EDUCATIONAL RESEARCH
FCE3900

RESEARCH DESIGN
DEFINITION OF RESEARCH DESIGN

- Research design is a set of advanced decisions that make up the master plan specifying the methods and procedures for collecting and analyzing the needed information.

- The research design is the master plan specifying the methods and procedures for collecting and analyzing the needed information.
EDUCATIONAL RESEARCH DESIGN

- History Research
- Descriptive Research
- Exploration Research
- Experimental Research
- Ex Post Facto Research
- Evaluation Research
**REVIEW OF TERMS**

- **Research**: a systematic approach to finding answers to questions.
- **Research Design**: a plan for gathering data for answering specific research questions.
- **Statistics**: the methods used on the data collected to answer the research questions at hand.
DESCRIPTIVE AND INFERENTIAL STATISTICS

• Descriptive Statistics: Methods used to obtain indices that characterize or summarize data collected

• Inferential Statistics: Methods that allow the researcher to make inferences from a set of data collected from a sample to a larger population.
<table>
<thead>
<tr>
<th>Research Objective</th>
<th>Appropriate Design</th>
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<tbody>
<tr>
<td>To gain background information, to define terms, to clarify problems and hypotheses, to establish research priorities</td>
<td>Exploratory</td>
</tr>
<tr>
<td>To describe and measure marketing phenomena at a point in time</td>
<td>Descriptive</td>
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<tr>
<td>To determine causality, to make “if-then” statements</td>
<td>Causal</td>
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Research Design: Exploratory Research

• Exploratory research is most commonly unstructured, “informal” research that is undertaken to gain background information about the general nature of the research problem.

• Exploratory research is usually conducted when the researcher does not know much about the problem and needs additional information or desires new or more recent information.

• Exploratory research is used in a number of situations:
  • To gain background information
  • To define terms
  • To clarify problems and hypotheses
  • To establish research priorities
Research Design: Exploratory Research

• A variety of methods are available to conduct exploratory research:
  • Secondary Data Analysis
  • Experience Surveys
  • Case Analysis
  • Focus Groups
  • Projective Techniques
• Secondary Data Analysis
  • Secondary data are data previously collected & assembled for some project other than the one at hand
• Pilot Studies
  • A collective term for any small-scale exploratory research technique that uses sampling but does not apply rigorous standards
• Includes
  • Focus Group Interviews
    • Unstructured, free-flowing interview with a small group of people
  • Projective Techniques
    • Indirect means of questioning that enables a respondent to project beliefs and feelings onto a third party or an inanimate object
    • Word association tests, sentence completion tests, role playing
• Case Studies
  • Intensively investigate one or a few situations similar to the problem situation

• Experience Surveys
  • Individuals who are knowledge about a particular research problem are questioned
DESCRIPTIVE RESEARCH

• Descriptive research is undertaken to describe answers to questions of who, what, where, when, and how.
• Descriptive research is often undertaken to determine the relationships among two or more variables and to explore their implications for cause and effect.
• Descriptive research is desirable when we wish to project a study’s findings to a larger population, if the study’s sample is representative.
• Two basic classifications:
  • Cross-sectional studies
  • Longitudinal studies
CLASSIFICATION OF DESCRIPTIVE RESEARCH STUDIES

• Cross-sectional studies measure units from a sample of the population at only one point in time.
  • Sample surveys: are cross-sectional studies whose samples are drawn in such a way as to be representative of a specific population.
    • These studies are usually presented with a margin of error.

• On-line survey research is being used to collect data for cross-sectional surveys at a faster rate of speed.
• Cross-sectional studies take “snapshots” of the population at a point in time.
CLASSIFICATION OF DESCRIPTIVE RESEARCH STUDIES

- Longitudinal studies repeatedly measure the same sample units of a population over time.
- One method is to draw different units from the same sampling frame.
- A second method is to use a “panel” where the same people are asked to respond periodically.
- On-line survey research firms recruit panel members to respond to online queries. Longitudinal studies often make use of a panel which represents sample units who have agreed to answer questions at periodic intervals.
- Many large research firms maintain panels of consumers.
Research Design: Descriptive Research
Longitudinal Studies

- Two types of panels:
  - Continuous panels ask panel members the same questions on each panel measurement.
  - Discontinuous (Omnibus) panels vary questions from one time to the next.

- Longitudinal data used for:
  - Market tracking
  - Brand-switching
  - Attitude and image checks
DESCRIPTIVE RESEARCH ADVANTAGES

• Educational research and experiences may contain many variables that cannot be realistically controlled.

• Educational research may require observations of life experiences.

