Chapter 2

The Research Process and Ways of Knowing

CHAPTER OBJECTIVES

The study of this chapter will help the learner to

- Discuss the philosophical orientations that influence the choice of a research design.
- Contrast the characteristics of quantitative and qualitative research.
- Review the steps involved in the research process.
- Determine the way that a design is linked to the research question.
- Classify research based on characteristics related to intent, type, and time.
- Evaluate what kind of evidence is best provided by quantitative and qualitative research.

KEY TERMS

Applied research	Longitudinal study	Qualitative research
Basic research	Mixed method	Quantitative research
Cross-sectional method	Paradigm	Quasi-experimental study
Experimental research	Prospective study	Retrospective study

Introduction

What is the nature of truth? It is hard to think of a more difficult question to answer. This fundamental question must be considered, however, to ensure that the research process is successful in providing evidence for practice. Research is about the search for truth. There are, however, multiple approaches to determining and describing truth. The successful researcher understands what approach is effective for the particular problem to be solved. The key is to consider *assumptions* about the nature of the world, the *question* to be answered, and the *intent* of the researcher.

The most fundamental questions to be answered in the beginning of a research process are philosophical but necessary ones: What constitutes knowledge? What is the nature of the world, and how can this research reflect that nature? The researcher should carefully consider these issues before proceeding with the design of the inquiry.

It is a mistake to jump straight from the research question to the design without considering the philosophical foundation on which the study will be built.

These philosophical considerations must represent more than the researcher's view of the world. That is, they must be carefully matched to a design that will address the specific nature of the research question. The goal is to produce knowledge that is relevant and applicable to the body of nursing knowledge that becomes evidence for practice.

VOICES FROM THE FIELD

When I started my doctorate, I was sure I wanted to do a straightforward quantitative experiment. I like numbers and statistics, so this kind of study seemed to be a natural extension of my interests. My subject, however, was a bit novel: I was trying to build a comprehensive model to measure inpatient nurse workload. I had always worked in hospitals and used patient acuity systems (systems used to measure the intensity of a patient's care needs) to assess the nursing workload, but a nurse said something that intrigued me: "If all I had to do was take care of my patients, I'd be fine." I set out to find out what all those other demands were, and how they affected the nurse's perception of workload.

I found out just how novel this topic was when I tried to do a literature review and discovered that I could not find any relevant literature. There were lots of opinion articles about measuring workload, and plenty of published quantitative studies focused on patient acuity, but none tried to look at workload holistically. Reluctantly, I concluded that I needed to utilize a mixed-methods design—that is, I needed to first figure out what the forces affecting the nurse's workload were, and then measure how much impact they had on the nurse's day.

I conducted a series of focus groups with nurses, observed them during their regular workdays, and interviewed quite a few individually. I found I could describe many nonpatient demands—equipment needed repair, supplies were missing, and other therapists and technicians interrupted patient care. In addition, there were some macro issues at play: Nurses said that strong teams were able to accomplish more work, but weak teams created more pressure. All the nurses mentioned the effects of good leadership on recruitment and retention, and subsequently on the stability of the nursing staff, which helped build teams—thereby reducing workload.

After theme analysis and triangulating the data from my focus groups, observations, and interviews, I developed a model of the demands on a nurse's time. This preparation seemed to take forever, but when I finally began to test the model quantitatively, the work went quickly. I was able to determine the elements that directly affected workload and those that had an indirect effect. I figured out that teamwork, leadership, and retention were central to efficient unit operations. Demonstrating caring, communicating with team members, and entering information into the health record also consumed a lot of time. I discovered that "hunting for things" is a legitimate time drain.

This study was a classic case in which answering the research question required both quantitative and qualitative methods. The qualitative phase helped me determine the fundamental things that frustrate a nurse, and the quantitative phase let me demonstrate whether those influences were real and strong.

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The Research Process

Regardless of the philosophical assumptions made in a specific study, some characteristics are universal to all research studies. Research by its very nature is systematic and rigorous; it is about a disciplined search for truth. "Systematic" implies that decisions are carefully considered, options weighed, and a rational basis documented to support the choices made. Those decisions and choices help form the foundation for, and build, a research study. They also make up phases of study that are more or less completed in sequence. These phases are depicted in **FIGURE 2-1**.

- Define a research problem: Identify a gap in the knowledge of nursing practice that can be effectively addressed with evidence.
- Scan the literature: Complete a systematic review of the literature to determine basic knowledge about the problem, to identify relevant evidence and a potential theoretical framework.
- Determine an appropriate design: Select a design that is appropriate for the philosophical assumption, the nature of the question, the intent of the researcher, and the time dimension.
- Define a sampling strategy: Design a sampling plan that details both how subjects will be recruited and assigned to groups, if appropriate, and how many subjects will be needed.

