

The FINE Foundation's

Conceptual and Analysis Criteria: *A Process for Identifying Quality Educational Research*

Conceptual Criteria

The following criteria may be useful in identifying quality research articles:

1. FOCUS: Does the work address the area of inquiry under consideration? Does it contribute to understanding the area under consideration, whether as a theoretical position statement, critical analysis, descriptive or case study, empirical study, or other legitimate form of scholarly inquiry?
2. VERITY: Does the work ring true? Is it consistent with accepted knowledge in the field? If it departs, why? Does it fit within the context of the literature? Is it intellectually honest and authentic?
3. INTEGRITY: Is the work structurally sound? Does it hang together? In a piece of research, is the design or research rationale logical and appropriate?
4. RIGOR: Is it important, meaningful, non-trivial? Is there sufficient depth of intellect rather than superficial or simplistic reasoning? Is the design of the study implemented according to norms appropriate for the nature of the study or scholarly work?
5. UTILITY: Is the work useful and professionally relevant? Does it make a contribution to the field? Does the piece have a clearly recognizable audience? Does it address practitioners appropriately? Does it contribute to practitioners' understanding or decision-making on the topic?
6. CLARITY: Is it written clearly and without jargon? Is the writing style appropriate to the nature of the study?

These criteria were adapted from:

Garman, N.B. (1986). The conceptual dissertation: Commentaries by practitioners as inquirers. (Report No. HE 019479). Paper presented at the Annual Colloquium of the Council of Graduate Students in Education, University of Pittsburgh School of Education. (ERIC Document Reproduction Service No. ED 272 057).

Comparison of Quantitative and Qualitative Research

Quantitative and qualitative studies contain the same basic elements but use somewhat different assumptions and approaches. The reviewer should first determine whether a study is primarily quantitative or qualitative in nature, then apply the respective criteria. The following table may assist the reviewer in determining the nature of the study.

Characteristics Associated w/Approach	Quantitative Research	Qualitative Research
Phrases	experimental; numerical data; empirical; statistical	□ descriptive; naturalistic; word-oriented
Key Concepts	variables; operationalizing; reliability; hypotheses; validity; statistical significance; replication, validity	meaning; common-sense understanding; process; social construction; themes; trustworthiness
Designs	structured; predetermined; formal; specific; detailed plan of operation	evolving; flexible; general; negotiated; a hunch as to how to proceed
Sample	large; stratified; control groups; precise; random selection; control for extraneous variables; representative	small; theoretical sampling; purposive sampling; selected to take into account as much context as possible
Techniques or Methods	experiments; survey research; structured interviewing; quasi-experiments; structured observation; data sets	observation; participant observation; reviewing documents and artifacts; open-ended interviewing
Data	quantitative; operationalized variables; quantifiable coding; statistical; counts, measures	descriptive; people's own words; personal documents; field notes; artifacts; official documents; audiotapes, videotapes, transcripts
Instruments and Tools	inventories; questionnaires; scales; test scores; computers; indexes	tape recorder; transcriber; notes; researcher is often only instrument
Data Analysis	deductive; statistical; occurs at conclusion of data collection	inductive; ongoing; models; themes; concepts; constant comparative method
Problems in Using	controlling other variables; Approach obtrusiveness; validity	time consuming; procedures not standardized; reliability

Format for Analysis Criteria

The following analysis criteria are in the form of questions and are organized by typical sections of a research report. Criteria for quantitative studies begin on [page 4](#); criteria for qualitative studies begin on [page 8](#).

QUANTITATIVE STUDIES

I. Introduction to Problem

- Statement of problem
- Review of literature
- Hypotheses/research questions

II. Research Procedures

- Sample
- Data gathering techniques
- Research design

III. Discussion

- Results
- Conclusions
- Recommendations

IV. Method Specific Criteria

- Survey/questionnaire
- Correlational
- Causal-comparative
- Experimental
- Quasi-Experimental

QUALITATIVE STUDIES

I. Introduction to Problem

- Introduction to problem
- Review of literature
- Statement problem/question

II. Research Procedures

- Participants
- Data gathering techniques
- Research design

III. Discussion

- Results
- Conclusions
- Recommendations

IV. Method Specific Criteria

- Interview/focus groups
- Observation
- Historical
- Case study(ies)