• Data collection may be spread over a large number of people over a large geographic area.
# Data Collection Methods in Descriptive Research Design

<table>
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<th>Surveys</th>
<th>Interviews</th>
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<td>Observations</td>
<td>Portfolios</td>
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DESCRIPTIVE RESEARCH
1. SURVEYS

• May be used to reveal summary statistics by showing responses to all possible questionnaire items.

• Often provide leads in identifying needed changes

• May be used to explore relationships between 2 or more variables.
DESCRIPTIVE RESEARCH
SURVEY FORMS

- Written questionnaires
- Personal interviews
- Telephone interviews

Factors to be considered
- Sampling
- Type of population
- Question Form
- Question Content
- Response rates
- Costs
- Available facilities
- Length of data collection
- Computer assisted techniques for data collection
DESCRIPTIVE RESEARCH

2. SURVEY FORM - INTERVIEWS

• More time efficient
• Allow the researcher to establish a rapport with the respondent
• Allow the acquisition of more in-depth information
• Allow for interviewer observation
• Allow the interviewer to obtain visual cues
• May be personal or telephone interviews
DESCRIPTIVE RESEARCH
SURVEY FORM – PERSONAL INTERVIEWS

Disadvantages
- Require more staff time
- Require more travel time

DESCRIPTIVE RESEARCH
SURVEY FORM – TELEPHONE INTERVIEW

Advantages
- Less expensive
- Less time-consuming

Disadvantages
- Limited telephone access
- Lack of interviewer’s ability to observe the respondent and obtain visual cues
DESCRIPTIVE RESEARCH
SURVEY FORM – MAILED QUESTIONNAIRES

Advantages
✓ Ability to reach large number of people across a wide geographic area
✓ Ease and low cost of distribution
✓ Minimal amount of staff required
✓ Allows respondents to respond in their time frame

Disadvantages
✓ Lower response rate
✓ Need to design a survey instrument with a simple format
DESCRIPTIVE RESEARCH
SURVEY FORM – MAILED QUESTIONNAIRES

• A letter of transmittal should accompany mailed questionnaires.
• Should state purpose and importance of research
• Should state importance of responding
• Should give a time frame to respond
• Should include a confidentiality statement
• Should include an offer to share results
• Should include a thank-you note to the respondent
DESCRIPTIVE RESEARCH
CHARACTERISTICS OF A GOOD SURVEY

• Good questioning techniques
• Use complete sentences
• Offer a limited set of answers
• Interesting
• Worded so that questions mean the same to all
• Provide definitions for confusing terms
• Uses the “I don’t know” answer very carefully
DESCRIPTIVE RESEARCH

OBSERVATIONAL RESEARCH METHODS

• Naturally occurring behaviors observed in natural contexts
• Contexts that are contrived to be realistic
• Require direct observation of behavior
• Data gathered without intermediary instruments
• Can yield a wealth of invaluable information
• Can be a complicated process
• Can be employed productively to support many purposes in educational technology
• Can be used to determine how people interact with technology in various stages of design and implementation
DESCRIPTIVE RESEARCH

OBSERVATIONAL RESEARCH METHODS

Structured Observations

- Rigid and controlled
- Predetermined methods

Unstructured Observations

- Used to determine unselective, detailed, continuous description of behavior.
- Detects unintended effects
- More time consuming because of time and labor required to collect and analyze sets of extensive observations
DESCRIPTIVE RESEARCH
OBSERVATIONAL RESEARCH METHODS

Develop observation form
- May be paper and pencil or electronic
- May use a rating scale to evaluate behavior
- A 3-point rating scale is sufficient
DESCRIPTIVE RESEARCH
OBSERVATIONAL RESEARCH METHODS

Newer Mediated Observation Techniques

- Audio
- Videotape
- Computers provide on-line monitoring (process of capturing characteristics of the human-computer interaction automatically)
  - Keystroke records
  - Audit trails
  - Logging data
DESCRIPTIVE RESEARCH PORTFOLIOS

• Provide a descriptive measure of student work based on actual performance
• Consist of learner-created products that reflect the processes of learning and development over time
Although descriptive studies are important, most educational studies involve questions about cause.

- What causes underachievement?
- Will multimedia cause students to be more motivated or lead to high achievement levels?

Not always easy to isolate variable that will explain those causes, so descriptive research can play an important role in providing information from another perspective.
IMPACT AND FUTURE OF DESCRIPTIVE RESEARCH

- Descriptive Research methods have gained acceptance
- Number of descriptive studies published in research journals has increased
- Descriptive research leads to prescriptions that instructional designers and educators can heed as they consider future direction
- By gathering descriptions of “what is” and comparing them to “what we would like” educators can see the area that needs to be addressed.