

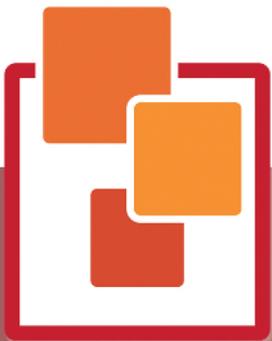


K TO **12**



PRACTICAL RESEARCH 2

Esther L. Baraceros



e-Book

First Edition

PRACTICAL RESEARCH 2

Esther L. Baraceros



Published & Distributed by

REX Book Store

856 Nicanor Reyes, Sr. St.

Tel. Nos. 736-05-67 • 735-13-64

1977 C.M. Recto Avenue

Tel. Nos. 735-55-27 • 735-55-34

Manila, Philippines

www.rexpublishing.com.ph



Philippine Copyright 2016
by Rex Book Store, Inc.
and
Esther L. Baraceros

RBS Practical Research 2

First Edition

ISBN 978-971-23-8083-9

Classification: Worktext (89-AA-00006-0A)

Published, copyrighted 2016, and distributed by **Rex Book Store, Inc. (RBSI)** with main office at 856 Nicanor Reyes Sr. St., Sampaloc, Manila / Tel. Nos.: 735-1364, 736-0567

RBSI Branches:

LUZON

•**MORAYTA:** 856 N. Reyes Sr. St., Sampaloc, Manila / Tel. Nos.: 736-0169, 733-6746; Telefax: 736-4191 •**RECTO:** 2161-65 Freedom Building, C.M. Recto Avenue, Sampaloc, Manila / Tel. Nos.: 522-4521, 522-4305, 522-4107, 733-8637 •**RECTO (La Consolacion):** Mendiola, Manila •**MAKATI:** Unit UG-2, Star Centrum Bldg., Sen. Gil Puyat Ave., Makati City / Tel. No.: 818-5363; Telefax: 893-3744 •**ROCKWELL:** 1st Floor, Ateneo Professional School, Rockwell Center, Bel-Air, Makati City / Tel. No.: 729-2015 •**CUBAO:** Unit 10 UGF, Doña Consolacion Bldg., Gen. Santos Ave., Araneta Center, Cubao, Quezon City / Telefax: 911-1070 •**ORTIGAS:** G/F East Tower, Philippine Stock Exchange Center, Exchange Road, Ortigas Center, Pasig City / Tel. No.: (02) 650-4347 •**CAVITE:** Block 4, Lot 20 Don Gregorio Heights 2, Zone 1-A Aguinaldo Highway, Dasmariñas, Cavite / Telefax: (046) 416-1824 •**CAVITE (Tanza):** (Display Area) Block 5, Lot 6, City View 4 and 5, Brgy. Tanauan, Tanza, Cavite •**NAGA:** 1-1A Geronimo Bldg., Barlin St., Sta. Cruz, Naga City, Camarines Sur / Telefax: (054) 811-6878 •**LEGAZPI:** Unit 6, 3rd Floor, A. Bichara Silverscreen, Legazpi City, Albay / Telefax: (052) 480-2244 •**CALAPAN:** Brgy. Salong, National Highway, Calapan City, Oriental Mindoro / Telefax: (043) 288-1650 •**BATANES:** L. Lopez St., Kayvalugan, Basco, Batanes •**TUGUEGARAO:** 10 Arellano Ext., Brgy. Ugac Sur, Tuguegarao, Cagayan / Telefax: (078) 844-8072 •**CABANATUAN:** Fontelera Building, 1271 Del Pilar Ext., Sangitan East, Cabanatuan City, Nueva Ecija / Tel. No.: (044) 464-2151; Telefax: (044) 600-5684 •**URDANETA:** Zone 6, Pinmaludpod, Urdaneta City, Pangasinan / Telefax: (075) 568-3975 •**ANGELES:** Unit H, JMS Bldg., MacArthur Highway, Brgy. Salapungan, Angeles City, Pampanga / Telefax: (045) 887-5371 •**BAGUIO:** Rex Hall Student Residences, Upper Gen. Luna cor. A. Bonifacio St., Baguio City, Benguet / Tel. No.: (074) 422-0574

VISAYAS

•**TACLOBAN:** Brgy. 74 Marasbaras, Tacloban City, Leyte / Tel. No.: (053) 323-8976; Telefax: (053) 523-1784 •**ILOILO:** 75 Lopez Jaena St., Brgy. San Isidro, Jaro, Iloilo City, Iloilo / Tel. No.: (033) 329-0332; Telefax: (033) 329-0336 •**BACOLOD:** 28 Brgy. 36, Purok Immaculada, Quezon Ave., Bacolod City, Negros Occidental •**CEBU:** 11 Sanciangko St., Cebu City / Tel. Nos.: (032) 416-9684, 254-6773, 505-4313; Telefax: (032) 254-6466

MINDANAO

•**CAGAYAN DE ORO:** J. Serifa St. cor. Vamenta Blvd., Carmen, Cagayan de Oro City, Misamis Oriental / Telefax: (088) 858-6775, 309-5881 •**DAVAO:** 156 C.M. Recto St., Davao City, Davao / Tel. Nos.: (082) 300-5422, 305-5772; Telefax: (082) 221-0272 •**GENERAL SANTOS:** Aparente St., Dadiangas Heights, General Santos City, South Cotabato / Telefax: (083) 554-7102 •**ZAMBOANGA:** San Francisco Loop, Mayor Agan Ave., Camino Nuevo B, Zamboanga City / Tel. No.: (062) 955-0887

www.rexpublishing.com.ph

No portion of this book may be copied or reproduced in books, pamphlets, outlines, or notes—whether printed, mimeographed, typewritten, photocopied, or in any form—for distribution or sale, without the written permission of the Publisher and Author/s. The infringer shall be prosecuted in compliance with copyright, trademark, patent, and other pertinent laws.

INTERNET LINK DISCLAIMER

REX PUBLISHING is not responsible for the accuracy, legality or content of the external sites and for that of subsequent links. These links are being provided as a convenience and for informational purposes only. Although verified at the date of publication, the publisher cannot guarantee that these links will work all of the time nor does it have control over the availability of linked pages.

Moreover, the publisher does not warrant sites or the servers that make them available are free of viruses or other harmful components. **REX PUBLISHING** does not warrant or make any representations regarding the use or the results of the use of the materials in these sites or in third-party sites in terms of their correctness, accuracy, timeliness, reliability or otherwise.

RBSI's Book Association Memberships: Philippine Booksellers Association, Inc. (PBAI); Book Development Association of the Philippines (BDAP); Philippine Educational Publishers Association (PEPA); Book Exporters Association of the Philippines (BEAP); Academic Booksellers Association of the Philippines (ABAP); Children's Literature Association of the Philippines, Inc. (CLAPI); Asian Publishers Resources Center (APRC)

PEPA's International Book Association Memberships: International Publishers Association (IPA); Asia Pacific Publishers Association (APPA); ASEAN Book Publishers Association (ABPA); Philippine Book Publishing Development Federation (Philbook)

Printed by  **REX PRINTING COMPANY, INC.**

84-86 P. Florentino St., Sta. Mesa Heights, Quezon City / Tel. No.: 857-7777

Contents

	Preface	vii
	Acknowledgments	ix
UNIT I	Nature of Inquiry and Research	
Lesson 1	Inquiry vs. Research: A Review	1
	1. Nature of Inquiry and Research	
	2. Characteristics of Research	
	3. Methods of Research	
	4. Inquiry vis-à-vis Research	
Lesson 2	Quantitative Research	7
	1. Definition of Quantitative Research	
	2. Characteristics	
	3. Classification	
	4. Importance	
	5. Quantitative vs. Qualitative Research	
Lesson 3	Experimental Research	13
	1. Definition of Experimental Research	
	2. Classification	
	3. Research Design of Non-Experimental Research	
	4. Quasi-Experimental Research	
Lesson 4	Non-Experimental Research	20
	1. Definition of Non-Experimental Research	
	2. Characteristics	
	3. Definition of Survey Research	
	4. Purposes of Survey Research	
	5. Planning a Survey Research	
	6. Strengths of Survey Research	
	7. Ethical Principles and Rules in Survey Research	
Lesson 5	Variables	28
	1. Definition	
	2. Basic Types	
	3. Variable Relationships	
	4. Other Types of Variables	
UNIT II	Identifying the Inquiry and Stating the Problem	
Lesson 6	Quantitative Research Problem	35
	1. Nature of Quantitative Research Problem	
	2. Sources of Quantitative Research Problem	

3. Research Questions vs. Quantitative Research Problem
4. Guidelines in Formulating a Quantitative Research Problem and Research Questions
5. Research Problems in Experimental Research
6. Types of Quantitative Research Questions
7. Approaches to Quantitative Research Questions

Lesson 7	Hypotheses	44
	<ol style="list-style-type: none"> 1. Definition of Hypothesis 2. Purposes of Hypotheses 3. Hypotheses vs. Research Questions 4. Categories of Hypotheses 5. Types of Hypotheses 6. Guidelines in Formulating Hypotheses 	

UNIT III Learning from Others and Reviewing the Literature

Lesson 8	Review of Related Literature (RRL)	51
	<ol style="list-style-type: none"> 1. Definition of RRL 2. Purposes of RRL 3. RRL in Quantitative Research 4. Steps in Conducting a Systematic Review 5. Meta-analysis in Quantitative Research 6. In-text Citation and Referencing Styles 7. Examples of MLA Referencing Style 8. Examples of APA Referencing Style 9. Ethical Standards in Literature-Review Writing 	

Lesson 9	Conceptual Framework	65
	<ol style="list-style-type: none"> 1. Definition of Conceptual Framework 2. Purposes of Conceptual Framework 3. Concept Map 4. Conceptual Framework vs. Theoretical Framework 5. Pointers in Writing a Conceptual Framework 	

Lesson 10	The Language of Research	73
	<ol style="list-style-type: none"> 1. Characteristics of the Language of Research 2. Research-Language Formation 3. Operational Definition 	

UNIT IV Understanding Data and Ways to Systematically Collect Data

Lesson 11	Quantitative Research Designs	83
	<ol style="list-style-type: none"> 1. Meaning of Quantitative Research Design 2. Types of Quantitative Research Design <ol style="list-style-type: none"> 2.1 Experimental Research Design 2.2 Non-Experimental Research Design 	

Lesson 12	Quantitative Data-Collection Techniques	94
	<ol style="list-style-type: none"> 1. Definition of Quantitative Data 2. Techniques in Collecting Quantitative Data <ol style="list-style-type: none"> 2.1 Observation 2.2 Survey 2.3 Experiment 2.4 Content Analysis 3. Measurement Scales for Quantitative Data <ol style="list-style-type: none"> 3.1 Nominal Scale 3.2 Ordinal Scale 3.3 Interval Scale 3.4 Ratio Scale 	

UNIT V Finding Answers through Data Collection

Lesson 13	Quantitative Data Analysis	107
	<ol style="list-style-type: none"> 1. Basic Concept 2. Steps in Quantitative Data Analysis <ol style="list-style-type: none"> 2.1 Preparing the Data 2.2 Analyzing the Data <ol style="list-style-type: none"> 2.2.1 Descriptive Statistical Technique <ol style="list-style-type: none"> 1) Frequency Distribution 2) Measure of Central Tendency (Mean, Median, Mode) 3) Standard Deviation 2.2.2 Advanced Quantitative Analytical Methods <ol style="list-style-type: none"> 1) Correlation 2) Analysis of Variance (ANOVA) 3) Regression 	
Lesson 14	Statistical Methods	117
	<ol style="list-style-type: none"> 1. Basic Concept 2. Statistical Methodologies <ol style="list-style-type: none"> 2.1 Descriptive Statistics 2.2 Inferential Statistics 3. Types of Statistical Data Analysis 4. Statistical Methods of Bivariate Analysis <ol style="list-style-type: none"> 4.1 Correlation or Covariation 4.2 Cross Tabulation 5. Measure of Correlation <ol style="list-style-type: none"> 5.1 Correlation Coefficient 5.2 Regression 	

Lesson 15	Sampling Procedure	126
	1. Basic Concept	
	2. Factors Affecting Sample Selection	
	3. Sampling Methods	
	3.1 Probability Sampling	
	3.2 Non-probability Sampling	
	4. Random Sampling vis-à-vis Statistical Methods	
	5. Advantages and Disadvantages of Five Basic Sampling Techniques	

UNIT VI Reporting and Sharing Findings

Lesson 16	Research-Report Writing	135
	1. Basic Concept	
	2. Research Writing vs. Report Writing	
	3. Guidelines in Research-Report Writing	
	4. Research-Report Writing Styles or Format	
	References	145
	Index	149

Preface

Wondering a lot about your world, you are always in quest of knowledge about people, things, places, events, and so on. One, two, or three things seem incomprehensible to you that you try to exhaust all the ways and means by which you can unravel the mystifying existence or condition of the objects of your curiosity.

Thirsting for knowledge, you decide to research on the exact cause of your wonderment. Thus, you inquire, investigate, read, observe, and interview, among others, to gather data or facts and information from where you can deduce what are valid or true about the focus of your bewilderment or confusion.

Collecting and analyzing data accurately, you come to a certain understanding of a phenomenon. But what could be the extent of your understanding about this remarkable event, person, or thing? In your hands are collected and analyzed data to trigger off your opinionated knowledge about such phenomenon.

However, your personal thoughts, feelings, views, and attitudes about this are true only in so far as they are related to your own perceptions. They are your subjective understanding of a person or a thing which cannot be quantified, measured, or expressed with precision or accuracy. Resulting from your interpretative thinking, your views about something are just your approximation, assumption, or prediction of what the thing really is.

The truth about a person, a thing, or any case is the *sine qua non* or bottom line of any research work. And the type of research that enables you to express the true, exact, or definite nature of something is **Quantitative Research**. This is the type of research that makes you obtain an accurate or objective knowledge, rather than an estimated or subjective knowledge about your sensory experience. It fuels your curiosity by letting you think that each research leads you to a discovery of knowledge that is not only valid and acceptable to you but also to people in general.

Using statistical and scientific methods of arriving at the truthfulness of something, quantitative research is apt to measure things involved in the research and to present the results in numerical forms. Appearing in its exact measurement or value in the form of a number, any data or findings enter

into the minds of people as true or valid discoveries, because numerical information always carries or expresses a specific value or measurement.

Giving a thing or any variable a specific number to represent its exact value indicates certainty rather than doubts in the minds of people about such thing. Further, dealing with something definite enables any person to verify the truthfulness of such variable. Quantitative research, then, is one investigative method of determining what are accurate, precise, or convincing to the world. This is precisely the concept that underlies this book.

Conceptualized on this basis, that is, on the accuracy or validity of any declarative and procedural knowledge you encounter, this book zeroes in on the extensive use of the modern pedagogical methods and techniques. Underpinned by the learning approaches of discovery, constructivism, transformative learning, and other correlative assumptions resulting from any paradigm shift in teaching-learning situations, these contemporary learning methodologies and strategies are empowered to satisfy your quest for the right or exact answers to your problems or questions about your surroundings in your day-to-day living. In short, this book is your way of knowing not only what to learn and practice, but also how to know and perform things in life with all accuracy or precision so that you will avoid producing erroneous decisions; but rather, make this world more meaningful and beautiful to live in.

E. L. B.

Acknowledgments

I am deeply indebted to all the book authors and Internet website writers whose paraphrased and summarized ideas on research are used in this book. Heartfelt thanks likewise, go to the owners of quoted words in this book, to the university librarians who willingly assisted me in my research work for the production of this book, and to all my former UP professors and other people who gave me good foundation knowledge on research and all those who stirred in me a genuine interest in coming out with this book on quantitative research.

There are many things you want to know in this world. People, things, places, events—their characteristics or qualities make you wonder continuously, frequently, or intermittently. Marveling at them, you tend to immerse yourself in a situation where you seem to be grappling with a problem or a puzzle. Questions after questions on the many aspects of the object of your curiosity prod you to move, act, or do something to find answers to your questions or to discover truths about your inferences or speculations on such object. Behaving like an investigator, asking and seeking answers to some questions about the thing you find puzzling indicates the true nature of inquiry or research.

LESSON 1 Inquiry vs. Research: A Review

Intended Learning Outcomes

After this lesson, you should be able to:

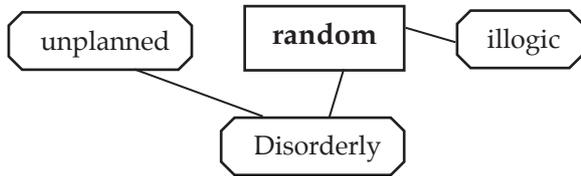
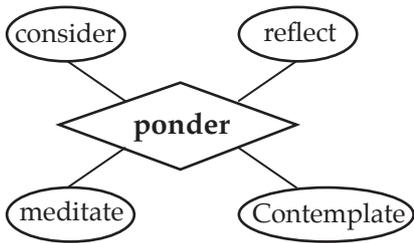
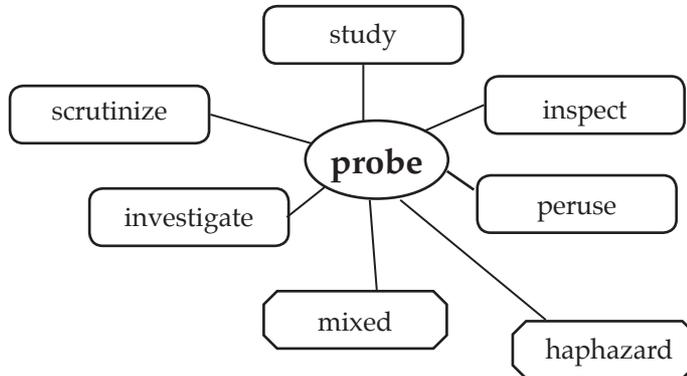
1. relate an unfamiliar term with other terms to discover the meaning of such difficult term;
2. explain the meaning of research in relation to inquiry;
3. point out the similarities and differences of research and inquiry;
4. distinguish lower-level questions from top-level questions to give stress to investigative kind of thinking;
5. judge the applicability of inquiry or research to a given situation; and
6. appraise the value of concepts learned about inquiry and research.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: Based on your stock knowledge and on the words surrounding the middle word, define the middle word in each cluster.



Activity 2: Vocabulary Practice

Directions: On the lines provided, construct sentences using the newly learned words.

Image Intensifier

LOOPING OR FREE WRITING

What do you recall about these two words: *Inquiry* and *Research*? Write them freely on the following lines without worrying about your grammar.

Concept Discovery

What else do you know about *Inquiry* and *Research*? Expand what you know about them by reading the following text.

INQUIRY vs. RESEARCH: A REVIEW

Nature of Inquiry and Research

One goal of education is knowledge acquisition. However, education is not just stocking your brain with knowledge, but it also encourages you to use acquired knowledge for a deeper understanding of the world—an understanding that inspires you to create, construct, or produce things for the betterment of not only your own life, but of the whole world as well. How is this possible?

Inquiry, a term that is synonymous with the word ‘investigation,’ is the answer to this question. When you inquire or investigate, you tend to ask questions to probe or examine something. You do this kind of examination through your HOTS or higher-order thinking strategies of inferential, analytical, critical, creative, and appreciative thinking to discover more understandable or meaningful things beyond such object of your inquiry. Thinking in this manner makes you ask open-ended questions to elicit views, opinions, and beliefs of others in relation to your research. (Small 2012)

Characteristics of Research

Research is a scientific, experimental, or inductive manner of thinking. Starting from particular to more complex ideas, you execute varied thinking acts that range from lower-order to higher-order thinking strategies reflected by these research activities: identifying the topic or problem, gathering data, making theories,

formulating hypotheses, analyzing data, and drawing conclusions. Cognitively driven terms like empirical, logical, cyclical, analytical, critical, methodical, and replicable are the right descriptive words to characterize research. These powerful modifiers that your previous research subject, Practical Research 1, explained to a certain extent, are the very same terms to characterize any quantitative research you intend to carry out this time.

The data you work on in research do not come mainly from yourself but also from other sources of knowledge like people, books, and artworks, among others. Hence, one cardinal principle in research is to give acknowledgment to owners of all sources of knowledge involved in your research work. Giving credit to people from whom you derived your data is your way of not only thanking the authors of their contribution to the field, but also establishing the validity and reliability of the findings of your research that ought to serve as instrument for world progress. (Muijs 2011; Ransome 2012)

Methods of Research

To be a researcher is to be a scientist, who must think logically or systematically; that is, your research activities must follow a certain order, like doing inductive thinking that makes you ponder on specific ideas first, then move to more complex concepts like conclusions or generalizations. Or, do the opposite of inductive thinking which is deductive thinking that lets you start from forming generalizations to examining details about the subject matter. These are not the only approaches, though, that you can adhere to in planning your research work. Depending on your topic and purpose, you are free to choose from several approaches, methods, and types of research you learned in your previous research subject, Practical Research 1. (Gray 2011; Sharp 2012)

Inquiry vis-à-vis Research

One scholarly activity that greatly involves inquiry is research. Similar to inquiry that starts from what you are ignorant about, research makes you learn something by means of a problem-solving technique. Both inquiry and research encourage you to formulate questions to direct you to the exact information you want to discover about the object of your curiosity. Your questions operate like a scrutiny of a person's attire to find out what are hidden between or among the compartments or folded parts of his/her clothes. Although the core word for both inquiry and research is investigation or questioning, they are not exactly the same in all aspects. Research includes more complex acts of investigation than inquiry because the former follows a scientific procedure of discovering truths or meanings about things in this world. (Goodwin 2014; Lapan 2012)

Concept Explanation

WHOLE CLASS ACTIVITY

Comprehension Check

Directions: Explain your understanding of inquiry and research by answering the following questions.

1. Compare and contrast Inquiry and Research.
2. Which is easier to carry out: Inquiry or Research? Give reasons for your answer.
3. How can a researcher be a scientist?
4. What if you do things randomly in research, what will be the consequences?
5. Should you immediately concern yourself with data analysis prior to research approach? Why? Why not?
6. Could Inquiry and Research go together? Explain your point.
7. What do you think of this line: Inquiry occurs completely with excessive familiarity with the physical looks of an object?
8. Do these two words, Inquiry and Research, somehow indicate strength of character?
9. Have you had an application of Inquiry and Research in your day-to-day life? Explain.
10. Name some institutions or organizations that often engage themselves in inquiry and research. Describe their ways of doing it.

Concept Elaboration

Directions: GROUP WORK. Form a group of three and do any of these group activities.

1. *Speculative thinking.* Prove how inquisitive you are by raising investigative questions about these topics: 21st Century Educational Strategies, Era of Globalization, Social Networking, Climate Change, Digital Age, Sustainable Community, Carcinogenic Foods, Email vs. Postal Mail, Stem-Cell Therapy, Proliferation of Dermatological Clinics, and Food Supplements. Classify your questions into lower-level and top-level questions.
2. Determine whether Inquiry or Research is applicable to the given situations. Check the corresponding column of your answer.

Situation	Inquiry	Research
<ol style="list-style-type: none"> 1. A person wants to know the occupant of one condominium. 2. A student wants to know the medicinal effects of guava leaves. 3. Mr. Cruz wants to know the technique to make his electric fan function instantly. 4. Professor Gomez wants to discover the impact of social networking on his students' learning abilities. 5. Aling Rosa wants to know the reason behind the decrease of her sales for the day. 6. A business man wants to find out which between these two marketing strategies: free tasting and attractive packaging, could increase daily sales. 		

Concept-Learning Assessment

Directions: Use percentage grade (50% to 100%) to indicate the extent of your learning about each of the following topics:

1. Differences and similarities between Inquiry and Research
2. Behavior of people practicing Inquiry and Research
3. Reasons behind people's inquisitive attitudes
4. Research as an inductive thinking
5. Lower-order and higher-order thinking strategies

Concept Transformation

Examine the setup of your family, your school, or any organization you are a member in. Which aspect of each group do you want to know more through inquiry or research? Present your answers to this question in a tabular form.

LESSON 2 **Quantitative Research**

Intended Learning Outcomes

After this lesson, you should be able to:

1. familiarize themselves with vocabulary terms to clarify things about quantitative research;
2. communicate with others using the newly learned vocabulary terms;
3. speculate about quantitative research;
4. define quantitative research accurately;
5. compare and contrast qualitative and quantitative research based on some criteria or standards;
6. draw distinctions between a qualitative question from a quantitative question;
7. ask questions any quantitative research seeks to answer; and
8. analyze the power of print media or electronic devices to trigger off students' quantitative questioning.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: To acquire substantial knowledge on some topics in this lesson, activate your schemata about the underlined word in each sentence. Get clues from its use in the sentence.

1. Demonstrate through a hand gesture the magnitude of the screen that you think is enough to block the window.
Meaning: _____
2. In looks, Malaysians are analogous to Filipinos, but in language, they are not.
Meaning: _____
3. Please use precise words to explain your point for the listeners' quick understanding of your ideas.
Meaning: _____
4. The plastic bag becomes inflated with much air blown into it; deflated, with air released from such container.
Meaning: _____

5. A person experiences moral instability if he does not pattern his life after Jesus Christ, the way, the truth, and the life.

Meaning: _____

Activity 2: Vocabulary Practice

Directions: Have a dialog with your partner. Use the newly learned words in your conversation.

Image Intensifier

Which between these two sets of statements is easier or quicker to understand? Justify your point.

Set A – Ninety five (95%) of the examinees passed the licensure exams.

Twenty pages of the book contain grammatically incorrect sentences.

Set B – A big number of examinees passed the licensure exams.

Several pages of the book contain grammatically incorrect sentences.

Concept Discovery

What do you think? Does your choice between Set A and B align itself to the content of the following selection or run counter to the text? Read the text to find out the truth.

QUANTITATIVE RESEARCH

Definition of Quantitative Research

Expressions like numerical forms, objective thinking, statistical methods, and measurement signal the existence of quantitative research. One word that reflects the true nature of this type of research is numerical. This term, numerical, is a descriptive word pertaining to or denoting a number or symbol to express how many, how much, or what rank things are or have in this world. Expressing meaning through numerals or a set of symbols indicates specificity, particularity, or exactness of something.

Quantitative research makes you focus your mind on specific things by means of statistics that involve collection and study of numerical data. Thus, to give the basic meaning of quantitative research is to say that research is a way of making any phenomenon or any sensory experience clearer or more meaningful by gathering and examining facts and information about such person, thing, place, or event appealing to your senses. You use mathematical operations of addition, subtraction, division, and multiplication to study and express relationships between quantities or magnitudes shown by numbers or symbols. Involving measurements and amounts, quantitative research seeks to find answers to questions starting with how many, how much, how long, to what extent, and the like. Answers to these questions come in numerals, percentages, and fractions, among others. (Suter 2012; Russell 2013)

Characteristics

Since quantitative research uses numbers and figures to denote a particular thing, this kind of research requires you to focus your full attention on the object of your study. Doing this, you tend to exclude your own thoughts and feelings about the subject or object. This is why quantitative research is described as objective research in contrast to qualitative research that is subjective. Characterized by objectiveness, in which only the real or factual, not the emotional or cognitive existence of the object matters greatly to the artist, quantitative research is analogous to scientific or experimental thinking. In this case, you just do not identify problems but theorize, hypothesize, analyze, infer, and create as well. Quantitative research usually happens in hard sciences like physics, chemistry, biology, and medicine; qualitative research, in soft sciences such as humanities, social sciences, education, and psychology, among others.

Classification

Quantitative research is of two kinds: *experimental* and *non-experimental*. Each of these has sub-types. Falling under experimental are these specific types: true experimental, quasi-experimental, single subject, and pre-experimental. Quasi-experimental comes in several types such as: matched comparative group, time series, and counterbalanced quasi-experimental. Non-experimental research, on the other hand, has these sub-types: survey, historical, observational, correlational, descriptive, and comparative research.

