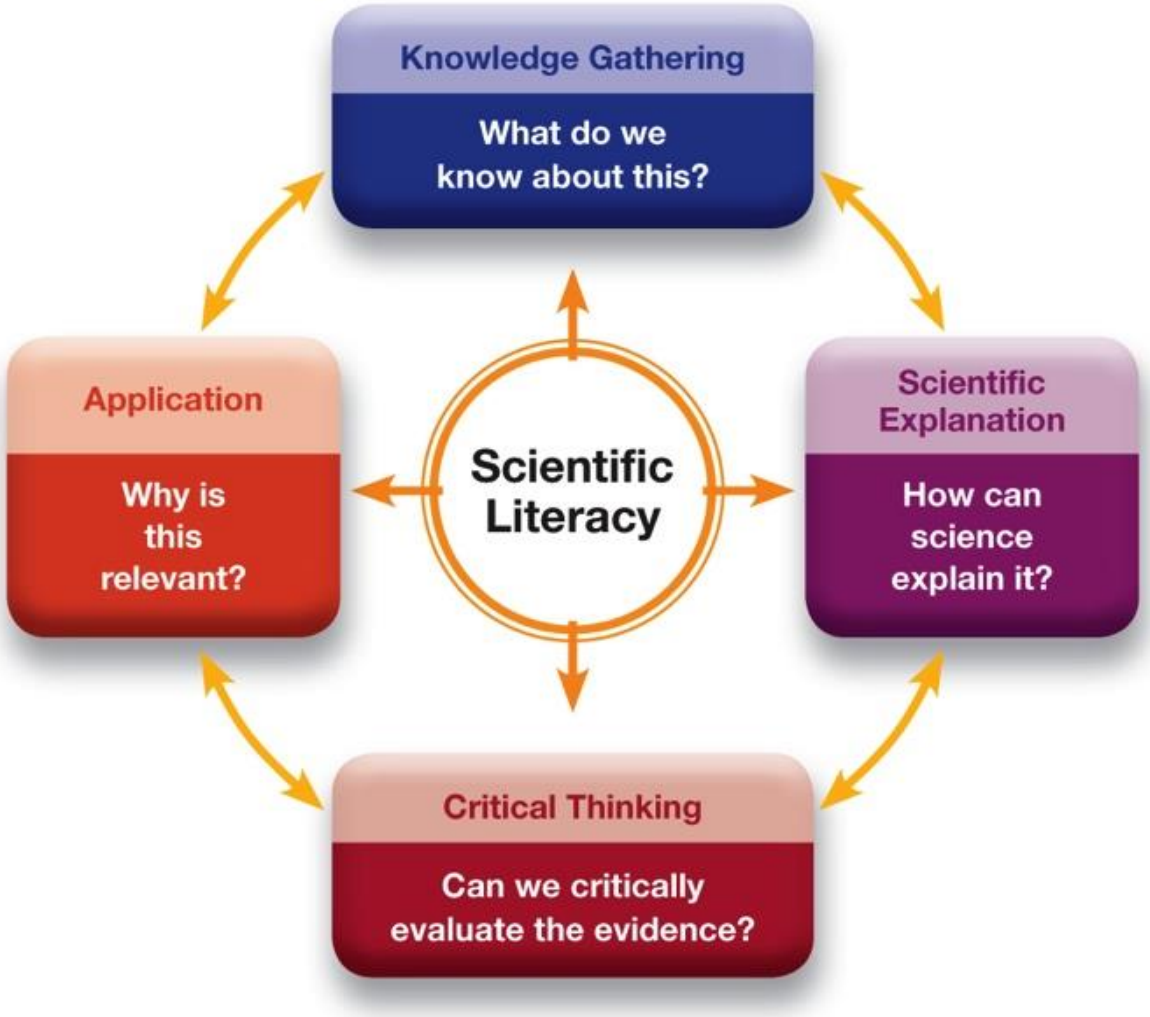
CHARACTERISTICS OF INFORMATION

PRIMARY	SECONDARY	TERTIARY
Information in its original form when it first appears Has not been published anywhere else or put into a context, interpreted, filtered, condensed, or evaluated by anyone else Examples are a professor's lecture, newspaper articles written by people at the scene of an event, the first publication of a scientific study, an original artwork, a handwritten manuscript, letters between two people, someone's diary, or historical documents such as the U.S. Constitution.	Has been removed from its original source and repackaged Restates, rearranges, examines, or interprets information from one or more primary sources Examples are your classmate's notes on a professor's lecture, a newspaper article reporting on a scientific study published elsewhere, an article critiquing a new CD, an encyclopedia article on a topic, or a biography of a famous person. Also, secondary information leads you to primary information. Examples are an index to newspaper articles, an index to articles from scientific research journals, or a bibliography of an author's original works.	Even further removed from the original information than a secondary source Leads you to secondary information Examples are a bibliography of critical works about an author, an index to general periodical articles, or a library catalog.

- **Scientific literacy** is the ability to understand, analyze, and apply scientific information.
- Scientific literacy involves four different skills:
  - gathering knowledge about the world
  - explaining it using scientific terms and concepts
  - thinking critically
  - applying this knowledge to relevant, real-world situations

Building Scientific Literacy

A Model of Scientific Literacy



The Successful Research Process

keys to your Success

- Research is always a multistep process.
- Research is often interdisciplinary.
- Think broadly about your topic; then narrow and refine the focus.
- Keep a record of everything you find and where and how you find it.

Steps to your Success

Identify Your Topic

- The topic is the idea that you are researching. Example: Pollution in the ocean.
- Brainstorm and create a concept map of the topic.
- Think about and visualize your topic from many different angles.
- Note related and interrelated topics.
- Note terminology and synonyms that can broaden your searching power.

