Research Literacy

Research Literacy

Is a set of abilities requiring individuals to:

- **Recognize when information is needed**
- **Have the ability to locate, evaluate it**
- **Use effectively the needed information**

Research Literacy Provides

- **Detailed information on impairments**
- **Wellness goals**
- **Treatment techniques and Outcomes**
- **Allows therapist to make value judgements about what worked and what didn’t**

It matters because….

- Fundamental for conventional health care disciplines (medicine, physical therapy, nursing, etc.)
- It helps distinguish useful treatments and practices from those with no benefits
- It facilitates acceptance of complementary therapies by conventional health care and public
- Cornerstone of evidence-based practice

Research Literacy - Importance?

- Distinguish useful treatments and practices from those that provide no benefit/are harmful
- Facilitates acceptance of new complementary healthcare modalities by the general public
- Intellectually stimulating, keeps us current

Information from media vs. research

- **Media** emphasizes ‘newsworthy’ angle vs. cautious interpretation by peer-reviewed journals

- **Research** reduces language barriers between conventional health and complementary approaches

Why Research?

- Research helps healthcare practitioner's to improve quality of care they can offer
- Aim: to provide the best possible health care
- Understanding research is vital to the continued development of complementary therapies.

What is Science?

Science as a Way of Thinking

- Open-minded curiosity and inquiry

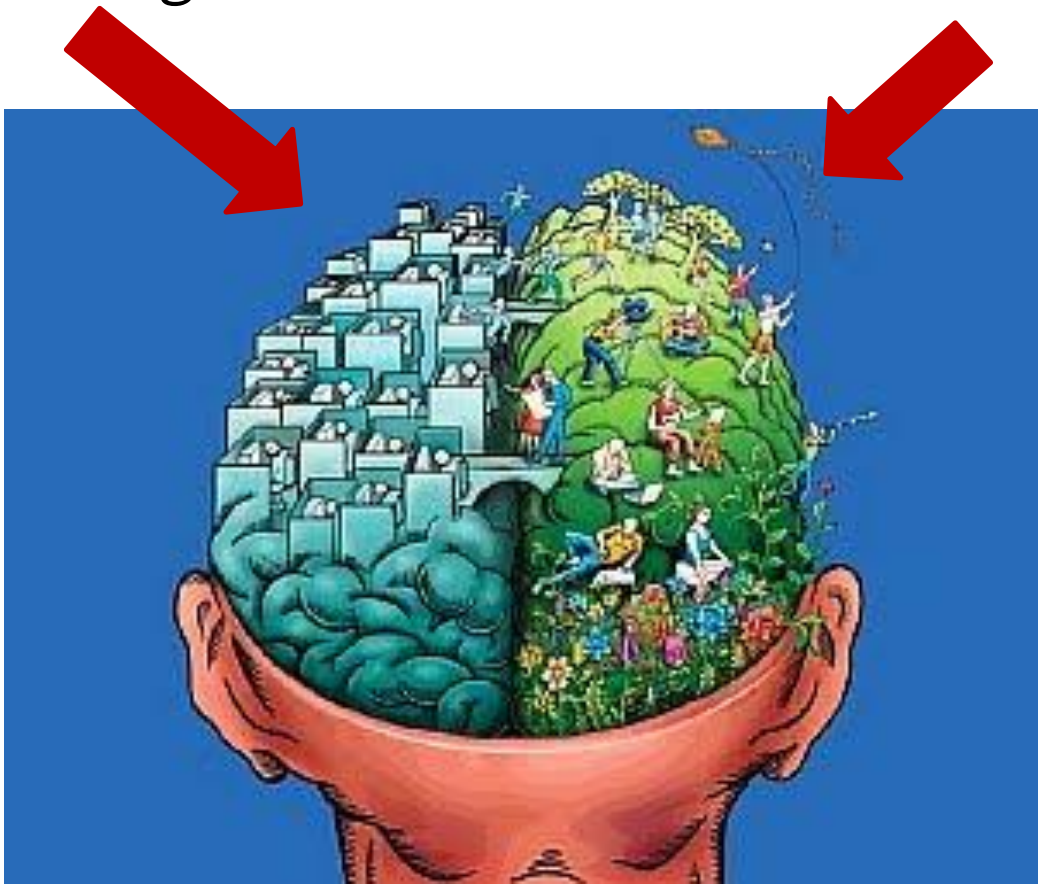
Other ways of gaining knowledge:

- Tradition: “it has always been done that way”
- Intuition: “it feels right”, we “just know”
- Authority: “my massage teacher told me so”

Other ways to acquire knowledge: Rationalism vs. Empiricism

Logic, reason, critical thinking

Observation, sensory experience



http://thedeconstructionzone.blogspot.ca/2011_08_01_archive.html

Rationalism: does not validate assumptions

All men are mortal (premise)
Socrates is a man (premise)
Socrates is mortal (conclusion)

Problem: there is no validation of premises (i.e. is Socrates a man or the name of a dog or a software?)