Importance

The importance of quantitative research lies greatly in the production of results that should reflect precise measurement and an in-depth analysis of data. It is also useful in obtaining an objective understanding of people, things, places, and events in this world; meaning, attaching accurate or exact meanings to objects or subjects, rather than inflated meanings resulting from the researcher's bias or personal attachment to things related to the research. Requiring the use of reliable measurement instruments or statistical methods, a quantitative study enables people to study their surroundings as objective as they can. This kind of research is likewise an effective method to obtain information about specified personality traits of a group member or of the group as a whole as regards the extent of the relationship of their characteristics and the reason behind the instability of some people's characteristics. (Muijs 2011; Gray 2012)

Quantitative vs. Qualitative Research

Having obtained much knowledge about qualitative and quantitative research, you are now able to compare and contrast the two based on some standards or criteria appearing in the following table. (Muijs 2011; Sharp 2012)

Standards	Qualitative	Quantitative
Mental survey of reality	Results from social interactions	Exists in the physical world
Cause-effect relationships	Explained by people's objective desires	Revealed by automatic descriptions of circumstances or conditions

Standards	Qualitative	Quantitative
Researcher's involvement with the object or subject of the study	Subjective; sometimes personally engaged	Objective; least involvement by the researcher
Expression of data, data analysis, and findings	Verbal language (words, visuals, objects)	Numerals, statistics
Research plan	Takes place as the research proceeds gradually	Plans all research aspects before collecting data
Behavior toward research aspects/ conditions	Desires to preserve the natural setting of research features	Control or manipulation of research conditions by the researcher
Obtaining knowledge	Multiple methods	Scientific method
Purpose	Makes social intentions understandable	Evaluates objective and examines cause-effect relationships
Data-analysis technique	Thematic codal ways, competence-based	Mathematically based methods
Style of expression	Personal, lacks formality	Impersonal, scientific, or systematic
Sampling technique	More inclined to purposive sampling or use of chosen samples based on some criteria	Random sampling as the most preferred

Concept Explanation

Activity 1

Directions: Circle the letter of the correct word to complete the sentence.

- You tend to inflate something in a qualitative research because of your _____.
 - objective views
 - teacher's influence
 - personal traits
 - mathematical skills
- This line, "The truth is out there." is true for _____.
 - qualitative research
 - quantitative research
 - all research designs
 - any research type
- People inclined to doing a quantitative research wants to discover truth in _____.
 - an exact manner
 - a careful way
 - an indirect way
 - a personal way

4. Some think of quantitative research as complex because of its use of _____.
 - a. hypotheses
 - b. numerical data
 - c. factual data
 - d. theories
5. A quantitative research presents research findings in this manner:
 - a. Many prefer to study with textbooks.
 - b. Students find textbooks indispensable or necessary.
 - c. Perhaps, 30% consider textbook unnecessary in their studies.
 - d. Out of 100 college students, 90 find textbooks beneficial to their studies.

Activity 2

Directions: Work in pairs for any of the following activities.

1. Ask each other questions about quantitative and qualitative research. Or, do a guessing game in which you describe something in relation to a research type and let your partner identify the idea being referred to. Be sure you know the right identification of your descriptions or answers to your questions as these are your basis to determine the correctness of the given answers. Decide how you will reward each other for having given more correct answers to questions raised.
2. Formulate a quantitative research question about each of the following topics:
 - a. Gender (male and female)
 - b. Learning styles (visual, audio, kinesthetic, etc.)
 - c. Philippine transportation system (MRT, LRT, buses, FX, jeeps, taxi, etc.)
 - d. Communication media (TV, newspaper, cellphones, email, Facebook, Instagram, etc.)
 - e. Public order and safety (labor strikes, crime, drug addiction, robbery, etc.)

Note: You may think of your own topic as the basis of your questions.

Concept Elaboration

Directions: In a group of three, formulate quantitative research questions out of the given qualitative questions.

1. Which of these expressions serves as the favorite of teenagers nowadays: OMG! My gosh, Oh, yak, Hey, you! My golly! Oh, my!
2. At which part of PNoy speech did the audience express their appreciation through rising from their seats?
3. How did the Miss Universe contestants answer questions pertaining to climate change?

4. In which country do OFWs love to work?
5. Which social media networking activity is the most favorable among Filipino college students?
6. What kind of pick-up lines did the lady Senator utter in front of the graduates?
7. What stand did the student leaders express about their school's new policy on tardiness and absences of students?
8. What reasons did the senators give about the arrest of the suspected drug lords?
9. Which shopping mall do people love to spend the most of their shopping time?
10. What noontime TV program ranks as the most watched program all over the Philippines?

Concept-Learning Assessment

Write a short essay about things you learned the most and the least through the topics dealt with in this lesson. Give your essay an interesting title.

Concept Transformation

Ponder on the headlines of big newspapers in town or on some TV programs; then, try asking quantitative questions about them. Give your teacher and classmates a written copy of your questions.

LESSON 3 **Experimental Research**

Intended Learning Outcomes

After this lesson, you should be able to:

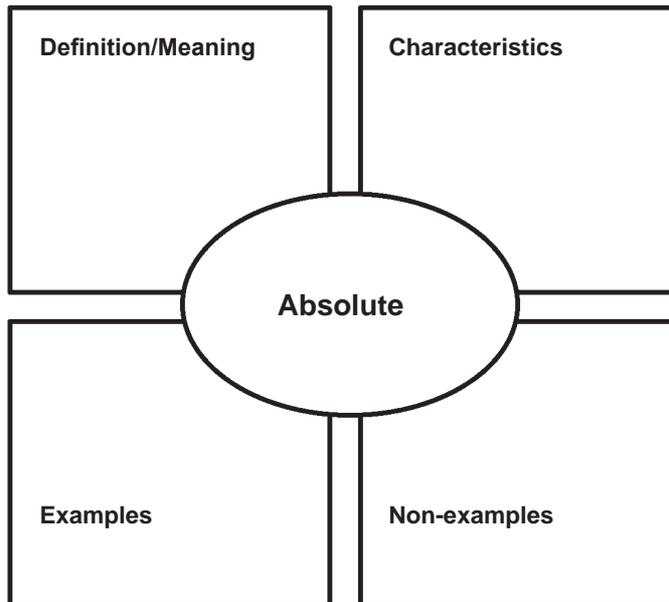
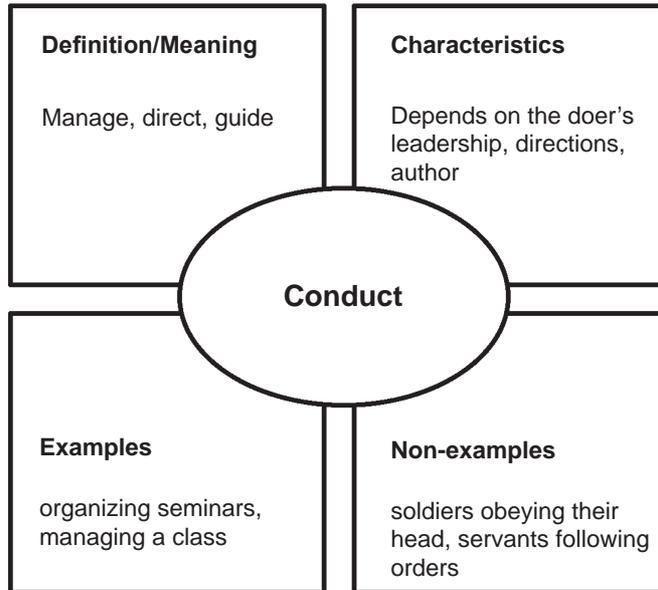
1. increase your vocabulary by giving the meanings, characteristics, and examples of terms used to explain some concepts about experimental research;
2. obtain a thorough or an in-depth understanding of experimental research;
3. justify the link between scientific thinking and experimental thinking;
4. identify the reasons behind the differences between experimental research and quasi-experimental research;
5. sequence the events to take place in any quasi-experimental research; and
6. synthesize your understanding of experimental research through a specific graph or a topical outline.

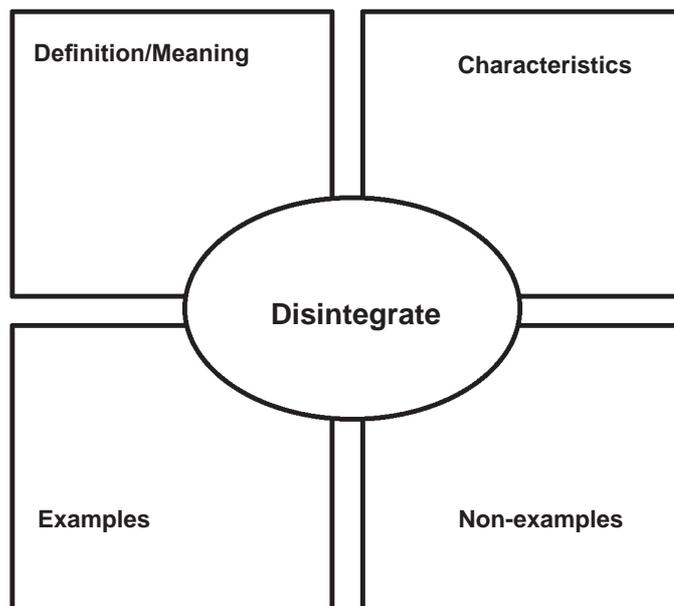
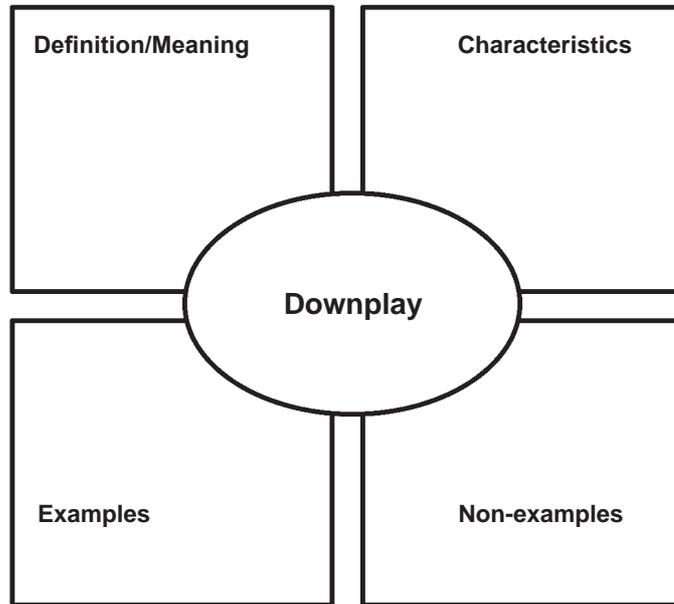
Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: Using your experience or background knowledge about the given words that were used in the reading selection for this lesson, know the meaning of such words situated in the middle of the Frayer Model Map. Explain your understanding of the word by writing some details about it in each quadrant of the map. Be guided also by the clues in the sentence below each graph. The first one serves as an example.





Activity 2: Vocabulary Practice

PANTOMIME

Act out a certain situation related to one of the newly learned words. Let your partner guess the target word referred to by your pantomime. Stress that the acceptability of your partner’s answer depends on the correctness of the use of the term in the sentence. Switch roles after every correct answer.

Image Intensifier

Name some famous and great inventions you have known since birth. What makes you say they are great? How do you think did the inventors come to discover the value or greatness of their creations?

Concept Discovery

Could the following selection give you the answers to your questions about the inventors? Read the text to discover answers to your questions.

EXPERIMENTAL RESEARCH

Definition of Experimental Research

Experimental research is a quantitative research that treats or deals with the object or subject of the research in a definite or exact manner and determines the extent of the effects or influence of the treatment on the object/subject, then discovers the causes of such effects. Two groups are involved in any experimental research: the *experimental group*, the one on which the treatment or influence is applied, and the *control group*, which does not receive any treatment. The objects or subjects involved in these types research are chosen randomly or selected by chance, rather than by the decision of the researcher.

Classification

Experimental research is categorized into two: *true experimental research* and *quasi-experimental research*. Based on where the experimental research is done, it is either *laboratory research* or *field research*. Your manner of selecting the participants indicates whether it is true experimental or quasi-experimental. The true experimental research absolutely uses random selection in determining who among the participants should compose the experimental group or the control group. The quasi-experimental research adopts a comparative technique in choosing the subjects.

The experimental group on which the treatment or condition is applied is not chosen randomly but matched or compared with another group whom you, the researcher, believe as having the same characteristics as the experimental group under treatment. Employing researcher's influence in sampling or subject selection, quasi-experimental research fails to qualify as a genuine experimental research. Hence, discoveries or findings resulting from this kind of experimental research are susceptible to doubts. (Sharp 2012; Gray 2013)

Research Design of Non-Experimental Research

Any plan you have about a non-experimental research must have the following aspects that take place in a sequential manner:

1. Specify the problem or topic of your research.
2. Formulate the research problem or hypotheses.

3. Determine the dependent and independent variables.
4. Select the participants or subjects.
5. Decide on the specific type of experimental research; meaning, whether it will be a true experimental or quasi-experimental research.
6. Conduct the experiment.
7. Collect, analyze, and interpret the results.

In conducting an experimental research, first, give a pre-test to examine the initial condition of both groups in relation to a variable, condition, or factor; second, apply to the control group a new condition; and third, give the latter group a post-test to determine the effects or influence of the treatment or condition applied on them.

There are many ways of letting a variable, factor, or condition intervene or have an application on the subjects, and of later determining the effects of such intervention. Here are some of these methods: (1) treatment evaluation; and (2) pre-test and post-test of multiple treatments or conditions. The first one is also called *ex post facto* or after the fact; meaning, evaluation comes after the treatment. Multiple treatment, on the other hand, makes you apply on the subjects, not just one, but also varied treatment methods like using books, interview, or social networking. You resort to this method when you want to discover the extent of student learning by means of these sources of data. (De Mey 2013; Creswell 2013)

Quasi-Experimental Research

Usually, participants chosen in a quasi-experimental research are those forming a class that remains as one group incapable of disintegration. The not randomly chosen participants are subjected to any of these types of quasi-experimental research (Muijs 2011):

1. *matched comparison* – choosing a treatment group and another group that has similarities with the treatment group
2. *time-series quasi-experimental research* – giving them series of pre-tests and post-tests
3. *single-subject quasi-experimental research* – controls treatment and condition applied to just one individual or a group

In which field of knowledge does a true experimental research usually take place? People in hard sciences (Physics, Chemistry, Biology, Pharmacy, and the like) love to do this kind of research; those in soft sciences (Psychology, Sociology, Humanities, Literature, Education, and other subjects falling under Social Sciences) usually do quasi-experimental research. (Gray 2012; Laursen et al. 2010)

Concept Explanation

Activity 1

Directions: INDIVIDUAL WORK. Explain your understanding about the text by answering the following questions on the given lines.

1. Compare and contrast the two basic types of experimental research.

2. Why is an experimental research also called a scientific method?

3. What is the primary factor in determining whether a research is true experimental or quasi-experimental?

4. What are the implications of declaring what is true by means of a quasi-experimental research?

5. Which is better between the two types of experimental research? Justify your choice.

6. How do you know when one is doing a true experimental or a quasi-experimental research?

7. Do you know somebody who has already done an experimental research? Describe this person including how he/she carried out his/her research work.

Concept Elaboration

Activity 1: Idea Clarification

Directions: PAIR WORK. Show through a PowerPoint Presentation a flow chart showing the sequential occurrence of the research stages in each type of quasi-experimental research.

Activity 2

Directions: GROUP WORK. In a group of three, graphically present the major and minor classifications of experimental research.

Activity 3

Directions: INDIVIDUAL WORK. Make a written outline of all the ideas you have discovered from the reading selection of this lesson.

Concept-Learning Assessment

Based on how well or poor your learning is of the topics you listed in your outline in the Concept Elaboration Activity 3, rank them in order on the lines provided. See to it that the topics you have learned the most are in the higher rank, and those you have learned the least, are in the lower rank.

Concept Transformation

Discover more about the ins and outs of experimental research by interviewing some professors in hard sciences. Share your discoveries with your teacher and friends by giving them a copy of the interview results.

LESSON 4 **Non-Experimental Research**

Intended Learning Outcomes

After this lesson, you should be able to:

1. increase the number of English words you know;
2. express your world views using newly learned words;
3. familiarize yourself with the nature of non-experimental research;
4. trace the development of survey research;
5. present a good plan of your survey research;
6. practice honesty and integrity in researching; and
7. conduct a practicable survey research.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: Give the meaning of the underlined word in each sentence. Be guided by the contextual clues.

1. How could the light be diffused all over the place, if it was placed between the two posts? _____
2. Give me a concrete evidence of the veracity of that to make me say yes to your offer right away. _____
3. A greedy man tends to manipulate things for his own benefit. _____
4. Being a versatile actor, he is able to give an excellent portrayal of various character roles. _____
5. Try to understand the poem in conjunction with the picture near its title.

Activity 2: Vocabulary Practice

Q&A TIME

Directions: PAIR WORK. Ask your partner a question using one of the newly learned words. Your partner's answer must reflect his/her understanding of the meaning of the new term. Swap roles after every correct response.

Example:

Q: If you are versatile, can the company assign you to any kind of work?

A: Sure, because as one who has the ability for varied tasks, I can do any kind of work.

Image Intensifier

Accomplish the following KWL Chart to form mental pictures about the reading material titled, *Non-Experimental Research* that you are about to read a few minutes from now.

What I already know	What I want to know	What I learned <i>(Do this after reading the text)</i>

Concept Discovery

NON-EXPERIMENTAL RESEARCH

Definition of Non-Experimental Research

Non-Experimental research is a way of finding out truths about a subject by describing the collected data about such subject and determining their relationships or connections with one another. Any treatment or condition is not involved in this type of research. But there is a measuring of variables here; hence, once you do a non-experimental research, you deal with both qualitative and quantitative data. Your desire to discover people's thoughts, views, feelings and attitudes about a certain societal issue, object, place, or event causes you to use non-experimental research.

Characteristics

1. It is incapable of establishing cause-effect relationships; by itself, it is able, if it takes place in conjunction with other experimental and quasi-experimental research methods.
2. It involves various ways of data analysis:
 - Primary – analysis of data collected by the researcher himself
 - Secondary – examination of data collected by other people
 - Meta-analysis – analysis of data expressed numerically.
3. It uses research method that applicable to both quantitative and qualitative data.

It collects data through survey, observation, historical studies, case studies, documentary analysis, and so on. (Suter 2012; Sarantakos 2013)

Definition of Survey Research

Many immediately come to think of Survey Research the moment they hear or read the expression, *Non-experimental research*. This is so because Survey research is the most used non-experimental research in the field of Sociology, Psychology, and Humanities. Inquiries, investigations, and experiments also happen in this type of non-experimental research, but in terms of types and analysis of data, Survey research follows a standard that is applicable to social sciences. (Schreiber 2011)

Survey research is a method of research that aims at knowing what a big number of people think and feel about some sociological issues. The data it collects from these people serving as “representatives or informants” explain or describe the society’s thoughts, attitudes and feelings towards environmental issues. Although survey research is a very old research technique that began in the period of the ancient Egyptian rulers, many still consider this as a very popular means of social inquiry. (Babbie 2013, p. 383)

The extensive use of survey research is proven by the fact that more than one-third of published research online in Sociology, Psychology, and Humanities were done through survey research. Usually used by researchers to study issues affecting a large population, survey research requires data-gathering techniques such as interview, questionnaire, online survey, and telephone interview that primarily consider the size of the group being studied. (Schutt 2013). Here, the researcher selects a sample of respondents from a small/large population and provide the chosen subjects a formalized questionnaire.

Purposes of Survey Research

1. To obtain information about people’s opinions and feelings about an issue.
2. To identify present condition, needs, or problems of people in a short span of time.
3. To seek answers to social problems.
4. To give school officials pointers on curricular offerings, guidance and counselling services, teacher evaluation, and so on.

Planning a Survey Research

The research design of a survey research is similar to that of the experimental research, only, that when it comes to data collection method and instrument, survey research goes through the following phases:

1. Explanation of objectives clearly
2. Formulation of research questions or hypotheses to predict relationships of variables
3. Determination of the exact kind of data referred to by the hypotheses or research questions

4. Assurance of the population or group of people to which the findings will be applied to
5. Finalization of the sampling method for selecting the participants
6. Identification of the method or instrument in collecting data; that is, whether it is questionnaire on paper, through phone, via computer, or face-to-face.

Strengths of Survey Research

Stressing the effectiveness and usefulness of survey research, Schutt (2013) gives the following pluses of survey research:

1. Versatility. It can tackle any issue affecting society.
2. Efficiency. It is not costly in terms of money and time, assuming there is excellent communication or postal system.
3. Generality. It can get a good representation or sample of a large group of people.
4. Confidentiality. It is capable of safeguarding the privacy or anonymity of the respondents.

Here are the weak points of survey research appearing in several books about this type of quasi-experimental research:

1. It cannot provide sufficient evidence about the relationships of variables.
2. It cannot examine the significance of some issues affecting people's social life.
3. It cannot get data reflecting the effects of the interconnectedness of environmental features on the research study.
4. It cannot consider man's naturalistic tendencies as the basis of human behaviour unless his ways or styles of living are related to his surroundings.
5. It cannot promote interpretive and creative thinking unless its formation of ideas results from scientific thinking.
6. It cannot have an effective application to all topics for research.
7. It cannot use a questioning or coding method that can accurately register differences among the participants' responses.
8. It cannot diffuse the main researcher's abilities to control and manipulate some factors affecting the study.
9. It cannot account for real or actual happenings, but can give ideas on respondents' views, beliefs, concepts, and emotions.

Ethical Principles and Rules in Survey Research

You are in a Higher Education Institution called college or university that always considers academic excellence as its number one goal. Be academically

competent by producing excellent research paper that will mirror not only your intellectual abilities but your valuing system as well. Considering the importance of honesty and integrity in conducting a research paper, keep in mind the following ethical principles and rules in producing an honest-to-goodness research paper (Ransome 2013; Corti 2014):

1. Respect whatever decision a person has about your research work for his participation in your study comes solely from his or her own decision-making powers.
2. Make sure that your study will be instrumental in elevating the living conditions of people around you or in bringing about world progress.
3. Conduct your research work in a way that the respondents will be safe from any injury or damage that may arise from their physical and emotional involvement in the study.
4. Practice honesty and truthfulness in reporting about the results of your study.
5. Accept the reality that the nature, kind, and extent of responses to your questions depend solely on the dispositions of the respondents.
6. Decide properly which information should go public or secret.
7. Stick to your promise of safeguarding the secrecy of some information you obtained from the respondents.

Concept Explanation

Activity 1

Directions: INDIVIDUAL WORK. Answer each question intelligently.

1. Describe one doing a survey research.

2. How does a survey research differ from other experimental research methods?

3. How popular is a survey research? Justify your answer.

4. Explain the relevance of survey research to education.

5. Do you agree that survey research is better than the other research methods?

6. As to how prestigious a research should be, what can you say about a survey research?

7. Why is the number of respondents crucial to sample selection?

8. Account for the historical development of survey research.

9. Has the history of research affected its present status?

10. How would you describe yourself as a researcher with integrity?

Activity 2

Directions: Write the letter of the expression in B that matches the one in A.

A	B
_____ 1. Involves treatment	a. data-gathering instrument
_____ 2. Statistical studies	b. confidentiality
_____ 3. Stress on one's views	c. where most survey research happen
_____ 4. Phone, email, questionnaire	d. points to exact data
_____ 5. Variable predictors	e. meta-analysis
_____ 6. Data types and analysis	f. generality
_____ 7. Secret identity of the subject	g. makes survey different from others
_____ 8. Social sciences	h. true experimental research
_____ 9. Research questions	i. hypotheses
_____ 10. Stands for lots of people	j. variables
	k. survey research

Concept Elaboration

Activity 1

Directions: PAIR WORK. Fill in the blank with the correct answer.

True experimental and _____1_____are the two types of experimental research. _____2_____selection of subjects happen in true experimental research; purposive selection occurs in a _____3_____. Another basis of _____4_____experimental research is _____5_____the experiment is done. If the study happens in a place surrounded by walls, it is a _____6_____. But if it is _____7_____it is a field experiment. Actually, the only thing that makes the two types of experimental research _____8_____from each other is the method of _____9_____the subjects. If the selection is randomized, it is definitely a _____10_____.

Activity 2: Research Conference

Directions: GROUP WORK. Form a group of five. Pretend you are guest speakers in a research conference. Take turns in discussing about one topic on non-experimental research.

Concept-Learning Assessment

Based on the extent of your understanding of non-experimental research, rank the following from 1 to 10, with 1 being the most learned and 10, not learned well.

- _____ Meaning of non-experimental research
- _____ Relation between non-experimental and quasi-experimental
- _____ Meaning of quasi-experimental research
- _____ Ethics in social research
- _____ Pluses and minuses of survey research
- _____ Survey research design
- _____ Purposes of survey research
- _____ Characteristics of non-experimental research
- _____ Data-gathering techniques of a sociology researcher
- _____ Nature of survey research

Concept Transformation

Considering all factors affecting a research work, think of one doable research study or one that you can do in a short span of time. Your school environment, circle of friends, and barangay or subdivision conditions may give you an idea on what to research on. Or, find out which topic appears interesting to you in various fields of knowledge, like Humanities, Architecture, Engineering, Science, Business, Psychology, or Education, among others. In pondering on any of these fields, much more, in presenting a written report of your research work, give stress to the importance of your study to the field of knowledge under which your research study falls. Actualize your research interest by going through the phases of a survey research.

Intended Learning Outcomes

After this lesson, you should be able to:

1. widen your vocabulary in English;
2. express your perceptions using the newly learned words;
3. define variables;
4. characterize variables;
5. compare and contrast types of variables;
6. distinguish independent variables from dependent variables; and
7. determine the connection between variables and research problems.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: Go to the main reading text of this lesson and look for the underlined word that has the same meaning as the word in the following list. Write the word you found opposite the given word.

1. Power, strength – _____
2. Carry – _____
3. To come to the surface – _____
4. Causing annoyance or disturbance – _____
5. Give, present – _____
6. Suffering from something – _____
7. Show – _____
8. Changes done to suit one's purpose – _____
9. Very necessary – _____
10. Points to something, refers to – _____

Activity 2: Vocabulary Practice

ADS OR POSTER MAKING

Directions: Imagine that you own a business company. In the space provided, create a poster or an advertisement to promote the product of your company. Provide your work with a caption that uses the words you have newly learned.

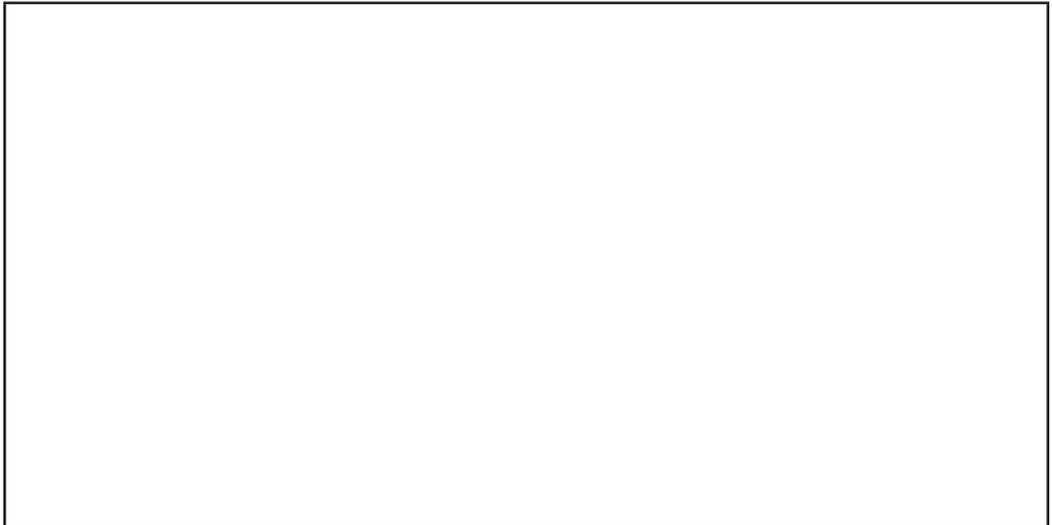


Image Intensifier

Think about this title of the reading material that you will soon read: *Variables*. What comes to your mind upon hearing this word? Ask questions to express your curiosity about this word.

