# Dissecting Research Articles – Quantitative – Education

In the Dissecting a Quantitative Article courseroom activity, you read a research article referred to as Sample Article 1. Sample Article 1 is an example of a quantitative research study. After reading the article, please answer the questions posed in each section of this form. If you do not know the answer, circle the *Neutral* answer.

**Note:** You may refer to the [Dissecting Research Articles](http://campustools.capella.edu/BBCourse_Production/PhD_Colloquia_CR3/Track_1/phd_t1_u05s1_h01_dissect.html) handout as you complete this activity.

### Section 1: Abstract, Introduction, Hypothesis, Research Question, and the Literature Review

The first step to dissecting and evaluating a research article is the review for clarity and consistency. The abstract, the introduction, the problem statement, and the research hypothesis or research question should not only be clearly stated, they should be consistent. The reader should be able to understand the relationship between each component. These components set the stage for the rest of the document.

**Directions***:* After reading Sample Article 1, please answer the following questions.

Bassey, P. U., Isangedighi, A. J., Okon, O. M., & Idaka, I. E. (2010). Some affective characteristics as correlates of secondary school students’ performance in mathematics in cross river state. *Global Journal of Educational Research, 9*(1), 77–83.

1. “An abstract is a brief, comprehensive summary of the contents of the article; it allows the readers to survey the contents of an article quickly and, like a title, it enables the persons interested in the document to retrieve it from abstracting and indexing databases” (APA, 2010, p. 25).

The abstract clearly and accurately summarizes the content of the study.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The introduction describes the research topic and depicts the problem statement. The introduction should inform the reader regarding the potential of the research to provide important and relevant answers.

The introduction explains why this problem is important and why this topic is worth researching.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. Leedy and Ormrod (2005) state that the research problem is the heart of the research process, “To see the problem with unwavering clarity and to state it in precise and unmistakable terms is the first requirement in the research process” (p. 43). The research problem clarifies the goals and the direction of the research.

The problem statement is clearly articulated, specific, and comprehensive.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The key terms should be defined so that the reader understands exactly what the writer is saying.

The research questions are clearly stated and the key terms are defined.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The literature review outlines the theory and past findings that are relevant to the research goals. The literature review should document the importance of the research problem. The literature review supports the necessity to study the specific research topic.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The introduction, statement of the problem, and the literature review are appropriate and consistent with the research question.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

### Section 2: Methodology – Research Design, Methods and Procedures, and Sampling

The methods section describes in detail how the study was conducted. The evaluation of the methodology consists of reviewing the research design, how the research participants were recruited, and the data collection procedures. Different research methodologies have different reporting requirements. The evaluation of a research article will vary somewhat depending on whether the research article is quantitative or qualitative. Article 1 is a quantitative study.

According to Creswell (2003, p. 18): “A quantitative approach is one in which the investigator primarily uses positivistic claims for developing knowledge (i.e., cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the test of theories), employs strategies of inquiry such as experiments and surveys, and collects data on predetermined instruments that yield statistical data. The goal of quantitative research is to support or disprove the hypotheses.”

Quantitative research designs attempt to find relationships between and among variables. The essence of quantitative research studies involves numbers and measurement. So the data collected involves numbers and, ultimately, statistical procedures are used to analyze those numbers. Quantitative research is aimed at verification. Examples of quantitative designs are:

* **Experiment –** An attempt to determine a cause-and-effect relationship. It involves the manipulation of an independent variable and measures the effect(s) on the dependent variable(s).
* **Quasi-experimental design** – A research design used when participants cannot be randomly assigned to the groups, but the researcher does manipulate an independent variable and measure the effect(s) on the dependent variable(s).
* **Non-experimental designs** (most often, a correlational study) – Determines the relationship between two or more variables.
* **Survey** – Obtaining information from one or more groups of people about their characteristics, opinions, attitudes or previous experiences and tabulates the information.

In order to dissect and evaluate research articles, there is a need to have knowledge of research methodology. A critique of a research study is not based on your personal beliefs or ideas, but on the scientific soundness of the study. As you progress through your graduate program you will develop the skills necessary to critique a research article. As you continue to read research articles, the following questions will guide you in developing your skills for critically reading and evaluating research articles.

**Directions***:* Please answer the following questions about the methodology for Sample Article 1.

1. The research design is stated and there is a detailed description of how the study will be conducted.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The methods and procedures regarding how data with be collected are clearly described.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The research design is suitable to answer the research questions.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The instruments used to measure the outcomes are described. The reasons for why they were chosen discussed; and the validity and reliability of the instruments was established.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

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| To evaluate the research evidence, it is important to know who the participants are and how they were chosen. The sampling strategy refers to the process of obtaining the research participants to be included in the study. The sampling section should clearly indicate the specific procedures used to recruit the participants. It should also indicate the sample size and the eligibility criteria. |

1. The participants were properly selected.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The sampling strategy was clearly explained.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

### Section 3: Quantitative Methodology

The next section of a research article—or the next subsection of the methods section—discusses the variables that were measured.