State your topic as a question. Example: How does pollution affect the ocean?

- Refine the question. Example: How does oil pollution affect marine life in the ocean?
- Identify key concepts and list synonyms for them. Example: ocean, seawater; pollution, oil spills; marine life, organisms, biology, plants, animals, fish, mammals.
- List disciplines or subject areas that relate to part of your research. Example: oceanography, environment and life sciences, fisheries, natural resources, marine affairs, biology, aquaculture, business.

Steps to your Success

Gather Background Information

- Get a broad overview of the subject or topic.
- Use both general and subject-specific encyclopedias and dictionaries.
- Get more focused, in-depth, or historical background on the topic.
- Use books written in the time period and follow up with more recent information.

Focus Your Research

- Gather up-to-date, current information on the topic.
- Use appropriate periodical information from popular, trade, and scholarly sources.
- Use high-quality, appropriate web sites.
- Gather in-depth, focused information on the topic.
- Search for research studies, surveys, and experiments about your topic.

Steps to your Success

Evaluate Your Sources

- Does the author have authority on the topic?
- What are the author's credentials?
- Is the information accurate for when it was written?
- Is there a consensus of opinion on this topic? What are the important ideas?
- What is the purpose of the source? How will it impact your research?
- Is the purpose to inform, to entertain, to teach, or to influence?
- Who is the author writing for? Is it biased in any way?
- Has the author looked at the material objectively?
- Does the author offer several points of view?
- How does the source help answer your research question?
- Does the source provide valuable, relevant information?
- Does the source answer a part of the total research question?

Keep In Mind That

- No study is perfect
- “All data is dirty is some way or another; research is what you do with that dirty data” (Manuel)
- Measurement involves making choices

Be Critical About Numbers

(Best 2001)

- “Every statistic is a way of summarizing complex information into relatively simple numbers.” (Best)
- How did the researchers arrive at these numbers?
- Who produced the numbers and what is their bias (prejudgment)?
- How can key terms be defined & in how many different ways?

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