Concept Discovery

Find out what this reading material has to say about “Variables.”

VARIABLES

Definition

Variables are “changing qualities or characteristics” of persons or things like age, gender, intelligence, ideas, achievements, confidence, and so on that are involved in your research study. Made up of the root or base word “vary” which means to undergo changes or to differ from, variables have different or **varying** values in relation to time and situation. For instance, as years go by, your age or intelligence increases. But placed in a situation where you are **afflicted** with a disease or have no means of reading or no access to any sources of knowledge, your intelligence tend to decrease. (Suter 2013, p. 137)

In research, especially in a quantitative research, one important thing you have to focus on at the start of your study is to determine the variables involved in your study. Unless you spend some time pondering on variables in your research, your work has no chance of attaining its goal. Your research problem or research topic to which you devote much of your initial research time finalizing stands great, if it has wordings on the basic variables involved in your study.

Basic Types

Basically, variables are of two types: *independent variables* and *dependent variables*. Independent variables are those that cause changes in the subject, while dependent variables are those that **bear** or **manifest** the effects caused by the independent variables. Hence, in a causal relationship, the cause comes from the independent variables; the effects, on the dependent variables.

In an experimental research, the independent variable as the condition or treatment applied to the experimental group is under the control, direction, or **manipulation** of the researcher or experimenter. For instance, to determine the positive effects of one modern grammar theory called SFG (Systemic Functional Grammar) on IC (Intercultural Competence), you apply this theory in varied ways like realizing this in a collaborative, oral, or written activity. In this case, the SFG serves as the independent variable and the IC as the dependent variable.

Variable Relationships

In a scientific way of studying cause-effect relationships, these two variables, independent and dependent are **part and parcel** of the research because the first one is the cause; the second, the effect that you can subject to any form of measurement. However, as you carry out the research, it is possible that one, two, or more variables or extra variables **crop up** to create an impact on the relationship between the independent and dependent variables. Being extra variables, they form this other type of variables called *extraneous variables*.

For example, in the case of *SFG vs. IC*, (the first as the independent variable; the second as the dependent variable) extraneous variables like age, gender, or personality traits may suddenly **surface** to create effects on the relationships of the two basic variables. Such extraneous variables are called *participant variables* if they refer to the moods, emotions, or intelligence of the subject; *situational variables*, if they **pertain** to nature of the place: smelly, chilly, cold, hot, spacious, and the like.

Other Types of Variables

Extraneous variables are to be controlled by you, the experimenter. But if they do not give in to your control, they become *confounding variables* that can strongly influence your study. Dealing with these types of variables gives you difficulty in determining the real cause of changes in the dependent variables; that is, whether it is due only to the independent variable or to the combination between the confounding and the independent variables. The involvement of confounding variables in the research results in the production of “mixed up, confusing, or bewildering results.” Involved not within the research situation but outside the research process, the extraneous

variables exist as “nuisance variables,” whose **potency** need to go down to prevent it from affecting the results negatively. (Suter 2013, p. 137; Thomas 2013; Schreiber 2012).

There are other types of variables which are as follows (Russell 2013; Babbie 2013):

1. *Constant* – do not undergo any changes during an experiment
2. *Attribute* – characteristics of people: intelligence, creativity, anxiety, learning styles, etc.
3. *Covariate* – included in the research study to create interactions with the independent and dependent variables
4. *Continuous* – quantitative in nature and is used in interval or ratio scale of measurement
5. *Dichotomous* – has only two possible results: one or zero
6. *Latent* – cannot be directly observed like personality traits
7. *Manifest* – can be directly observed to give proofs to latent variables
8. *Exogenous* – found outside an identified model
9. *Endogenous* – found inside; as a part of identified model

Concept Explanation

Activity 1: Idea Extension

Directions: INDIVIDUAL WORK. Keeping in mind the meaning of variables in research, check all words in the list that can operate as variables in any research study.

- | | | |
|------------------------------------------------|-----------------------------------------|--------------------------------------------|
| <input type="checkbox"/> water | <input type="checkbox"/> voice | <input type="checkbox"/> academic grades |
| <input type="checkbox"/> skills | <input type="checkbox"/> ghost | <input type="checkbox"/> aspirations |
| <input type="checkbox"/> ghost | <input type="checkbox"/> handwriting | <input type="checkbox"/> textbooks |
| <input type="checkbox"/> experience | <input type="checkbox"/> guardian angel | <input type="checkbox"/> academic grades |
| <input type="checkbox"/> world | <input type="checkbox"/> life plans | <input type="checkbox"/> economic status |
| <input type="checkbox"/> dreams | <input type="checkbox"/> class size | <input type="checkbox"/> mental pictures |
| <input type="checkbox"/> reading comprehension | | <input type="checkbox"/> physical exercise |

Activity 2

Directions: Write C if the sentence is correct; W, if not.

- _____ 1. The experimenter relates himself/herself with the independent variable.
- _____ 2. Extraneous variables are nuisance variables.

- _____ 3. Extraneous variables are as significant as independent variables.
- _____ 4. All variables are prone to changes or variations.
- _____ 5. All variables are controllable.
- _____ 6. The effects of something on dependent variables are measurable.
- _____ 7. Only words can express the effects of variables on dependent variables.
- _____ 8. The effects of something can be shown through fractions and percentages.
- _____ 9. It is wrong to expose the variables to changeable factors.
- _____ 10. Attribute variables have the same meaning as participants' variables.

Activity 3: Guessing Game

Directions: WHOLE CLASS ACTIVITY. A student describes one type of variable. The first one to guess it correctly earns bonus points and becomes the next quiz master.

Concept Elaboration

Activity 1: Variable Identification

Directions: INDIVIDUAL WORK. Identify the independent and dependent variables in each research problem. Write your answer under the right column.

Research Queue	Independent Variable	Dependent Variable
1. How does logical thinking develop critical thinking?		
2. What are the effects of Koreanovelas on the Filipino value system?		
3. In what way does collaborative learning increase communicative competence?		
4. To what extent does texting decrease students' grammatical competence?		
5. What corrupt practices trigger off one's resignation?		

Activity 2

Directions: INDIVIDUAL WORK. Think of your own research problems then write them on the lines provided. Underline once the independent variable; twice, the dependent variable.

Concept-Learning Assessment

Directions: Rate your understanding of the concepts behind the following topics by checking the column of your answer.

Topics	Very Poor	Poor	Fair	Good	Excellent
1. Meaning of variables					
2. Dependent variables					
3. Independent variables					
4. Relationship between the two basic variables					
5. Role of extraneous variables					
6. Confounding variables					
7. Essence of variables					
8. Types of attribute variables					
9. Differences among variables					
10. Control variables vs. Controlled variables					
11. Nuisance variables					

Concept Transformation

Discover who among your professors have MA or PhD degrees. Know and evaluate the titles of their papers based on how transparent the title is; meaning, how visible the independent, dependent, and other variables are in the title.

Unit II

Identifying the Inquiry and Stating the Problem

In research, you are prone to thinking in various levels that range from the simplest to the most complex modes or patterns of thinking. Your initial thinking acts here pertain to what you want to research on or what you intend to subject more to higher levels of thinking as you go through the several stages of research. The kind or quality of thinking and attention you give to your acts of choosing your research topic and of specifying questions you want your research study to find answers to strongly determine the success of your research work.

LESSON 6 Quantitative Research Problem

Intended Learning Outcomes

After this lesson, you should be able to:

1. increase the number of English words you know;
2. communicate your world views through the newly learned words;
3. explain the meaning of a quantitative research problem;
4. evaluate the quality of qualitative research problem and research questions;
5. use prose and non-prose means of comparing and contrasting the approaches and types of research questions;
6. distinguish a researchable from a non-researchable research problem; and
7. apply the guidelines in stating a quantitative research problem and research questions.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: Give the meaning of the underlined word in each cluster of words. Let the other words in the set serve as clues to the meaning of the word.

1. maintain, assert, aver, warrant
2. perplexities, difficulties, problems, confusions
3. puzzle, enigma, problem, conundrum
4. approximate, near, close, adjacent
5. treasures, cherish, nurtures, sustains

6. exactness, peculiarity, specificity, definiteness
7. direct, geared, fit, control,
8. drive, goad, urge, prod
9. thrust, dive, plunge, jump,
10. think, mull over, ponder, reflect

Activity 2: Vocabulary Practice

Directions: On the lines provided, construct sentences fusing two or three of the newly learned words.

Image Intensifier

WHOLE CLASS ACTIVITY

Brainstorming Session...In what condition are you, now? Happy, anxious, contented, confused, puzzled, problematic, and what have you? What do you mean by *problem*?

Concept Discovery

Could the following reading material, *Quantitative Research Problem*, contain ideas approximating your thoughts and feelings about the term, *problem*? Find out by reading this text intelligently.

QUANTITATIVE RESEARCH PROBLEM

Nature of Quantitative Research Problem

Life is not always a bed of roses. It is made up of both negative and positive aspects of life. Experiencing something negative or making you fail to aver or affirm the existence of a thing you expected to see or happen is a natural occurrence in

life. This situation in life, where you find difficulty in knowing or finding answers or solutions to questions causing you worries or perplexities is called a *problem*. By nature, you or any person on earth do not want to stay long in a problematic kind of life. Once you encounter a problem, being an inquisitive, speculative, and creative person, you immediately would like to find ways and means to free yourself from such conundrum in your life.

Sparked by your curiosity or interest, you get to ponder on a problem needing answers. You resort to thinking of what to solve, whom to ask, where to go, and how to do all the things you want to happen to find the answer to the problem. Behaving this way, you are then confronted with a *research problem*. A research problem is something that nurtures in your mind a difficulty or uncertainty, enough to push you to do an empirical investigation whereby you search for answers to a problem by collecting and analyzing data or information through which you can find the right answer or solution.

Requiring you to adopt an empirical attitude toward your problem in a way that you depend on your sensory experience, conduct experimentation, or perform a scientific method in arriving at the truth about something makes your problem a *researchable problem*. Being researchable, your research problem becomes a *Quantitative Research Problem*, not a qualitative research problem that people consider not researchable because it is more inclined to explaining or describing people's views, values, attitudes, opinions, and other subjective traits. Unlike a quantitative research problem that is not only characterized by precision, specificity, or stability, but also geared toward a possible result, qualitative research problem is described as expansive, widespread, and developing and it is focused more on processes rather than on outcomes. (Matthews 2010; Schreiber 2012)

Sources of Quantitative Research Problem

What are the things around you that could trigger your mind to mull over one problematic area in your life that you want to look into empirically? One of the following could give rise to a quantitative research problem (Edmonds 2013; Punch 2014):

1. Agencies of the government, or any non-government institutions
2. Your own experience or genuine interest in something
3. Previous research findings which you want to validate or consider as studies suffering from some inconsistencies or discrepancies
4. Present political social or economic issues in society
5. Review of related literature

Research Questions vs. Quantitative Research Problem

Several reasons prod you to define or finalize a research problem or a research topic. But this does not mean that after spending time thinking about a research problem, immediately, you plunge into carrying out an investigation or collecting and analyzing data. Thinking of a research problem or a topic to research on is a beginning act in research. Another initial research act is asking a set of specific questions or identifying sub-problems about your research problem.

These specific or subquestions, called *Research Questions* to specify the scope and the method in collecting and analyzing data, give you the right direction in your research. In addition, they are questions to give further definition or explanation of the research problem by stressing the fact that they elicit answers to clarify or solve the research problem, which is the main problem of the research. Here are examples of statements to show the relationship between a quantitative research problem and research questions. (Thomas 2013; Layder 2013)

Research Problem

Interrogative statement: What percentage of Manila private universities consider the use of grammar textbooks as the most effective way to help college students attain communicative competence?

Declarative statement: The main objective of this study is to find out the percentage of Manila private universities considering the use of grammar text books as the most effective way to help college students attain communicative competence.

Research Questions

Interrogative statements:

1. What is an English grammar textbook?
2. What is communicative competence?
3. What components of the grammar textbook work for communicative-competence development?
4. How many Manila private universities require the use of grammar textbooks?
5. How many Manila private universities use grammar textbooks as references only?
6. To what extent do Manila private universities find grammar textbooks effective in helping college students attain communicative competence?

Declarative statements:

Likewise, this study aims at finding answers to the following specific objectives:

1. To define a grammar textbook
2. To explain the meaning of communicative competence
3. To identify the components of the grammar book that work for communicative-competence development
4. To determine the number of Manila private universities requiring the use of grammar textbooks
5. To determine the number of Manila private universities using grammar textbooks as references only
6. To determine the extent of Manila private universities considering grammar textbooks as the means by which they can help the college students attain communicative competence

Guidelines in Formulating a Quantitative Research Problem and Research Questions

1. Formulate a research problem that is researchable; meaning, open to empirical investigation.
2. See to it that you state your quantitative research problem clearly, concisely, and possibly, if under APA referencing style, not beyond 12 words.
3. Have your research problem focus on a general understanding of your research topic.
4. Construct a research problem that mirrors the importance of carrying out the research for finding answers or solutions to a problem.
5. Let your quantitative research problem state the variables and their relationships with one another.
6. Construct an introductory statement to present your research problem, which is the main problem of your research.
7. State your research questions or sub-problems, not in the form of yes-or-no questions, but in informative questions.
8. Express your research problem and research questions either in an interrogative or declarative manner, but some research books say that the former is more effective than the latter form. (Babbie 2013; Punch 2014; Walliman 2014)

Research Problems in Experimental Research

You came to know through the previous lessons in this book that quantitative research may either be non-experimental or experimental, and that the latter is of two types: true experimental or quasi-experimental research. In most aspects of experimental research, both of these two types have similarities, like both include selection of subjects, pre- and post-tests, and the use of treatment or control group. Among these three key aspects of experimental research, randomized selection is its leading characteristic, so much so, that the absence of random selection of participants denies its identity as a true experimental and converts it into a quasi-experimental or semi-experimental research in which the selection process takes place not by chance but by the experimenter's purpose or decision.

Regardless of several contrasting characteristics of true and quasi-experimental research, both tackle research problems that require you to deal with these four basic elements of experiments (Schreiber 2012):

1. Subjects or objects (people, places, things, events, etc.)
2. The subject's condition before the actual experiment
3. The treatment, intervention, or condition applied on the subject
4. The subjects' condition after the treatment

Types of Quantitative Research Questions

A quantitative research problem can generate a set of research questions or sub-problems that fall under any of these types of research questions:

1. *Descriptive research questions* – ask questions on the kind, qualifications, and categories of the subjects or participants
2. *Relation questions* – are questions about the nature and manner of connection between or among variables
3. *Causal questions* – reasons behind the effects of the independent variable on the dependent variable is the focus of these types of research questions

Approaches to Quantitative Research Questions

Likewise, you may start asking research problems or research questions based on any of these two approaches:

1. *Deductive Approach*

Your questions begin from “hunches or predictions” or expectations about the outcome of your research. Ask questions centering on a theory or concept, discover the accuracy of the theory, ponder on variables to represent the extent of the application of the theory, and make up your mind on which variable to study through observation, interview, or experimentation. Explaining the meaning of a variable based on its involvement or role in the research process, particularly, in the measurement, manipulation, or control of the concept application is giving such term its *operational definition*.

2. *Inductive Approach*

Deductive approach goes from bigger ideas such as theories or concepts to smaller ideas; conversely, inductive approach starts from smaller and simpler ideas to bigger or more complex ones. Inductively formulated research questions focus on description of things to prove an idea or a system. Central to this approach are specific details to prove the validity of a certain theory or concept. (Walsh 2009, p. 35)

Concept Explanation

Activity 1

Directions: WHOLE CLASS ACTIVITY. Make your mind clear to all your classmates about each of the following expressions by stating what you mean about such word or phrase.

1. Research questions vs. Research problems
2. Researchable problem
3. Source of a research problem
4. The nature of a quantitative research problem

5. Research question approaches
6. Components of a quantitative research problem
7. Types of research questions
8. Interrogative statement vs. Declarative statement
9. Twelve-word limit
10. Pointers on quantitative research problem and research questions

Activity 2

Directions: PAIR WORK. Using numbers 1 to 5, rank the following chronologically.

1. _____ collecting data
 _____ formulating research questions
 _____ stating a research problem
 _____ being interested in something
 _____ analyzing data
2. _____ pre-test
 _____ population issue
 _____ post-test
 _____ sampling process
 _____ treatment or intervention

Activity 3

Directions: Check the column that speaks of the quality of the given quantitative research problem. Accomplish the last column, too.

Quantitative Research Problem	Researchable	Non-researchable	Comments, reasons, reactions
1. What are the viewers thoughts and feelings about the ending of the movie?			
2. What percentage of the movie viewers find the ending tragic?			
3. How many find the movie unrealistic?			
4. Does the movie reflect Philippine culture?			

Quantitative Research Problem	Researchable	Non-researchable	Comments, reasons, reactions
5. What fractional number represents the extent of the movie's projection of Filipino culture?			
6. In the director's attempt to explain the cultural impact of the movie, what reasons did he give?			
7. What kind of reasons or causes did he give to clarify the viewers' questions on Philippine culture in relation to the movie?			
8. In terms of frequency of different causes given by the director, in what rank order is the reason on lack of intercultural competence?			
9. How many causes are attributed to globalization?			
10. What value system of the director did the movie reflect?			

Concept Elaboration

Activity 1

Directions: In the space below, give a graphical presentation of your answers in Concept Explanation, Activity 2.

Activity 2

Directions: Give one significant research term or concept you encountered or learned in this lesson about quantitative research problem. Under time limit, your partner elaborates such term or concept. Switch roles after getting a 2-point correct answer. Submit to your teacher a copy of the summary of the *honestly-recorded points*.

Concept-Learning Assessment

Recall every concept or topic on quantitative research problem that you have learned in this lesson. Evaluate the extent of your understanding of an item by entering such concept or topic in the right column.

Excellent learning	Average learning	Little learning	Poor learning	Zero learning

Concept Transformation

Look at your surroundings: your family, friends, classmates, school, plants, varied modern technological gadgets or devices like your cell phones, tablets, ear phones, computers, vehicles, and so on. Center your mind on one problem or puzzling thing about any of these things, people, or places you are exposed to. State your quantitative research problem and formulate a set of research questions about your research problem. Be careful in formulating your research questions as these indicate the scope and delimitation of your study; meaning, the specific topics your research work has to focus on. Likewise, mention the advantages or benefits of your study as well as those who will experience the benefits of your research project. Exchange output with one another. Keeping in mind all the things you learned about quantitative research problem and research questions, critique one another's work.

5. Read the memo to ascertain the truth about the new salary scheme.
- | | |
|----------|--------------|
| a. test | c. find out |
| b. prove | d. reach out |

Activity 2: Vocabulary Practice

Directions: On the lines provided, use the newly learned words in sentences.

Image Intensifier

Complete the following **KWL Chart**. Accomplish the last column later on.

What I Already Know	What I Want to Know	What I Have Learned

Concept Discovery

HYPOTHESES

Definition of Hypothesis

What is a hypothesis? A *hypothesis* is a tentative explanation or an answer to a question about variables, their relationships, and other facts involved in the research. A research always ends up with a result. However, you are free to hypothesize; meaning, to infer, propose, or guess about factual things related to the research. It is an inferential thinking that makes you guess something based not only on

whatever experience or factual knowledge you have about such thing but also on conclusions that were logically drawn by other research studies. A hypothesis has to be tested through analytical investigation to prove how true or false it is. (Creswell 2014; Russell 2013)

Purposes of Hypotheses

Some researchers find hypotheses essential because of the following reasons:

1. They guide you on which aspect of the research to focus on.
2. They provide opportunities to prove the relationship between variables.
3. They give the right direction of the research.
4. They outline your thoughts on your manner of summarizing the results and of explaining the conclusions.
5. They push for an empirical study to prove the existence of relationship of variables and the effects of independent variable on the dependent variable.

Hypotheses vs. Research Questions

In an experimental research that takes place in a scientific method, one of your initial acts is formulating these two: research questions and hypotheses. Both are related to your research but they are not exactly the same. Their difference lies in the amount of stock knowledge you have about the focus of your study. If you know much about the variables or have lots of knowledge about other factual data involved in the research through your review of related literature, you can formulate hypotheses. Otherwise, form research questions. At any rate, the purpose of these two forms of inferential thinking is to propose possible or probable answers or solutions to the research problem focused on by the study. The results of your research or investigation prove whether the hypotheses are correct, incorrect, or partially correct. (Schreiber 2012)

Categories of Hypotheses

There are two categories of hypotheses: *null hypotheses* and *alternative hypotheses*. A null hypothesis symbolized by ***H₀***, which states the absence of relationship between the independent and dependent variables. It is therefore a statement to disprove the fact that the independent variable (treatment, intervention, or condition) has an effect on the dependent variable. The opposite of null hypothesis is the alternative hypothesis. Symbolized by ***H₁***, the alternative hypothesis states the relationship between the independent and the dependent variables and the fact that the first affects the second one. (Morgan 2014; Thomas 2013)

Types of Hypotheses

Choosing which type of hypothesis to use depends solely on you, the researcher. It does not mean, however, that choosing one of the following types of hypotheses makes you come out with the best hypothesis because no type of hypotheses is superior to any hypothesis. (Badke 2012; Morgan 2014)

1. *Theory-driven vs. Data-driven hypotheses*

A hypothesis that is based on existing theory to explain the relationship of variables and the effects of one variable on the other variables is theory-driven. But if it is based on the findings of previous research studies, it is a data-driven hypothesis.

2. *Directional (one-tailed) vs. Non-directional (two-tailed) hypotheses*

Directional hypotheses state the relationship of two variables as well as of the relationship of these variables. Non-directional hypotheses, on the other hand, state the relationship of variables but not on the direction of the relationship.

3. *Descriptive vs. Causal hypotheses*

A statement specifying the relationship between two variables due to the influence of something is a descriptive hypothesis; due to cause-effect relationship, it is a causal hypothesis. True experimental or quasi-experimental research such as a correlation study uses causal hypotheses; non-experimental research uses descriptive hypotheses.

Guidelines in Formulating Hypotheses

The craft in hypotheses formulation requires you think of the following pointers (Mc Bride 2013; Lapan 2012):

1. Express your hypotheses in a declarative sentence.
2. Support your hypotheses with ideas based on theories, known facts, previous studies, or your own experience and wisdom.
3. Establish a logical relationship between the hypotheses and the research problem.
4. Have your hypotheses predict the nature of relationship between or among variables.
5. Ascertain the possibility of having some means of testing, analyzing, and investigating your hypotheses.
6. Avoid wordiness by using clear, exact, or specific language in stating the hypotheses.

Concept Explanation

Activity 1: Class Inquiry

Directions: WHOLE CLASS ACTIVITY. Take turns in asking questions about the text on *Hypotheses*. Questions and answers reflecting HOTS (higher-order thinking strategies of interpreting, criticizing, applying, and creating) will merit higher recitation grade.

Activity 2

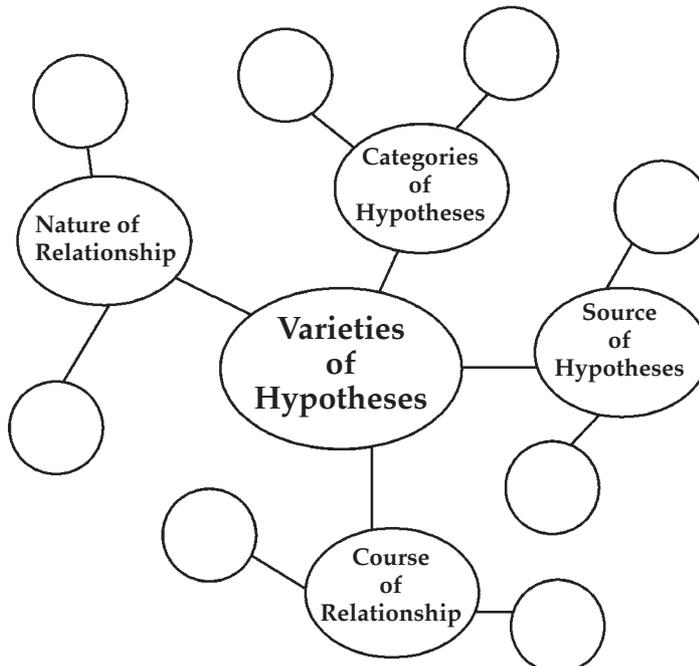
Directions: Answer each question intelligently and concisely.

1. Why is a hypothesis a tentative explanation of something?
2. Is hypothesizing an example of HOTS? Why? Why not?
3. How do you formulate hypotheses?
4. Describe the relationship between hypotheses and research questions.
5. In research, what is the appropriate research time for hypotheses formulation? Explain your answer.
6. Should every research be provided with hypotheses? Give reasons for your answer.
7. Can any researcher formulate hypotheses? Why? Why not?
8. How do you determine the quality of hypotheses?
9. If you were to advise your friend on hypotheses formulation, what would you tell him/her?
10. Formulate hypotheses about the hottest issue in town.

Concept Elaboration

Activity 1

Directions: INDIVIDUAL WORK. Complete this bubble graph with the right words to indicate hypotheses classification.



Activity 2

Directions: Check the right column to indicate your judgment of the quality of the given hypotheses.

Hypotheses	Good	Bad	Reasons, Comments
1. Can the results of the survey discourage candidate Garcia’s supporters?			
2. A survey to get the voters’ election preferences could indicate candidate Garcia’s winnable stand.			
3. The survey results do not indicate a candidate’s chances to win.			
4. Definitely, God will make candidate Garcia win in the election.			
5. Lots of vote buying in Sta. Fe made Garcia lose his candidacy.			

Activity 3

Directions: Write **Ho** on the line if the statement is a null hypothesis for the given research problem; **Hi**, if it is an alternative hypotheses; and **X** if it is not a hypotheses.

Quantitative Research Problem: In what order should the 18 senatorial candidates be ranked on the basis of their experience on legal management?

- _____ 1. One-half of the senatorial candidates are knowledgeable about law.
- _____ 2. Two-thirds of the senatorial candidates have no knowledge about law.
- _____ 3. Being lawyers means having rich background knowledge on law.
- _____ 4. The lone lawyer among the candidates will be in rank one.
- _____ 5. The only lawyer in the group will not be number one in the rank.

Concept-Learning Assessment

Check the column that speaks of the extent of learning you have had about hypotheses.

Concepts	Strongly agree	Agree	Undecided	Disagree	Strongly disagree
1. You can very well compare and contrast the types of hypotheses.					
2. You know very well how to formulate excellent hypotheses.					
3. You have learned very well why you have to formulate hypotheses.					
4. You have learned very well the difference between hypotheses and research questions.					
5. You have learned very well the difference between null and alternative hypotheses.					

Concept Transformation

Refresh your mind about the quantitative research problem and research questions you formulated in the last part of Lesson 6 (Concept Transformation). Unless you want to form another quantitative research problem and research questions, formulate hypotheses (3 alternative and 2 null hypotheses) about your Lesson 6 quantitative research problem.