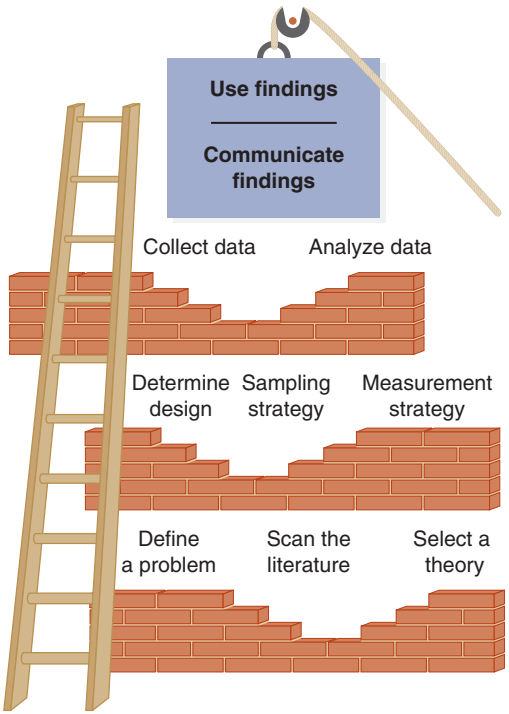


FIGURE 2-1 The Research Process: Building a Study

Paradigm: An overall belief system or way of viewing the nature of reality and the basis of knowledge.

- Collect data: Gather the data using appropriate data collection protocols and reliable, valid methods.
- Analyze data: Apply analytic techniques that are appropriate for the type of data collected and that will answer the question.
- Communicate the findings: Disseminate the findings to the appropriate audiences through conferences and publication.
- Use the findings to support practice: Promote the uptake of the research by linking it to specific guidelines for nursing practice.

These phases may look as if they make up steps, with the end of one phase leading directly to the beginning of another. It is, however, misleading to call the research process a series of steps. Such a description implies that the tasks are done in a particular sequence and that the components are distinct and mutually exclusive. In reality, the design of a research study is a fluid process, one that may be considered a work in progress until the final plan is complete. The process may resemble an elaborate game of Chutes and Ladders more than anything else. In this game, progress is made until the player reaches a chute, which will take the player back to a lower level. In research, several things may happen at the same time—for example, the search for a theoretical framework, the literature review, and construction of the research question. Although the researcher may complete most of these tasks and move on to the design of the study, occasionally a situation will arise that prompts the researcher to reconsider the phrasing of the question, or new literature may be published. Consequently, the phases may be conducted out of sequence, or the researcher may go back and forth between phases. The phases may overlap, or some phases may not be visited at all. So many varieties of research are possible that any depiction of the research process must come with the caveat that it is a general guide that is adapted to the situation at hand.

In quantitative research, decisions are usually finalized before data collection begins, although emergent issues may, even then, require adaptation of the research plan. In contrast, in qualitative research, the research plan is adapted based on both the data generated by the respondents and the nature of those data. Qualitative design decisions may not be completed until the final report is written.

In general, the way the research process emerges and the phases that are implemented in a research study are based on many characteristics of both the research problem and the researcher. These characteristics and assumptions lend themselves to several general classifications of research. The choice of an overall research classification is the first step in determining the specifics of a research design.

Classification of Research by Philosophical Assumptions About the Nature of the World

The philosophical assumptions that drive the design of a study are rooted in the paradigms of those who are doing the studying. A **paradigm** is an overall belief system, a view of the world that strives to make sense of the nature of reality and the basis of knowledge. The disciplined study of nursing phenomena is rooted in two broad paradigms, both of which are relevant for nursing research. These two broad paradigms reflect

methods that are primarily quantitative (based on the measurement of observable phenomena) or qualitative (based on the analysis of the meaning of events as depicted in the words and actions of others).

Quantitative Research

Quantitative research is the traditional approach to scientific research. It is rooted in the philosophical assumptions of positivism and determinism. Positivism assumes that features of the environment have an objective reality; the world is viewed as something available for study in an unchanging form. A related assumption underlying the scientific method is determinism: a belief that events are not random, but rather have antecedent causes. In the face of these beliefs—the existence of an objective reality, in which events can be linked to an associated cause—the researcher's challenge is to understand the relationships among human phenomena. The task of positivist scientific inquiry, then, is to make unbiased observations of the natural and social world.

Quantitative research: A traditional approach to research in which variables are identified and measured in a reliable and valid way.

Qualitative research: A naturalistic approach to research in which the focus is on understanding the meaning of an experience from the individual's perspective.

Quantitative research involves identifying the variables that represent characteristics of interest and then measuring them in a reliable, valid way. This type of research is characterized by a tightly controlled context that enables the researcher to rule out extraneous effects. Both the way subjects are selected and the protocols for the study are designed to eliminate bias. Statistical analysis is used to establish the level of confidence in the results and to rule out the effects of random error. These conclusions, then, constitute the contribution to scientific knowledge.

There is no doubt that the scientific study of cause and effect in nursing practice is necessary and important for evidence-based practice; quantitative approaches are particularly well suited for answering questions about the nursing actions that can influence outcomes. These studies produce some of the strongest evidence for the benefits of an intervention.