To be confident of the conclusion, each step or premise must be tested (empiricism)

Empiricism: demonstration of statements

- It validates assumptions of rationalism by observations, measurements, physical assessments

- It defines science and scientific method

How do the idea's of Rationalism and Empiricism Apply to RMT's?

- When a client tells us they have a sore shoulder as a result of playing baseball on the weekend, we can ***rationalise*** that they may have a rotator cuff tear.

- We then become empiricists and "prove" our beliefs based on a physical assessment. We can use orthopaedic testing to do so.

Scientific Method is about asking questions

- What? How? Why?
- Development and testing hypotheses
- Hypothesis: highly specific statement that can be demonstrated (T or F) through methodical gathering and analysis of data

Science - Characteristics

- Describes/explains relationships between variables
- Systematic: methodical gathering of data (relevant info is not overlooked or left out)
- Anti-authoritarian: evidence-based
- Assumes that knowledge is always provisional

Videos on science concepts

- https://www.ted.com/talks/ben_goldacre_battling_bad_science#t-7923 (14:12 min)
- https://www.ted.com/talks/michael_specter_the_danger_of_science_denial (16:22 min)

- http://www.youtube.com/watch?v=BVfI1wat2y8 (8:53)
- https://www.youtube.com/watch?v=GKGtkzgKfkc (10:30)

Ethics in Health Care Research

Code of Ethics applies to research with humans

and animals

Goal: to maximize effort to protect human and animal rights and well-being of study's participants

Ethical Clinical Research: 2 basic principles

- Full information disclosure of study procedures (so participants can make informed decision regarding their participation)

- Do everything possible to minimize potential harm to study participants – do no harm (Hippocratic Oath)

Who is a scientist?

- Empirical evidence
- Skeptical
- Risky Predictions-Stating an idea in a way that it could be refuted. The principle of “falsifiability”
- Precise-Hunch Hypothesis Prediction Evidence
- Open-Clear descriptions & Replication.

Evidence Based Practice (EBP)

- **Uses Evidence to guide clinical decisions**

- **Integrates 3 components**
  - **Best Research Evidence**
  - **Clinical Experience**
  - **Client Values**

Scientific Rationale for Decisions

- Clinical Problem Solving/Clinical Reasoning
- Research Methods
- Experimentation
- Evidence Based/Informed Practice

https://www.youtube.com/watch?v=tsk788hW2Ms

- STATISTICS!!!!

Measurements, why do we care?

- What can we measure?
- How can we measure it?
- How **reliable** is it?
- How **valid** is it?
- What does this all MEAN!!!

Determine a course of action.

- http://www.stuffyoushouldknow.com/podcasts/how-the-scientific-method-works/

- **Science: the intellectual and practical activity encompassing the structure and behavior of the physical and natural world through observation and experimentation.**
- **Treatment Plans: Way more exciting than it sounds!**
- **Differential Diagnosis: Way more scary than it sounds!**

Adapt to operational constraints

Ahhh pardon?

1) Adapt

2) Operational Constraints

1, 2, 3….GO!

Determine a course of action.

- Science: systematically builds and organizes information that has testable explanations and predictions
- Treatment Plans: Way more exciting than it sounds!
- Differential Diagnosis: Way more scary than it sounds!

Accept responsibility for decisions and actions.

- https://soundcloud.com/science-vs-season-1
- **Clinical Problem Solving/Clinical Reasoning**
- **Research Methods**
- **Experimentation**
- **Evidence Informed Practice**
- **STATISTICS!!!!**

1) Falsification and accumulation of knowledge

- Science works best when attempting to prove a thing to be false
- When hypothesis fails to be demonstrated as false enough times, it becomes part of the accepted knowledge
- Knowledge is always provisional: we can never say that: "such and such is certainly true"

Science: proving something to be false rather than proving it to be true

- Nothing is certainly true (research question), it is always possible for new information to be discovered.
- A hypothesis is tentatively true to date because no evidence has disconfirmed it.
- It implies that accepted knowledge is always provisional and there are degrees of certainty.
- Scientific knowledge is always temporary: there are degrees of uncertainty (changes based on new knowledge)

Knowledge is always provisional

- As new knowledge becomes avail, accepted knowledge eventually changes to include it

- Rarely 1 study provides evidence to conclusively answer a question

- One study builds upon another, evidence accumulates over time

"If I have seen farther than other men, it is because I have stood on the shoulders of giants"

Albert Einstein

2) Reproducibility of Results

It is the capacity of a study to be repeated by another investigator and still produce same/ similar results

Reproducibility of Results

- This is the highest standard of validating a hypothesis
- If experimental results that cannot be replicated by others using the same methods and materials are viewed skeptically by scientific community
- Standard practice: to provide enough detail for fellow scientist to reproduce study

Provide rationale for decisions.

- http://www.stuffyoushouldknow.com/podcasts/research-tips-from-sysk/

- **Embody the Socratic principle: "The unexamined life is not worth living" , because we realize that many unexamined lives together result in an uncritical, unjust, dangerous world.**

- **~ Linda Elder, September, 2007**