An examination of the quantitative and qualitative models help to identify their strengths and weaknesses and how their divergent approaches can complement each other. In most cases, researchers and writers fall into one of the two camps--either relying exclusively upon "objective" survey questionnaires and statistical analyses and eschewing warm and fuzzy qualitative methods, or using only qualitative methodologies, rejecting the quantitative approach as decontextualizing human behavior. However, researchers recognize that each approach has positive attributes, and that combining different methods can result in gaining the best of both research worlds.

Quantitative research uses methods adopted from the physical sciences that are designed to ensure objectivity, generalizability and reliability. These techniques cover the ways research participants are selected randomly from the study population in an unbiased manner, the standardized questionnaire or intervention they receive and the statistical methods used to test predetermined hypotheses regarding the relationships between specific variables. The researcher is considered external to the actual research, and results are expected to be replicable no matter who conducts the research.

The strengths of the quantitative paradigm are that its methods produce quantifiable, reliable data that are usually generalizable to some larger population. Quantitative measures are often most appropriate for conducting needs assessments or for evaluations comparing outcomes with baseline data. This paradigm breaks down when the phenomenon under study is difficult to measure or quantify. The greatest weakness of the quantitative approach is that it decontextualizes human behavior in a way that removes the event from its real world setting and ignores the effects of variables that have not been included in the model.

Qualitative research methodologies are designed to provide the researcher with the perspective of target audience members through immersion in a culture or situation and direct interaction with the people under study. Qualitative methods used in social marketing include observations, in-depth interviews and focus groups. These methods are designed to help researchers understand the meanings people assign to social phenomena and to elucidate the mental processes underlying behaviors. Hypotheses are generated during data collection and analysis, and measurement tends to be subjective. In the qualitative paradigm, the researcher becomes the instrument of data collection, and results may vary greatly depending upon who conducts the research.

The advantage of using qualitative methods is that they generate rich, detailed data that leave the participants' perspectives intact and provide a context for health behavior. The focus upon processes and "reasons why" differs from that of quantitative research, which addresses correlations between variables. A disadvantage is that data collection and analysis may be labor
intensive and time-consuming. In addition, these methods are not yet totally accepted by the mainstream public health community and qualitative researchers may find their results challenged as invalid by those outside the field of social marketing.

### Premises of the Qualitative and Quantitative Research Paradigms

**Research Design and Methodology.** There is normally three kinds of academic research designs -- qualitative, quantitative and triangulation.

Qualitative research focuses on understanding phenomena, rather than predicting as in the application of traditional quantitative or statistical research.

<table>
<thead>
<tr>
<th></th>
<th>Qualitative</th>
<th>Quantitative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research Definition</strong></td>
<td>A formal systematic, realistic and consistent <em>subjective</em> strategy for obtaining information about a targeted research micro group or individual situation that can be used to describe life experiences and give them meaning.</td>
<td>A formal systematic, realistic and consistent <em>objective</em> strategy for obtaining information about a targeted research macro population. A method used to describe, test relationships, and examine cause and effect relationships.</td>
</tr>
<tr>
<td><strong>Research Goal</strong></td>
<td>The realistic goal is to clearly identify a primary research question to answer and gain an understanding and insight by exploring the depth, richness, and complexity inherent in phenomenon.</td>
<td>The realistic goal is to clearly identify the primary research hypothesis, test relationships, find facts, describe and examine cause and effect relations.</td>
</tr>
<tr>
<td><strong>Research Objectives</strong></td>
<td>A prioritized arrangement of specific key researchable and measurable research questions and sub-questions; or specific key measurable research hypothesis and sub-hypotheses, respectively.</td>
<td></td>
</tr>
<tr>
<td><strong>Research Strategy</strong></td>
<td>The creation of a unique, appropriate, timely design, techniques and activities appropriate for the research objective(s) and goal(s) that are consistent and synergistic. Because credibility, reality, reliability and validity weigh heavily upon the research outcome, it is important for the researcher to “do the right thing and do things right.”</td>
<td></td>
</tr>
</tbody>
</table>
Triangulation is the integration of both qualitative and quantitative (mixed-method) research designs, combining both into a single research strategy to increase the quality of results.

The methodology section describes the procedures the student can follow (content analyses, face-to-face interviews, questionnaires, quantitative analyses, etc.), the information and/or data that the student can collect, and how the student can develop conclusions to address the purpose of the research, the problem or issue under study.