Several reasons are behind your choice of a particular topic to research on. Your curiosity or familiarity about an animate creature or inanimate object and its functionality inspire you to discover more about such person or thing. Whatever experience or background knowledge you have about your chosen topic becomes valuable believable only as regards your acts of proving the validity or truthfulness of your claims about your topic, if these ideas of yours are related to what the world or other people already know or have already discovered or done about your chosen topic. Aligning your thinking with other people's ideas displayed legally and professionally in varied literary works lends credibility to whatever ideas you have about your research study.

LESSON 8 Review of Related Literature (RRL)

Intended Learning Outcomes

After this lesson, you should be able to:

1. increase the number of English words you know;
2. express worldviews freely using newly learned words;
3. enumerate the purposes of review of related literature;
4. familiarize with the review or related literature in quantitative research;
5. make a graphical presentation of the systematic review of related literature;
6. differentiate meta-analysis from other literature-review methods;
7. compare and contrast these two referencing styles: APA and MLA;
8. document your research paper by using your chosen referencing style properly;
and
9. practice the ethical standards in writing your literature-review results.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: From the box, choose the word that is similar in meaning to the italicized word in the sentence. Write your answer on the line provided.

hard	appropriate	to go
exactness	total	give
	control	

1. I have varied suggestions for the success of our project, but for now, let Mr. Lee's suggestion *prevail*. _____
2. Not checking the essential parts of your car is not a simple case, but a sign of *gross* negligence. _____
3. I know I have enough time and effort to stand the *rigorous* way of conducting a research project. _____
4. Please state with *precision* your final decision on the sale of the property along the beach. _____
5. That's the *apt* answer to his question. _____
6. Stay at home. *Resort* to calling up your friends only in times of emergency. _____
7. To make the plants *yield* fruits fast, water them regularly. _____

Activity 2: Vocabulary Practice

Directions: While away your time by having a chit-chat or a relaxed conversation with your partner. Use the newly learned words in your conversation.

Image Intensifier

Be grand Speculators! Raise as many questions as you can about this term: *Review of Related Literature*.

Concept Discovery

Do you think the following reading material has the answers to your questions? Find out by reading this text intelligently.

REVIEW OF RELATED LITERATURE (RRL)

Definition of RRL

RRL is an important component of research regardless of the type of research. Be it qualitative or quantitative research, you spend time and effort in reviewing related

literature. Reviewing related literature is one major activity in research that makes you examine or study again concepts or ideas related to your research that people managed to publish in books, journals, or other reading materials in the past.

Purposes of RRL

Your reasons for reviewing related literature are true for both qualitative and quantitative research. You re-examine written works related to your research for the following purposes:

1. To find out the connection of your research to the current conditions or situations of the world
2. To know more about theories or concepts underlying your research and to learn from them with respect to your own research study
3. To discover the relation of your research with previous research studies
4. To obtain information on the accuracy or relevance of your research questions
5. To familiarize yourself with technical terms related to your research

RRL in Quantitative Research

You have learned that there are two basic methods of reviewing related literature: traditional and systematic review. Traditional is for qualitative research; systematic, for quantitative research. Systematic review, 'a question-driven methodology' is used by quantitative researchers who begin their research work by asking questions—one big question that states the main problem of the research and a set of sub-questions that deal with specific aspects of the research. Qualitative research likewise begins with research questions, but these are open-ended and subjective questions, in contrast to quantitative questions that aim at obtaining exact, specific, and objective answers whose origin or sources are easy to trace. (Ridley 2012, p. 189; Jesson 2011)

Steps in Conducting a Systematic Review

Systematic review of related literature happens through the following sequential steps:

1. Clarifying the research questions
2. Planning the research based on your understanding of the research questions
3. Searching for literature
4. Listing criteria for considering the values of written works
5. Evaluating the quality of previous research studies
6. Summarizing the various forms of knowledge collected

Obtaining results of the review of related literature by means of systematic review that takes place in a step-by-step method is a scientific way of conducting a re-examination of reading materials that have close connection with your research. Adopting a systematic review of related literature prevents you from being bias in dealing with the varied form of literature. The adherence of systematic review to scientific method makes it the apt RRL method for quantitative research that likewise follows the scientific method of looking into the truthfulness of something. (Babbie 2013; Russel 2013; Jesson 2011)

Meta-analysis in Quantitative Research

What is meta-analysis in relation to RRL? *Meta-analysis* is a kind of review of related literature in which you re-examine and combine the results of two or more statistical studies for coming out with a grand total to indicate stronger effects of the research outcome. Putting the results together and making them appear as one result work to strengthen whatever impact the independent variable has on the dependent variable.

Meta-analysis helps in guaranteeing the precision of the measuring method used in a quantitative research. However, this merging of statistical results is not applicable to all quantitative research studies. You resort to meta-analysis only if the statistics that you intend to combine come from studies having several similarities like they are comparable in terms of research questions, research design, treatment, measuring technique, and measurable outcome. Similar in many ways, these studies that are apt for combination purposes are called *homogenous studies*. Conversely, with a number of differences from other studies, they are called *heterogeneous studies* and are exempted from this type of systematic review of related literature called meta-analysis.

The qualitative approach of narrative synthesis which is a systematic review using written verbal language to explain or describe test results is the appropriate RRL method for heterogeneous studies. The meta-analysis systematic review prevails strongly in the field of medicine where researchers must conduct studies to yield medicines that, supported by sufficient evidence, are capable of reaching their certainty level. (Ridley 2012; Jesson 2014)

In-text Citation and Referencing Styles

All reading materials related to your research that you intend to review or re-examine offer you concepts, ideas, or information belonging to other people. Having honesty, respect, or courtesy to the owners of these varied forms of knowledge as well as gratefulness for their valuable contribution to the field, you see to it that the names of these idea owners or authors appear in the appropriate sections of your research paper.

Other people's ideas incorporated in the central section or main body of your paper are to be cited or referred to the true owners of borrowed ideas. Referring to authors within the main body of the paper is called *Citation* or *In-text Citation*; at the end of the paper, it is called *Bibliography* or *References*. The two most commonly used referencing styles are the *MLA* (Modern Language Association) and the *APA* (American Psychological Association). The following table shows you how these two referencing styles differ in some aspects.

Aspect	APA System	MLA System
Writing the Author's name	Full surname first, then followed by initials of first and middle name	Full surname first, followed by full first name, and optional initial of the middle name
Writing the title of the reading material	Italicized title with only the beginning word capitalized (exception: capital for every proper noun)	Underlined or italicized title with all content words capitalized
Writing the copyright date	Written after the author's name	Written after the publisher's name

*Examples of MLA Referencing Style***1. Citation or In-text Citation**

(Zobel 287)

(Lopena, Torres, Bado 90–150)

(Carlos et al. 134–150)

(Gorio: 1: 66–70)

2. Documentary Notes

The same as the entries in a bibliography or References, except that, here, the first name precedes the family name of the author.

Fely Decena, G. Globalization. Quezon City: GB Press. 2016

Mariano Lopez. Tropical Depressions.

3. Bibliography/References**One author**

Decena, Fely G. Globalization. (Quezon City: GB Press. 2016).

Lopez, Mariano. Tropical Depressions. (Manila: Adarna Publishing House, 2016).

Two Authors

Certeza, Nina C. and David, Jose L. Intercultural Competence. (Baguio City: KLM Co., 2018).

Ramos, Hilario R. and Benitez, Rosie M. Academic Competitions. (Manila: National Bookstore, 2016).

Three Authors (*List down the names in the order they appear in the title page.*)

Perez, Dino A., Mista, Dora C. and Paluan, Gloria F. Carcinogenic-Foods. (Pasay City: ABC Press, 2016).

Flores, Lauro D. Aranda, Ben C., and Ferrer, Socorro V. The Manila Voters. (Quezon City: Abiva Publishing House, 2016).

Three or More Authors (*Use the first name in the list*)

Fuller, Norma N. et al. Trial Proceedings. (Quezon City: Rex Bookstore, 2016).

Vinluan, Violeta et al. Labor Unions. (Pasig City: Hope Press, 2016).

Anonymous Author (*If the authorship of a work is known but not revealed on the title page, the name is given in brackets.*)

[Violeta Gamboa]. The Korean Telenovelas. (Nowhere: Nonesuch Press, 2016).

[Cora Cruz]. Billiards Game. (Nowhere: Nonesuch Publication, 2016).

(If the identity of the author is guessed, a question mark follows the name before the closing bracket.)

[Violeta Gamboa?]. The Korean Telenovelas. (Nowhere: Nonesuch Press, 2016).

Editor, Translator, Compiler

Fidel, Gabby. F. ed. Philippine Trial Courts. (Manila: PH Press, 2016).

Atayde, Luis F. comp. BIR Collection System. (Quezon City: Abiva Publishing House, 2016).

Santos, John S. The Senior Citizens' Club. trans. (Makati City: Rex Press, 2016).

Editor, Translator, Compiler with an Author

Parayno, Gabriel. F. Philippine Politics. Edited by Kay Abante and Cora Cortez. (Manila: PH Press, 2016).

Generoso, Luis F. Banking Systems. Compiled by Gina David.

(Quezon City: Abiva Publishing House, 2016).

Formoso, John S. The Makati Business Club. Translated by Carlos Fojas. (Makati City: Rex Press, 2016).

Organization, Association, or Corporation as Author

International Monetary Fund, Survey of Asian Economies. Vol. 6, Malaysia, Thailand, Indonesia and Philippines (New York: International Monetary Fund, 2008).

No Ascertainable Publication Facts

Carillo, Cory. The Marcos Regime. (n.p., n.d.)

Solis, Dianne. Philippine Law Schools. (n.p., n.d.)

Popular Magazines

Soriano, Mila. "The French Dishes," Panorama, March 2016, pp. 23–26.

Romulo, Arnold. "Oregano Leaves." World Mission, May 8, 2016, p. 8.

Newspapers

News items from daily papers are rarely listed in a bibliography.

Rather, the name of the paper may be given either in the general alphabetical list or in a separate section devoted to the newspapers.

Interviews

Interviews are best cited in texts or notes. It is not necessary to include them in a bibliography, but if they are listed, the entries should appear in this manner:

Baranda, Felicitas. "Laguna de Bay: Interview with Felicitas Baranda."
By Gloria Manalad. *The Manila Bulletin*, 4 August 2016.

Theses, Dissertations, and Other Unpublished Works

Villaroman, Rina. D. "Traditional Language Theories" (Ph. D diss., U.P. Diliman, 2016).

Ocampo, Dolores G. "Critical Evaluation of UST High School Language Books" (M. A. UST, 2016)

Reference Books: Encyclopedia, Dictionary, Almanac, Indexes, etc.

Well-known reference books are usually not listed in bibliographies. When such reference books are listed in notes, the facts about the publication are usually omitted, but the edition, if not the first, must be specified.

References to encyclopedia, dictionary, or to the alphabetically arranged works cite the items (not the volume or page number) preceded by S.V. or sub verbo, meaning under the word.

1. Encyclopedia Britannica, 10th ed., S.V. "Ozone Layer."
2. Columbia Encyclopedia, 5th ed., S.V. "Industrial Revolution."
3. Webster's New International Dictionary, 3rd ed., S.V. "cantankerous."

Slides and Film's Videocassettes

Fajardo, Carina C. "Yolanda Rescuers." (Quezon City: Palmall Press, 2016) slides.

Arenas, Carl A. "Cars for Rent." (Manila: SSG Press, 2016) filmstrip.

Materials through Computers

1. Signed article in a magazine
Smith, Robert. "Email Craze." *Interactions*. July 2016.
<http://www.inter.com/Jol/labor.htm/>
2. Unsigned article in a magazine
"Power Interview." *Business Trends Magazine*. August 2016.
<<http://www.BusTrendscom/BusTrends/Trends/ctshoot.htmlz>>
3. Article in Journal
"Systemic Functional Grammar." *English Forum*. 38.7(2016). 18 May 2016.
<<http://www.jhu.edu/EnglishStudiesJournal/vol.83/83.1stretson.htmlz>.

4. Article in Newspaper

Salcedo, Jeorge. "Japanese traffic Rules." *New Daily Life Star*. 21 December 2017. <http://www.nytimes.com/2016/26/world/28/MIDE.htmlz>.

5. An Editorial

"Golden Gate at San Francisco City" Editorial. *Philippine Daily Inquirer*. July 7, 2016. <http://www.a-pinq.com/ed/2016/24/po4.htmlz/>

6. Online books

Barbour, Kate D. Constructivism. 2016. <http://AMPRA2etext2014/14w0310txtz>.

Alison, Gloria G. "Skills and Strategies." 15–20, May 2016 dialog ERIC AED23376.

7. CD-ROM/Diskette

Diamante, Pete B. "Radiotherapy Treatment." *Manila Post News Bank*. April 2017:

TI Manila Post News Bank. CD-ROM. News Bank.

"Domestic Helper." *The Oxford English Dictionary*. 2nd ed. CD-ROM. Oxford UP, 2017.

Examples of APA Referencing Style

1. **Citation or In-text Citation**

(Lopena, 2016) (Olivarez, 2017)

(Cortez, Mabeza, Brado, 2016, pp. 120–130)

(Ligos et al., 2016)

According to Flores (2017)...

Olidan (2016) maintains that...

A study on the Pork Barrel Scam is a "doable research work"

(Abunda, 2016, p.78)

2. **Bibliography/References**

One author

Floro, J. A. (2016). *The Colds Virus*. Quezon City: GB Press.

Gorrez, B. M. (2017). *The Philippine Educational System*. Manila:

Adarna Publishing House.

Two Authors

Oropesa, N. C. and Danes, J. L. (2017). *Coron Islands*. Baguio City: KLM Company.

Reylado, M. R. and Sabando, J. M. (2017). *Academic Institutions*.

Manila: National Bookstore.

Three Authors (*List down the names in the order they appear in the title page.*)

Regalaa, C. A., Bautista, C. C. and Laya, G. F. (2017). *The Philippines' Supreme Court Justice*. Pasay City: ABC Press.

Agoda, J. D. Oracia, B. C., and Torres, S. V. (2017). *The Rescuers of super-typhoon Yolanda*. Quezon City: Abiva Publishing House.

Three or More Authors (*Use the name of the first author listed on the title page.*)

Bora, E. N. et al. (2016). *BIR Regional Offices*. Quezon City: Rex Bookstore.

Avilla, V. et al. (2016). *Labour Unions*. Pasig City: Hope Press.

Anonymous Author (*If the authorship of a work is known but not revealed on the title page, the name is given in brackets.*)

[Candelario, E.]. *The opium craze*. (2016). Nowhere: Nonesuch Press.

[Amarillo, L.]. *Pragmatism*. (2016). Nowhere: Nonesuch Publication.

(*If the identity of the author is guessed, a question mark follows the name before the closing bracket.*)

[Candelario, E.?] *The opium craze*. Nowhere: Nonesuch Press.

Editor, Translator, Compiler

Parehas, G. F. (2016). ed. *Folk's lucky charms*. Manila: PH Press.

Delarosa, L. F. (2016). comp. *Philippine Banking System*. Quezon City: Abiva Publishing House.

Anahaw, J. S. (2016). *Summer illnesses*. trans. (Makati City: Rex Press.

Editor, Translator, Compiler with an Author

Garabillo, G. F. (2016). *Science textbook writing*. Edited by Gina Alano and Chito Fortez. Manila: PH Press.

Lirado, Izza F. (2016). *Classroom observations*. Compiled by Baby Rapido. Quezon City: Abiva Publishing House.

Amante, J. S. (2016). *Pope Francis*. Translated by Carina Davalos. Makati City: Rex Press.

Organization, Association, or Corporation as Author

International Monetary Fund, 2008. Survey of Asian Economies. Vol. 6, Malaysia, Thailand, Indonesia, and Philippines. New York: International Monetary Fund.

No Ascertainable Publication Facts

Corona, L. *The rise and fall of the Roman empire*. (n.p., n.d.)

Socorro, D. *Private law schools*. (n.p., n.d.)

Popular Magazines

Alamares, M. (March 2016). "The French cuisine." Panorama, pp. 23–26.

Paras, A. (May 8, 2016). "The 2016 ASEAN conference." World Mission, p. 8.

Newspapers

Tan, C.S. "Posh subdivisions in Pasay City." (2016). Philippine Daily Inquirer. 7 May.

Manila Bulletin. (2017). Editorial, 2 December.

Malaya. (2016). Editorial, 18 July.

Interviews

Corpuz, F. (April 2016). "Quantitative research: interview with Felicitas Corpuz." April 2016. Interview by Anabelle Gomez. *The Manila Bulletin*,
Claro, E. (May 2017). "High-school institutions: interview with Dr. John.

Almeda." Interview by Lina Carillo. *The Daily Tribune*.

Theses, Dissertations, and Other Unpublished Works

Parayno, R. D. (2016). "Meta-cognitive reading among basic learners." Ph. D diss., U.P. Diliman.

Mariano, D. G. (2017). "English plus textbooks in college: discourse Analysis." M. A. UST.

Slides and Film's Videocassettes

Prudencio, K. C. (2016). "Urban planning." Quezon City: Palmall Press. slides.

Barcenas, E. A. (2017). "Philippine shopping malls." Manila: SSG Press. filmstrip.

Materials through Computers

1. Signed article in a magazine
Alegre, R. (July 2016). "Social-media networks." *Personality growth*. Retrieved from <http://www.inter.com/Jol/labor.htm/>
2. Unsigned article in a magazine
"Unstructured interview. (August 2016)." Business Trends Magazine. Retrieved from <http://www.BusTrendscom/Bus Trends/Trends/ctshoot.htmlz>.
3. Article in Journal
"Linguistic competence. (18 May 2016)." English Forum. Retrieved from <http://www.jhu.edu/English Studies Journal/vol.83/83.1stretson.htmlz>.
4. Article in Newspaper
Davalos, J. "The era of globalization." (21 December 2016). New Daily Life Star. Retrieved from <http://www.nytimes.com/2016/26 world/28 MIDE.htmlz>.
5. An Editorial
"Politics in the Philippines. (7 July 2016)." Editorial. Philippine Daily Inquirer. Retrieved from <http://www.a-pinq.com/ed/2016/24/po4.htmlz/>
6. Online books
Silverman, F. D. (2016). *American pragmatics*. Retrieved from <http://AMPRA2 etext2014/14w0310txtz>.
Forbes, J. G. (15–20, May 2017). "Non-verbal language." Retrieved from dialog ERIC AED23376.
7. CD-RM/Diskette
Muralla, P. B. (April 2016). "Stem-cell treatment." *Manila Post News Bank*. TI Manila Post News Bank. CD-ROM. News Bank.
"Maharishi." (2016). *The Oxford English Dictionary*. 2nd ed. CD-ROM. Oxford UP.

Ethical Standards in Literature-Review Writing

Nowadays, with the advent of modern technology causing the emergence of varied electronic communication devices and online sources of information, collecting data happens easily and speedily. Through computer technology with its powerful Internet, you become exposed to extensive amount of knowledge that is so easy to lure you into practicing the copy-and-paste technique of obtaining ideas for your research

paper. Unmindful of prestigious ways of working academically, there is a danger that you may fall into this dishonest way of reviewing and writing related literature.

The ethical way of literature writing tells you to acknowledge the owners of borrowed ideas and put quotation marks around copied words from books or articles. Intentionally or negligently disregarding the use of quotation marks around words copied exactly is not only unethical but an indication of gross plagiarism as well. You must be aware of the fact that with the surfacing of online sources of information, software to detect plagiarism from online sources has likewise become so available in academic institutions. Proper citation and referencing is your way of freeing yourself from plagiarism and of avoiding people from casting doubts on your honesty and integrity as a researcher. (Fraenbel 2012; Ransome 2011)

Concept Explanation

Activity 1

Directions: PAIR WORK. Fill in the blanks with correct answers to complete the text.

Review of related literature happens in two ways: (1) _____ and systematic review. Systematic review is for (2) _____; traditional for qualitative research. A review of statistical results makes you use (3) _____ kind of systematic review. All test results are applicable to (4) _____' except those coming from (5) _____ studies. (6) _____ review through meta- analysis are given by (7) _____ studies, not by (8) _____ that are characterized by dissimilar research aspects. Whatever studies the statistical results come from, these should be (9) _____-based results; meaning they are based on facts. Not giving importance to proofs or evidence, you resort to presenting literature review results in (10) _____.

Activity 2

Directions: Put a check mark before the correct answer.

1. Meta-analysis supports a review of related literature that is:
 - traditional
 - systematic
 - technical
 - total
2. A systematic review of related literature follows a certain:
 - theory
 - method
 - instruction
 - model

Activity 2

Directions: Check the right column for each referencing item.

Referencing Item	True only for APA style	True only for MLA style	For APA and MLA styles
1. (Bravo, 2016, p.83)			
2. Colon after publication place			
3. Date after the author			
4. Period after the bibliographical entry			
5. Underlined title of the book			
6. Date after the publisher			
7. Italicized title of the book			
8. Capitalized content words in the title			
9. (Araullo 383)			
10. Capitalized initial word and proper nouns in the title			

Concept-Learning Assessment

In a brief reflective essay, express how much you understood the concepts about the RRL or Review of Related Literature in a quantitative research. Specify which ideas sank into your mind or came to your understanding excellently, moderately, slightly, poorly, or emptyly.

Concept Transformation

1. Find in your computer a quantitative research study that applied the systematic review of meta-analysis. Download it for further analysis and clarifications on some concepts or ideas you have learned about meta-analysis.
2. Visit the section of your school library where you can see theses and dissertations. Examine the referencing styles used in these reading materials. Find out the accuracy and consistency of the application of the referencing style the researcher has chosen to use.

LESSON 9 Conceptual Framework

Intended Learning Outcomes

At the end of the lesson, you should be able to:

1. widen your vocabulary in English;
2. communicate thoughts and feelings using newly learned word;
3. explain the meaning of conceptual framework;
4. clarify the difference between a conceptual framework and a theoretical framework;
5. justify the essence of a conceptual framework;
6. critique a conceptual framework based on some pointers; and
7. write a conceptual framework applying the guidelines on doing this important aspect of the research.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: PAIR WORK. Put a plus sign (+) under the heading of the column if it is related with the vocabulary word; minus sign (-), if it is not related with the word.

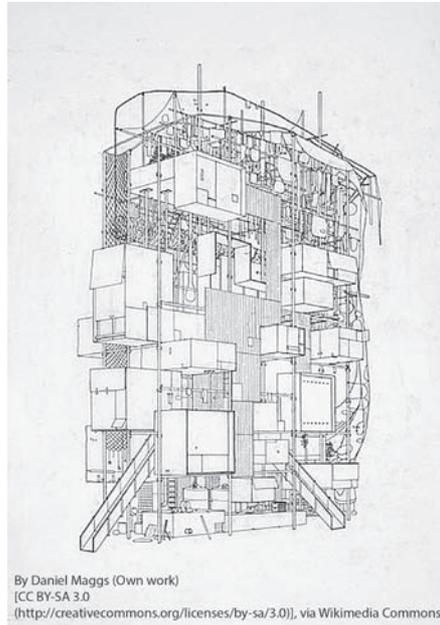
Vocabulary	Concrete	Trait	Abstract	Direction	Action
1. Holistically					
2. Cognitive					
3. Nutshell					
4. Comprehensive					
5. Scheme					

Activity 2: Vocabulary Practice (Verbal to Non-Verbal Communication)

Directions: By means of gestures, bodily actions, facial expressions, eye movements, or posture, express the meaning of one newly learned word. Have your partner guess the new word you acted out. But his or her answer does not depend only on the identification of the word but on the correct use of the word in a sentence as well.

Image Intensifier

Examine this graph. What do you think of this schematic diagram?



Concept Discovery

CONCEPTUAL FRAMEWORK

Definition of Conceptual Framework

Research is an academic activity that requires a great deal of abstraction or formation of concepts or ideas in your mind about things in your surroundings. This activity in all its stages immerses you into performing varied higher-order thinking strategies of interpreting, criticizing, applying, and creating. Resulting from mental conceptions and viewed holistically, research has to appear understandable to people who are enthusiastic to read the research findings. Owing to the cognitive-based nature of this scholarly academic work called research, you need a certain scheme or detailed plan or system to explain the components of the research including the relationships of these research features.

Wanting to make clear the ins and outs of your research in a nutshell, you resort to making a conceptual framework of your study. A *conceptual framework* is a graphical presentation of your concepts or ideas on the basic structure or components of your research as well as on the relationships of these elements with one another. It is a graph or non-prose material, specifically, a schematic diagram that shows a well-ordered elements of the research. Giving a carefully constructed arrangement of the components of your study, conceptual framework is abroad outline or plan to give shape to your research. (Shields & Rangarjan 2013)

Purposes of Conceptual Framework

Conceptual framework shows the organization, order, and direction of your research study. It is an essential initial activity of your research because by means of a

schematic diagram, explained verbally as well, it enables the readers to obtain a general understanding of the research. It gives people a notion on the research activities you want to perform, on the manner you want to carry these activities out, and on the knowledge you have to prove your familiarity with your research topic or research problem. It also serves the purpose of clarifying concepts and their relationships with one another in a research study.

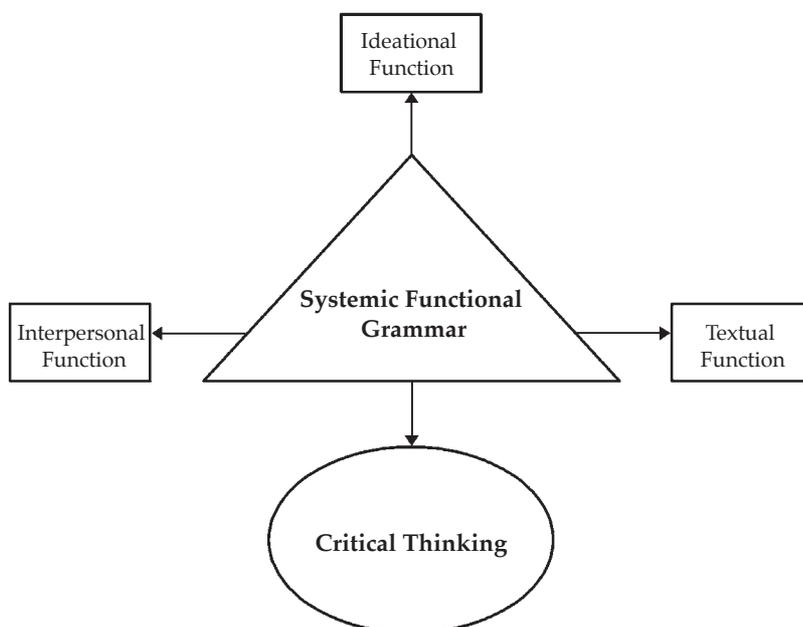
Concept Map

Made up of varied figures: lines, circles, boxes, and other marks or symbols representing your concepts on these varied features of your research—research question, review of related literature, research methodology, and variables, among others—a conceptual framework looks like a map showing the main features of a plan or project plus the relationship between or among the features or variables in the research. Through the proper connection of lines and pointing of arrows to boxes and other codes symbolizing your concepts about the research, the readers are able to visualize a comprehensive picture of your study.

Here is an example of a Conceptual Framework of a research study.

Research Problem or Topic: “Improving Critical thinking through Systemic Functional Grammar”

Systemic Functional Grammar or SFG is a modern language theory which states that man’s critical thinking increases whenever he uses language for these reasons: first, for ideational function or for knowledge acquisition; second, for interpersonal function or creating human relationships, and third, for textual function or for strategic and coherent expression of ideas. In this case, the independent variables are the SFG components (ideational, interpersonal, and textual functions) and the dependent variable is critical thinking. Here is the conceptual framework to present the concepts underlying this study. (Ravich & Riggan 2012)



A Sample Conceptual Framework

Conceptual Framework vs. Theoretical Framework

All your plans, concepts, or ideas about the many aspects of your research are shown and clarified graphically and verbally in the conceptual framework. However, looking so broad or numerous, all components of the study, concrete and abstract, are not extensively and thoroughly explained by the conceptual framework. Hence, there is this other part of your research paper, called *theoretical framework* that gives and explains the theories, principles, generalizations, and research findings, which have some connection to your research study.