Nevertheless, nurses pose many questions that are not adequately addressed by a strict adherence to measurement of an objective reality. In turn, the single adherence to a positivist view has drawn considerable criticism from nurse researchers, and many of these criticisms are legitimate. The nature of nursing care involves helping others attain their health goals, many of which are defined by the individual, not the nurse. Perceptions of quality of life, the meaning of a life event, and the willingness to endure side effects for a therapeutic result are all based on the patient's construction of reality, not the nurse's perceptions. In turn, many related questions are better addressed with a process of naturalistic inquiry.

Qualitative Research

Qualitative research is based on a naturalistic paradigm. This belief system is represented by a view of reality that is constructed by the individual, not the researcher. In the naturalistic view, reality is not a fixed entity, but rather exists in the context of what the research participant believes it to be. Qualitative researchers believe that many different views of reality are possible, and all of them are right. An associated belief for the naturalistic researcher is relativism, or the belief that there are always multiple interpretations of reality, and that these interpretations can exist only within an individual. The qualitative researcher, then, believes there is no process in which the ultimate basis for a singular truth can be identified.

Qualitative methods focus on an understanding of the meaning of an experience from the individual's perspective. Extended observation of participants, in-depth interviews or focus groups, case studies, and studies of social interaction are examples of qualitative methods. The inquiry process focuses on verbal descriptions and observable behaviors as a basis for analysis and conclusions.

Qualitative methods are appropriate for addressing questions in which the meaning of the patient's experience is central to understanding the best therapeutic approach. Issues of behavior change, motivation, compliance with a regimen, and tolerance of a treatment are all examples of topics in which the patient's perception is central to assisting the patient to a healthy state. The analysis of themes that describe the meaning of the experience for the patient is based on words and observations, rather than on measurable phenomena. The researcher establishes a relationship with the subject, and bias is considered an inherent part of the research process. The findings from qualitative studies are used to enhance evidence-based practice by incorporating the patient's preferences and values into guides for nursing practice.

The differences in philosophy, roles, and methods between quantitative and qualitative research are depicted in **Table 2-1**. These contrasts are made to help the student

Table 2-1 A Comparison of Quantitative and Qualitative Characteristics

Element	Quantitative	Qualitative
View of reality	Reality is objective and can be seen and measured.	Reality is constructed by the individual.
View of time	Reality is relatively constant.	Reality is continuously constructed.
Context	Reality can be separated from its context.	Reality is embedded in its context.
Researcher approach	Objective, detached.	Personally involved.
Populations studied	Samples that represent overall populations as subjects.	Individual cases, represented as informants.
Measures	Human behavior or other observable phenomena.	Study the meanings that individuals create.
Observations	Analyze reality as definable variables.	Make holistic observations of the total context.
Design	Preconceived and highly controlled.	Emergent and fluid, adaptable to informants' views.
Analysis	Descriptive and inferential statistics.	Analytic induction to determine meaning.
Generalization	Use inference to generalize from a sample to a defined population.	Transfer knowledge from case analysis to similar cases.
Reports	Objective, impersonal reports in which the researcher's opinions are undetectable.	Interpretive reports that reflect the researcher's reconstruction of the meaning of the data.

understand the variations between these two overall approaches. Both types of research have many characteristics in common:

- A disciplined, rigorous approach based on external evidence
- Methods that require samples and the cooperation of individuals
- A focus on the rights of human subjects and ethical guidelines
- An aim of discovering new knowledge that can be used to improve nursing practice

Mixed method: A research approach that combines quantitative and qualitative elements; it involves the description of the measurable state of a phenomenon and the individual's subjective response to it.

Many nurse researchers assume that they must select only one approach and carry out the study in a pure and inflexible way. In fact, it is the rare study that relies on just one approach or the other. The choices made in research design are probably less about a solely qualitative approach versus a solely quantitative approach, and more about selection from a continuum of choices that may overlap from one approach to the other. Many quantitative studies involve asking the subjects to respond to questions or give opinions in which the participants' words are later analyzed to enhance the statistical findings. Experimental researchers may rate subject behaviors using scales that contain subjective elements, or they may record their own observations of behaviors. Conversely, many qualitative studies use measurement to determine the reliability of multiple raters in determining themes and to verify the trustworthiness of conclusions. A basic qualitative validation method is triangulation, or the search for multiple sources to confirm the same finding, in which numbers are often retrieved to confirm verbal data. There are many situations in which a blend of methods is appropriate. Called *mixed-methods designs*, these are often appropriate for evidence for a holistic profession such as nursing.

