* Clearly identifying the target population and the accessible population is important in the sampling process.
* Random sampling techniques share two important characteristics:
  + The chance that each member of the population will be selected can be specified.
  + All members of the population have an equal chance of being selected.
* Simple random sampling is the best way to obtain a representative sample, although no method guarantees perfect representation of the population.
* Stratified random sampling is a process whereby certain subgroups are selected for inclusion in the sample.
  + Proportional stratified sampling involves a process where the identified subgroups in the sample are represented in the same proportion in which they exist in the population.
  + Equal stratified sampling is a process where the representation of subgroups is equal.
* Cluster random sampling involves the random sampling of existing groups, or clusters.
* Multistage random sampling is a combination of cluster random sampling and individual random sampling.
* Systematic sampling involves selecting the *K*th individual from a population list.
  + Depending on the organization of the list, systematic sampling may be a random sampling technique or a nonrandom technique.
* Nonrandom sampling techniques do not permit specification of the probability of inclusion in the population, nor do they guarantee that every member of the population has an equal chance of being selected.
* Convenience sampling involves a selection of whoever happens to be available.
* In snowball sampling, current participants identify other individuals to act as participants in the study.
* Quota sampling involves the selection of the sample based on precise numbers of individuals with specific characteristics.
* Purposive or judgment sampling identifies individuals who are believed to be representative of a given population.
* Generally speaking, the larger the population size, the smaller the percentage of the population required to get a representative sample.
* When samples are selected randomly, there is still a chance that differences will exist between the population and the sample; this is known as sampling error.
* Sampling bias is a systematic error and is usually the fault of the researcher.
* A measurement scale is a system used to organize data so they can be reviewed, analyzed, and interpreted appropriately.
  + Nominal scales are associated with measuring a categorical variable.
  + Ordinal scales possess the same characteristics as nominal scales, but also rank order variables based on the degree to which they possess a given characteristic.
  + Interval scales possess all the characteristics of nominal and ordinal scales, but the values represent equal intervals.
  + Ratio scales are the highest level of measurement and possess all the characteristics of the other scales, but also have a true zero point.
* Quantitative data collection techniques vary greatly.
* Surveys are a group of quantitative data collection techniques that involve the administration of a set of questions or statements to a sample of respondents.
* Questionnaires are specific types of surveys that are administered in written form.
* Four types of survey questions are demographic, knowledge, attitudinal, and behavioral questions.
* Closed-ended, or forced-choice questions resemble multiple-choice or other types of items where respondents select from a number of given options.
* Open-ended questions allow for more individualized responses.
* Checklists are closed-ended items that provide only a dichotomous response option.
* Likert items begin with a statement and then ask individuals to respond on an agree–disagree continuum.
* Likert-type items also exist on a continuum, but measure something other than agreement.
* Developing quality survey instruments is not an easy task; researchers should follow the design guidelines.
* Formative and summative classroom assessments can be used as sources for quantitative data.
* Standardized test scores can also be used as sources of data.
* Validity and reliability are essential qualities in quantitative research.
* Validity has to do with whether we actually measured what we intended to measure, and whether the inferences follow logically from our interpretations.
* Evidence of validity must be collected during research studies to determine the validity of research inferences.
  + Evidence of validity comes from the following sources: test content, response processes, internal structure, relations to other variables, and consequences of testing.
  + Determination of the validity of inferences from collected data is based on judgment or the calculation of validity coefficients.
* Reliability has to do with the consistency of the data that are collected.
  + Reliability of quantitative data is determined through several statistical procedures, including test–retest reliability (stability), equivalent-forms reliability (equivalence), and internal consistency methods.
  + Methods for determining internal consistency reliability include split-half, Kuder-Richardson, and Cronbach’s alpha reliabilities.
* Reliability is a necessary, but not sufficient condition for validity.