Critical Analysis of a Research Paper:
7 Questions

Robert G. Davis, Ph.D., FIES

Senior Staff Research Engineer
Pacific Northwest National Laboratory

Critical Analysis of a Research Paper

1. What type of paper?
2. What was the question?
3. What was measured?
4. What processes were used?
5. What analyses were done, and how?
6. What were the conclusions?
7. What should happen next?

1) What type of paper?

- Experimental
- Epidemiological
- Exploratory (field, pilot)
- Expository (analytical, theoretical)
- Explanatory (tutorial)

- *LR&T*:   Research, Review, Case study, Discussion (Theoretical)
- *LEUKOS*: Scientific research results, Review, Lighting application, Engineering development, Tutorial

2) What was the question?

- What gap does this question address?

- Why is the question important, and to whom?

- Has anyone else asked this question?

- Has anyone else asked related questions?

3) What was measured? STIMULUS

- Variables manipulated?

- Variables held constant?

- Extraneous / confounding variables addressed?

- Extraneous / confounding variables *not* addressed?

3) What was measured? RESPONSE

- Performance (behavioral) variables?

- Perception (self-report) variables?

- Physiological variables?

- Demographic variables?

- Converging operations? (Mixed methods)

4) What processes were used?

- Were proper measurement procedures followed?

- Could it be replicated based on the details provided?

- Counterbalancing / bias considered?

- Makes & models of instruments? Calibration details?

- Standard response measures or original to the study?

- Measured versus calculated / derived data?

5) What analyses were done, and how?

- Constructing metrics for analysis

- Descriptive statistics

- Inferential statistics

- Graphics

- Uncertainty

6) What were the conclusions?

- Supported by the data presented?

- Consistent with theories / models?

- Validity of generalizing?

- Alternative explanations?

7) What should happen next?

- Nothing – asked & answered

- Immediate next steps?

- Tangential ideas that arose?

- What would you do differently?