Conceptual framework enables the readers to clearly see in their minds the basic structure of the research and the relationships of variables and other factual things involved in the study. Theoretical framework, on the other hand, makes people know and understand evidence-based truths, concepts, speculations, and assumptions underlying each aspect of the research and the relationships of these research features with one another.

An in-depth knowledge of the theoretical principles governing or controlling the things involved in the research makes you think well and accurately of the varied aspects of your study; thereby, giving you the chance to have a better view of not only the main problem of your research but also of its other components. You get to read in the theoretical framework the basis or foundation of the research; in the conceptual framework, the broad outline plan to carry out the research on the basis of the theories, principles, or generalizations proven true by facts and logical reasoning. (Shields & Rangarjan 2013; Walliman 2014)

Pointers in Writing a Conceptual Framework

1. Familiarize yourself with the objective of the conceptual framework.
2. Base the contents of the conceptual framework on your own understanding of the elements and of the relationships of the research features.
3. See to it that all aspects of the conceptual framework are related to the objective of the research.
4. Let others read your conceptual framework for comments or feedback for improvement purposes.

Concept Explanation

Activity 1

Directions: INDIVIDUAL WORK. Answer each question intelligently and concisely.

1. Describe the behavior of one writing a conceptual framework of a research.

2. In what stage of research is conceptual framework written? Give reasons for your answer.

3. Why should a research be given a conceptual framework?

4. Suppose the research has no conceptual framework, what would the consequences be?

5. Compare and contrast these two: conceptual and theoretical framework.

6. Which between the conceptual framework and theoretical framework is comparable to the post of a house? Justify your point.

7. Should you focus your attention first on the conceptual framework than on the theoretical framework of your research paper? Why? Why not?

8. How does a conceptual framework mirror some personality traits of the researcher?

9. Do you find writing a conceptual framework easy or difficult? Explain your point.

10. If you were to write a conceptual framework, what should your work contain?

- | | | |
|-------------------------------------------------------------------|-------|-------|
| 4. Conducting pre-test and post-test | _____ | _____ |
| 5. Analysis of rhetorical patterns | _____ | _____ |
| 6. Reading as a psycholinguistic game | _____ | _____ |
| 7. Universe formation through explosion | _____ | _____ |
| 8. Seeing the link between the Science book and the CHED syllabus | _____ | _____ |
| 9. Syllabus as the blueprint of the course | _____ | _____ |
| 10. Testing the effects of Ebola virus on rats | _____ | _____ |

Activity 2

Directions: GROUP WORK. Form small groups with four members each. Choose which of the following group activities can give your group a higher teacher evaluation.

1. *TV Broadcaster or Radio Announcer.* Pretend you are this kind of person. With all confidence, fluency, and accuracy, take turns in airing what you know about conceptual and theoretical framework. Decide on the time limit.
2. *Academic Contest.* Take turns in being a Quiz Master to ask series of questions about conceptual and theoretical framework. Be qualified to be the next Quiz Master in the group by giving three correct answers successively.
3. *Colloquy.* Pretend you are participants in a colloquy (conference of scholars and experts). Exchange ideas or views about all the things you learned through this lesson. Teacher evaluation of your performance takes place as he/she mills around the room.

Activity 3

Directions: INDIVIDUAL WORK. Picture in your mind one thing you want to accomplish as soon as possible. Give the basic structure, shape, or formation of this mental picture of yours through a prose and a non-prose material.

Concept-Learning Assessment

Directions: Based on how much you understood the concepts behind each given topic, grade yourself honestly from 0% to 100%.

1. Meaning of conceptual framework _____
2. Meaning of theoretical framework _____
3. Difference between conceptual and theoretical framework _____
4. Purposes of conceptual and theoretical framework _____
5. Graphical presentation of conceptual _____

6. Narrative presentation of the conceptual framework _____
7. Schematic diagram _____
8. Guidelines on conceptual-framework writing _____

Concept Transformation

1. Recall one research problem or topic that the past lessons made you ponder on in a span of time. Write the conceptual framework of this research topic that uses a schematic diagram to present your concepts about this research topic. Explain this further with words.
2. Formulate three to four research questions about this research problem. Your research questions will guide you on the specific topics your RRL or review of related literature will focus on. Stick to your research questions as you do your RRL in your school library and through the different online library and academic databases like the ERIC, DAAI, PROQUEST, CAMIO, and EBSHOST, among others.
3. Synthesize the results of your library and online readings. Apply the ethical standards in writing your review of related literature by documenting them properly with the use of one these standard referencing styles: APA or MLA.

LESSON 10 The Language of Research

Intended Learning Outcomes

At the end of this lesson, you should be able to:

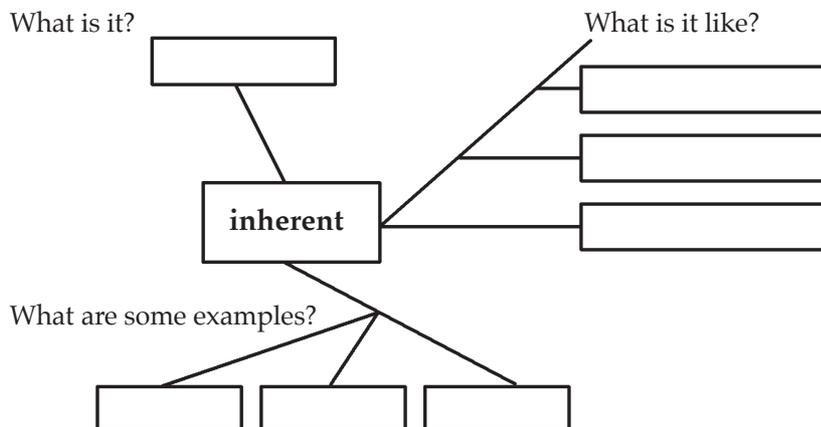
1. increase the number of English words you know;
2. communicate world views using newly learned words;
3. describe the language of research;
4. state the reasons behind research-language formation;
5. explain the meaning of operational definition;
6. distinguish an operational definition from other types of definition;
7. compare and contrast operational and theoretical definition; and
8. give an operational definition of a term based on the guidelines they learned about defining terms operationally.

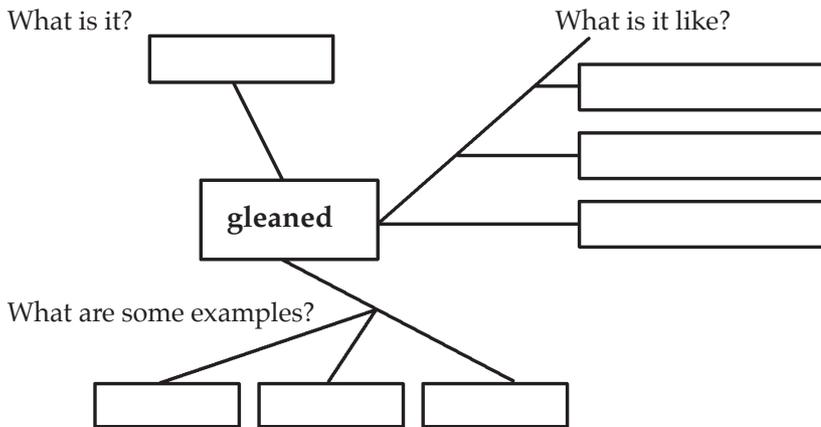
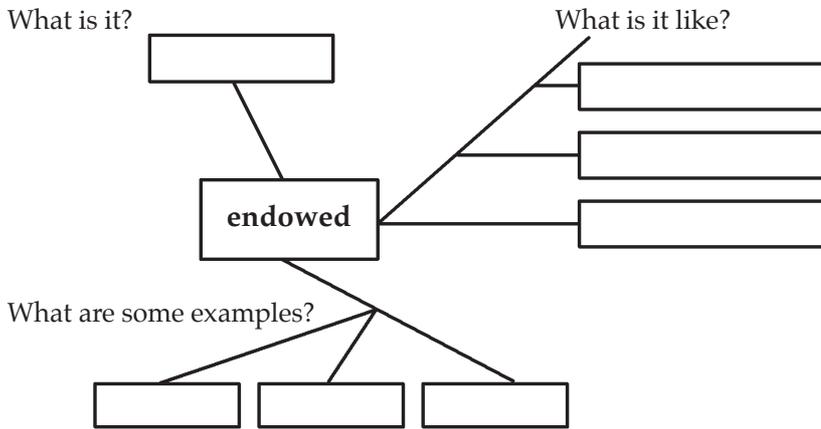
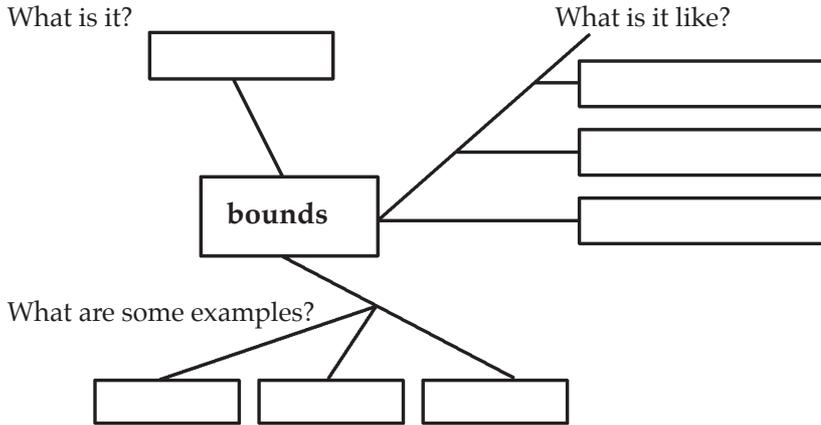
Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: Answer the questions about the italicized center most word. Get some clues about this middle word from the main reading selection of this lesson that shows wherein these target words are underlined.





Activity 2: Vocabulary Practice

Directions: On the lines provided, use one newly learned word in a sentence. You may use two or more new terms in one sentence.

Image Intensifier

GRAPHS OF LANGUAGES

Directions: Examine the following graph of languages. Put a check mark (✓) in the cell having a language that you know; an X over the language you know nothing about.

Ilocano	French	Spanish	German	English	Italian
Chinese	Bicolano	Korean	Pangasinense	Cebuano	Chavakano
Greek	Japanese	Pampangenio	Ibanag	Malaysian	Arabian
Kankanaey	Italian	Waray-waray	Ilongo	Latin	Russian

Concept Discovery

What about the language of research? What do you know about this kind of language? Discover more about this language by reading the following text.

THE LANGUAGE OF RESEARCH

Characteristics of the Language of Research

Research is searching for truth in a systematic way or in a scientific method. Doing things in this manner means going into a world of science that deals mostly with facts, principles, theories, generalizations, methods, and the like. Existing within the **bounds** of science that is quite different from other subjects because of its inclination to special or abstract terms, research is likewise pregnant with extraordinary terms because this has a language of its own. It has its own organized system of language structures that you, as the researcher, use to communicate with your fellow researchers and with readers eager to know the findings of your research.

Endowed with special knowledge; meaning, ideas that are applicable to a particular purpose, you possess a certain expertise that only people belonging to your area of specialization find understandable and easy to relate themselves with. Your

expertise or special knowledge in research causes you to use words, phrases, and other language structures whose meanings and uses are familiar with or common only to those engaged in research. For non-researchers, unless they purposely read books on research, the language of research appears as a jargon. *Jargons* are terms considered as technical because these are commonly used only by people belonging to the same field of specialization. Exclusively used by specific set of persons, like the engineers, doctors, lawyers, architects, or businessmen, among others, these terms do not sound familiar or understandable to ordinary persons in society. (Shields & Rangarian 2013; Trochim 2006)

Research-Language Formation

The specialized forms of the language of research are caused by the following factors (Trochim 2006):

1. Multisyllable words

Some terms reflecting the **inherent** characteristics of research as a scientific method are made up of a number of syllables such as the following:

- theoretical – concepts
- empirical – observable
- probabilistic – uncertain
- quantitative – numerical
- qualitative – opinionated
- scientific– systematic
- inquiry – investigation

2. Types and forms of questions

Research has its own types of questions. It has to ask questions that describe, show relationships, and give reasons behind the occurrence of something. For instance, for a qualitative research, questions to be asked must elicit views, emotions, or opinions of people. Quantitative research, on the other hand, asks questions about the exact number, percentages, or frequency of things. Informative questions rather than yes-or-no questions are the appropriate questions to ask in research.

3. Span of time covered by the research.

Owing to the length of time—months or years—that takes place in a study, research introduced the terms cross-sectional and longitudinal studies. *Cross-sectional study* involves a one-time collection of data in a span of time; *longitudinal study*, repeated collection of data for the purpose of finding out changes of patterns over time.

4. Variable relationships

Concerning itself with whether or not a variable has effects on another variable, based on cause-effect relationships and on a certain pattern that may result in positive or negative relationship, research came out with the following terms for variables:

- a. Independent variables – the cause of something
 - b. Dependent variables – bears the effect of the independent variable
 - c. Extraneous variable – extra or unexpected variable cropping up outside the research design
 - d. Confounding variable – unstable variable
5. Formulation of Hypotheses

Forming of hypotheses indicates the staging of a research. It signals the occurrence of a scientific or investigative way of doing things. Hence, there are these terms: *null hypotheses* for guessing negative results of the research and *alternative hypotheses* for positive results.

6. Data

These are facts, information, or logically derived forms of knowledge that are called *qualitative data* if they are verbally and subjectively expressed; *quantitative data*, if they are numerically and objectively expressed.

7. Unit of Analysis

The subject or object of your research study makes up one major entity and this may either be one of the following:

- a. Individual, group, artefact (painting, book, travelogue)
- b. Geographical unit (municipality, province, country)
- c. Social interaction (husband-wife, teacher-learner, employer-employee)

Operational Definition

Meaning of Operational Definition

Concepts, theories, principles, assumptions, predictions, and other abstracts terms are the catchwords of research. These are cognitively-coined terms that appear so complex to readers, in general, especially, those with zero background knowledge about research. A theoretical definition (explanation based on the concepts or knowledge related to the field of discipline and widely accepted as correct) prevents readers from immediately seeing the relationships or relevance of things involved in the research. One way of giving a clear meaning of a concept or anything involved in the research is to define it operationally.

What is an operational definition? *Operational definition* is making the concept or the thing meaningful by specifying the way your research should measure such concept. It defines the basic concept through the operation used or research activity involved to measure the concept. Making the concept measurable indicates that the operational definition is a component of an empirical process that requires observation for distinguishing the concept from other ideas, for measuring it with precision, and for knowing its meaning clearly. Defining the term based on its operation or application in the research gives other researchers the opportunity to evaluate the measurement procedure and to repeat such procedure in their own research studies. The following examples give you an idea on how to define a term operationally. (Ravich & Riggon 2012; Trochim 2006)

Guidelines in Giving Operational Definitions

Gleaned from books on research are the following pointers on defining terms operationally:

1. Have a clear understanding of the concept focused on by your study before you begin defining such concept operationally.
2. Base your operational definition on the concept under study.
3. Express the operational definition in only one sentence.
4. Let the operational definition explain the measurement of variables clearly.
5. Construct an operational definition that other researchers can understand, assess, and repeat in other research studies.

Examples of Operational Definitions

1. Defining Temperature
 - Theoretical/Conceptual Definition: heat flowing between infinite reservoirs
 - Operational Definition: define temperature in relation to *operations with gas thermometers*
2. Defining Electric Current
 - Theoretical/Conceptual Definition: force between two parallel conductors
 - Operational Definition: mention the *device, current balance, to measure electric current*
3. Defining Anger
 - Theoretical/Conceptual Definition: intangible; not directly measured by observation
 - Operational Definition: mention *facial expressions, vocabulary, or voice tone to measure anger*
4. Defining Virgo
 - Theoretical/Conceptual Definition: constellation of stars (cannot tell the process of formation)
 - Operational Definition: mention *the way of locating Virgo in the sky (repeatable process)*

Concept Explanation

Activity 1

Directions: PAIR WORK. Show the connection of two ideas by drawing an arrow to link a phrase in column A to that in column B.

A	B
1. Non-researchers Technical terms Systematic method Theoretical definitions Concept under study	meanings based on concepts of the field used by those in one field of profession consider language of research as a jargon basis of operational definition scientific method
<hr/>	
2. Operational definition Abstract terms First step in operational definition One-sentence definition Language of research	concepts, theories, principles, inferences length of operational definition consists of specialized forms focuses on concept measurement knowing the concept under study

Activity 2

Directions: Check the statement that is true.

1. _____ Science is synonymous with jargon.
 _____ Science deals with concrete and abstract terms.
 _____ Science is a branch of research.
2. _____ Experts' words and phrases enrich the language of research.
 _____ Experts' specialized words of a subject are not applicable to research.
 _____ Experts' language is metaphorical and philosophical.
3. _____ Research has its own way of framing questions.
 _____ Research gives way to any kind of question.
 _____ Research happens despite the absence of research questions.
4. _____ Research is understandable because of its multisyllable words.
 _____ Research sounds complex because of its multisyllable words.
 _____ Research needs more multi-syllable words from experts.
5. _____ Operational definition stresses the category of the concept under study.
 _____ Operational definition stresses theoretical definition of a concept.
 _____ Operational definition stresses the measurement of a concept.
6. _____ An empirical study happens in a qualitative study.
 _____ An empirical research defines terms selectively.
 _____ An empirical research requires observations of the object.

7. _____ Other researchers should not mind one's operational definition of a term.
 _____ Other researchers could base their definition on one's operational definition.
 _____ Other researchers are not in a position to judge one's operational definition.
8. _____ Operational definition is full of specialized terms.
 _____ Operational definition is an element of an empirical study.
 _____ Operational definition is as understandable as a conceptual definition.
9. _____ Theoretical definition has nothing to do with operational definition.
 _____ Theoretical definition is your stepping stone to operational definition.
 _____ Theoretical definition is a substitute of operational definition.
10. _____ The language of research is classical.
 _____ The language of research is ordinary.
 _____ The language of research is unique.

Concept Elaboration

Activity 1

Directions: INDIVIDUAL WORK. On the line provided, write OD, if the sentence defines the term operationally; TD, if it defines the term theoretically or conceptually.

- _____ 1. A sentence is a word or group of words that expresses a complete idea.
- _____ 2. A sentence is made up of a subject, consisting of a name word, and a predicate, made up of an action word, to express a complete thought.
- _____ 3. A bug is a fault or an error in a computer program.
- _____ 4. A bug is an error in a computer program that is characterized by high-speed telegraph key.
- _____ 5. Strangury is less than 20-minute slow and bloody way of urinating.
- _____ 6. Strangury is a person's abnormal way of urinating.
- _____ 7. Sterilization is any procedure such as the use of a steam-pressure cooker to destroy microorganisms.
- _____ 8. Sterilization is a complete destruction of all microorganisms.
- _____ 9. Analog is the representation of values through the use of physical variables.
- _____ 10. Cycle is a set of operations.

Activity 2

Directions: Convert each theoretical definition to operational definition.

1. A university is a place for learning.

2. Electric fan is a device for convenience.

3. Painting is an art.

4. A phrase is a group of words.

5. Patience is an ability to wait.

Concept-Learning Assessment

Put a check mark (✓) under the right heading to describe how much you have learned the concept for the following topics.

Topics	Excellent	Very Good	Good	Poor
Characteristics of the language of research				
Formation of the language of research				
Operational definition				
Operational vs. Theoretical definition				
Pointers in making the operational definition				
Abstract terms				

Concept Transformation

Surf the Internet and look for online published research study. Make a list of terms that the study defined operationally. Keeping in mind what you learned about the language of research and operational definition, critique the way the online operational definitions were made. Show your teacher and classmates a copy of your critical evaluation of the online operational definitions.

Unit IV

Understanding Data and Ways to Systematically Collect Data

A lot of data from different sources preoccupy your mind as you go through the several stages of research. To understand the data; that is, to find meanings in them in relation to your study, you have to conduct an orderly manner of gathering, identifying, and grouping them. A set-by-set arrangement of facts and information is a must in research, because in arriving at a conclusion about your study on the basis of the collected data, you don't only deal with lone proof or evidence but also with several proofs hinging upon a common theme, concept or theory.

LESSON 11 Quantitative Research Designs

Intended Learning Outcomes

At the end of this lesson, you should be able to:

1. widen your vocabulary in English;
2. exchange ideas with one another using the newly learned words;
3. explain the meaning of quantitative research design;
4. compare and contrast the types of quantitative research designs;
5. classify the types of quantitative research designs;
6. outline the experimental research-design stages;
7. present a graphical look of the experimental research-design stages; and
8. judge the quality of finished quantitative research designs.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: Circle the letter of the word or phrase that is similar in meaning to the underlined word in the sentence. Be guided by some clues in the sentence.

1. Being a renowned person, he does not need to give his name to the guards. All the people in the community know his name.

a. kind	c. friendly
b. famous	d. wealthy
2. The stone glitters like a star but it is not comparable to a real diamond; it is a quasi-diamond.

a. costly	c. genuine
b. cheap	d. almost
3. Do you envisage yourself wearing the most expensive diamond ring on earth?

a. imagine	c. present
b. justify	d. prove
4. Befriend all people around you but shun relating yourself closely with rumour mongers.

a. help	c. expect
b. avoid	d. hesitate
5. Wear something that approximates the gown of Ms. Universe or one red dress that looks like orange at first glance.

a. looks damaging to	c. appears close to
b. popularizes	d. advertises
6. Neglecting to consult me about the list of names, your purposive erasure of my name in the list needs immediate explanation from you.

a. forceful	c. accidental
b. intentional	d. careful
7. You must be in a good mental condition to be able to conceive the things you want to do as soon as possible.

a. share ideas	c. explain well
b. form ideas	d. write well
8. My vision of Pope Francis, whom I haven't personally met yet, reminds me of one story I read about St. Francis of Assisi.

a. wishful attitude	c. mental picture
b. comic strip	d. scary dream

9. Lacking in Vitamin C, you are prone to colds and other respiratory diseases.
- | | |
|----------------|--------------|
| a. susceptible | c. submitted |
| b. near | d. similar |
10. Studying hard will ensure you good grades.
- | | |
|-----------|-----------|
| a. show | c. give |
| b. assure | d. record |

Activity 2: Vocabulary Practice (Guessing Game/Pantomime)

Directions: PAIR WORK. Act out something in relation to one of the new words you have learned. Then, let your partner guess the target word but his or her complete correct three-point answer depends also on the correct use of this word in a sentence. Swap roles after every correct answer. Give an end to your guessing game by submitting to your teacher your honestly accumulated points.

Image Intensifier

*Brainstorming Session...*The title of the main reading material of this lesson is *Quantitative Research Design*. What immediately comes to your mind upon uttering or hearing this title?

Concept Discovery

Do you think your thoughts or ideas on the said title are incorporated in the following reading material? Read this text to find out the truth of your ideas on quantitative research designs.

QUANTITATIVE RESEARCH DESIGNS

Meaning of Quantitative Research Design

There are a lot of things that you want to do in life. You want to be a Dean's Lister, to be in other parts of the world, to be a millionaire, to be a renowned scientist, engineer, surgeon, and so forth. To realize one, two, or three of these things you want to happen in your life, first, envisage any of these in your mind then have a vision of what to do and how to do such thing. Doing this is seeing in your mind the order or arrangement of things involved in the activity you want to perform. This is an act of designing wherein a plan or an outline of your activities is conceived in your mind. It is a design that takes a certain shape the moment you use symbols to lay its structure or components on a piece of paper.

In any research type, much more, in a quantitative research where you do a great deal of abstraction and scientific or logical thinking, a research design is a part and parcel of your study. By means of your research design, you are able to make these aspects of your research clear: your methods or techniques in finding answers to your research questions and in collecting data.

Coming out with the design of your research is not an initial act of your study. It is not the starting period of your research that makes you pour much of your time in mulling over your research problem and in obtaining background knowledge about your research topic. Preparing the design of your research work takes place after finalizing your mind on these major aspects of your research: research topic, background of the study, research questions, hypotheses, and research strategy like: case study, experimentation, survey, and action research, among others, that would introduce you to the different data-collecting techniques of interview, observation, and questionnaire. Simply stated, quantitative research focuses on numbers, statistics, and relationships between variables. (Punch 2014; Edmonds 2013; Lapan 2012)

Types of Quantitative Research Designs

Experimental Research Design

1. Definition

Experimental research design is a quantitative research design that bases its research method on a scientific activity called experiment, in which a test or examination of a thing under a manipulated or controlled environment is done to determine the validity or truthfulness of such thing. This design involves two groups of subjects: the experimental group on which the condition, treatment, or intervention is applied and the control group that is not given any treatment or condition.

Following this experimental design, you conduct two kinds of tests: pre-test for both groups and post-test for the experimental or treatment group to see the difference between them based on the effects of the treatment or condition given to the experimental group. (Picardie 2014; Yin 2012)

2. Types

There are two types of experimental research designs: the true experimental design and the quasi-experimental design. (De Mey 2013; Creswell 2013)

- a. True Experimental Design – What proves this as a true experimental design is its random selection of participants. It is a bias-free selection that ensures objectivity of results. This design is the best way to examine causal relationships.
- b. Quasi-experimental Design – The term *quasi* (pronounced as *kwahz-eye*) means partly, partially, pseudo, or almost. The non-adherence of this research design to random selection of participants is the reason it got the name, quasi-experimental research, which means a research with the capacity to yield findings that are seemingly or more or less true. Prone to bias caused by your purposive, rather than random selection of participants, quasi-experimental design is incapable of establishing cause-effect relationships. Trying to approximate or to be like the true experimental design, this research design comes in different types such as the following:

- **Matched comparison group design**
In this quasi-experimental design, instead of selecting participants for the control group, you get a set of participants that shows close similarities with the experimental or treatment group based on one or more important variables.
- **Time-series quasi-experimental design**
Your act of controlling the variables in this case is through multiple observations of the subjects before and after the treatment or condition applied to the experimental group. The purpose of serial observations is to see the connection between the pre-test and the post-test based on the taking place of the treatment or condition.
- **Counter-balanced quasi-experimental design**
Here, control is applied to one group to examine the effects of all treatment and conditions to control variables. For instance, negative results coming from three-time observations are counterbalanced or given weight that is equated with positive results from four- or five-time observations.
- **Single-subject quasi-experimental design**
This design is used when the population is so large that you find difficulty in choosing a group to study. So, you decide to apply the condition or treatment to a single subject like a class of learners then later find out the effects of the treatment on the entire class.

Experimental Research Design Stages

The true experimental and quasi-experimental designs follow the same stages in research designing. Their difference lies only in the participant-selection process, in that the first is randomized; the second, purposive. (Lapan 2012; Walliman 2014)

1. Clear knowledge of the research objectives that enable you to decide not only on the kind of research you have to do, but also on the manner you have to follow in conducting the research.
2. Formulation of hypotheses to state your guesses of what may not be true (null hypotheses) or may be true (alternative hypotheses) about the results.
3. Method of testing your hypotheses or of examining their validity like deciding whether you have to follow the experimental design or the quasi-experimental design.
4. Choice of which instrument to use in collecting data; that is, whether to use interview, observation, or questionnaire.
5. Process of selecting the subjects to compose the control group and the experimental group.
6. Performance of experimentation that allows control of the cropping up of extraneous variables and of the experimenter's bias.
7. Collection and analysis of data.

Non-Experimental Research Design

1. Definition

Non-experimental design is a quantitative research design that is capable of giving qualitative and quantitative data, but more on qualitative data; hence, this is often used in the field of social sciences. Unlike the experimental design that allows manipulation or control of some aspects of the research, non-experimental research design shuns controlling variables. Instead, it involves variables the way they naturally exist on earth.

