

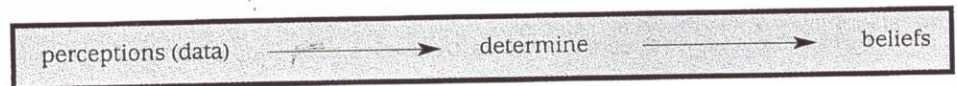
It would be misleading to assume that all researchers—and therefore all research studies—follow these steps exactly. For example, it may not be necessary to formally state a hypothesis in some studies. Although not all research studies conduct the procedure exactly as described above, they do have one important thing in common. Collecting, analyzing, and interpreting information (Step 3 above) is always done in research. It is the result of this step that provides the necessary impetus that allows us to answer our initial questions.

How, then, is the scientific method related to research in the broad field of education? There is a great deal of similarity between the two. Simply put, **educational research** involves the application of the scientific method to educational topics, phenomena, or questions in search of answers. Educational research is typically carried out in the following manner:

1. Specify the topic about which a concern exists.
  2. Clarify the specific problem on which the research will focus.
  3. Formulate research questions and/or hypotheses concerning the main problem.
  4. Carry out procedures by which data (a more appropriate term for “information”) are collected, analyzed, and interpreted.
  5. State the findings determined as a result of the data analysis.
  6. Draw conclusions related to the original research questions and/or hypotheses.
- (Mertler & Charles, 2011)

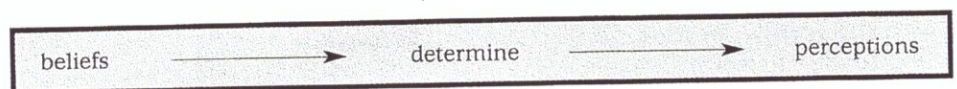
Note the similarities between Dewey’s list of steps in the scientific method and those used to conduct educational research. The major components are common to both lists. In either case, it is important to remember that in practice these steps do not always occur as neatly as presented here, nor do they always follow the sequence listed.

Johnson (2008) also reminds us that, as consumers of research as well as potential researchers, we must be aware of the differences between science and pseudoscience. Science—that is, the use of the scientific method for inquiry—uses perceived reality (typically in the form of collected data) to determine beliefs. In other words, data are collected and analyzed in order to determine what is believed:



An example of scientific inquiry is the Trends in International Mathematics and Science Study (or TIMSS). TIMSS resulted from the American education community’s need for reliable and timely data on the mathematics and science achievement of our students compared to that of students in other countries. Since 1995, TIMSS has provided trend data on students’ mathematics and science achievement from an international perspective. TIMSS uses standardized achievement tests, administered and scored in identical fashion, as the means of collecting student data. The tests are similar in content, form, and length in order to allow for comparisons. What makes this study “science” is the standardization and objectivity incorporated into the research design.

In contrast, pseudoscience uses beliefs to determine perceived reality. One begins with a strong belief and then looks for data to support that belief (Johnson, 2008):



Pseudoscience is often used as a marketing tool by companies to sell products or by groups or individuals in an attempt to demonstrate that their ideas, methods, or products are the best or most effective. Clearly, this approach is not systematic, nor is it objective; it does not utilize the scientific method. Therefore, it is not science, and it is not research.