Mixed Methods

Mixed methods are becoming an important tool in nursing research, particularly in evaluation research. Evaluation research is the application of research methods to the study of programs, projects, or phenomena. Increasingly, the question is not whether mixed methods are appropriate, but rather how they should be used. There are three criteria for classification as a mixed method study:

1. At least one qualitative and one quantitative method are combined.
2. Each method is used rigorously according to the standard of that research methodology.
3. The study must be carried out by using a mixed-methods design, which also includes integration of the quantitative and qualitative data. (Creswell & Plano Clark, 2011)

Mixed-method designs can provide pragmatic advantages when exploring novel or complex nursing problems (Wasti et al., 2022). The qualitative data provide a deep understanding of the human experience, while the quantitative data enable the researcher to identify and measure relationships. The collective strength of combining both types of data provides a better understanding of the research problem than can be achieved with either form of data alone (Creswell, 2014). Mixed methods are often applied in an

ad hoc way, meaning the researcher initiates the study by using a primarily quantitative or qualitative method, and then integrates elements of the alternative approach as an afterthought. The most effective use of mixed methods, however, occurs when they are employed in a systematic, proactive way (Dawadi et al., 2021). For example, mixed methods might be used for the following purposes:

- Describe the rate of handwashing on a nursing unit (quantitative) as well as the nurses' perceptions about the importance of handwashing (qualitative).
- Measure the presence of bacteria on a nurse's hands after washing (quantitative) and observe the handwashing steps the nurse used (qualitative).
- Count the number of times a nurse washed their hands between patients (quantitative) and record the nurse's report on the convenience of handwashing facilities (qualitative).

Choosing a Design

Many considerations go into the choice of a general approach to research design. The philosophical orientation of the researcher is just one element. The nature of the research question, the skills and abilities of the researcher, and access to resources and samples are all important elements to consider prior to choosing the research methodology.

Of primary importance to the selection of an approach is the nature of the research question. Research questions that focus on the effectiveness of an intervention require a scientific approach (assuming effectiveness is defined as an objectively measured outcome). For example, the effectiveness of a skin-care regimen in preventing pressure injuries is best studied by applying the proposed regimen to one group of patients, applying a standard regimen to another group of patients, and then measuring the rate of pressure injury development in both groups. If the regimen is effective, then the subjects with the new regimen will have a lower pressure injury rate than those with the standard regimen. This is the traditional experiment, and it is still one of the strongest and most common research designs in health care.

In contrast, research questions that focus on the acceptability of an intervention may require a qualitative approach. The new regimen may be effective, but it may be painful, have an unpleasant smell, or consist of a cream that sticks to clothing. Assessment of these attributes, which will almost certainly affect whether a patient complies with the skin-care regimen, requires asking the patients about their preferences for the treatment and whether the outcome outweighs the unpleasant side effects.

Some of the considerations when choosing an approach are researcher driven. Many researchers have a personal preference for one approach over another. When the research question may be answered in several different ways, or when various aspects of a phenomenon require study before evidence can be deduced, then the researcher's personal preference may drive the selection of an approach. The skills required for quantitative research include the capacity to define variables, recruit subjects, use random assignment methods, create reliable and valid measurements, and analyze results with statistical techniques. The skills required of qualitative researchers are quite different.

They include the ability to find and select those subjects who can best inform the question, observe and record actions and interactions in detail, skillfully interview subjects or focus groups, and distill meaning from large amounts of word-based data. Both skill sets can require years to develop and hone. It is natural, then, that most researchers find themselves specializing in one approach or the other.

GRAY MATTER

Consider the following elements prior to choosing a research design:
- Philosophical orientation of the researcher
- Nature of the research question or problem
- Skills, abilities, and preferences of the researcher
- Resources and sample access

GRAY MATTER

The following skills are required for quantitative research:
- Defining variables
- Recruiting subjects
- Using random assignment methods
- Creating reliable and valid measurements
- Analyzing results with statistical techniques

GRAY MATTER

The following skills are required for qualitative research:
- Finding and selecting subjects appropriate for the question
- Observing and recording actions and interactions in detail
- Interviewing subjects skillfully
- Distilling meaning from large amounts of word-based data

A host of practical considerations must be addressed when selecting an approach. Quantitative methods require measurement tools, subjects who are willing to undergo experimental treatments (or the risk of no treatment), statistical software, and access to individuals knowledgeable in statistical analysis and interpretation. Qualitative methods need less in the way of tools and software, but they require informants who are willing to be observed or interviewed, often for extended periods of time. The individuals who are accessible, as well as the material resources required, may drive the selection of a feasible research approach.

A Note About Using Theoretical Frameworks in Nursing Research

Theory is an attempt to explain the world around us. Nurses become part of the world of health care through an understanding of theories about nursing, which attempt to explain why nurses do what they do. Nursing care is a complex process, and explanations of human actions and interactions can be complicated and difficult to understand without a road map. Theory is a method of mapping these complex processes of human action and interaction that affect patient care.

The word *theory* comes from the Greek *theoria*, which means "vision." Nurse scientists use theories to explain their visions of reality. Theories are not facts; instead, they are methods of posing what might be reality. Just as there are many visions of reality, so there are many theories that attempt to explain that reality. These theories often form the basis for research studies, in that many aspects of a conceptual model might potentially be the subject of study.

Nurse researchers also use theory as a *framework* for their studies. Developing a conceptual foundation involves a series of steps that focus on the selection and definition of concepts, concept analysis, relational statements, and conceptual models of action and interaction. In this way, theoretical frameworks form the backbone of a research study. Using a strong framework lends credence to the study's results, but more importantly allows for the replication of the study and the synthesis of its outcomes into guidelines.

