Evaluation and Assessment of Instructional Design

Module #1

Educational Research Fundamentals and Ethics

Part 2: Differences Between Scientific Method & Process and Relation to Educational Research

Module 1, Part 2 Introduction

Although the scientific method and process are similar in nature, there are key differences that must be understood in order to apply them to educational research.

- Definition and comparison of scientific method and scientific process.
- Application to educational research and instructional design.

Scientific Method vs. Scientific Process

Though a number of students feel that they are similar, the scientific method and scientific process applicable to research are **different** from each other.

Scientific Method

- Most commonly used approach to research – educational and otherwise.
- Differencing of opinion as to how many steps it entails.
  - As few as four (4) steps and as many as eight (8) steps.
- Purpose
  - A systematic way to prove or disprove a theory or assumption.
  - Critical to the effectiveness and application of educational research for educational design.

– Michael (2002)

– Cohen, p. 15-17 (2007)

Modified Scientific Method For Educational Research

- Best Approach – Six (6) Step Modified Method
  - Applied From Research Articles
- Steps in Scientific Method
  - Step 1: Initial Research Study on Topic
  - Step 2: Hypothesis Testing
  - Step 3: Tools Used To Defend/Defeat Hypothesis
  - Step 4: Discussion on Data Acquired / Analyzed
  - Step 5: Review of Results & Generalizations
  - Step 6: Recommendations for Future Research

Scientific Method & Educational Research

- Reasoning behind modified six (6) step method
  - Applies extensive practices that have been common for more than 30+ years.
  - Combines some steps while expanding others
    - More applicable to educational research and instructional design.
    - Adds emphasis for conducting research applying the available pool of knowledge to further it.
  - Cyclical in nature

Scientific Process

A scientific process is one which uses a standardized process to gain knowledge in a specific subject or topic.

- Similarities to a scientific method
  - Step-by-step process to get to a conclusion.
  - Uses **existing** theories and correlations to defend or defeat a theory.
- Differences to a scientific method
  - Far more structured of a process.
    - Comprehensiveness
  - Predictability of results

Preferred Method To Use

While the scientific process is less used in educational research, its structure combined with the process of the scientific method provides a solid structure for studies.

- Application of revised scientific method provided.
- Use of structure is **very important** in educational research AND instructional design.
  - Disorganized courses and learning outcomes
  - Course materials used or not used.
  - Incorporation of ADDIE method.
  - Learning is a science in itself (and a quickly growing one!)