A Meta-Analysis of the Effectiveness of Responsible Conduct of Research Education

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Background

- Government agencies (e.g., NIH, NSF) and higher education institutions have invested heavily in ethics education
- As a result, many instructional programs bearing on the responsible conduct of research (RCR) have been initiated in recent years
- A wide variety of instructional models have been used in these educational programs
- Objective:
  - Identify elements of instruction that do or do not contribute to the various outcomes sought in RCR educational programs

Research Questions

1. How effective is RCR education?

2. Is RCR education improving?

3. What instructional content and delivery methods are particularly effective?

Method – Literature Search

- 32 databases and 14 key journals
- Dissertation Abstracts and conference presentations
- RCR Program Directors and Principal Investigators (NSF/NIH grants related to ethics education) were contacted

Method – Inclusion Criteria

1. Empirical investigation of the effectiveness of RCR instruction

2. Clear description of course characteristics and evaluation methods

3. Presentation of statistics needed to calculate an effect size

Final sample: 106 ethics courses (150 unique effect sizes)

Method – Coding Procedures

- Operational definitions and rating scales were developed
- 6 experts in the field of ethics reviewed these scales
- 3 judges were trained to apply rating scales
- 100+ instructional characteristics were assessed
- Sufficient interrater agreement was achieved (86%)

Results

- Courses delivered between 2007 and 2015 produced a Cohen's *d* of .56 which is considered practically significant and represents an improvement over earlier studies (*d* = .36)

- Highly effective instructional content
  - Personal integrity (*d* = .96)
  - Data integrity (*d* = .82)
  - Differences in field norms (*d* = .80)
  - Common rule (*d* = .78)
  - Contemporary ethics issues (*d* = .62)
  - Whistleblowing (*d* = .64)
  - Authorship and publication practices (*d* = .60)
  - Instructional compliance (*d* = .60)

Results

- Less effective instructional content
  - Community issues (*d* = .23)
  - Personal values (*d* = .22)
  - Civil maturity (*d* = .21)
  - Diversity (*d* = .19)
  - Organizational values (*d* = .19)
  - Lab safety (*d* = .19)
  - Power differentials (*d* = .18)

Results

- Highly effective delivery methods/activities
  - Note taking (*d* = .85)
  - Debate (*d* = .63)
  - Analysis of current events (*d* = .60)
  - Review (*d* = .59)
  - Worksheets (*d* = .55)
  - Case-based instruction (*d* = .50)

Results

- Less effective delivery methods/activities
  - Moral method (*d* = .30)
  - Book review (*d* = .29)
  - Service learning (*d* = .25)
  - Mentoring (*d* = .19)

Limitations

- Several course characteristics of interest could not be assessed due to ambiguous course descriptions
- “File drawer bias” was mitigated (49 out of 150 effects were from unpublished sources)
- Given the relatively small number of courses identified, results could only be examined at the overall criterion level
- Only ethics courses in the sciences were examined (i.e., biomedical, engineering, social)

Conclusion

- RCR education programs are improving in effectiveness and have now demonstrated effects on ethics of practical value
- However, some elements of instruction work better than others
- Programs stressing active, thoughtful analysis of contemporary ethics issues vis-à-vis basic, standard guidelines are most effective