2. Types

The following are the types of non-experimental research designs (Schreiber 2012; Letherby 2013; Creswell 2014):

1. Descriptive – depicts an image or a picture of an individual or a group
2. Comparative – states the differences or similarities between or among people, things, objects, etc.
3. Correlative – shows the extent and direction of variable relationships, that is, whether a negative or positive relationship exists between or among them
4. Survey – describes the attitudes, preferences, views, feelings, views, and other behavioral patterns of a big number of people for arriving at a certain conclusion about societal concerns and issues
5. Ex Post Facto – translates itself into these English words, “that which is done afterwards” and has the purpose of deriving data from things that are by nature taking place, so as to obtain explanations about past events (Litchman 2013, p. 42)

Concept Explanation

Activity 1

Directions: INDIVIDUAL WORK. Circle the letter of the correct answer.

1. Designing a research is thinking _____ .

a. critically	c. literally
b. skillfully	d. imaginatively
2. To design a research is seeing the research process in your _____.

a. paper	c. library
b. mind	d. book

3. Preparing in your mind how to find answers to your research questions is _____.
- a. deciding on your research topic
 - b. controlling your emotions
 - c. designing your research
 - d. asking research questions
4. These are aspects of your research: research objectives, topic, questions, hypotheses, and methodology. You come to think of quantitative research design _____.
- a. before finalizing your mind on these aspects of your research
 - b. after thinking of these aspects of your research
 - c. as you formulate hypotheses about these parts
 - d. as you ponder on your research problem
5. Central to experimental design is analysing relationships that are _____.
- a. specific
 - b. causal
 - c. hypothetical
 - d. stable
6. A quantitative research design that is equated with qualitative design is _____.
- a. true experimental
 - b. semi-experimental
 - c. non-experimental
 - d. quasi-experimental
7. Quantitative research designs are true for all experimental designs except the aspect on _____.
- a. subject selection
 - b. variable relationships
 - c. treatment application
 - d. variable control
8. A quantitative research design that makes you be have as a scientist is _____.
- a. survey research
 - b. case study
 - c. experimental design
 - d. correlative study
9. An empirical study is based on a research design that is _____.
- a. qualitative
 - b. hypothetical
 - c. quantitative
 - d. theoretical
10. These two are the leading indicators of the occurrence of true experimental design:
- a. Pre-test and post-test
 - b. Randomization and variable control
 - c. treatment and condition
 - d. experimental and control group

Activity 2

Directions: Answer each question intelligently and concisely.

1. What should you be thinking of before designing your research?

2. Does your research still follow a quantitative research design despite its non-use of random selection of subjects? Why? Why not?

3. How do you know that one is applying a quantitative research design?

4. Supposing you can not apply a true experimental design but you still want to follow a quantitative research design, what research can you do? Give reasons for your answer.

5. What do you mean by experimental and control group?

6. Should the experimental and control group always be selected randomly? Why? Why not?

7. Why do some people resort to applying quasi-experimental design rather than true experimental design?

8. Do you agree that the best research results come from experimental designs? Justify your point?

9. If you were to conduct a quantitative research, which quantitative research design would you follow? Explain your answer.

10. Do you know of some people around who did a research study using a quantitative research design? Describe this person in relation to his/her study.

Concept Elaboration

Activity 1

Directions: PAIR WORK. Make a topical outline and graphical presentation of the categories of quantitative research designs.

- 1) OUTLINE

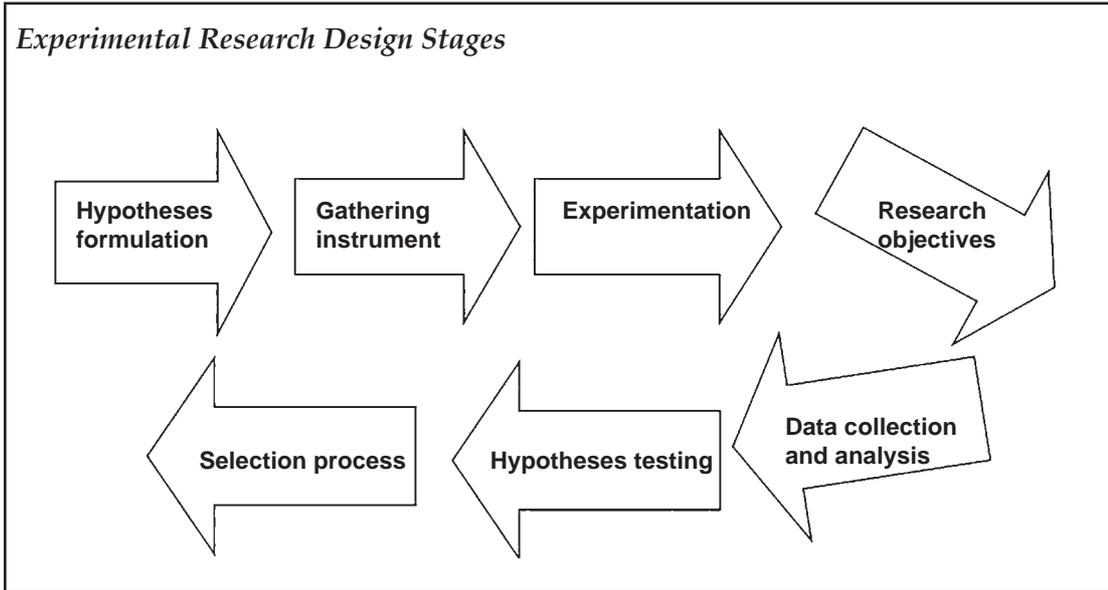
Quantitative Research Designs

- 2) GRAPHICAL PRESENTATION

Quantitative Research Designs

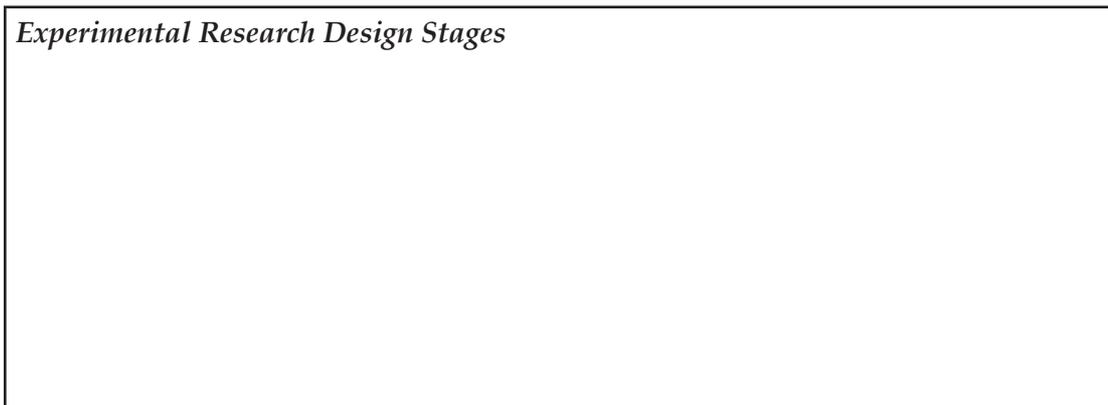
Activity 2

Directions: Evaluate the accuracy of the following flow chart of the experimental research designing stages.



Activity 3

Directions: In the space provided, present the correct flow chart of the experimental research design stages.



Concept-Learning Assessment

Think of the concepts or ideas about quantitative research designs that you learned through this lesson. Classify these ideas based on the extent of your understanding of these concepts. List them down in the right column.

Concepts	Excellent	Very good	Average	Poor	Zero

Concept Transformation

Discover the type of research one or two people around you did in the past. Focus your attention on those who did quantitative research studies. Request them to grant you a few-minute interview in relation to their quantitative studies. Center your interview on the research design their studies applied. Then, subject the interview results to critical evaluation on the basis of what you learned about quantitative research designs. Let your teacher and classmates read a brief report on your interview with these selected people.

LESSON 12 **Quantitative Data-Collection Techniques**

Intended Learning Outcomes

At the end of this lesson, you should be able to:

1. increase the number of English words you know;
2. communicate world views using the newly learned words;
3. explain the meaning of quantitative data;
4. differentiate the quantitative-data collection techniques;
5. describe each quantitative data-collection instrument;
6. specify the appropriate data-collection instruments for each data-collection method;
7. evaluate the effectiveness of interview questions; and
8. name the right quantitative measurement scale for a research question.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: INDIVIDUAL WORK. Give the meaning of the underlined word in each cluster of words. Be guided by the other words in the cluster serving as clues.

1. arbitrary, prejudicial, biased, subjective
2. graduated, ranked, gradated, ordered
3. faraway, secluded, distant, remote
4. express, connote, denote, signify
5. advent, arrival, coming, approach
6. fallacious, erroneous, wrong, incorrect
7. oblivious, absorbed, engrossed, preoccupied
8. highfalutin, complex, difficult, high-flown
9. guide, direct, manipulate, lead
10. reap, yield, produce, generate

Activity 2: Vocabulary Practice

QUESTION-ANSWER GAME

Directions: PAIR WORK. Ask a question that has some connection with the meaning of one newly learned word. Let your partner guess the target word referred to by your question. But he or she has to use the word correctly in a sentence to get the two-point correct answer. Switch roles after every correct answer. Your submission of the honestly listed points per correct answer signals the end of your game.

Image Intensifier

Surround with the appropriate words and phrases the expression in the middle of the graph.



Concept Discovery

What do you think? Could the words appearing as bubbles in the cluster be found in the following reading material? Read this text to find out the truth.

QUANTITATIVE DATA-COLLECTION TECHNIQUES

Definition of Quantitative Data

Data are pieces of information or facts known by people in this world. Appearing measurable, numerical, and related to a metrical system, they are called *quantitative data*. These data result from sensory experiences whose descriptive qualities such as age, shape, speed, amount, weight, height, number, positions, and the like are measurable. Denoting quantity, these words appear in records in numerical forms that are either discrete (1, 2, 3, 4, 5, 6...) or continuum (amount of flour...). However, these quantitative data become useful only in so far as they give answers to your research questions. (Russell 2013; Creswell 2013).

Techniques in Collecting Quantitative Data

Collecting data is one major component of any type of research. Undermining its importance would result in the production of inaccurate data sufficient to render your research study invalid. Hence, in collecting quantitative data, stress is given to the accuracy or appropriateness of your data-gathering technique as well as of the right instrument to collect the data. The following are the most used quantitative data-gathering techniques along with the data-gathering instruments for each technique. (Matthews 2010; Badke 2012; Thomas 2013; Woodwell 2014)

1. **Observation**

Using your sense organs, you gather facts or information about people, things, places, events, and so on, by watching and listening to them; then, record the results of the functioning of your eyes and ears. Expressing these sensory experiences to quantitative data, you record them with the use of numbers. For instance, watching patients lining up at a medical clinic, instead of centering your eyes on the looks of the people, you focus your attention on the number, weight, and height of every patient standing up at the door of the medical clinic.

As a researcher preoccupied with collecting quantitative data through observation, you begin to count the number of patients and get the measurement of their height and weight. These numbers representing the results of your counting and measurement are then jotted down in your record notebook. Seeing, touching, and hearing the sources of data personally, you engage yourself in *direct observation*. It is an *indirect observation*, if you see and hear them, not through your own eyes and ears, but by means of technological and electronic gadgets like audiotapes, video records, and other recording devices used to capture earlier events, images, or sounds.

2. **Survey**

Survey is a data-gathering technique that makes you obtain facts or information about the subject or object of your research through the data-gathering instruments of interview and questionnaire. This is the most popular data-gathering technique in quantitative and qualitative researcher studies for the researchers are free to use not just one survey instrument but also these two following data-gathering instruments.

Questionnaire

Questionnaire is a paper containing series of questions formulated for an individual and independent answering by several respondents for obtaining statistical information. Each question offers a number of probable answers from which the respondents, on the basis of their own judgment, will choose the best answer. Making up a questionnaire are factual and opinionated questions. Questions to elicit factual answers are formulated in a multiple-choice type and those to ask about the respondents' views, attitudes, preferences, and other opinionated answers are provided with sufficient space where the respondents could write their sentential answers to opinionated questions.

Responses yielded by this instrument are given their numerical forms (numbers, fractions, percentages) and categories and are subjected to statistical analysis. Questionnaire is good for collecting data from a big number of respondents situated in different places because all you have to do is either to hand the paper to the respondents or to send it to them through postal or electronic mail. However, ironically, your act of sending the questionnaires to respondents, especially to those in remote areas, is susceptible to waste of money, time, and effort for you do not have any assurance of the return of all or a large number of fully accomplished questionnaires.

Interview

Survey as a data-gathering technique likewise uses interview as its data-gathering instrument. Similar to a questionnaire, interview makes you ask a set of questions, only that, this time, you do it orally. Some, however, say that with the advent of modern technology, oral interview is already a traditional way of interviewing, and the modern ways happen through the use of modern electronic devices such as mobile phones, telephones, smart phones, and other wireless devices.

➤ Order of Interview Questions

In asking interview questions, you see to it that you do this sequentially; meaning, let your questions follow a certain order such as the following: (Sarantakos 2013; Fraenbel 2012)

First set of questions – opening questions to establish friendly relationships, like questions about the place, the time, the physical appearance of the participant, or other non-verbal things not for audio recording

Second set of questions – generative questions to encourage open-ended questions like those that ask about the respondents' inferences, views, or opinions about the interview topic

Third set of questions – directive questions or close-ended questions to elicit specific answers like those that are answerable with yes or no, with one type of an object, or with definite period of time and the like

Fourth set of questions – ending questions that give the respondents the chance to air their satisfaction, wants, likes, dislikes, reactions,

or comments about the interview. Included here are also closing statements to give the respondents some ideas or clues on your next move or activity about the results of the interview

➤ **Guidelines in Formulating Interview Questions**

From the varied books on research are these tips on interview question formulation that you have to keep in mind to construct effective questions to elicit the desired data for your research study:

- a. Use clear and simple language.
- b. Avoid using acronyms, abbreviations, jargons, and highfalutin terms.
- c. Let one question elicit only one answer; no double-barrel question.
- d. Express your point in exact, specific, bias-free, and gender-free language.
- e. Give way to how your respondents want themselves to be identified.
- f. Establish continuity or free flow of the respondents' thoughts by using appropriate follow-up questions (e.g., Could you give an example of it? Would you mind narrating what happened next?).
- g. Ask questions in a sequential manner; determine which should be your opening, middle, or closing questions.

3. Experiment

An experiment is a scientific method of collecting data whereby you give the subjects a sort of treatment or condition then evaluate the results to find out the manner by which the treatment affected the subjects and to discover the reasons behind the effects of such treatment on the subjects. This quantitative data-gathering technique aims at manipulating or controlling conditions to show which condition or treatment has effects on the subjects and to determine how much condition or treatment operates or functions to yield a certain outcome.

The process of collecting data through experimentation involves selection of subjects or participants, pre-testing the subjects prior to the application of any treatment or condition, and giving the subjects post-test to determine the effects of the treatment on them. These components of experiment operate in various ways. Consider the following combination or mixture of the components that some research studies adopt:

- a. Treatment → evaluation
- b. Pre-test → Treatment → Post-test
- c. Pre-test → Multiple Treatments → Post-test
- d. Pre-test → Treatment → Immediate Post-test → 6-mos.
Post-test → 1-yr. → Post-test

These three words: treatment, intervention, and condition, mean the same thing in relation to experimentation. These are the terms to mean the things given or applied to the subjects to yield certain effects or changes on the said subjects. For instance, in finding out the extent of the communicative competence of the subjects, put these participants in a learning condition where they will perform varied communicative activities such as dramatizing a story, round-table discussions, interviewing people, table-topic conversation, and the like.

Dealing with or treating their communicative abilities in two or more modes of communication is giving them *multiple treatments*. The basic elements of experiment which are subjects, pre-test, treatment, and post-test do not operate only for examining causal relationships but also for discovering, verifying, and illustrating theories, hypotheses, or facts. (Edmonds 2013; Morgan 2014; Picardie 2014)

4. Content Analysis

Content analysis is another quantitative data-collection technique that makes you search through several oral or written forms of communication to find answers to your research questions. Used in quantitative and qualitative research studies, this data-collection method is not only for examining printed materials but also for analyzing information coming from non book materials like photographs, films, video tapes, paintings, drawings, and the like. Here, you focus your study on a single subject or on two entities to determine their comparative features. Any content analysis you want to do is preceded by your thorough understanding of your research questions because these are the questions to guide you in determining which aspect of the content of the communication should you focus on to find the answers to the main problem of your research.

Measurement Scales for Quantitative Data

In quantitative research, measurements of data expressed in numerical forms form in a scale or one that consists series of graduated quantities, values, degrees, numbers, and so on. Thinking about the type and scale of measurement that you have to use in your quantitative research is important because your measurement choices tell you the type of statistical analysis to use in your study. Not knowing which scale of measurement to use may result in your erroneous examination of the data.

There are two categories of scales of measurement: qualitative scales of measurement and quantitative scales of measurement. Under quantitative scales of measurement are these two: the *nominal scale* to show the classification of things based on a certain criterion such as gender, origin, brand, etc., and the *ordinal scale* to indicate the rank or hierarchical order of things. The quantitative scales of measurement are the *interval scale* for showing equal differences or intervals between points on the scale in an arbitrary manner (showing differences in attitudes, inclinations, feelings, ideas, fears, opinions, etc.) and the *ratio scale*, like the interval scale, that shows equal differences or intervals between points on the scale. However, these two quantitative scales of measurement are not exactly the same, in that, the latter gives value to zero,

while the former does not give any value to zero for the value depends solely on the respondent. (Schreiber 2011; Letherby 2013)

Examples:

1. Nominal Scale – categorizing people based on gender, religion, position, etc. (one point for each)

religion – Catholic, Buddhist, Protestant, Muslim

gender – male, female

position – CEO, vice-president, director, manager, assistant manager

Summing up the points per variable, you will arrive at a certain total that you can express in terms of percentages, fractions, or decimals like: 30% of males, 25% of females, 10% of Catholics, 405 of Buddhists, and so forth.

2. Ordinal Scale – ranking or arranging the classified variables to determine who should be the 1st, 2nd, 3rd, 4th, etc., in the group
3. Interval Scale – showing equal intervals or differences of people’s views or attitudes like this one example of a scale called *Likert Attitude Scale*:

Reading is important.

_____	_____	_____	_____	_____
Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree

How often does your professor come late?

_____	_____	_____	_____	_____
Always	Most of the time	Sometimes	Rarely	Never

How would you rate your professor’s performance?

_____	_____	_____	_____	_____
Very Poor	Poor	Fair	Good	Excellent

4. Ratio Scale – rating something from zero to a certain point
Performance in Math subject – a grade of 89% (from 0 to 100%)

Concept Explanation

Activity 1

Directions: INDIVIDUAL WORK. Fill in the blank with the correct answer.

Central to _____1_____ are words; to quantitative research are _____2_____. In this second type of research, you use the data-gathering technique called _____3_____ that uses _____4_____ and _____5_____, two data-gathering instruments that are made up of _____6_____. Questions on things resulting from your experience are called _____7_____ questions; those on your interpretative or critical thinking are called _____8_____ questions. Survey is a data-gathering _____9_____ while interview and questionnaire are data-gathering _____10_____. Another quantitative data-gathering technique is the _____11_____ that uses your _____12_____ organs, specifically, your _____13_____ and _____14_____ in collecting data. Watching and listening to people and things with your own eyes and ears is a _____15_____ kind of observation; with audio tape or video tape, is _____16_____ type of observation _____17_____. _____17_____ is one quantitative data-collection technique that aims at controlling variables to discover _____18_____ relationships. This method involves independent _____19_____ variables and dependent variables. The _____20_____ receive treatment or condition and, if it is given the performance rating of 95%, it will appear on a scale of measurement called _____21_____ scale.

Activity 2

Directions: Using the table below, compare and contrast each pair of expressions.

Pair of Expressions	Comparison	Contrast
Quantitative data vs. Qualitative data		
Interview vs. Questionnaire		
Direct observation vs. Mediated observation		
Pre-test vs. Post-test		
Interval scale vs. Ration scale		

Activity 3

Directions: Based on what you learned about interview questions find out if the following interview questions are effective. Give reasons for your answer.

1. Would you mind telling me all the events again, then give me what took place right after the last event?

2. Tell me something about the UCLA's SPSS and STATA statistical techniques.

3. Why don't you preoccupy yourself mulling over the expediency of having a merrymaking day with those waifs living with the high-strung, supercilious, cantankerous woman?

4. Oh, you are in time for our session. Didn't you find this place easy to locate?

5. As a starting question, please tell me why you refuse to attend your Religion subject?

6. Do you find your Math subject difficult and what about having some tutorial lessons about it?

7. What question did I fail to ask that you think I should have asked?

8. Why do you not like yourself to be identified as Maria Salome when this name sounds unique and nicer than your present name, Janette Nicole Angelina?

9. My first question is, what do you think of the extent of corruption that has been going on in some government offices?

10. Let me end this session by asking you this question, how did you reach this place?

Activity 4

Directions: Check the right column that corresponds to the given questions.

Interview questions	Opening questions	Generative questions	Directive questions	Closing questions
1. Is there anything you want me to know more about your meeting with the Pope that you failed to reveal to me?				
2. Can you describe your feelings upon seeing the Pope?				
3. We have agreed to have this session in 30 minutes. Is this okay with you?				
4. What makes you so eager to see the Vatican City, soon?				
5. What time of the year do you want to go to Rome?				

6. You took a taxi cab in coming here, didn't you?				
7. Why do you think the Pope love visiting many countries?				
8. Would you like sitting at the window or near the bulletin board?				
9. Compare and contrast your experience in meeting the previous and the current Pope?				
10. What do you think was the most significant thing that we dealt with in the interview?				

Concept Elaboration

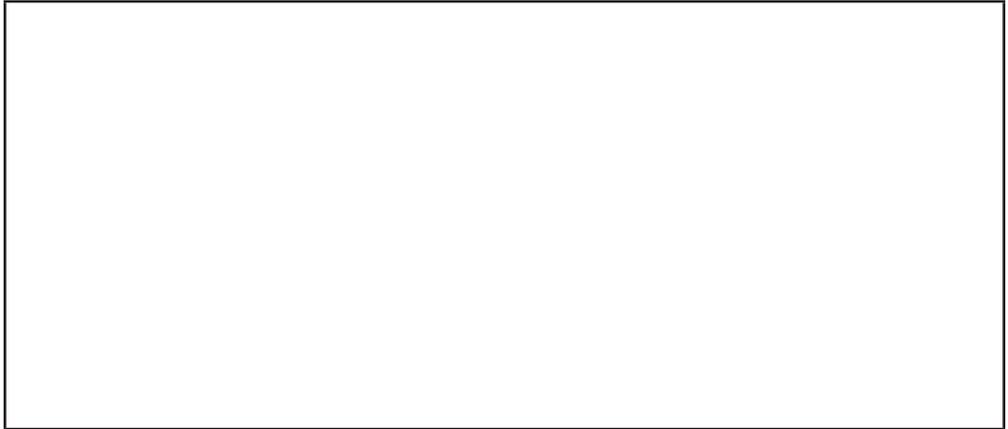
Activity 1

Directions: GROUP WORK. Give the ideas signaled by the headings of the table about each given research question.

Research Questions	Quantitative Data-Collection Technique	Quantitative Data-Collection Instrument	Quantitative Scale of Measurement
1. How long did the audience clap for PNoy's SONA?			
2. What percentage of the students said they do not like the style of their new school uniform?			
3. What difference, if any, is there between intermediate learners (ages 10–12) and high-school learners (ages 13–16) in their fondness of cellphone texting?			

Activity 2

Directions: Using the space provided, present through a graph the categories of the quantitative data-collection techniques and the quantitative data-gathering instruments.



Activity 3

Directions: Form a group of three. Pretend you are guest speakers in a conference about research. Divide among yourselves the significant topics about quantitative data-collection techniques that you want to share with the conference participants with the use of the latest technological devices. Allot a certain time for the open forum.

Activity 4

Directions: PAIR WORK. Pretend you are researchers and choose the same data-gathering method called survey that uses interview as its data-gathering instrument. Interview your partner on your chosen topic. Using the same data-gathering method and deciding to exchange roles later, agree on the time limit for each interview session that you should ask questions in a sequential order.

Concept-Learning Assessment

Using the space below, write a reflective essay about your learning experience on the quantitative data-collection techniques. Let your essay reveal how much you learned about each concept behind each topic dealt with in this lesson. Express which concepts are the most understood, slightly understood, and the least understood ones.

Did I learn
much or little?

Reflect...Reflect...
Reflect...

Concept Transformation

Use the Likert Scale to measure some of your grade-level schoolmate's satisfaction, attitude, feelings, biases, or inclinations about people, restaurants, TV programs, government officers, social media networks, online games, Internet, digital technology, and mobile phones, among others. Share some people what you discovered about your fellow students whom you randomly selected from the total population of Grade 12 students in your school. Likewise, include in your written results report clear descriptions of the sample and the sampling procedure you used.

You want to satisfy your curiosity about a certain subject matter. The only way to do this is to link yourself with people, things, and other elements in your surroundings because, by nature, research involves interdependence or interactions among people and things on earth. The answers to your investigative acts about the topic you are interested in come from people you get to communicate with and from things you subject to observations. Research is an act of gathering opinions, facts, and information to prove your point or to discover truths about your research problem or topic.

LESSON 13 Quantitative Data Analysis

Intended Learning Outcomes

At the end of this lesson, you should be able to:

1. widen your vocabulary;
2. communicate worldviews using newly learned words;
3. trace the stages of quantitative data analysis;
4. differentiate the quantitative data-analysis techniques;
5. organize data in a tabular manner;
6. use a graph to show frequency and percentages distribution;
7. calculate the measures of central tendency; and
8. use descriptive statistics in analyzing data.

Concept Linkers**Old and New Concept Fusion**

Activity 1: Vocabulary Improvement

Directions: Give the meaning of the underlined word in the sentence. Be guided by the way the it is used in the sentence.

1. Choose one from the several alternative solutions from the guidance counsellor.
2. After collating those pages, staple them, please.
3. Go straight ahead; do no make the mistake of deviating from the route we agreed upon.

4. Without drawing the graph, you can't tabulate the test results.
5. Some consider roses, chocolates, heart-shaped candies as codes for love.

Activity 2: Vocabulary Practice

Directions: Do the KIM (Key, Information, Memory). Complete the following grid with ideas or pieces of information indicated by the headings.

Key Terms	Information/Meaning	Memory Clues (sentence expressing your experience about the key term)
1. Alternative		
2. Collating		
3. Deviating		
4. Tabulate		
5. Code		

Image Intensifier

Look at these figures. Do you know what these symbols mean? What is running through your mind as you examine the things inside the box?

$$(x + a)^n = \sum_{k=0}^n \binom{n}{k} x^k a^{n-k} \quad (1 + x)^n = 1 + \frac{nx}{1!}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \frac{dy}{dx} \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x y^2 \quad \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \quad \sqrt{a^2 + b^2}$$

$$\sin \alpha \pm \sin \beta = 2 \sin \frac{1}{2}(\alpha \pm \beta) \cos \frac{1}{2}(\alpha \mp \beta)$$

$$f(x) = a_0 + \sum_{n=1}^{\infty} \left(a_n \cos \frac{n\pi x}{L} + b_n \sin \frac{n\pi x}{L} \right)$$

Concept Discovery

What about the following reading material? Does it have something to say about the figures in the box? Read to find out.

