MAED 508 - Learning Team Midterm Exam
For MA018
Due January 9, 2006

III. Define each of the types of research and provide a brief example of each.

Experimental

In Experimental research, the investigator begins with a hypothesis (or hypotheses) about how he believes two or more independent items are related. Each item is known as a variable. The investigator devises a structured protocol, or experiment, which will provide data the investigator can use to determine whether or not a relationship exists between the variables.

Once the experiment is constructed, individual tests it calls for are administered and their results observed, measured, and catalogued. The investigator analyzes those results and determines if his hypothesis is proven.

Those researchers who pursue perfection in their methodologies test the experiment itself through the same procedures. Theoretically, researchers could continue testing incrementally to the point of infinity just to prove validity of *every* component! This is known as "The Adrian Monk Model." ☺

According to educational research authority L. R. Gay (1987), Experimental research is the best method for procuring rock-solid evidence of cause-and-effect relationships (see "Causal-Comparative," *supra*).

Examples of Experimental Research

Humanities/Social Sciences	Comparison of adult scores vs. adolescent scores on computer-delivered tests of matching state capitols to their respective states
Life Sciences	Measuring growth rates of plants provided nutritional supplements vs. plants grown without the supplements

Natural Sciences	Observing the result of applying hydrochloric acid to a variety of compounds
Engineering	Measuring the tensile strength of pure aluminum at various temperatures

Causal-Comparative

Causal-Comparative research is closely aligned with Experimental research because Causal-Comparative measures the relationship between two or more variables (see "Experimental," *infra*). However, Causal-Comparative research goes further by attempting to identify whether there is a cause-and-effect relationship between the variables. Causal-Comparative differs from Experimental research because it does not allow researchers to manipulate variables. Causal-Comparative deals strictly with comparison of the variables, while Correlation research studies the degree of relationship between them (see "Correlational," *supra*).

One of the weaknesses of Causal-Comparative research is the potential influence of external factors on the study. Because of this potential, the results of Causal-Comparative studies are usually subjected to closer scrutiny than other research.

Examples of Causal-Comparative Research

Humanities/Social Sciences	The Hawthorne Experiments – the effect of workplace lighting on the productivity of workers (excellent example of failing to control external influences)
Life Sciences	Determining the effect exercise has on blood pressure reduction in post-menopausal women
Natural Sciences	Determining the effect of various concentrations of antifreeze in water on the boil-over points of a specific radiator
Engineering	Study the effect of various types of precipitation on a length of applied paving material

Correlational

Building on the methodologies of Experimental research and Causal-Comparative research, Correlational research uses structured tests to determine relationships between variables (see "Experimental" and "Causal-Comparative," infra). Unlike Causal-Comparative, Correlational research is not limited to determining a cause-and-effect relationship.

Through Correlational research, investigators attempt to identify the specific degree of relationship between variables in a study. The degree of relationship is mathematically derived and known as a correlation coefficient. A correlation coefficient is expressed as a numerical value between –1.00 and +1.00, as shown in the table below:

-1.00	0.00	+1.00
Negative relationship	No relationship	Positive relationship

Following a study, investigators using Correlational research analyze collected data according to statistical models that have been well-tested over time and found to be relevant, valid, and reliable. If such analysis indicates the variables are closely related, the correlation coefficient will be near +1.00. If the two variables are not related, the correlation coefficient will be near 0.00. If the correlation coefficient is near -1.00, the variables are negatively related.

Some of the weaknesses of Correlational research include the following:

- failure to survey a statistically significant population
- failure to ensure construct validity and replication reliability of the testing instrument
- over-extrapolation of sample results to universal population

Examples of Correlational Research

Humanities/Social Sciences	Determining whether over-anxious parents have over-anxious children
Life Sciences	Studying the effect of hormone replacement therapy on bone density in post-menopausal women
Natural Sciences	Monitoring the effect of increased air pollution on trees in the Great Smoky Mountains National Park
Engineering	Determining the structural integrity of a concrete pillar subjected to various weight loads