Analysis Criteria for Quantitative Studies

I. INTRODUCTION TO PROBLEM

- **Is the stated problem clear and researchable?**
 - Is the rationale for the problem clearly presented?
 - Has related background information pertaining to the problem been provided to support the need for this study?
Description: Background information such as the history and current status of the problem (including statistics that reinforce the necessity to investigate this problem) should be presented.
- **Has a thorough review of literature informed the procedures and discussion?**
 - Are cited references relevant to the problem and up-to-date?
 - Are the majority of sources primary?
Example (to avoid): Johnson (1990) states that, "Research is not fully utilized in educational improvement" (Smith, 1992, p. 26). This is not a primary source as it was referenced to Smith and not the original work of Johnson.
 - Are the results of cited studies compared and contrasted?
 - Does the review relate to the problem and present implications for the problem?
- **Are hypotheses/research questions explicitly and clearly stated?**
 - Does each hypothesis/research question state an expected relationship/difference between two variables? (Gay, 1987).
Example: "Students from single parent family homes have less absenteeism than students from dual parent family homes." A difference is described between the two types of homes (independent variable) in terms of absenteeism (dependent variable). See description of correlational studies under method-specific criteria.
 - Are variables clearly defined?
 - Is a logical, documented, and unbiased rationale provided for each hypothesis/research question?
Description: The rationale for each hypothesis should be based upon the implications of previous research. Bias may be present if the author sets out to "prove" the hypothesis. The author's affiliations and attitude can also be implications of bias (Borg & Gall, 1989).

II. RESEARCH PROCEDURES

- **Did sampling procedures produce a sample that is representative of an identifiable population or of a local population?** (Borg & Gall, 1989).

- Are characteristics of sample and population described?
Description: Demographics, such as age, race, and gender, should be presented.
- Did sample selection methods produce a biased sample?
Description: Randomly selected samples are typically representative of the population. Although many researchers cite the use of volunteers and available groups as major sources of sample bias, most research utilizes volunteers even if the participants have been first randomly selected.
- Is the agreement between the researcher and participants described such that the participants are fully aware of their rights?
- Are precise numbers given for participating and non-participating subjects as well as an explanation for these numbers? (Crowl, 1993).
- Is sample size large enough?
Description: In general, the larger the sample the more representative it is of the population. Gay (1987) recommends the following minimum sample sizes for the respective types of research: descriptive-10% of population; correlational-30 subjects; causal-comparative-30 subjects per group; and experimental-15 subjects per group (p.119). See method-specific criteria for definitions of these types of research.
- **Are data gathering techniques and sources appropriate, valid, and reliable?**
 - Is a thorough description given for each instrument or data source?
 - Is a rationale provided for each instrument?
 - Have instruments that have been specifically designed for this study been piloted?
Description: Piloting an instrument with a similar sample ensures that the instrument is appropriate for and understandable to the studied sample.
 - Are measures of validity and reliability discussed?
Description: Validity is the degree to which interpretations of test scores are useful for given purposes. Evidence about the content of the test or about how test scores correlate with scores from other measures may be useful in assessing validity. A validity coefficient indicates the degree to which test scores relate to other test scores or are able to predict how well an individual will do in a future situation. Reliability is the degree to which a test can repeatedly produce consistent scores with the same individuals. Reliability coefficients range from 0 to 1, where 1 represents perfect reliability .
 - Are procedures of administering, scoring, and interpreting instruments fully described?
- **Are the research design and procedures appropriate and replicative?**
 - Is the research design appropriate for investigating the hypothesis/research question?

- Are procedures sufficiently described to permit replication by another researcher? (Gay, 1987).
- Has the research design eliminated effects of possible confounding variables? (Crowl, 1993).

Description: A confounding variable is one that obscures relationships between/among other variables. Generally, confounding variables cannot be corrected.

Example: An experimental study investigates the effectiveness of computer-based instruction by comparing two classes; one class receives the traditional lecture mode of instruction from Mr. Anderson while the other class receives computer-based instruction from Ms. Wiley. Assume that the students in the computer-based course performed better. One cannot conclude that this improved performance was due to the different methods of instruction since it could be due to Ms. Wiley's teaching ability. In this case, the difference in instructors is the confounding variable as it obscures any meaningful conclusions about the results of this study (Gravetter & Wallnau, 1992).

III. DISCUSSION

- **Are results appropriate and clear?**
 - Are statistical techniques appropriate for the hypotheses?
 - Are results presented correctly and clearly in the text and in tables and graphs?
 - Are levels of significance and degrees of freedom described and used correctly?

Description: Level of significance-Whatever coefficient is used to describe a statistical relationship, a level of significance must be stated in terms of alpha (α). Alpha refers to the probability of the calculated relationship (or difference) occurring by chance. Therefore, if $\alpha = .05$, there is a 5% chance of finding a relationship (or difference) in error. Common alpha levels are .05 and .01; sometimes .10 is acceptable (Gravetter & Wallnau, 1992).