RESEARCH 1 - 5 Lecture: Differences in Quantitative and Qualitative Research
http://www.youtube.com/watch?v=DxFuw22bPnE
Lecture: Comparing Quantitative and Qualitative Data

http://www.youtube.com/watch?v=Zx2UGrXPqzY

RESEARCH 1 - 4 Lecture: Qualitative Research

http://www.youtube.com/watch?v=uDjnB-8PKjM
RESEARCH 1 – 3 Lecture: Quantitative Research
http://www.youtube.com/watch?v=edVSwukt-lk

Lecture: Research Questions Hypothesis and Variables
http://www.youtube.com/watch?v=_BmijuZExQ

- Research Question(s)
  - Defines what the research study hopes to learn
  - Presented as a question
    - What?
    - How?
    - Why?
    - When?
  - Example: “How does changing the thermostat setting impact a room’s temperature?”
Lecture: Types of Research & Research Designs -- Rey Ty
http://www.youtube.com/watch?v=49_u-pXwx7g

Literature Reviews: Lecture: An Overview for Graduate Students
http://www.youtube.com/watch?v=t2d7y_r6SHU
Lecture: Tips for Writing a Literature Review
http://www.youtube.com/watch?v=SfxrrMVzXK0

Lecture: Writing the Literature Review
http://www.youtube.com/watch?v=GpErYDb6PsY
Lecture: The Literature Review
http://www.youtube.com/watch?v=jKL2pdRmwc4

Lecture: How to Write a Great Research Paper
http://www.youtube.com/watch?v=g3dkRstqdDA
Lecture: 5 tips to improve your writing
http://www.youtube.com/watch?v=GgkRoYPLhts

Lecture: Writing Skills: The Paragraph
http://www.youtube.com/watch?v=0IFDuhdB2Hk
Introduction Characteristics of Research

Every higher education discipline has academic and professional activity has tools that help improve techniques and assure a quality product. Research is no exception. The tools of the trade are often considered into three groupings: hardware, software, and methods or knowledge. Hardware tools in our case include computers, PDAs and cell phones. Software tools relate to computer programs such as word processing, spreadsheets or data base programs, and changeable forms such as written tests, worksheets, or rubrics. The methods of education, academia and of a profession refer to knowledge and understanding of the procedures involved.

For example, when a professor performs a PowerPoint presentation in class, the machine they use is considered hardware; the computer program used to retrieve and present the slides is the software, and the use of the machine and software as well as the presentation and application to treat student interest in learning. All three types of tools are typically necessary in higher education and to every profession, with research being no exception.

- Research originates with a question or problem.
- Research requires a clear articulation of a problem, a goal and objectives.
- Research involves developing and following a specific plan of procedures.
- Research usually divides the principal problem into sub-problems or sub-hypotheses, respectively.
- Research requires the collection and interpretation of data in an attempt to resolve the problem that initiated the research.
- Research is, by its nature cyclical or, more exactly, helical.
### Key Issues About Planning and Designing the Research or Project Proposal

<table>
<thead>
<tr>
<th>Purpose</th>
<th>What does the researcher want to know and why does the researcher want to know? What does the researcher want to be able to decide or offer as a result of the research? Why?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>Who or what are the sources of the information or data, and how can the research sources participate with interest, whether or not they are beneficiaries of the research results? For instance: are they providing funding, other resources or support, is it upper management, are they employees, customers, neighbors, associations, etc. Why?</td>
</tr>
<tr>
<td>Data Needs</td>
<td>What kinds of information or data (from: employees, groups, customers, office documents, files, or some other media: quantitative or qualitative), are needed to conduct an analysis, draw conclusions, make decisions or recommendations? Why?</td>
</tr>
<tr>
<td>Data Collection</td>
<td>How can data or information be collected using a reasonable methodology, e.g., surveys, questionnaires, interviews, examining documentation, or a literature review? Why?</td>
</tr>
<tr>
<td>Time Line</td>
<td>When is the information or data needed; when must it be collected? What are the identifiable resources available to support information or data collection? Why?</td>
</tr>
<tr>
<td>Significance</td>
<td>Why or how is the study important? Who or what will benefit from the research and work-product? Why?</td>
</tr>
</tbody>
</table>

### Method Tools of Research

Knowledge of the procedures involved in research is perhaps the most important tool. Without this, the best computers and most reliable software would be useless. For the researcher, there are several important areas that must be mastered, including the knowledge of scientific methods, the use of statistical software, the practical application of statistical formulas, knowledge of writing style, and the ability to gather information and critically review the research of others. For this reason, this is considered a methods tool in that it provides or calls upon appropriate knowledge of research methods and may assist in the process of performing, evaluating and utilizing the work of others.