QUANTITATIVE DATA ANALYSIS

Basic Concept

At this time, you already know that data means facts or information about people, places, things, events, and so on, and when these data appear not in words, images or pictures, but in numerical forms such fractions, numbers, and percentages, they become quantitative data. To understand the numbers standing for the information, you need to analyze them; that is, you have to examine or study them, not by taking the data as a whole, but by separating it into its components. Then, examine each part or element to see the relationships between or among the parts, to discover the orderly or sequential existence of these parts, to search for meaningful patterns of the components, and to know the reasons behind the formation of such variable patterns.

Quantitative data analysis is time consuming because it involves series of examinations, classifications, mathematical calculations, and graphical recording, among others. Hence, a thorough and advance planning is needed for this major aspect of your study. However, all these varied analytical studies that you pour into your research become significant only if prior to finalizing your mind about these activities, you have already identified the measurement level or scale of your quantitative data; that is, whether your study measures the data through a ratio or interval scale, not by means of nominal or ordinal scale because these last two levels of measurement are for qualitative data analysis. It is important for you to know what scale of measurement to use, for the kind of quantitative analysis you will do depends on your measurement scale. (De Mey 2013; Letherby 2013; Russel 2013)

Steps in Quantitative Data Analysis

Having identified the measurement scale or level of your data means you are now ready to analyze the data in this manner (Badke 2012; Letherby 2013; Mc Bride 2013):

Step 1: Preparing the Data

Keep in mind that no data organization means no sound data analysis. Hence, prepare the data for analysis by first doing these two preparatory sub steps:

1. *Coding System*

To analyze data means to quantify or change the verbally expressed data into numerical information. Converting the words, images, or pictures into numbers, they become fit for any analytical procedures requiring knowledge of arithmetic and mathematical computations. But it is not possible for you to do the mathematical operations of division, multiplication, or subtraction in the word level, unless you code the verbal responses and observation categories.

For instance, as regards gender variable, give number 1 as the code or value for Male and number 2 for Female. As to educational attainment as another variable, give the value of 2 for elementary; 4 for high school, 6 for college, 9 for MA, and 12 for PhD level. By coding each item with a

certain number in a data set, you are able to add the points or values of the respondents' answers to a particular interview question or questionnaire item.

2. *Data Tabulation*

For easy classification and distribution of numbers based on a certain criterion, you have to collate them with the help of a graph called *Table*. Used for frequency and percentage distribution, this kind of graph is an excellent data organizer that researchers find indispensable. Here's an example of tabulated data:

Total Sample Size: 24

Gender	Male: 11 (46%) Female: 13 (54%)
Course	Fine Arts: 9 (37%) Architecture: 6 (25%) Journalism: 4 (17%) Com. Arts: 5 (20%)
School	FEU: 3 (12%) MLQU: 4 (17%) PLM: 3 (12%) PUP: 5 (20%) TIP: 4 (17%) UE: 5 (20%)
Attended in 2016 Summer Arts Seminar-Workshop	Yes: 18 (75%) No: 6 (25%)
Role in the 2016 Seminar-Workshop on Arts	Speaker: 4 (17%) Organizer: 3 (12%) Demonstrator: 5 (20%) Participant: 12 (50%)
Satisfaction with the demonstration and practice exercises	Strongly agree: 11 (46%) Agree: 5 (20%) Neutral: 2 (8%) Disagree: 4 (14%) Strongly disagree: 2 (8%)

Step 2: Analyzing the Data

Data coding and tabulation are the two important things you have to do in preparing the data for analysis. Before immersing yourself into studying every component of the data, decide on the kind of quantitative analysis you have to use, whether to use simple descriptive statistical techniques or advanced analytical methods. The first one that college students often use tells some aspects of categories of data such as: frequency of distribution, measure of central tendency (mean, median, and mode), and standard deviation. However, this does not give information about population from where the sample came. The second one, on the other hand, fits

graduate-level research studies because this involves complex statistical analysis requiring a good foundation and thorough knowledge about statistics. The following paragraphs give further explanations about the two quantitative data-analysis techniques. (De Mey 2013; Litchman 2013; Picardie 2014)

1. *Descriptive Statistical Technique*

This quantitative data-analysis technique provides a summary of the orderly or sequential data obtained from the sample through the data-gathering instrument used. The results of the analysis reveal the following aspects of an item in a set of data (Morgan 2014; Punch 2014; Walsh 2010):

- Frequency Distribution – gives you the frequency of distribution and percentage of the occurrence of an item in asset of data. In other words, it gives you the number of responses given repeatedly for one question.

Example:

Question: By and large, do you find the Senators' attendance in 2015 legislative sessions awful?			
Measurement Scale	Code	Frequency Distribution	Percent Distribution
Strongly agree	1	14	58%
Agree	2	3	12%
Neutral	3	2	8%
Disagree	4	1	4%
Strongly disagree	5	4	17%

- Measure of Central Tendency – indicates the different positions or values of the items, such that in a in a category of data, you find an item or items serving as the:

Mean – average of all the items or scores

Example: $3 + 8 + 9 + 2 + 3 + 10 + 3 = 38$

$$38 \div 7 = 5.43 \text{ (Mean)}$$

Median – the score in the middle of the set of items that cuts or divides the set into two groups

Example: *The numbers in the example for the Mean has 2 as the Median.*

Mode – refers to the item or score in the data set that has the most repeated appearance in the set.

Example: *Again, in the given example above for the Mean, 3 is the Mode.*

- Standard Deviation – shows the extent of the difference of the data from the mean. An examination of this gap between the mean and the data

gives you an idea about the extent of the similarities and differences between the respondents. There are mathematical operations that you have to do to determine the standard deviation. Here they are:

- Step 1. Compute the Mean.
- Step 2. Compute the deviation (difference) between each respondent's answer (data item) and the mean. The plus sign (+) appears before the number if the difference is higher; negative sign (-), if the difference is lower.
- Step 3. Compute the square of each deviation.
- Step 4. Compute the sum of squares by adding the squared figures.
- Step 5. Divide the sum of squares by the number of data items to get the *variance*.
- Step 6. Compute the square root of variance figure to get standard deviation.

Example:

<i>Standard Deviation of the category of data collected from selected faculty members of one university.</i>		
<i>(Step 1) Mean: 7</i>		
Data Item	<i>(Step 2)</i> Deviation	<i>(Step 3)</i> Square of Deviation
1	-8	68
2	-5	25
6	-1	1
6	-1	1
8	+8	1
6	-1	1
6	-1	1
14	+7	49
16	+9	81
		Total: 321
<i>(Step 4) Sum of Squares: 321</i>		
<i>(Step 5) Variance = 36 (321 ÷ 9)</i>		
<i>(Step 6) Standard Deviation -6 (square root of 6)</i>		

2. *Advanced Quantitative Analytical Methods*

An analysis of quantitative data that involves the use of more complex statistical methods needing computer software like the SPSS, STATA, or MINITAB, among others, occurs among graduate-level students taking

their MA or PhD degrees. Some of the advanced methods of quantitative data analysis are the following (Argyrous 2011; Levin & Fox 2014; Godwin 2014):

- a. *Correlation* – uses statistical analysis to yield results that describe the relationship of two variables. The results, however, are incapable of establishing causal relationships.
- b. *Analysis of Variance (ANOVA)* – the results of this statistical analysis are used to determine if the difference in the means or averages of two categories of data are statistically significant.

Example: If the mean of the grades of a student attending tutorial lessons is significantly different from the mean of the grades of a student not attending tutorial lessons

- c. *Regression* – has some similarities with correlation, in that, it also shows the nature of relationship of variables, but gives more extensive result than that of correlation. Aside from indicating the presence of relationship between two variables, it determines whether a variable is capable of predicting the strength of the relation between the treatment (independent variable) and the Outcome (dependent variable). Just like correlation, regression is incapable of establishing cause-effect relationships.

Example: If reviewing with music (treatment variable) is a statistically significant predictor of the extent of the concept learning (outcome variable) of a person

Concept Explanation

Activity 1: Speculative Thinking (Whole Class Activity)

Directions: Questions do not only indicate your curiosity about your world but also signal your desire for clearer explanations about things. Hence, ask one another thought-provoking questions about quantitative data analysis. For proper question formulation, you may draft your questions on the space provided below.

Activity 2

Directions: INDIVIDUAL WORK. Recall two or three most challenging questions your classmates aired to the class that you wanted to answer but failed to get the chance to do so. Write and answer them on the lines provided.

Activity 3

Directions: Match the expression in A with those in B by writing the letter of your answer on the line before the word.

A	B
_____ 1. Mean	a. data-set divider
_____ 2. Ratio	b. facts or information
_____ 3. Data	c. part-by-part examination
_____ 4. Coding	d. data-preparation technique
_____ 5. Analysis	e. repetitive appearance of an item
_____ 6. Mode	f. $\text{sum} \div \text{no. of items}$
_____ 7. Median	g. valuable zero
_____ 8. Standard deviation	h. ANOVA
_____ 9. Regression	i. shows variable predictor
_____ 10. Table	j. data organizer

Concept Elaboration

Activity 1

Directions: INDIVIDUAL WORK. Have make-believe or imaginary grades of yours in all your subjects in the last three grading periods. Also, compute the mean per grading period including the general average.

Activity 2

Directions: Following the procedure in calculating standard deviation, compute the standard deviation of the data set in the box. Likewise, give the median and the mode of the data set.

Mean: _____

Sum of Squares: _____

Variance: _____

Standard Deviation: _____

Data Item Deviation Square of Deviation

Data Item	Deviation	Square of Deviation
0		
0		
1		
1		
2		
3		
4		

5
6
6
7
7
7
Median _____
Mode _____

Concept-Learning Assessment

How would you rate the extent of your learning of the concepts on quantitative data analysis? Discover this by checking the right column that corresponds to the given concept.

Concepts	Very Poor	Poor	Fair	Good	Very Good	Excellent
Meaning of data						
Meaning of quantitative data						
Meaning of quantitative data analysis						
Stages of quantitative data analysis						
Coding						
Data tabulation						
Descriptive statistics						
Mean						
Mode						
Median						
Standard deviation						
Correlation						
ANOVA						
Regression						

Concept Transformation

Visit your school library. Scan several theses and dissertations in this place to find out what kind of data analysis the studies used. Tabulate the results of your findings of at least ten studies. Give your teacher and friends copies of your data tabulation.

Intended Learning Outcomes

At the end of this lesson, you are expected to:

1. increase the number of English words you know;
2. express their worldviews using newly learned words;
3. define statistics;
4. justify the relevance of statistics to research;
5. differentiate descriptive statistics from inferential statistics;
6. explain the methods of bivariate-data analysis;
7. familiarize themselves with bivariate statistical methods; and
8. compare and contrast the kinds of tests to measure correlation or covariation.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: Put a plus sign (+) under the feature related to the word on the left side; minus sign (–) under the feature not related to the word. Be guided by the way such word was used in the main reading material of this lesson. Scan the text to see these underlined words.

Vocabulary	Concrete	Trait	Abstract	Direction	Action
1. calculate					
2. soothsayer					
3. variance					
4. prowess					
5. fork					

Activity 2: Vocabulary Practice

Directions: Draw or sketch anything in connection to your understanding of the newly learned terms. Write a sentence about your drawing on the following Sketch Pad .

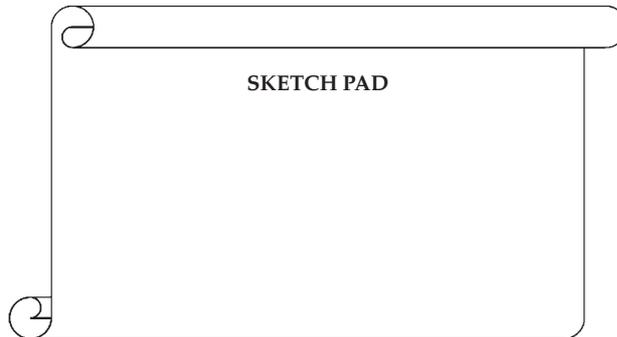
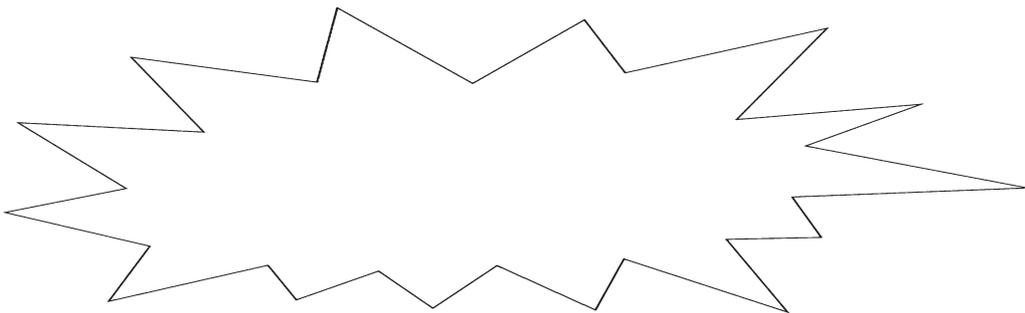


Image Intensifier

Be a *soothsayer*...Focus your attention on the title of the following reading material. Predict what the text is all about. Write your predictions in the given space .



Concept Discovery

How do you think does the reading material validate your predictions? Read the text to find out.

STATISTICAL METHODS

Basic Concept

What is statistics? *Statistics* is a term that pertains to your acts of collecting and analyzing numerical data. Doing statistics then means performing some arithmetic procedures like addition, division, subtraction, multiplication, and other mathematical calculations. Statistics demands much of your time and effort, for it is not merely a matter of collecting and examining data, but involves analysis, planning, interpreting, and organizing data in relation to the design of the experimental method you chose. Statistical methods then are ways of gathering, analyzing, and interpreting variable or fluctuating numerical data.

Statistical Methodologies

1. *Descriptive Statistics*

This describes a certain aspect of a data set by making you **calculate** the Mean, Medium, Mode and Standard Deviation. It tells about the placement or position of one data item in relation to the other data, the extent of the distribution or spreading out of data, and whether they are correlations or regressions between or among variables. This kind of statistics does not tell anything about the population.

2. *Inferential Statistics*

This statistical method is not as simple as the descriptive statistics. This does not focus itself only on the features of the category of set, but on the characteristics of the sample that are also true for the population from where you have drawn the sample. Your analysis begins with the sample, then, based on your findings about the sample, you make inferences or assumptions about the population. Since the sample serves as the basis of your conclusions or generalizations about the population, it is a must that you use random sampling to guarantee the representativeness of the sample; meaning, to make sure that the sample truly represents the population in general.

Inferential statistics is a branch of statistics that focuses on conclusions, generalizations, predictions, interpretations, hypotheses, and the like. There are a lot of hypotheses testing in this method of statistics that require you to perform complex and advanced mathematical operations. This is one reason inferential statistics is not as popular as the descriptive statistics in the college level where very few have solid foundation of statistics. (Argyrous 2011; Russell 2013; Levin & Fox 2014)

Types of Statistical Data Analysis

Types of statistical analysis of variables in a quantitative research are as follows:

- Univariate Analysis – analysis of one variable
- Bivariate Analysis – analysis of two variables (independent and dependent variables)
- Multivariate Analysis – analysis of multiple relations between multiple variables

Statistical Methods of Bivariate Analysis

Bivariate analysis happens by means of the following methods (Argyrous 2011; Babbie 2013; Punch 2014):

1. *Correlation or Covariation* (correlated variation) – describes the relationship between two variables and also tests the strength or significance of their linear relation. This is a relationship that makes both variables getting the same high score or one getting a higher score and the other one, a lower score.

Covariance is the statistical term to measure the extent of the change in the relationship of two random variables. Random variables are data with varied values like those ones in the interval level or scale (*strongly disagree, disagree, neutral, agree, strongly agree*) whose values depend on the arbitrariness or subjectivity of the respondent.

2. *Cross Tabulation* – is also called “crosstab or students-contingency table” that follows the format of a matrix (plural: matrices) that is made up of lines of numbers, symbols, and other expressions. Similar to one type of graph called table, matrix arranges data in rows and columns. By displaying the frequency and percentage distribution of data, a crosstab explains the reason behind the relationship of two variables and the effect of one variable on the other variable. If the Table compares data on only two variables, such table is called *Bivariate Table*.

Example of a Bivariate Table:

HEI Participants in the 2016 NUSP Conference

HEI	MALE	FEMALE	Row Total
CEU	83 (10.2%)	101 (12.2%)	184
FEU	69 (8.5%)	93 (11.3%)	162
JRU	102 (12.6%)	120 (14.5%)	222
La Salle	79 (9.7%)	99 (12%)	178
MLQ	81 (10%)	79 (9.5%)	159
NU	61 (7.5%)	58 (7%)	119
OUP	59 (7.2%)	48 (5.8%)	107
UP	120 (14.8%)	98 (11.9%)	218
UST	152 (18.7%)	127 (15.4%)	279
Column Total	806 (100%)	823 (100%)	1,629

Measure of Correlation

The following are the statistical tests to measure correlation or covariation:

1. *Correlation Coefficient*

This is a measure of the strength and direction of the linear relationship between variables and likewise gives the extent of dependence between two

variables; meaning, the effect of one variable on the other variable. This is determined through the following statistical tests for Correlation Coefficient: (Argyrous 2011; Creswell 2014; Levin & Fox 2014)

- *Spearman's rho* (Spearman's r , or r) – the test to measure the dependence of the dependent variable on the independent variable
- *Pearson product-moment correlation* (Pearson's r , r or R) – measures the strength and direction of the linear relationship of two variables and of the association between interval and ordinal variables.
- *Chi-square* – is the statistical test for bivariate analysis of nominal variables, specifically, to test the null hypothesis. It tests whether or not a relationship exists between or among variables and tells the probability that the relationship is caused by chance. This cannot in any way show the extent of the association between two variables.
- *t-test* – evaluates the probability that the mean of the sample reflects the mean of the population from where the sample was drawn. It also tests the difference between two means: the sample mean and the population mean. ANOVA or analysis of variance also uses t-test to determine the **variance** or the difference between the predicted number of the sample and the actual measurement. The ANOVA is of various types such as the following:
 - a. One-way analysis of variance – study of the effects of the independent variable
 - b. ANCOVA (Analysis of Covariation) – study of two or more dependent variables that are correlated with one another
 - c. MANCOVA (Multiple Analysis of Covariation) – multiple analyses of one or more independent variables and one dependent variable to see if the independent variables affect one another

2. *Regression*

Similar to correlation, regression determines the existence of variable relationships, but does more than this by determining the following: (1) which between the independent and dependent variable can signal the presence of another variable; (2) how strong the relationship between the two variables are; and (3) when an independent variable is statistically significant as a **soothsayer** or predictor.

Each of these statistical tests has its own formula that, with your good background knowledge about statistics, you may be able to follow easily. However, without solid foundation about statistics, to be able to apply them to your research, you need to read further about statistics or hire the services of a statistician.

Think of **forking** out hundreds of dollars or thousands of pesos for a research study in the graduate or MA/PhD level, not for one in the collegiate level. It is in your bachelor degree level where the world expects you to show your **pro prowess** in conducting a research that uses simple descriptive statistical techniques.

To attain mastery in the use of descriptive statistics is to prepare you for another kind of research work that uses inferential statistics, a statistical method requiring thorough knowledge and full mastery of the formulae underlying advanced statistical methods to guarantee the validity, credibility, and prestige of your research findings.

Concept Explanation

Activity 1

Directions: INDIVIDUAL WORK. Answer the following questions intelligently and concisely.

1. Describe a research study that uses statistics.

2. Do non-experimental research methods use statistics, too? Why? Why not?

3. Differentiate the two kinds of statistical methods.

4. What is the role of hypotheses in inferential statistics?

5. How does bivariate analysis take place?

6. Which research method fits inferential statistics? Give reasons for your answer.

7. Do you agree that standard deviation can measure variable relationships? Why? Why not?

8. Could you possibly do any of the statistical methods you have learned? Explain your point.

9. Is it correct to say, "To be a quantitative researcher is to know much about statistics"? Justify your point.

10. Whom could you approach for help with regard to the true experimental research study you intend to conduct, soon? Give reasons for your answer.

Activity 2

Directions: Compare and contrast the following expressions.

1. Univariate, bivariate, multivariate

2. Correlation, covariation, variance

3. ANOVA vs. MANCOVA

4. Spearman's r vs. Pearson's r

5. t-test vs. Chi-Square

Intended Learning Outcomes

At the end of this lesson, you should be able to:

1. widen your English vocabulary;
2. exchange ideas with one another using the newly learned words;
3. explain the meaning of sampling;
4. familiarize with the factors affecting sample selection;
5. compare and contrast sampling techniques;
6. find ways to overcome bias in sampling;
7. enumerate the pluses and minuses of some random-sampling techniques;
8. adopt the most appropriate sampling technique for a chosen research topic; and
9. carry out a sampling technique with scientific value.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: From the box, pick out the word that means the same thing as the underlined word in the sentence. Be guided by some clues in the sentence.

exact	layers
no factual basis	surrendered
unrighteous	limitations
one with no fixed residence	

1. Please, give me a precise answer to erase the doubt in my mind.

2. You have not experienced meeting him yet, so stop burdening yourself with those unfounded fears. _____
3. The atmosphere of the earth is made up of several strata and the ozone is the stratum that serves as the electric fan of the earth. _____

4. I feel like I'm choked or tied to a rope with those many restrictions imposed on me. _____
5. Being in the last stage of Cancer, the man readily succumbed to the physician's treatment procedure for him. _____
6. The wayward man has a technique in avoiding any policeman's arrest. _____

Activity 2: Vocabulary Practice

Directions: In the space provided, make a poster or advertisement that has something to do with the newly learned words. Give your creative work a relevant and interesting caption.



Image intensifier

Based on this title of the reading material, *Sampling Procedure*, what do you think is the text all about?

Concept Discovery

SAMPLING PROCEDURE

Basic Concept

Sampling means choosing from a large population the respondents or subjects to answer your research questions. The entire population is involved but for your research study, you choose only a part of the whole.

The word *population* is a technical term in research which means a big group of people from where you choose the *sample* or the chosen set of people to represent the population. *Sampling frame*, on the other hand, is the list of the members of the population to which you want to generalize or apply your findings about the sample, and *sampling unit* is the term referring to every individual in the population. The sampling, as well as the research results, is expected to speak about the entire population. Unless this does not refer to the population, in general, the sample-selection procedure has no scientific value. (Emmel 2013; Lapan 2013)

Factors Affecting Sample Selection

In choosing your respondents, you do not just listen to the dictates of your own mind but also to other factors such as the following (Babbie 2013; Edward 2013; Tuckman & Engel 2012):

1. *Sample Size*

How big should the sample be? Some researchers base their decision on their own experience and on research studies they have already read. But the best way to guide you in determining the right sample size is the representativeness of the sample with respect to the population. See to it that the sample truly represents the entire population from where the sample came.

The representativeness or accuracy of a sample size is really hard to determine. However, using the right sampling technique such as a randomized one, your chances of getting a sample reflecting 95% distribution of the population or of a sample representing the whole population is highly probable. This acceptable level of probability of the representativeness of the sample is called *confidence level* or *0.05 level*. This theory of probability is true only for randomly selected respondents, not for any non-probability type of sampling.

2. *Sampling Technique*

Sampling techniques fall under two categories: *probability sampling* and *non-probability sampling*. The first one uses a random selection; the second, a purposive or controlled selection. Probability sampling that gives all population members equal opportunity to be chosen as people to constitute the sample is a precise way of sampling. Based on pure chance, it is unbiased or an accurate manner of selecting the right people to represent the population.

Bias is the leading factor in choosing your respondents. This is one of the causes of sampling errors. The other errors in sampling are attributed to your procedure in sampling.

3. *Heterogeneity of Population*

Heterogeneous population is composed of individuals with varied abilities. There is a wide variation among the people composing the population. If it is a homogeneous population where lots of uniformity in abilities exist among population members, a sample of one will do. But for

a heterogeneous group, a sampling technique that will widely spread the choosing of a large sample among all members of the population is necessary.

4. *Statistical Techniques*

The accuracy of the sample depends also on how precise or accurate your methods are in calculating the numbers used in measuring the chosen samples or in giving a certain value to each of them. Any error in your use of any statistical method or computing numbers representing the selected subjects will turn in unfounded results.

5. *Time and Cost*

Choosing samples makes you deal with one big whole population, with each member of this large group needing your attention, time and effort, let alone the amount of money you will fork out for the materials you will need in making the sampling frame. Hence, considering all these things, your sample selection makes you spend some of your time deliberating or mulling over several factors affecting or influencing your sample selection.

Sampling Methods

The sampling methods are of two groups which are as follows (Tuckman 2012; Emmel 2013; De Vaus 2013; Picardie 2014):

1. *Probability Sampling*

This is a sampling method that makes you base your selection of respondents on pure chance. In this case, everybody in the population participates. All are given equal opportunity or chance to form the sample that is capable of reflecting the characteristics of the whole population from where such sample was drawn. The following are the different probability sampling techniques:

- a. Simple-random sampling – choosing of respondents based on pure chance
- b. Systematic sampling – picking out from the list every 5th or every 8th member listed in the sampling frame until the completion of the desired total number of respondents
- c. Stratified sampling – choosing a sample that will later on be subdivided into strata, sub-groups, or sub-samples during the stage of the data analysis
- d. Cluster sampling – selecting respondents in clusters, rather than in separate individuals such as choosing 5 classes of 40 students each from a whole population of 5,000 students

Ensuring a bias-free selection of subjects, these probability sampling techniques are considered by many as more capable than the non-probability sampling techniques in coming out with the accurate or exact samples to give pieces of information about the population as a whole.

2. *Non-probability Sampling*

The sampling techniques included in this category are not chosen randomly, but purposefully. Not randomized, they are susceptible to bias. Unlike the probability sampling techniques that exclude the researcher's judgment, the non-probability sampling techniques succumb to the control, likes, or wishes of the researcher and to restrictions imposed by the researcher on the sampling procedure. The following are the non-probability sampling techniques:

- a. Quota sampling – choosing specific samples that you know correspond to the population in terms of one, two, or more characteristics
- b. Voluntary sampling – selecting people who are very much willing to participate as respondents in the research project
- c. Purposive sampling – choosing respondents whom you have judged as people with good background knowledge or with great enthusiasm about the research
- d. Availability sampling – picking out people who are easy to find or locate and willing to establish contact with you
- e. Snowball sampling – selecting samples from several alternative samples like drug dependents, human traffickers, street children, and other wayward and homeless people whose dwelling places are not easily located for they are like nomads moving from place to place

Random Sampling vis-à-vis Statistical Methods

The most preferred sampling technique in qualitative or quantitative research is random sampling. However, this kind of probability sampling requires the use of statistical method in measuring the sample. Three probability sampling techniques: simple random, stratified, and systematic depend greatly on statistics for sample accuracy. The use of statistics does not only prevent you from favoring any side of a thing or situation involved in the research but also proves the accuracy or precision of your sampling procedure. Contributing to the accuracy of sampling through the use of statistical methods in *stratified sampling* is your adherence to the following steps of this unbiased sampling technique (Suter 2012; Emmel 2013; Corti 2014):

1. Decide on the size of the sample.
2. Divide the sample into sub-sets or sub-samples, with the sub-samples having the same aggregate number as that of the sample they came from.
3. Select the appropriate sub-sample randomly from each sub-group or stratum.
4. Put together the sub-sample results to get the total number of the overall sample.

Advantages and Disadvantages of Five Basic Sampling Techniques

Sampling Techniques	Advantages	Disadvantages
Random Sampling	The most accurate theoretically; influenced only by chance	Unavailable list of the entire population sometimes or prevention of random sampling by practical considerations
Stratified sampling	Assures a large sample to subdivide on important variables; needed when population is too large to list; can be combined with other techniques	Can be biased if strata are given false weights, unless the weighting procedure is used for overall analysis
Systematic sampling	Similar to random sampling; often easier than random sampling	Sometimes permits bias
Cluster sampling	Easy to collect data on the subject	Prone to bias when the number is small
Quota sampling	Available when random sampling is impossible; quick to do	Presence of bias not controlled by the quota system

Concept Explanation**Activity 1**

Directions: INDIVIDUAL WORK. Write C on the space before the number, if the sentence is correct; NC, if it is not correct.