Degrees of freedom are a function of the number of subjects and groups participating in the study (Gay, 1987). Degrees of freedom affect the level of significance, such that as the degrees of freedom increase, the easier it is to attain significance. Each test of significance has a formula for calculating the degrees of freedom.
 - Have all graphs and tables been thoroughly discussed in text?
 - Was every hypothesis tested?
- **Do the results of the data analysis support conclusions of the study?**
 - Has each hypothesis been confirmed or rejected in terms of the study's results?
 - Are conclusions supported by results?

- Are results discussed in terms of agreement or disagreement with previous studies?
- Have possible limitations of the study been discussed?
- **Are recommendations for future action asserted?**
 - Have implications for educational practice been addressed?
 - Are recommendations for future research asserted?
 - Has the author avoided overemphasizing findings that are statistically significant but not practical?
Example: Suppose the author found that students receiving computer-based instruction (experimental group) performed better than students receiving lecture (control group) and so recommends the development of a new computer-based curriculum. The results leading to this conclusion and recommendation came from administering a final test of 125 questions to the two groups, totaling 400 students. The mean scores of the experimental and control groups were 76.5 and 74.5, respectively. While these means were statistically significant (possibly due to the large sample), the two point spread may not represent an important educational difference. Thus, the author's recommendation to develop and implement a computer-based curriculum may not be practical since the expected improvement may not justify the cost.

IV. METHOD SPECIFIC CRITERIA FOR QUANTITATIVE STUDIES

- **Survey/Questionnaire Studies** (Minimum sample size-10% of population)
 - Have piloting procedures been fully described?
 - Are directions to questionnaire respondents clear and consistent?
 - Is an appropriate response format used?
 - Do questions relate to study objectives?
 - Are leading questions avoided?
- **Correlational Studies** (Minimum sample size-30 subjects)

Description: Correlational studies investigate the relationship/difference between two variables.

Example: Researcher investigates the relationship between GPA (independent variable) and absenteeism (dependent variable). The most common means of expressing the degree of the relationship is the Pearson correlation coefficient (r). This correlation coefficient ranges from -1.00 (a perfect negative relationship) to $+1.00$ (a perfect positive relationship), where zero represents no relationship.

 - Is rationale presented for each variable selected?
 - Does the author discuss findings and conclusions in terms of relationships and not in terms of cause and effect?

- For prediction studies: Is the criterion variable well defined? Was the prediction equation validated with at least one other group?
- **Causal-Comparative Studies** (Minimum sample size-30 subjects/group)

Description: Causal-comparative studies are somewhat similar to correlational studies in that they describe conditions that already exist; however, causal-comparative studies attempt to determine a cause or reason for an effect by controlling for extraneous variables and thus eliminating other possible causes for the effect.

Example: Researcher investigates the effect of socio-economic status (SES) on school achievement. The independent variable or cause is SES which cannot be manipulated. The dependent variable or effect is school achievement measured in GPA. Three groups of students would be identified-low, mid, and high socio-economic levels. These groups would be equated in terms of other possible variables and then compared by GPA.

 - Are characteristics that differentiate the independent and dependent variables clearly defined?
 - Are important extraneous variables identified and controlled?

Description: An extraneous variable is one that unintentionally interferes with the effect of the independent variable. "Researchers usually try to control for extraneous variables by experimental isolation, by randomization, or by some statistical technique such as analysis of covariance" (Vogt, 1993, p.88). Another technique used is matching.

Example: Using the previous example of socio-economic status and school achievement, other possible variables that may interfere with the effect are intelligence, absenteeism, and family status.
 - Are causal relationships discussed with due caution?
 - Are alternative hypotheses discussed?
- **Experimental Studies** (Minimum sample size-15 subjects per group)

Description: Experimental studies, like causal-comparative studies, also examine cause and effect relationships; however, experimental studies do so by focusing on a treatment (independent variable) and an outcome (dependent variable). This type of research usually compares an experimental group (receives treatment) to a control group (receives no treatment). Common problems in experimental research are the difficulties in obtaining equivalent groups and in controlling extraneous variables and treatments.

Example: Researcher investigates the effect of positive reinforcement (treatment/independent variable) on school achievement measured through semester grades (dependent variable). The researcher randomly assigns participants to an experimental group (receives treatment) and a control group (no treatment). The groups are then compared with respect to semester grades. Extraneous variables may be: instructor, time of day, course content, grade level.

 - Are group formation methods described?

