

## **Chapter 1**

### **Answers to Study Questions**

#### **1.1. Why should we study educational research?**

To become “research literate.”

Because we live in a society that’s driven by research.

To improve your critical thinking skills.

To learn how to critically evaluate published research.

To learn how to conduct research in case the need arises one day.

#### **1.2. What are the definitions of the five general kinds of research?**

The five general kinds of research are basic research, applied research, evaluation research, action research, and orientational research. Here are the definitions:

(a) Basic research – research aimed at generating fundamental knowledge and theoretical understanding about basic human and other natural processes

(b) Applied research – research focused on answering practical questions to provide relatively immediate solutions

(c) Evaluation - determining the worth, merit, or quality of an evaluation object

(d) Action research – applied research focused on solving practitioners’ local problems

(e) Orientational research – research done for the purpose of advancing an ideological position

#### **1.3. Why is it important that both basic and applied research be done?**

Basic research helps provide a solid foundation of reliable knowledge on which future research can be built, and applied research helps answer “real world” or practical questions. Obviously, both of these are important.

#### **1.4. What is the difference between formative and summative evaluation?**

They have a different purpose. Formative evaluation is used for the purpose of improving an evaluation object. Summative evaluation is used for the purpose of making judgments about the overall effectiveness of an evaluation object and determining whether a program should be continued.

#### **1.5. What is the key question associated with each of the following forms of evaluation: needs assessment, theory assessment, implementation assessment, impact assessment, and efficiency assessment?**

(a) Needs assessment – Is there a need for this type of program?

(b) Theory assessment – Is this program conceptualized in a way that it should work?

(c) Implementation assessment – Was this program implemented properly and according to the program plan?

(d) Impact assessment – Did this program have an impact on its intended targets?

(e) Efficiency assessment – Is this program cost effective?

#### **1.6. What are the different sources of knowledge? Which ones are especially important for educational researchers?**

(a) Experience (i.e., empiricism)

- (b) Expert opinion
- (c) Reasoning (i.e., rationalism)

Educational researchers use a mixture of both empiricism and rationalism. Empiricism involves collecting data, and rationalism involves reasoning and thinking about the concepts and the results and developing theories to organize the explanations.

**1.7. What is the key difference between inductive reasoning and deductive reasoning?**

Inductive reasoning is reasoning from the particular to the general. Deductive reasoning is reasoning from premises to a specific conclusion that will be true if the premises are true; it is a top-down approach to reasoning.

**1.8. Describe the two forms of the scientific method, and explain why both are important.**

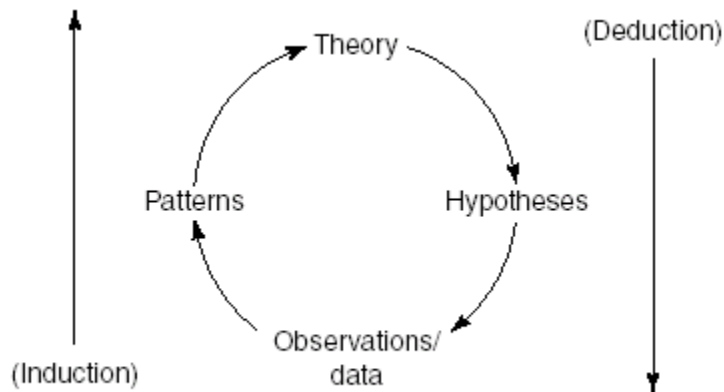
The two forms or styles are the inductive form and the deductive form.

(a) The inductive scientific method follows three steps: observe the world, search for a pattern in what is observed, and make a generalization about what is occurring. This is a “bottom up” approach to research. It is especially useful for generating and constructing new ideas and theories.

(b) The deductive scientific method also follows three steps: state the hypothesis (based on theory or research literature), collect data to test the hypothesis, and make a decision to accept or reject the hypothesis. This is a “top down” approach to research. It is especially useful for testing ideas and theories.

In practice, researchers use both of these methods, often in a cyclical manner as shown in the research wheel (Figure 1):

■ **FIGURE 1.1**  
The research wheel



**1.9. Explain why researchers do not use the word “proof” when they write up the results of their research in journal articles.**

Because empirical research provides evidence, not proof. Empirical research is different from areas such as logic and mathematics where proof is obtained. In empirical research what is found tomorrow is not necessarily the same as what is found today; that is, the future may not always

resemble the past; therefore, empirical research only provides evidence of how things operate. In research, we always leave open the possibility of today's explanations being replaced with newer and better explanations. Rather than using the word proof, just use the word "evidence" when you are talking about the conclusions of empirical research.

**1.10. What criteria can you use to determine the quality of a theory or an explanation?**  
They are in Table 1.4 which is reproduced here for your convenience.

■ **TABLE 1.4** How to Evaluate the Quality of a Theory or Explanation

1. Is it (i.e., the theory or explanation) logical and coherent?
2. Is it clear and parsimonious?
3. Does it fit the available data?
4. Does it provide testable claims?
5. Have theory-based predictions been tested and supported?
6. Has it survived numerous attempts by researchers to identify problems with it or to falsify it?
7. Does it work better than competing or rival theories or explanations?
8. Is it general enough to apply to more than one place, situation, or person?
9. Can practitioners use it to control or influence things in the world (e.g., a good theory of teaching helps teachers to positively influence student learning; a good theory of counseling helps counselors to positively influence their clients' mental health)?

**1.11. What does the principle of evidence state?**

It says that what we obtain in empirical research is EVIDENCE, NOT PROOF.

A corollary of the principle and an important point to remember is that one should respect the evidence of findings when they have been *replicated* (i.e., found in many different studies) rather than relying on a single research study (i.e., replication leads to better evidence).

**1.12. What are the five main objectives of educational research. (Hint: the first letters form this acronym, EDEPI.)**

Explore, describe, explain, predict, and influence.

**1.13. Why is each of the five main objectives of research/science important?**

Each of these has an important role in research and science. *Exploration* is especially important in the early stages of research to generate concepts and theories that can be further tested later. It gets research started; it gives us direction. *Description* is carried out, to some degree, in every research study; it provides needed information and helps us to understand exactly what we are looking at. *Explanation* is important because it studies causes and effects and it involves testing and improving theories (i.e., our explanations). *Prediction* is common in the mature sciences, and helps us to improve our world by predicting what will happen. For negative predictions (e.g., dropping out of school and drug use), predictions can be followed with interventions to help prevent the negative outcomes. For positive predictions, one wants to do whatever leads to the positive predictions. *Influence* is the ultimate goal of research as we strive for social betterment

and improvement of our world; in education, influence comes about through the implementation of demonstration programs to show what works and then later through changes in educational policies to have a broader social impact.