

## MUSIC 662 – Genres of Research in Music Education<sup>1</sup>

- I. **Historical research** searches for “truth” about the past; clarifies how we got where we are now; assesses or reassesses contributions by major figures; analyzes past trends; etc.
- II. **Philosophical research** searches for general underlying truths or monumental concepts; analyzes and/or suggests “big ideas” and assumptions, formulates theories
- III. **Behavioral/empirical research** studies how humans think and act
  - A. **Quantitative** employs scientific method (controlled experiments); quantifies observable data
    1. **Nonexperimental** no cause-effect relationships sought or expected
      - a. **Descriptive** describes “what is” (categories, numbers)
      - b. **Correlational** describes strength or degree of relationships
    2. **Experimental** seeks to prove or disprove cause-effect relationships
      - a. **True-experimental** involves randomization of subjects
      - b. **Quasi-experimental** subjects not randomized
      - c. **Causal-comparative** “ex post facto” studies which analyze collected data to determine causal relationships (not generated by a hypothesis)
      - d. **Meta-analysis** combines and analyzes multiple similar studies
  - B. **Qualitative** examines subjects in “natural” settings; uses narrative (rather than numerical) data collection based on observation and/or interaction
    1. **Narrative** studies aspects of people’s lives through their stories; involves interviews etc.
    2. **Phenomenological** studies the “essence” of human experience and the processes of “knowing” and assigning “meaning”
    3. **Ethnographic** studies intact cultural groups in natural settings
    4. **Grounded theory** examines and interprets thought and activity “grounded” in the point of view of the subjects (rather than theories and assumptions of the observer); allows categories to emerge
    5. **Case study** studies a single event, activity, or process of a period of time
    6. **Action** studies events and behaviors without constraints of formal research design; trial-and-error problem-solving and discovery; sometimes oriented toward intervention; some don’t consider this legitimate research
  - C. **Mixed methods** combines both quantitative and qualitative modes
    1. **Sequential** quantitative and qualitative data are collected separately and sequentially (one follows up on the other)
    2. **Concurrent** both forms of data are collected simultaneously and integrated
    3. **Transformative** uses a “theoretical lens” technique (perhaps derived from a reform-oriented theory) in a specific setting as a framework that defines what/why/how of phenomenon to be studied, what is expected, what will be ignored; attempts both to generate new ideas and improve (“transform”) the educational setting in which it is conducted

<sup>1</sup> Annotated version of outline in Kenneth H. Phillips, *Exploring Research in Music Education and Music Therapy* (New York and Oxford: Oxford University Press, 2008), 7.

## Music 662 – STATISTICS TERMS

### Hypothesis

A supposition or assumption advanced as a basis for reasoning or argument, or as a guide to experimental investigation; a tentative explanation for an observation or phenomena that can be tested through experimentation; a specific statement or proposition, stated in a testable (researchable) form, predicting a particular relationship among multiple variables.

### Variables: independent, dependent

Variables are named pieces of data of different types. The value of variables can be changed, and the value can be referred to by the name of the variable. Variables represent the characteristics, attributes, or qualities of cases. For example, if the cases are persons, the variables could be sex, age, height, weight, feeling of empowerment, math ability, etc.

**Independent variables** are those manipulated or controlled by the researcher in an experiment. They are administered to the experimental group.

**Dependent variables** are the behaviors or mental processes affected by the independent variable. They are observed and measured before and after the administration of the independent variable. These are the ones to be explained by the researcher

### Measurements of central tendency: mean, median, mode

A **mean** is the arithmetic average; the sum of the data divided by the sample size. The mean is the most common measure of central tendency.

The **median** is the midpoint in an ordered series of numbers; half the data values are above the median, and half are below. It's the middle number or item in a set of numbers or objects arranged from least to greatest (or the mean of the two middle numbers when the set has two middle numbers).

The **mode** is the most frequent value of a random variable, the value that has the largest number of observations. Mode is not necessarily unique. The mode of a distribution is simply defined as the most frequent or common score in the distribution; if the highest frequency is shared by more than one value, the distribution is said to be bimodal or multimodal

### Standard deviation

A deviation is a variation that deviates from a norm, such as variance from the mean (average); or, the difference between an observed value and the expected value of a variable or function.