Examples of Nursing Theory in Research

Nursing theories have been widely used in nursing research to guide investigations and promote evidence-based practices. Isik et al. (2021) used Orem's Theory of Self-Care to examine the effectiveness of a nurse-led intervention for children with asthma. The study aimed to determine if the intervention could improve children's self-care abilities in the management of their asthma. The researchers applied Orem's theory to design the intervention, which focused on recognizing and managing asthma symptoms, demonstrating correct techniques for asthma medication administration, and goal setting for self-management.

In a study about nurses' experience of work, Nelson et al. (2021) used Watson's Theory of Human Caring to investigate the extent to which caring for self and caring of the nurse manager impacts nurse job satisfaction. The researchers hypothesized that nurses who engaged in self-care and perceived that they had a caring manager would be more satisfied with their jobs than nurses who did not engage in self-care and believed that they did not have a caring manager. Watson's theory was used to guide the study, which posits that caring for self is a prerequisite for effectively caring for others.

Theoretical considerations may also influence the selection of a specific design. The researcher may start the design process by deciding which concepts are of interest. The way that these concepts interact with each other and create a framework is called

a theory. Theoretical models are commonly tested with both quantitative and qualitative designs, and they provide a road map for future research. Theoretical and conceptual frameworks are the necessary backbone of a research study. Using a well-founded and well-referenced framework lends credence to the study, but, even more importantly, allows for comparisons across studies, as well as building from or between studies. Basing a study on a sound theoretical framework is one way to ensure that the research will be systematically designed.

Myriad thoughtful decisions must be made to choose the right approach for a particular research problem. The key word is *thoughtful*. These decisions should be based on a sound rationale, and the researcher should be able to articulate the basis for these decisions.

Basic research: Theoretical, pure, fundamental, or bench research done to advance knowledge in each subject area.

Applied research: Research conducted to gain knowledge that has a practical application and contributes in some way to a modification of practice.

Experimental research: Highly structured studies of cause and effect are usually applied to determine the effectiveness of an intervention. Subjects are selected and randomly assigned to groups to represent the population of interest.

Classifications of Research by the Intent of the Researcher

Research is classified by the basic belief system that drives its design features, but it must also reflect the intent of the researcher. There are two kinds of goals for research: (1) to provide new knowledge for the foundation of nursing and (2) to provide knowledge that can be immediately applied to the practice of nursing. The first of these is referred to as *basic research*; the latter is termed *applied research*.

Basic research is commonly referred to as theoretical, pure, fundamental, or bench research. One might think of the work done by scientists in laboratories as basic research. It is used to test theories and to build the body of knowledge that forms the foundation for practice, but it does not directly apply to the practice setting. Examples of basic research include measuring neuromuscular responses to stimuli or studying the effects of circulatory volume on neonatal cardiac function.

Applied research is undertaken with the single goal of improving nursing practice. The findings from such research are intended to contribute in some way to a modification of nursing practice. Examples of applied research include investigating the effects of therapeutic massage for the pain of labor or determining the efficacy of specific counseling techniques after the death of a spouse.

Both basic and applied research may be conducted by using quantitative, qualitative, or mixed methods. Most clinical nursing research is considered applied research, and the findings that are generated as evidence for practice are exclusively of an applied nature. This is not to imply that basic research is not valuable. Indeed, one must have a clear understanding of the underlying theoretical and physiological basis for a given nursing practice to understand its mechanisms of effect.

Classifications of Research by the Nature of the Design

Another classification of research is associated with the nature of the design. Experimental research refers to studies of cause and effect, which are usually undertaken to determine the effectiveness of an intervention. In an experimental design, some type

Quasi-experimental study: Studies of cause and effect, like experimental designs, but using convenience samples or existing groups to test interventions.

Retrospective study: Studies conducted using data that have already been collected about events that have already happened. Such secondary data were originally collected for a purpose other than the current research.

of randomization method is employed to select subjects or assign them to groups according to how well they represent the population of interest. The researcher manipulates some aspect of the patient's treatment in a highly controlled setting and compares the outcomes to those for a group that has received no treatment or a standard treatment. If the outcomes are different, the researcher assumes the difference is a result of the treatment because all other variables have been controlled. Experimental designs are characterized by highly structured protocols for sample selection and assignment, intervention, measurement, and analysis. Such designs aim to eliminate bias and control for rival explanations for the outcome.

Nonexperimental designs cover a broad range of studies that do not share these characteristics and, therefore, cannot test cause and effect. **Quasi-experimental studies** mimic experimental designs in most ways except for the selection and assignment of subjects. Such studies often use convenience samples or existing groups to test interventions. For example, a quasi-experimental study might test an intervention by selecting populations in two different nursing homes, where one group gets the treatment and the other does not. However, subjects are not randomly assigned to the nursing homes.