- Were participants selected randomly to maximize generalizability of findings (external validity)?
- Were participants randomly assigned to treatments to ensure that results reflect the effect of the treatment (internal validity)?
- Are extraneous variables identified?
(See extraneous variable under causal-comparative studies.)
- Were control procedures applied to equate the groups on the extraneous variables?
- Is there any evidence to suggest reactive effects on groups?
- **Quasi-Experimental Studies** (Minimum sample size-15 subjects per group)
Description: Similar to experimental studies, quasi-experimental studies also manipulate a treatment; however, they do not randomly assign participants to groups. Because quasi-experimental studies usually use existing groups, this design is often more convenient and less disruptive to the participants and the researcher.
Example: The previous example from experimental research can also serve as an appropriate example of quasi-experimental research with the difference that the researcher would use two existing groups of students, such as two classes that have already been formed.
 - Are groups compared such that they are relatively similar?
 - Are extraneous variables identified and controlled?
(See extraneous variable under causal-comparative studies.)
 - Are causal relationships discussed with due caution?

Analysis Criteria for Qualitative Studies

I. INTRODUCTION TO PROBLEM

- **Is the stated problem clear and researchable?**
 - Is the rationale for the problem clearly presented?
 - Has related background information pertaining to the problem been provided and does it support the need for this study?
Description: Background information such as the history and current status of the problem should be presented.
- **Has a thorough review of literature informed the procedures and discussion?**
 - Are cited references relevant to the problem and up-to-date?
 - Are the majority of sources primary?
 - Are the results of cited studies compared and contrasted, or is the review merely a listing of summaries? (Gay, 1987).
 - Does the review relate to the problem, presenting its implications for the problem?
- **Is the research problem clearly stated?**
 - Is the problem statement or question set within a particular context?
 - Is the research problem open-ended enough to encourage inductive exploration of themes rather than the testing of hypotheses?

II. RESEARCH PROCEDURES

- **Did selection procedures identify participants/sources appropriate to the problem?**
 - Are characteristics of participants and site described?
Description: Demographics, such as age, race, and gender, should be presented.
 - Were purposeful and non-probabilistic sampling strategies used? (Patton, 1980; Goetz and LeCompte, 1984).
Description: Researcher deliberately selects participants for the insights they can provide in investigating the research problem.
- **Are data gathering techniques and sources appropriate and trustworthy?**
 - Have a variety of data gathering techniques been used? (Glesne & Peshkin, 1992)
 - Is a thorough description given for each technique, data source, and/or instrument?
 - Is a rationale provided for each technique, data source, and/or instrument?

- Have techniques that have been specifically designed for this study been piloted?

Description: Testing a technique with a similar sample ensures that the technique is appropriate for and understandable to the studied sample.

- Are techniques to assure trustworthiness discussed?

Description: Trustworthiness consists of attention to concepts such as credibility, transferability, dependability, and confirmability. Credibility is the establishment of the "truth value" of the findings; that is, the findings and interpretations are credible to the reader and the researcher has appropriately represented the multiple realities of those studied.

Transferability is the provision of sufficient "thick description" to enable the reader to decide whether the concepts or themes can be transferred to another setting. Dependability is the use of sufficient methods and techniques to assure that the study's results can be trusted. Confirmability is the ability for others to examine all data sources and processes to assure that the findings are grounded in data (Lincoln & Guba, 1985).

- Are procedures of data gathering and analysis fully described?
- **Are the research design and procedures appropriate for investigating the research question?**
 - Are the researcher's decisions with respect to research design fully described and justified?

III. DISCUSSION

- **Are results appropriate and clear?**
 - Is a rich description of the observations/responses provided?
 - Does each theme, generalization, or proposition emerge from the data in a meaningful way?
- **Do the results of the data analysis support conclusions of the study?**
 - Are multiple sources of evidence used to support conclusions?
 - Are reasonable explanations provided for findings?
 - Are conclusions supported by results?
 - Are results discussed in terms of agreement or disagreement with previous studies?
 - Have possible limitations of the study been discussed?
- **Are recommendations for future action asserted?**
 - Have implications for educational practice been addressed?
 - Are recommendations for future research asserted?
 - Has author avoided overgeneralizing findings beyond the context of the study?