The **standard deviation** is the square root of the average of the squares of deviations about the mean of a set of data, thus a statistical measure of spread or variability.

## Correlation

Most generally, the degree to which one phenomenon or random variable is associated with or can be predicted from another. Correlation is a statistical measure referring to this relationship. A correlation between two variables suggests (but doesn't prove!) some causal relationship between these variables.

Zero correlation means the results are not related at all. There can be positive or negative correlations. That is, in the relationship between two sets of data, where when one changes, the other is likely to make a corresponding change, if the changes are in the same direction, then there is a positive correlation. If it is in the opposite direction, then it is a negative correlation. Correlation is expressed by a number between -1 and +1, sometimes called the "coefficient of correlation."

## Chi Square ( $X^2$ )

This is the name for a statistical test to determine the probability that an observed deviation from the expected event or outcome occurs solely by chance. It can measure the assumption that the distribution characteristics of a set of data is "reasonable" (similar to expected). It computes the probability that there is no significant difference between the expected frequency of an occurrence with the observed frequency of that occurrence.

## Parametric/nonparametric statistics

**Parametric inferential statistical methods** are mathematical procedures for hypothesis testing which assume that the distributions of the assessed variables belong to known "parametrized" families of probability distributions (= there is a recognized "normal" distribution, as in a bell curve showing people's heights or life expectancies). **Non-parametric statistics** refers to a group of statistical procedures that researchers use to test data that are not normally distributed (such as personal income, or occurrences of rare diseases, or number of automobile accidents). These tests make no assumptions at all about the population from which the data is drawn; knowledge of parameters is not necessary either.

## Quantitative Mode

### Assumptions

- Social facts have an objective reality
- Primacy of method
- Variables can be identified and relationships measured
- **Etic** (outside's point of view)

### Purpose

- Generalizability
- Prediction
- Causal explanations

### Approach

- Begins with hypotheses and theories
- Manipulation and control
- Uses formal instruments
- Experimentation
- Deductive
- Component analysis
- Seeks consensus, the norm
- Reduces data to numerical indices
- Abstract language in write-up

### Researcher Role

- Detachment and impartiality
- Objective portrayal

## Qualitative mode

### Assumptions

- Reality is socially constructed
- Primacy of subject matter
- Variables are complex, interwoven, and difficult to measure
- **Emic** (insider's point of view)

### Purpose

- Contextualization
- Interpretation
- Understanding actors' perspectives

### Approach

- Ends with hypotheses and grounded theory
- Emergence and portrayal
- Researcher as instrument
- Naturalistic
- Inductive
- Searches for patterns
- Seeks pluralism, complexity
- Makes minor use of numerical indices
- Descriptive write-up

### Researcher Role

- Personal involvement and partiality
- Empathic understanding

*Source:* Del Siegle, "Qualitative versus Quantitative: Predispositions of Quantitative and Qualitative Modes of Inquiry," available on the Internet at <http://www.gifted.uconn.edu/siegle/research/Qualitative/qualquan.htm> (accessed 25 July 2006).

## Features of Qualitative & Quantitative Research

Qualitative	Quantitative
"All research ultimately has a qualitative grounding"	"There's no such thing as qualitative data. Everything is either 1 or 0"
The aim of <b>qualitative</b> analysis is a complete, detailed description.	In <b>quantitative</b> research we classify features, count them, and construct statistical models in an attempt to explain what is observed.
Recommended during earlier phases of research projects.	Recommended during latter phases of research projects.
Researcher may only know roughly in advance what he/she is looking for.	Researcher knows clearly in advance what he/she is looking for.
The design emerges as the study unfolds.	All aspects of the study are carefully designed before data is collected.
Researcher is the data gathering instrument.	Researcher uses tools, such as questionnaires or equipment to collect numerical data.
Data is in the form of words, pictures or objects.	Data is in the form of numbers and statistics.
Qualitative data is more 'rich', time consuming, and less able to be generalized.	Quantitative data is more efficient, able to test hypotheses, but may miss contextual detail.
Researcher tends to become subjectively immersed in the subject matter.	Researcher tends to remain objectively separated from the subject matter.

*Source:* James Neill, "Qualitative versus Quantitative Research: Key Points in a Classic Debate," available on the Internet at <http://www.wilderdom.com/research/QualitativeVersusQuantitativeResearch.html> (accessed 25 July 2006)