Other nonexperimental designs include descriptive research, correlation research, and predictive research. *Descriptive* research involves the study of a particular situation or event that already exists. The researcher does not manipulate any variables, although the study itself is systematic and thorough. *Correlation* research focuses on the existing relationships between variables. Such a study might, for example, search for a relationship between a single variable in two populations (e.g., Do teens with mothers who had teen pregnancies have a higher teen pregnancy rate themselves?). Correlation studies might also search for relationships between two variables in the same sample (e.g., Do overweight teens have higher pregnancy rates?). It is important to note that correlation does not equal causation—for example, a relationship might be identified between overweight teens and higher pregnancy rates but that does not mean one causes the other. *Predictive* research takes the correlation aspect one step further, searching for relationships in which the values of one variable can be used to predict the values of another (e.g., Do certain family characteristics predict the risk of a teen pregnancy?). Predictive research is particularly helpful in public health studies and research involving the determination of whether a risk factor may lead to a particular health condition.

Classifications of Research by the Time Dimension

A final classification of research studies is by the time dimension chosen for the studies. These investigations may focus on the past or the future, referred to as retrospective and prospective studies, respectively.

Retrospective studies are conducted using data that have already been collected about events that have already happened. For nursing research, these data often come from chart review. In such a study, the researcher is unable to control most aspects of variable

definition and data collection because those steps were performed before the study was conceived. The researcher conducting a retrospective study relies on the accuracy and completeness of these secondary data, or data that were originally collected for a purpose other than the research study. For example, a nurse might conduct a retrospective study to determine differences in the rate of ventilator-associated pneumonia between patients who received oral care every 4 hours and those who did not. The diagnosis of ventilator-associated pneumonia and the timing of oral care could both be retrieved from patient charts—a convenient source of reliable data. However, in this case, the nurse researcher is dependent upon the staff nurses' documentation of the timing and extent of oral care. If the chart does not have a record of oral care in a 4-hour period, is it because such care was not provided or because it was not recorded? If oral care is recorded, was the care rendered according to current standards? The nurse researcher must balance the convenience of secondary data with the risks of inaccuracy and incompleteness of the data set.

Prospective studies are those designed and conducted by the researcher. This approach enables the researcher to control most aspects of research design and implementation, and primary data are collected (that is, data are collected by the researcher directly from subjects for the specific study at hand). Prospective studies are generally more reliable than retrospective studies due to the greater control afforded to the researcher. For example, a nurse might conduct a prospective study of oral care and ventilator-associated pneumonia by experimenting with different time periods, methods, or durations of oral care and measuring the rate of ventilator-associated pneumonia in the patients participating in the study. In this case, the procedures can be highly controlled, and the outcomes reliably measured and recorded accurately. However, such a study would be difficult to design and carry out because of the need to address ethical questions, sampling challenges, and substantial time demands. The accuracy and completeness of data would be realized at the expense of considerable complexity and effort.

Prospective study: Study planned by the researcher for collection of primary data for the specific study and implemented in the future.

Longitudinal study: Study conducted by following subjects over time, with data collection occurring at prescribed intervals.

Cross-sectional method: Study conducted by looking at a single phenomenon across multiple populations at a single point in time, with no intention for follow-up in the design.

Studies may also be characterized based on whether they are conducted over time or at a single point in time. Such studies are referred to as longitudinal and cross-sectional studies, respectively.

Longitudinal studies are conducted over time—often very long time periods—to study the emergence of disease or the long-term effects of treatments. Subjects are followed over time, with data collection occurring at prescribed intervals during that period. An advantage of longitudinal studies is their ability to determine the effects of risk factors or interventions over time. A disadvantage is the potential for attrition as subjects are lost to the study over its duration. There may also be effects from the act of repeatedly measuring the same individuals over time. An example of a longitudinal study would be monitoring the children of smokers over time to measure the emergence of pulmonary disease.

Cross-sectional methods focus on collecting data at a single point in time. No follow-up is intended or built into the design. The result is a comprehensive picture of the existence of a phenomenon in the present, without concern for how it will look in the future. Cross-sectional methods often examine a single phenomenon across multiple

populations at a single point in time. These methods have the advantage that they are completed in a limited amount of time and may yield valuable information about how different populations respond to the same disease or treatment. Their primary disadvantage is that the effects of time are not evaluated and cannot be analyzed. An example of a cross-sectional study would be determining the prevalence and distribution of pulmonary diseases in a sample of children who have a parent smoker in the home at a given point in time.

Longitudinal and cross-sectional studies are frequently used in public health and epidemiology to study the distribution and determinants of disease over time or across populations. These methods can also be used in nursing research to study the effects of risk factors, interventions, or nursing practice changes as they unfold at different times and for different people.

Reading Research for Evidence-Based Practice

Although it is relatively easy to categorize research by its approach, type, time dimension, and other distinctions in a research textbook, in reality these distinctions are not quite so tidy or clear-cut. Reading a research study while trying to classify its characteristics often results in frustration. Just as the research process must be viewed as a fluid process that articulates decisions made on a continuum, so reading a research study challenges the nurse not to determine whether the right design has been selected, but whether the researcher has made the right choices.