IV. METHOD SPECIFIC CRITERIA FOR QUALITATIVE STUDIES

- **Interview/Focus Group Studies**
 - Were interview procedures piloted? Are pilot procedures and results fully described?
 - Are qualifications and training of interviewers discussed?
 - Do interview questions relate to study objectives?
 - Do interviewers avoid leading questions?
 - Is the method of recording responses described?
 - Is the method of analyzing the responses discussed?
- **Observation Studies**
 - Are behaviors to be observed clearly described?
 - Were all possible behaviors in the studied site observed?
 - Were behaviors observed over an adequate length of time?
 - Are qualifications and training of observers discussed?
 - Are the methods of recording observations discussed?
- **Historical Studies**

Description: "Historical research is the systematic collection and objective evaluation of data related to past occurrences in order to test hypotheses concerning causes, effects, or trends of those events that may help to explain present events and anticipate future events" (Gay, 1987, p. 183).

 - Are the majority of data sources primary rather than secondary?
 - Was each piece of data subjected to both external and internal criticism?
Description: External criticism establishes authenticity of data. Internal criticism establishes accuracy of data and is based on the following four factors: knowledge and competence of author, time delay, bias and motives of author, and consistency of data (Gay, 1987).
- **Case Studies**

Description: The case study is an in-depth investigation of an individual, group, or institution.

 - Was a rationale provided for the case selected?
 - Did the sources of data emerge logically and naturalistically from the context of the case?
 - Were appropriate strategies used to gain multiple perspectives (e.g., triangulation, member checking)?

Bibliography

- Bogdan, R. & Biklen, S. (1982). *Qualitative research in education*. Boston: Allyn & Bacon.
- Borg, W. R. & Gall, M. D. (1989). *Educational research: An introduction* (5th ed.). White Plains, NY: Longman Inc.
- Crowl, T. K. (1993). *Fundamentals of educational research*. Dubuque: Brown & Benchmark.
- Fraenkel, J. R. & Wallen, N. E. (1993). *How to design and evaluate research in education* (2nd ed.). New York: McGraw-Hill, Inc.
- Garman, N. B. (1986). *The conceptual dissertation: Commentaries by practitioners as inquirers*. (Report No. HE 019479). Paper presented at the Annual Colloquium of the Council of Graduate Students in Education, University of Pittsburgh School of Education. (ERIC Document Reproduction Service No. ED 272 057).
- Gay, L. R. (1987). *Educational research: Competencies for analysis and application* (3rd ed.). Columbus, OH: Merrill.
- Glesne, C. & Peshkin, A. (1992). *Becoming qualitative researchers: An introduction*. White Plains, NY: Longman Publishing Group.
- Goetz, J. & LeCompte, M. (1984). *Ethnography and qualitative design in educational research*. New York: Academic Press.
- Gravetter, F. J. & Wallnau, L.B. (1992). *Statistics for the behavioral sciences* (3rd ed.). St. Paul, MN: West Publishing Co.
- Lincoln, Y. & Guba, E. (1985). *Naturalistic inquiry*. Beverly Hills: Sage Publications.
- Marshall, C. & Rossman, G. B. (1994). *Designing qualitative research* (2nd ed.). Newbury Park, CA: Sage Publications.
- Miles, M. & Huberman, A. (1994). *Qualitative data analysis: A sourcebook of new methods* (2nd ed.). Beverly Hills: Sage Publications.
- Mirriam, Sharan B. (1988). *Case study research in education: A qualitative approach*. San Francisco: Jossey-Bass, 1988.
- Vogt, W.P. (1993). *Dictionary of statistics and methodology: A nontechnical guide for the social sciences*. Newbury Park, CA: Sage Publications.

About the Authors

Mary K. Ducharme, Ph.D., is associate professor and co-chair of the Department of Teaching and Learning at Drake University. She teaches undergraduate and graduate courses in early childhood education and graduate courses in curriculum development and qualitative research methodology. Her primary research interests are in teacher education program and faculty development. Dr. Ducharme was a Kellogg National Fellow from 1987 through 1990. She and Edward R. Ducharme are the editors of the *Journal of Teacher Education*.

Barbara L. Licklider, Ph.D., is associate professor, Department of Professional Studies in Education, Iowa State University. A native Iowan, her primary teaching responsibilities lie in preparation of school principals. Working with Iowa educators in local schools, her research interests revolve around school reform, effective middle level education, and enhancing success for students at risk.

William A. Matthes, Ed.D., is the director of the Office of Rural Education Policy and Planning at the University of Iowa. He teaches graduate courses in counselor education. Dr. Matthes' research has focused on issues confronting schools in rural settings.

Rachel A. Vannatta, Ph. D., is the associate director of educational research at the FINE Foundation. Prior to this position, she assisted in the development of an alternative high school for at risk youth. Dr. Vannatta's research interests include at risk youth and educators' use of research.