**Introduction to Understanding Variables**

Variables are found in quantitative studies, not in qualitative studies. Variables are specific concepts that are being studied. They vary along a continuum in terms of their characteristics (continuous variables) or they have at least two categories (categorical variables). For example, let us say the study is to examine gender differences in levels of morality. Gender is one variable in the study, and the other variable is level of morality.

Gender has two categories: (1) male and (2) female.

Level of morality can vary along a continuum—let us say in this case, morality scores can range from 1–100 with higher scores being more morally sensitive.

Variables can be divided into two categories: independent and dependent variables. The independent variable causes or influences the change. The dependent variable is the outcome variable and must be measurable. You can use this formula to help you differentiate between the independent and dependent variable:

X 🡪 Y

X influences Y where X is the independent variable and Y is the dependent variable.

In the case above, gender is the independent variable and level of morality is the dependent variable.

**Directions**: From your review of Sample Article 1, answer the questions below.

1. In reviewing Sample Article 1, identify the variables in the study. Which is (are) the independent variable(s)? Which is (are) the dependent variable(s)?
	1. Independent variables(s).
	2. Dependent variable(s).
2. An extraneous variable can create problems for the researcher. Extraneous variables are undesired variables that can influence the dependent variable and change or invalidate the results of an experiment.

Can you identify any extraneous variables in Sample Article 1?

### Section 4: Analysis, Findings, Discussion, and Ethics

After authors of quantitative articles present the methods that were used and discuss their variables, they present the findings from their analysis of the data. When evaluating the research findings, first look for the scientific research evidence. Examples of nonscientific evidence are opinions, value judgments, personal experiences, unsupported assertions, and second-hand reports. If the results are based on nonscientific evidence, they should not be treated as reliable.

When you are dissecting the findings of the study or what the researcher wants you to believe, how do you decide what evidence to believe? The following questions are helpful:

* What is the proof?
* Where is the evidence?
* How do you know that is true?
* Why do you believe that?
* Can you prove it?
* Is the research evidence relevant to the key points?
* Does the researcher draw the correct conclusion from the evidence?
* Is there information missing?

Researchers are susceptible to confirmation bias, meaning that there can be a tendency to confirm personal beliefs. When evaluating a research article it is important to be aware of possible confirmation bias and of your own personal beliefs, so that you can objectively decide whether the results have been reasonably presented and interpreted.

The results section must thoroughly explain how the data were collected and what statistics were used to analyze the data. The results must be described in enough detail in order to justify the conclusions.

**Directions**: Having read the results presented in Sample Article 1, answer the following questions:

1. The results are presented in enough detail to allow the reader to evaluate the results.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The conclusions and generalizations are valid and justified by the data analysis.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The researcher has considered other possible interpretations of the results.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The discussion is reasonable in view of the data collected and analyzed.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The research questions were answered.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

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| Ethics in research is of particular importance. For purposes of this exercise, some fundamental ethical concerns are listed here.* Informed consent should be in the form of a written statement that fully informs the participant of the nature of the research project and what is expected of participants. The researcher has the informed consent form signed by the participant.
* Harm and loss of dignity refers to the right to self esteem and protection from harm. Involvement in the study should not be physically or mentally harmful to the participants.
* Privacy and confidentiality relates to procedures to ensure that information is stored in locked areas and no one outside of the researchers will have access to participants’ records. The researcher must protect the anonymity of the participants.
* Participants should be informed that they have the right to decline or withdraw from the research at any time without consequences.
 |

1. There is no evidence of ethical violations in this research.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

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| After presenting the results, the researcher interprets the implications of the research findings. This includes recommendations for further research and suggestions for relevant application of the research findings. Please answer these questions about that section of the Sample Article. |

1. The researcher clearly states the implications and applications of the research.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. This research has contributed relevant information to the field of study in your school. (Why the research does or does not contribute to the proposed field should be discussed with your table.)

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

1. The researcher offers a reflection on the limitations of the study including the research design.

**Strongly Agree Agree Neutral Disagree Strongly Disagree**

Please keep this list of questions and train yourself to use them to dissect all the articles in your literature review on the research topic. After using it frequently, you will not need the list, because the questions will come more naturally. Using the questions to train yourself will also allow you to keep deepening your knowledge of the elements of a well constructed research article.

References

Bassey, P. U., Isangedighi, A. J., Okon, O. M., & Idaka, I. E. (2010). Some affective characteristics as correlates of secondary school students’ performance in mathematics in cross river state. *Global Journal of Educational Research, 9*(1), 77–83.

Creswell, J. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches.* Thousand Oaks, CA: Sage Publications, Inc.

Leedy, P. D., & Ormrod, J. E. (2005). *Practical research: Planning and design* (8th ed.). Upper Saddle River, NJ: Prentice-Hall. ISBN 0131108956.