Often, in the introduction of a study, qualitative researchers will make explicit their reasons for choosing a particular design. In general, a qualitative study will state that it is a qualitative approach somewhere in the abstract, introduction, or initial methods sections. This is not usually the case with quantitative research. Instead, it is often up to the reader to determine the specific decisions the researcher made and to try to deduce the reasoning behind those decisions.

The reader can pick up some hints early in the abstract and the methods section that will provide clues about the time dimension of the study. Comments about the use of "secondary data" or "using data collected for another study" will indicate the study is retrospective. In this case, the critical reader should be looking for evidence that the researchers accounted for the lack of accuracy and specificity that accompanies retrospective studies, or at least acknowledged its existence. Researchers will rarely identify primary data explicitly as such, but the inclusion of an intervention protocol or a measurement procedure indicates that the data were prospectively gathered.

It is usually relatively easy to determine whether a study is longitudinal or cross-sectional. The reader can look for measures that were collected repeatedly on the same individuals as a clue that a study is longitudinal. The researcher might use terms such as *paired sample*, *dependent data*, or *repeated measures* to indicate that data were collected over time from the same subjects. If it is clear that data were collected once from individuals at a single point in time, then the study is a cross-sectional one.

It is important to categorize the type of study before using it as evidence. The hierarchy of evidence encompasses a variety of research designs, but the connection to the

strength of a practice recommendation is based, to a great extent, on the type of study. Listed here are some of the points to appraise when reading a research study to determine whether the authors used the appropriate approach:

- Does the research question match the specific approach chosen?
- If an intervention was tested, was a quantitative approach used?
- If patient preferences and values were assessed, was a qualitative method or a mixed method used?
- Does the researcher articulate a rationale for decisions about the research approach?
- Does the author provide logical reasoning for the specific design selected? If not, can it be deduced from the characteristics of the study?

The initial review of a research study for its approach, type, and time dimension is useful in determining the level of evidence its findings represent. This assessment ensures that the nurse will use the research results appropriately in supporting evidence-based nursing practice.

Using Research in Evidence-Based Practice

Although it would seem obvious that applied research is the most helpful for evidence-based practice, basic research may also be used for this purpose. The hierarchy of evidence considers basic research about physiology and pathophysiology to be legitimate considerations in making practice decisions, on par with professional expert opinion and descriptive research. When developing a research-based practice guideline, a good starting place is a foundation of the existing knowledge about the physiological and psychological forces that may be in play in a given nursing practice situation.

The results of both quantitative and qualitative research are useful in evidence-based practice. Although randomized controlled trials (experimental designs)—both singularly and in aggregate—clearly provide the strongest evidence for practice, they do not provide the only evidence for practice. Well-designed quasi-experimental, descriptive, correlation, and predictive designs provide evidence that can be used to determine whether an action can be designated as recommended, optional, or not recommended.

Qualitative and mixed methods are primarily useful in determining the preferences and values of the patient. They may, however, be used to theorize interventions that might be effective, particularly when little research is found or when the research topic deals with behavioral, psychological, or spiritual issues. Exploratory studies often give rise to theories that subsequently can be tested with quantitative methods, improving on the evidence for practice. The best practice guidelines are those that incorporate a variety of research studies and methods into a single guideline so the needs of patients can be addressed in a comprehensive, evidence-based manner.

Selecting an Approach During COVID-19

Most of the studies being conducted during the time of the COVID-19 pandemic used a quantitative approach. It makes sense that quantitative research would take precedence during the pandemic, as researchers were driven to identify interventions that would help in treating and eradicating the virus. But what about the experiences of people who were living with the virus and the nurses who were caring for those people? The pandemic created unprecedented disruption for those who were caring for COVID-19 patients. Thus, their experiences were also important data to consider and could only be collected through a qualitative approach. Possible qualitative research questions might inquire about the evolving roles of nurses, the emotional toll of caring for COVID-19 patients, changes in nurse–patient interactions, and the impact of new policies and guidelines. Other areas of focus for qualitative research during the COVID-19 pandemic might include the perspectives of nursing students, the ethical dilemmas faced, and lessons learned.

Casey et al. (2021) sought to understand the experiences of graduate nurses who were transitioning to nursing practice during COVID-19. Even though investigating this phenomenon did not result in a specific treatment for the virus, the researchers were able to identify factors that impacted these nurses and their ability to care for patients during the midst of the COVID-19 pandemic. Studies such as this aimed to deepen our understanding of nursing's response to the pandemic and its implications for healthcare practices, education, and policy moving forward.

Creating Evidence for Practice

Given all of these approaches, types, and dimensions of research, outlining a specific research study may seem daunting. A systematic approach to making the decisions required, however, helps narrow the choices relatively quickly and makes the process a manageable one. Using criteria for each step in the decision-making and design process can help ensure that the right choices are made for the right reasons.