### Hardware Tools of Research

The most commonly used hardware tool in research is the computer. We use this device in order to run software, to measure changes in the autonomic nervous system, and to detect brain damage and other physical problems. Other instruments that might be seen in social science research might include a device to measure reflexes or muscle strength, or the hardware, such as blocks and puzzles, associated with an intelligence test. Hardware provides us with a means to interact with our subjects and therefore gather information on their performance.
Software Tools of Research

The software tools of research are typically more abundant than hardware tools in the social sciences. Software is usually thought of to mean computer programs that tell the hardware what to do, but any tool not related to a physical device can be considered software. Included in this category is statistical software, consent forms, published tests, questionnaires, observation forms, and, to a lesser degree, the interview.

Qualitative Research

Qualitative research is a field of inquiry that crosscuts disciplines and subject matters. Qualitative researchers aim to gather an in-depth understanding of human behavior and the reasons that govern such behavior. The discipline investigates the why and how of decision making, not just what, where, when. Hence, smaller but focused samples are more often needed rather than large random samples.

A specialized form of qualitative research is cognitive testing, used to develop survey items. Survey items are piloted on study participants to see what reactions they elicit. Another specialized method is focus groups, often used in market research but also in other contexts where a range of responses from a target group is useful (e.g., a group of nurses might give their reactions to new work requirements).

Qualitative research is also highly useful in policy and evaluation research, where understanding why and how certain outcomes were achieved is as important as establishing what those outcomes were. Qualitative research can yield useful insights about program implementation -- were expectations reasonable? Did processes operate as expected? Were key players able to carry out their duties?

Quantitative Research

Statistics is the most widely used branch of mathematics in quantitative research outside of the physical sciences, and also finds applications within the physical sciences, such as in statistical mechanics. Statistical methods are used extensively within fields such as economics, social sciences and biology. Quantitative research using statistical methods typically begins with the collection of data based on a theory or hypothesis, followed by the application of descriptive or inferential statistical methods. Typically, a very large volume of data is collected, which requires validating, verifying and recoding before analysis. Software packages such as PSPP and R are typically used for this purpose.

Causal relationships are studied by manipulating factors thought to influence the phenomena of interest while controlling other variables relevant to the experimental outcomes. In the field of health, for example, researchers might measure and study the relationship between dietary intake and measurable physiological effects such as weight loss, controlling for other key variables such as exercise. Quantitatively based opinion surveys are widely used in the media, with statistics such as the proportion of respondents in favor of a position commonly reported. In opinion surveys, respondents are asked a set of structured questions and their responses are tabulated. In
the field of climate science, researchers compile and compare statistics such as temperature or atmospheric concentrations of carbon dioxide.

Empirical relationships and associations are also frequently studied by using some form of General linear model, non-linear model, or by using factor analysis. A fundamental principle in quantitative research is that correlation does not imply causation. This principle follows from the fact that it is always possible a spurious relationship exists for variables between which covariance is found in some degree. Associations may be examined between any combination of continuous and categorical variables using methods of statistics.

Research Sampling

A sample is a restricted and limited part of a statistical research population whose properties are studied to gain information about the whole research population of interest. It is with awareness, however, of the significance of different ways of sampling and deciding an appropriate sample size. Research must present conclusions about an entire research population based on the use of inferential statistics, therefore, sampling enables the researcher to determine or estimate the intended research population’s characteristics by directly examining only a representative portion.

Survey Questionnaire

The survey questionnaire is an inexpensive way to gather information or data; it may be the only feasible way to reach a number of research participants large enough for a statistical analysis of the survey questionnaire responses. A survey questionnaire should be viewed as a multi-stage process beginning with a definition of the aspects to be examined and ending with interpretation of the results. The researcher must concentrate on how to formulate research objectives for the survey questionnaire, prepare it for administration and look at how the information or data can be classified subjectively vs. objectively and quantitatively vs. qualitatively.

Research Interview

The research interview is a special interpersonal communication between two or more research participants. If it is important or significant for gathering information or data, the researcher must use appropriate strategy and techniques that will best serve the research interest to be able to analyze and document a participant’s response while participating at the same time. A communications exchange takes place and requires an awareness and attention the content factors.

Statistical Software. Simple statistical problems, such as determining the mean or the median of a small data set, can easily be done with a calculator. Most formulas that will be used in a research report, however, are a lot more complex. While a calculator will work, a statistical program can reduce the computation time by hours, days, or even weeks. Imagine trying to determine the mean, standard deviation, t-score, and z-score conversions of twelve data sets each containing 300 subjects. Even the best statistician will spend many hours on this project that could be done by a computer in a matter of minutes once the data is entered.
The most widely used statistical software used for social science research is the Statistical Package for the Social Sciences (SPSS) and is relatively easy to use if you have basic computer knowledge. SPSS can perform hundreds of statistical computations and even graph your data. Another program, SAS, also performs these functions and is gaining popularity with many researchers. Both, however, can be expensive to purchase so it would be wise to use your school’s software or look into a student version.

