Familiar sources for answering questions

Tradition
Authority
Common Sense

Less Familiar but more reliable sources for answering questions

Science
Scientific Method
Research

Process

Identify concern and Clarify the Problem
Formulate research questions or hypotheses
Collect and analyze data
State findings and draw conclusions

Guiding Principles

Rules of:
  Legality
  Ethics
  Philosophy
  Procedure

Good school system has influx of ethnic ESL
Grades slip & unrest between students

Scientific Method

1. A specific strategy used to answer questions and resolve problems.
2. Focuses on discovering valid facts and relationships.
3. Facts and truth not the same
   ✬ Facts are not immutable.

Impartial people make agreements concerning observations which are:
   ✬ COHERENT
   ✬ CONSISTENT

Theory is an idea based on observable and/or circumstantial evidence.
It stands until credible, consistent evidence contradicts the evidence of the theory. Hypothesis developed for research and experiments are based on theories.

**Facts** depend on observation and accurate measurement
Fact is not established through speculation, hunch, belief, revelation, or inner vision.

The relationship among facts give us the ability to predict and control circumstances, events, and even human behavior.

**John Dewy** -- application of scientific method to educational research.

Presented as series of steps:
1. Identify concern and clarify the Problem
2. Formulate research questions or hypotheses
3. Collect and analyze data
4. State findings and draw conclusions
5. Use conclusions to verify or reject the hypothesis.

**Process of Educational Research**
1. Identify a concern
2. Clarification of the concern becomes the “Problem”
3. Formulate a research question or questions or Hypothesis.
4. Procedures--collect data, summarize and analyze
5. State findings determined through the data
6. Draw conclusions related to research question(s) or Hypotheses.

**Operating Rules**

- Legality
- Ethics
- Philosophy
- Procedure

**Legal Principles**
1. **Protection** (health & safety)
2. **Confidentiality**--anonymity

**Ethical Principles**
1. **Beneficence** – Research is conducted to garner knowledge & shed light (do no harm) (Bell Curve)

Always increase understanding promote opportunity, & advancement of population at large.

2. **Honesty**
3. **Accurate Disclosure** (participants should know with what they are getting involved. (does not mean full disclosure -- may bias results).

**Philosophical Principles**
1. **Significance** -- findings should contribute to human knowledge (not the same as statistical significance).
2. **Generalizability** -- significance of findings have applicability beyond the sample.
3. **Replicability**
4. **Probability** -- understand .05 & .01 does not mean certainty.

**Procedural Principles**
1. **Researchability** -- (can sci meth. be applied? can problem be modified or topic be limited? can data be obtained? can research be accomplished within restraints of: time, facilities, distance, money, & other logistical and practical matters
2. **Parsimony** (KISS)
3. **Credibility** -- (procedures should ensure: significance, validity (on target), & reliability (consistent)).
4. **Rival Explanations** -- anticipate challenges control for bias & confounding variables.