Criteria for Selecting an Approach

The primary consideration when selecting an approach is ensuring a match between the problem and the approach chosen to provide a solution. If the question is one that relates to the effectiveness of an intervention, identifies factors that influence a patient's outcome, or finds the best predictors for a patient's condition, then clearly a quantitative approach is needed. If the problem is one that requires an in-depth understanding of the patient's experience and the meaning of a phenomenon, then qualitative research is required. Either approach may be used for exploratory research or when there is little existing research. However, a qualitative or descriptive study is often a good way to start an exploration of a phenomenon for which little or no existing literature is available.

Mixed methods are the best way to capture the outcomes of both approaches. However, mixed methods are complex and require that the researcher have a command of both quantitative and qualitative research skills. It is rare that a novice researcher would undertake a mixed-method study to address a single problem. Instead, mixed methods

are often reserved for evaluation of complex issues or for developing and testing models of action and interaction. Mixed-methods research involves the collection and integration of both qualitative and quantitative data, providing a richer understanding than using either method alone, which is often particularly helpful in practice-based research (Thompson & Zhang, 2020).

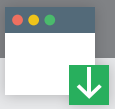
A careful self-assessment of personal experiences and abilities will also help the researcher arrive at a feasible study method. Time devoted to reflection about one's propensity toward quantitative or qualitative methods is time well spent in preparing for a research study. Using a method that is not compatible with the researcher's nature can be frustrating and result in poorly executed research. If a researcher knows that a particular approach is difficult for them to apply, then the nurse may want to join a research team to learn more about the process and to gain the mentorship and support that comes from individuals who are competent in, and passionate about, the approach. A pragmatic self-assessment of available time, software, resources, and competency is also useful before arriving at a conclusion about a study design.

Finally, the nurse researcher should consider the expectations of the audience they are trying to reach. That audience may include fellow nurses, healthcare team members, or administrators. The nurse researcher would also do well to consider other audiences that must be addressed to communicate the results effectively, such as journal editors, conference attendees, graduate committees, or professors. The needs and interests of these audiences may be as important as those of fellow practitioners when it comes to ensuring that the research results are communicated broadly enough to be used in practice.

Summary of Key Concepts

- Research is about the search for truth, but there are multiple ways to determine and describe truth. The key to a successful research process is to understand which approach is appropriate for the problem to be solved.
- The research process is a fluid, dynamic one that includes multiple processes. These processes may occur in sequence, or they may overlap; some phases may even be skipped. The phases in the research process include defining the research problem, scanning the literature, selecting a theoretical framework, determining an appropriate design, defining a sampling strategy, collecting and analyzing data, communicating the findings, and using the findings to support practice.
- Philosophical assumptions drive the fundamental design of a study and are rooted in the paradigms of quantitative or qualitative methods. Quantitative studies employ measurement to produce an objective representation of relationships and effects. Qualitative studies use verbal reports and observations to arrive at an interpretation of the meaning of a phenomenon.
- Mixed methods may involve elements of both quantitative and qualitative research, but the standards for both approaches must be met. Mixed methods are most effective for evaluation research and for developing and testing models of action and interaction.

- A design should be chosen based on the nature of the research question and the preferences and skills of the researcher, as well as practical considerations such as access to subjects, software, and other resources.
- Research can be classified by the intent of the researcher. Basic research reflects an intent to contribute to the fundamental body of knowledge that is nursing. Applied research reflects the sole intention of providing evidence that can be directly applied to the practice of nursing.
- The nature of research design can be categorized as experimental or nonexperimental. Experimental designs are highly controlled, with a goal of testing cause and effect. Nonexperimental designs can be descriptive, correlative, or predictive. Both types of designs provide evidence for nursing practice, but the recommendations from experimental designs are considered stronger.
- Research can be categorized by its time dimension as retrospective or prospective. Retrospective studies use secondary data that have already been collected. Prospective studies use real-time processes to collect primary data explicitly for the study.
- Studies can also be classified as longitudinal or cross-sectional. Longitudinal studies measure some aspect of the same subjects over time, whereas cross-sectional studies measure a characteristic from multiple populations at a single point in time.



CRITICAL **APPRAISAL EXERCISE**

Retrieve the following full-text article from the Cumulative Index to Nursing and Allied Health Literature or a similar search database:

King, A., Campbell, J., James, C., & Duff, J. (2020). A workplace stretching program for the prevention of musculoskeletal disorders in perioperative staff: A mixed methods implementation study. *Journal of Perioperative Nursing*, *33*(4), e3–e10.

Review the article, focusing on the design of the study. Consider the following appraisal questions in your critical review of this research article:

1. What benefit did the author believe would result from using mixed methods for the study of this subject?
2. Discuss the link between the purpose of the study and this specific design.
3. Classify this study with respect to each of the following dimensions:
   a. The intent of the researcher
   b. The type of study
   c. The time dimension of the study
4. Which characteristics did this study possess that were quantitative in nature?
5. Which characteristics did this study possess that were qualitative in nature?
6. Describe the reasons you think a mixed-methods approach was the most appropriate for this population and research goals.

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