Descriptive Statistics

A statistic is a numerical representation of information. Whenever we quantify or apply numbers to data in order to organize, summarize, or better understand the information, we are using statistical methods. These methods can range from somewhat simple computations such as determining the mean of a distribution to very complex computations such as determining factors or interaction effects within a complex data set. This chapter is designed to present an overview of statistical methods in order to better understand research results. Very few formulas or computations will be presented, as the goal is merely to understand statistical theory.

Before delving into theory, it is important to understand some basics of statistics. There are two major branches of statistics, each with specific goals and specific formulas. The first, descriptive statistics refers to the analysis of data of an entire population. In other words, descriptive statistics is merely using numbers to describe a known data set. The term population means we are using the entire set of possible subjects as opposed to just a sample of these subjects. For instance, the average test grade of a third grade class would be a descriptive statistic because we are using all of the students in the class to determine a known average.

Second, inferential statistics, has two goals: (1) to determine what might be happening in a population based on a sample of the population (often referred to as estimation) and (2) to determine what might happen in the future (often referred to as prediction). Thus, the goals of inferential statistics are to estimate and/or predict. To use inferential statistics, only a sample of the population is needed. Descriptive statistics, however, require the entire population be used. Many of the descriptive techniques are also used for inferential data so we’ll discuss these first. Let’s start with a brief summary of data quality.

Inferential Statistics

Since the purpose of this text is to help you to perform and understand research more than it is to make you an expert statistician, the inferential statistics will be discussed in a somewhat abbreviated manner. Inferential statistics refer to the use of current information regarding a sample of subjects in order to (1) make assumptions about the population at large and/or (2) make predictions about what might happen in the future. The basic statistical methods explained in the previous chapter are used a great deal in inferential statistics, but the data is taken a step further in order to generalize or predict.

We can easily determine the mean of a known sample of subjects by adding up all of their scores and dividing by the number of subjects. The mean of a sample is therefore a known variable. To
determine the mean of the population that has not been testing or to predict the mean of a test that has not yet been taken requires the researcher to make assumptions because these variables are not known to us. The goal of inferential statistics is to do just that - to take what is known and make assumptions or inferences about what is not known. This chapter will focus on the basic statistical procedures used for various types of data and will conclude with an explanation of how this data is used to estimate errors and make inferences.

<table>
<thead>
<tr>
<th>The CARS Checklist for Research Information and Data Source Evaluations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Credibility</strong></td>
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<td><strong>Accuracy</strong></td>
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<tr>
<td><strong>Reasonableness</strong></td>
</tr>
<tr>
<td><strong>Support</strong></td>
</tr>
</tbody>
</table>

**Creating your paper**

Before you begin piecing together your report you should create an outline. Set it up the way you think you want it. Your notes should be on note cards so they can be shuffled around to match the rough outline.

**Introduction**

This should include your thesis statement (what your paper is about). Your thesis statement should be limited to what you can accomplish in this paper. If it is too broad, you won't be able to do a thorough job researching and it will show. Keep it simple, clear and readable. Explain any specific terms you use.
The Body

Be sure that you create the paper. Don't let the way you researched or what you found influence how you will write it. The quotes should support your finding but you must weave them together into an A+ paper. Give the reader some background information on the topic. Citing the history of the problem and who is affected will give the paper focus. Introduce possible solutions or depending on your instructions or guidance, provide possible solutions in the area of closure, summary or transition; in some cases this may be done in the conclusion. However it is done it must be supported throughout your paper.

Reminder: Be sure all efforts in the research are consistent with the research requirement given, or always check to be sure there are specific requirements. It is not acceptable under any conditions to not comply with given research requirements.

The Closure/Summary or Transition

This should restate the thesis statement. This is a good time to evaluate whether or not you stuck to the topic. Never be afraid to state that this may need more research. It lets the reader know you did as much work as you can and move on or acknowledges that further research could result in different outcomes or solutions.

References

Organization is the key to a good research paper. You need to keep track of all the sources you use for this research paper. Be sure to write down all the information you will need for your reference page. What information is this you ask? Read on.

You must give credit to any source when using a quote. You may create your own thoughts based on what you have read. However, be very careful of taking information and not giving credit to the original author. If you fail to do so, this is called plagiarism. It is illegal and most academic school policies expel students who plagiarize. A good research paper will have direct quotes as a support.