- _____ 1. Sampling unit is synonymous with sampling frame.
- _____ 2. Population in relation to sampling refers to the citizens of Philippine archipelago.
- _____ 3. The principal purpose of sampling is the application of results in the population.
- _____ 4. You look forward to having several group samples in a stratified sampling.
- _____ 5. In a stratified sampling, you randomly choose samples from several groups.

- _____ 6. Sampling decisions depend 100% on your own dispositions or judgement.
- _____ 7. You are detached from your personal inclinations when you do a random selection of subjects.
- _____ 8. Non-probability sampling is not very particular about statistics.
- _____ 9. Probability sampling techniques are suitable for Quantitative research studies.
- _____ 10. Bias can only be minimized; can't be totally eliminated.

Activity 2

Directions: On the lines provided, write your reasons to justify your NC answer in the preceding activity (Activity 1).

Activity 3

Directions: From the box, choose the appropriate sampling technique for each given situation. Write your answer on the line before the number.

A. quota sampling	B. cluster	C. availability
D. snowball	E. purposive	F. systematic
G. voluntary	H. stratified	I. probability
J. statistics	K. simple random	

- _____ 1. Going to different areas to obtain a sample from varied set of people
- _____ 2. Offering varied sampling techniques whose validity depends much on statistics
- _____ 3. Interviewing people buying fish at the market place
- _____ 4. Selecting respondents from each of these sections: A, B, C, and D
- _____ 5. Making sections A, B, C, and D as your respondents
- _____ 6. Choosing from your class the native speakers of English as the subjects in your study entitled: *The Extent of the Grammatical Competence of UST Freshmen Students*
- _____ 7. Putting all the names of population members in a box and draw from the box the total number of the sample
- _____ 8. Selecting the exact number of samples possessing comparative features or traits with the population
- _____ 9. Accommodating extra-willing people to act as the respondents
- _____ 10. Taking every 15th person in the sampling frame as the chosen respondent

Concept Elaboration

Activity 1: Quiz Master of the Year!

Directions: GROUP WORK. *Quiz Master of the Year!* Form a group of six. Alternate in being a Quiz Master to ask questions about the things you learned through this lesson. Every correct answer gets 2 points and gives one the qualifications to be the next Quiz Master. Submit your honestly accumulated scores at the end of the activity.

Activity 2

Directions: PAIR WORK. In the space provided, classify the following expressions based on a certain criterion or factor. Write the basis for each class.

sampling technique

stratified sampling

quota sampling

systematic sampling

time and cost

population

availability sampling

snowball sampling

cluster sampling

sampling unit

purposive sampling

sample

heterogeneous group

sample size

simple random sampling

voluntary sampling

simple random sampling

statistics

Class A

Basis: _____

Class B

Basis: _____

Class C

Basis: _____

Concept-Learning Assessment

Using numbers 1 to 11, rank order the following topics based on the extent of your understanding of the concepts behind each topic, with 1 as the most understood topic; 11, the least.

- _____ Probability sampling
- _____ Sampling unit, sampling frame
- _____ Sample vs. population
- _____ Factors in choosing samples
- _____ Non-probability sampling
- _____ Statistics vs. Random sampling
- _____ Sample size
- _____ Heterogeneous vs. homogeneous group
- _____ Advantages and disadvantages of random sampling
- _____ Sampling errors
- _____ .05 level

Concept Transformation

Think of one doable quantitative research topic. Surf the Internet for a list of topics from where you can get an idea of one specific topic you can work on. Decide on which appropriate sampling technique to use for this topic. Make a written report defining, explaining, and describing every aspect of your sampling design or plan.

Research adheres to a certain manner of making public its findings. It is incapable of convincing any readers of the genuineness of the research report, unless it follows the academically and professionally accepted standards of writing the report in terms of its language, structure or format, and acknowledgment or recognition of the sources of knowledge responsible for making the entire research study reputable, genuine, and credible basis for effecting positive changes in this world.

LESSON 16 **Research-Report Writing**

Intended Learning Outcomes

At the end of this lesson, you should be able to:

1. lengthen the list of English words you know;
2. use newly learned words in expressing worldviews;
3. explain the meaning of research-report writing;
4. compare and contrast research writing and report writing;
5. apply the guidelines on research-report writing;
6. become familiar with the language of academic writing;
7. point out the similarities and differences between APA and MLA styles;
8. familiarize with the standard research-writing format ;
9. acquire awareness of the mechanics of research-report writing; and
10. critique the structural organization of a sample research-report component.

Concept Linkers

Old and New Concept Fusion

Activity 1: Vocabulary Improvement

Directions: The words listed are underlined in the reading material that you are going to read later. Look for the word that corresponds in meaning to the word or phrase below in the list. Be guided by the contextual clues and write your answer on the line opposite each word.

1. accept or stick to something _____
2. mental _____
3. deliberate _____

4. absolutely necessary _____
5. owning something _____
6. superior or towering over _____
7. directed _____

Activity 2: Vocabulary Practice

Directions: PAIR WORK. Have a conversation about any topic both of you are interested in. Discover the connection of the newly learned words in your conversation as you use them in your exchange of ideas with your partner.

Image Intensifier

What kind of writing have you already experienced? Write your answers in the *Table* by checking the right column representing your thoughts and feelings about the kind of writing you have already experienced. Accomplish the last column, too.

Types of Writing	Easy	Difficult	Challenging	Enjoyable	Reason/s
Technical writing					
Expository writing					
Research Writing					
Literature writing					

Concept Discovery

RESEARCH-REPORT WRITING

Basic Concept

The first things you do in research are: **mulling over** a research problem that will lead you to the final topic of your research, obtaining background knowledge about your topic by reviewing related literature, formulating research questions, collecting and analyzing data, drawing conclusions, and making recommendations. Going through all these research stages make you perform all levels of thinking especially the HOTS or higher-order thinking strategies of interpretative, critical, interactive, and creative thinking.

Moving on after all these **cognitive**-driven research activities, you reach the final stage of your research study which is the presentation of your research output. This is the time when you have to think of how to give a formal account of what and how you discovered something about your research topic. Central to this last stage of your research study is sharing information or making known to people the results of your several-month inquiry of a certain topic. However, it is not telling the readers of how you found out truths in any way you want. Your study is an academic work that has to **abide** by some rules or standards in research-report writing.

You learned that there are different kinds of writing: technical writing, expository writing, fictional writing, and academic writing, among others. Research-report writing is an academic writing, in that, its focus is on reporting or telling about the results of your investigation of a specific subject matter. It is not simply communicating your opinions, but doing this in a controlled way; that is, you have to follow socially determined and discipline-specific rules in terms of language, structure, and format or style. Governed by several writing rules and standards, research-report writing is the most challenging and demanding kind of writing among learners in higher education institutions. (Russell 2013; Corti 2014; Punch 2014)

Research Writing vs. Report Writing

How would you compare and contrast research writing and report writing? Both depend on various sources of data or information, but they differ from each other as to what kind of data they present. Research writing presents facts and opinions of other people about a particular subject matter. It also includes your own interpretations, as the researcher, about these known facts. Report writing, too, presents facts and opinions of others; however, it does not claim that these opinions originally come from the writer, for the reason that some reading materials like books, journals, magazines, and other reading materials have already published these facts and opinions. This is where the main difference between the two lies.

The research paper gives you what other people think of a certain topic in addition to what you, the researcher, think about this topic, while report just presents facts and information about a subject matter without adding something new to this existing body of facts and opinions. Further, a genuine research paper does not only shed a new light on a subject by finding new facts and opinions, but also aims at saying something original by re-evaluating or using these known facts and opinions. (Litchman 2013; Babbie 2013; Punch 2014)

Guidelines in Research-Report Writing

Now, you know that research-report writing is not plain writing of a report where you just present facts and opinions of other people that you got from varied reading materials. It is a special kind of writing that communicates not only declarative knowledge or discovered ideas, but also procedural knowledge or the processes you did in discovering ideas. Hence, to make your research report communicate all these forms of knowledge to readers, you need to apply the following guidelines in research-report writing.

1. Organize the parts of your research report based on the standard research-report structure that consists of the following sequential components:
 - a. **Title.** This part of your research paper gives information and descriptions of the things focused on by your research study.
 - b. **Abstract.** Using only 100 to 150 words, the abstract of a research paper, presents a summary of the research that makes clear the background, objectives, significance, methodologies, results, and conclusions of the research study.

- c. **Introduction.** Given a stress in this section of the paper are the research problem and its background, objectives, research questions, and hypotheses.
- d. **Methodology.** This part of the research paper explains the procedure in collecting and analyzing data and also describes the sources of data.
- e. **Results or Findings.** There's no more mentioning of analysis of data or not yet analyzed data in this section. What it does is to present the research findings that are expressed through graphics, statistics, or words.
- f. **Conclusions.** This section explains things that will lead you to significant points, insights, or understanding, or conclusions that **derive** their validity, credibility or acceptability from the factual evidence gathered during the data-collection stage. Stated here, too, is the significance of the results; that is, whether or not these are the right answers to the research questions or the means of hypotheses acceptance or rejection. Your assessment of the data in relation to the findings of previous research studies is also given a space in this section of the research paper.
- g. **Recommendations.** Due to teachers' instructions or discipline-specific rules, this section tends to be optional in some cases. Done by some researchers, this section gives something that will expand or extend one's understanding of the conclusions raised earlier, such as suggesting a solution to the problem or recommending a further research on the subject.
- h. **References.** It is in this part where you display the identities or names of all writers or owners of ideas that you incorporated in your research paper.
- i. **Appendices.** Included in this section are copies of materials like questionnaires, graphs, and letters, among others that you used in all stages of your academic work, and are, then, **part and parcel** of your research study.

2. Familiarize yourself with the language of academic writing.

Research-report writing is an academic writing and central to this kind of writing is the expression of ideas, viewpoints, or positions on issues obtained through learned or trained methods of producing sound evidence to support your claims or conclusions about something. **Geared** toward bringing out what are generally true, valid, and acceptable, the language of research-report writing uses rich-information vocabulary and adopts an objective, formal, or impersonal tone or register.

Here are some ways to maintain an objective and an impersonal tone in academic texts such as your report about your research study:

- a. **Dominantly** use passive voice than active voice sentences.
- b. Use the third-person point of view by using words like his or her, they, or the user, instead of the personalized first-person point of view like I, We, Me, Our, etc.

- c. De-emphasize the subject or personal nature of the academic text by avoiding the use of emotive words like dissatisfied, uninteresting, or undignified.
- d. Use modality (words indicating the degree of the appropriateness, effectiveness, or applicability of something) to express opinionated statements that are prone to various degrees or levels of certainty. For instance, use low modality when you think your opponents have strong chances to present their valid reasons against your argument, or high modality, when you are sure you have sufficient basis to prove your point.

High modality expressions like could, should, must, definitely, absolutely, surely, necessarily, and essentially are usually used for recommending solutions to problems or for specifying reasons for some actions.

3. Observe the mechanics of research-report writing which are as follows:
 - a. **Physical Appearance.** Use white bond paper having the size of 8 ½ x 11 in. and provide 1 ½ in. left-right margin, plus 1 in. top-bottom margin. Unless your teacher instructs you to use a particular font style and size, use the standard Times Roman, 12 pts.
 - b. **Quotations.** A one-line, double-spaced quotation is in quotation marks; 4- to 5-line, single-spaced quotations are indented further from the margin to appear as block quotation.
 - c. **Footnotes.** Footnotes appear at the bottom of the page and are numbered consecutively starting with number one (1) in each chapter.
 - d. **Statistics and Graphs.** Use tables, charts, bar graphs, line charts, pictograms, flowcharts, schematic diagrams, etc. in connection with the objectives of the study.
 - e. **Final Draft.** Subject the final form of the research report to editing, revising, rewriting, and proofreading.
 - f. **Index.** Alphabetize these two types of index: subject index and author index.

Research-Report Writing Styles or Format

Depending on the requirements of your teacher or the area of your discipline, **adopt** any of the following research-report writing styles or format:

1. APA (American Psychological Association)
2. MLA (Modern Language Association)
3. CMS (Chicago Manual of Style)

The first two styles—APA and MLA—are the most commonly used styles or format. Prone to objectivity, those in the fields of Science, Psychology, Business, Economics, Political Science, Anthropology, Engineering, and Law go for APA; to subjectivity, Humanities (Religion, Literature, and Language) go for MLA.

Lesson 8 of this book gives you comprehensive and detailed explanations plus examples of these two research writing styles. Chicago style is the basis of the APA and MLA styles. It is called *Author-Date Style* if it follows the APA form; *Humanities Style*, if it follows the MLA style. (Babbie 2013; Schutt & Engel 2013; De Vaus 2014)

Concept Explanation

Activity 1

Directions: PAIR WORK. Fill in the blank with the correct answer.

- 1) Chicagostyle is given the name, _____ a _____ system for APA; Humanities system for _____ b _____. Deciding on what font style to use refers to the _____ c _____ of your paper. This also tells you to use _____ d _____ for one-line quotation and single space for _____ e _____ quotation.
- 2) A brief summary of your research paper is given by the _____ a _____; the Background, research problem, and research questions by the _____ b _____. In the _____ c _____ section of your paper, you reveal research _____ d _____ that get their extended meanings in the section called _____ e _____.

Activity 2

Directions: Without going back to the text, compare and contrast each given pair of expressions.

Words in Pairs	Comparison	Contrast
1. Research vs. Report writing		
2. Author-date system vs. Humanities system		
3. MLA vs. APA		
4. One-line quotation vs. Five-line quotation		
5. Conclusion vs. Recommendation		
6. Left-Right margin vs. Top-Bottom margin		
7. Abstract vs. Introduction		
8. Academic language vs. Literary language		
9. Passive voice vs. Active voice		
10. Research report vs. Literature report		

Concept Elaboration

Activity 1

Directions: INDIVIDUAL WORK. Check the column that represents your view about the given statement. Justify your choice in the last column.

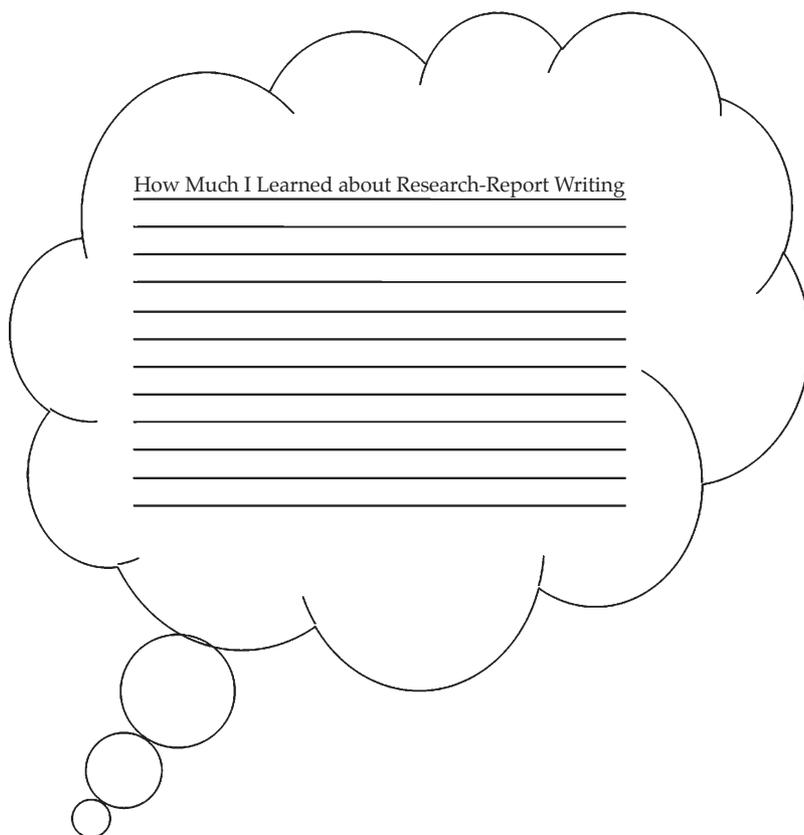
Statements	Agree	Disagree	Reasons, Comments, Reactions
1. You are free to use any language form in academic texts.			
2. Facts and opinions in all report types are genuine.			
3. Things mentioned in the conclusion are evidence-based information.			
4. Very little difference exists between APA and MLA.			
5. APA and MLA are applicable in any area of knowledge.			
6. Read data analysis in the body of the paper, not in the conclusion portion.			
7. Research paper submission occurs immediately after writing all major research parts.			
8. Recommendation is not as compulsory as conclusion.			
9. Discipline-specific writing rules come from the school heads.			
10. Research writing is report writing			

Activity 2: Class Inquiry Hour

Directions: Form a group of four. The first group representative to correctly answer a question coming from the teacher earns five points for the whole group. Submission of the summary of honestly earned points signals the end of the inquiry.

Activity 3

Directions: Find out if the following abstract of a research paper is in keeping with your concepts about abstract writing. Write the results of your critical evaluation on the lines provided.



Concept-Learning Assessment

In the space provided, write a reflective essay stating how much or how little your understanding is about the research concepts you learned through this lesson.

Concept Transformation

Refresh your mind about the research topic you thought of in this section of Lesson 15, *Concept Transformation*, and to which you applied a certain sampling technique. Conduct a research study on this. In carrying out this research with the assistance of your school library, different academic/library databases, and other online resources, do the following:

1. Conduct a review of related literature.
2. Collect and analyze data.
3. Draw conclusions based on data-analysis results.
4. Formulate recommendations.
5. Present a written report of your research indicating its adherence to the standard structure or format of an academic written work and a paper manifesting your creativity in using non-prose materials like graphs to make the whole of your written work presentable.
6. Make a complete list of references you used.

References

- Argyrous, G. 2011. *Statistics for research*. Los Angeles: Sage.
- Badke, W. B. 2012. *Teaching research process: The faculty's role in the development of skilled student researchers*. New Delhi: CP Chados Publishing.
- Babbie, E. 2014. *The basics of social research*. 6th ed. USA: Wadsworth Cengage Learning.
- Bernard, R. 2013. *Social research method: Qualitative and quantitative approach*. Los Angeles: Sage.
- Burns, A. and Bush, R. 2012. *Basic research methods*. 3rd ed. New York: Pearson.
- Canavor, N. and Meirowitz, C. 2010. *The truth about the new rules of business writing that you mean*. New York: McGraw-Hill.
- Clow, K. and James, K. 2014. *Essentials of marketing research: Putting research into practice*. Los Angeles: Sage.
- Coghan, D. and Branneick, T. 2014. *Doing action research in your own organization*. 4th ed. Los Angeles: Sage.
- Corti, L. et al. 2014. *Managing and sharing research data: A guide to good practice*. Los Angeles: Sage.
- Creswell, J. 2014. *Research design : qualitative, quantitative, and mixed method approaches*. 4th ed. Los Angeles: Sage.
- Decilo, P. 2014. *Achieving impact in research*. Los Angeles: Sage.
- De Mey, L. Dr. and Smith, D. Dr. 2013. *Advanced research methods*. London: Sage.
- De Vaus, D. 2014. *Survey in social research*. 5th ed. London: Routledge.
- Dixon, J. and Singleton, R. A. 2013. *Reading social research studies in inequalities and deviance*. Los Angeles: Sage.
- Edmonds, A. and Kennedy, T. 2013. *An applied reference guide to research designs: Qualitative, quantitative, and mixed method*. Los Angeles: Sage.
- Emmel, N. 2013. *Sampling and choosing cases in qualitative research*. Los Angeles: Sage.
- Feinberg, F. Kinnear, T. and Taylor, J. 2013. *Modern marketing research: Concepts, methods, and cases*. Australia: Cengage Learning.
- Fraenbel, J. Wallen, N., and Hyun, H. 2012. *How to design and evaluate research in education*. 2012. USA: Mc-Graw-Hill.
- Gibson, B. and Hartman, J. 2014. *Rediscovering grounded theory*. Los Angeles: Sage.
- Goetsch, D. L. et al. 2010. *Technical drawing and engineering communication*. Australia: DELMAR Cengage Learning.

- Goodwin, J. and Goodwin, K. 2014. *Research methods: Designing and conducting research with a real-world focus*. Los Angeles: Sage.
- Gorard, S. 2013. *Research design: Creating robust appreciation for the social research*. Los Angeles: Sage.
- Gray, T. 2013. *How to do your research project*. Los Angeles: Sage.
- Hammersley, M. And Traianou, A. 2012. *Ethics in qualitative research: Controversies and context*. Los Angeles: Sage.
- Hannemen, R., Kposowa, A., and Riddle, M. 2013. *Basic statistics for social research*. Los Angeles: Sage.
- Jesson, J., Matheson, L., and Lacy, F. 2011. *Doing your literature review: Traditional and systematic techniques*. Los Angeles: Sage.
- Lapan, S., Quartaroli, M., and Riemer, F. 2012. *An introduction to research methods and designs*. USA: Jossey-Bass, A Wiley Imprint.
- Lappuci, R. and Haghi, A. K. 2013. *Education for a digital world*. Toronto: Apple Academy Press.
- Laursen, S. et al. 2010. *Understanding research in Sciences, Technology, Engineering, and Math*. New York: Pearson.
- Layder, D. 2013. *Doing excellent small-scale research*. Los Angeles: Sage.
- Letherby, G., Scott, J., and Williams, M. 2013. *Objectivity and subjectivity in social research*. Los Angeles: Sage.
- Levin, J. and Fox, J. 2014. *Pearson new international edition (elementary statistics in social research essentials)*. New York: Pearson.
- Litchman, M. 2013. *Qualitative research in education*. 3rd ed. Los Angeles: Sage.
- Mc Bride D. M. 2013. *Process of research in psychology*. Los Angeles: Sage.
- Matthews, B. and Ross, L. 2010. *Research Method: A practical guide for the social research*. New York: Pearson.
- Meng, K. J. 2012. *Marketing research for beginners: a practical guide (Handbook)*. Singapore: Cengage Learning.
- Morgan, D. L. 2014. *Integrating qualitative and quantitative methods: A pragmatic approach*. Los Angeles: Sage.
- Muijs, D. 2011. *Quantitative research in education*. Los Angeles: Sage.
- Peggs, K., Snort, B., and Burridge, J. 2013. *Observation method*. Los Angeles: Sage.
- Penrose, A. M. and Katz, S. B. 2011. *Writing in the sciences: Exploring communication in workplace*. Los Angeles: Sage.
- Picardie, C. and Masick, K. D. 2014. *Research methods (designing and conduction research with a real-world focus)*. Los Angeles: Sage.
- Punch, K. F. 2014. *Introduction to social research qualitative and quantitative approaches*. 3rd ed. Los Angeles: Sage.

- Ransome, P. 2013. *Ethics and values in social research*. New York: Palgrave Macmillan.
- Remlen, D. and Van Ruzzin G. 2011. *Research method in practice: Strategies for description and causation*. Los Angeles: Sage.
- Ridley, D. 2012. *The literature review: A guide for students*. Los Angeles: Sage.
- Robylyer, M. D. and Doering, A. 2013. *Integrating educational technology into teaching*. New York: Pearson.
- Russell, B. 2013. *Social research methods: Qualitative and quantitative approaches*. Los Angeles: Sage.
- Sarantakos, S. 2013. *Social research*. 4th ed. New York: Palgrave Macmillan.
- Schreiber, J. K. and Ashner-Self, K. 2011. *Educational research*. USA: John Wiley and Sons.
- Sharp, J. 2012. *Success with your educational research project*. Los Angeles: Sage.
- Shields, P. and Rangarajan, N. 2013. *A playbook for research methods: Integrating conceptual framework and project management*. Stillwater, OK: New Form Press.
- Schutt, R. K. and Engel, R. J. 2013. *Investigating The social world: The process and practice of research*. London: Pine Forge Press.
- Smaldino, S., Lawther, D., and James, D. 2012. *Introducing technology and media for learning*. 10th ed. New York: Pearson.
- Small, R. V. et al. 2012. *Teaching for inquiry: Engaging learners within*. New York: Neal-Shuman Publishers, Inc.
- Suter, N. W. 2012. *Introduction to educational research: A critical approach*. Los Angeles: Sage.
- Thomas, G. 2013. *How to do your research project*. Los Angeles: Sage.
- Trochim, W. 2006. *The research method of knowledge base*. 2nd ed. USA: Cengage Publishing.
- Walliman, N. 2014. *Your undergraduate dissertation*. 2nd ed. Los Angeles: Sage.
- Walsh, M. 2010. *Research made real: a guide for students*. U.K. Nelson Thornes Ltd.
- Woodwell, R. 2014. *Research foundation*. Los Angeles: Sage.
- Yin, R. K. 2012. *Application of case studies research*. Los Angeles: Sage.

INTERNET SOURCES

- Analyzing Qualitative Data: Pell Institute – Evaluation Toolkit. 2015. “Analyzing Quantitative data.” Accessed August 31, 2014. <http://toolkit.pellinstitute.org/education-guide/analysis>.
- Bivariate Analysis – WOW.com. 2014. “Bivariate analysis.” Accessed July 25, 2014. <http://en.wikipedia.org/wiki/Bivariate-analysis>.
- Dr. A. Jacow Primal Center. 2015. “T-test.” In Basis Research Definition/Psychology/Glossary/Alleydog.com. Accessed June 24, 2015. [www.alleydog.com/global/definition.php? term-](http://www.alleydog.com/global/definition.php?term-)

- Ess, A. 2015. "How to write the title for a research paper." In *How to Write a Title for a Research Paper*. Accessed October 4, 2014. <https://www.ehow.com/how-8245008-write-title-research>
- Inquiry-based learning:Explanation-thirteen.2004. "Concept to Classroom." Accessed October 25, 2014. www.thirteen.org/edonline.conceptcomponents2htclass/inquiry.
- Kennan, M. 2015. "How to calculate statistical sample sizes." In *How to Calculate Statistical Sample Sizes*. Accessed May 2, 2015. <http://www.ehow.com/how-7850881-calculate-samp/>.
- Kubicek, J. 2005. "Inquiry-based learning." In *Canadian Journal of Learning and Technology*. Accessed September 26, 2014. www.ericdigest.org.
- Neil, J. 2007. "Quantitative versus qualitative research." In *Quantitative Versus Qualitative Research: Key Points in Classic Debate*. Accessed September 30, 2014. www.wilderdom.com/research/QualitativeVersusQuantitativeResearch.html.
- Schwartz, K. L. 2012. "Paraphrasing, summarizing & plagiarism." In *Citing Sources –ipl2+Research & Writing-Internet Public*. Accessed May 16, 2014. <http://Writing-2.richmond.edu/writing/wwwweb/pelisci/b>.
- Theoretical Definition – ITL Serial. 2014. "Theoretical definition." Accessed January 16, 2015. <http://platostanford.edu/entries/science-theory-observation#opeObsRep>.

Index

A

Analysis of covariation, 121

Analysis of variance, 121

ANCOVA, 121

Appendices, 138

Attribute variables, 31

B

Bias, 128

Bibliography, 54

Bivariate analysis, 119

C

Causal questions, 40

Central tendency, 111

Chi-square, 121

Citation, 54

Coding system, 109

Concept map, 67

Conceptual framework, 66–67, 68

Conclusions, 138

Confounding variables, 30, 77

Constant variables, 31

Content analysis, 99

Continuous variables, 31

Control group, 16, 86

Correlation coefficient, 120–121

Correlation, 121

Covariate variables, 31

Cross-sectional study, 76

Cross tabulation, 120

D

Data analysis, statistical

bivariate, 119–120

correlation, 119

covariance, 120

covariation, 119

multivariate, 119

univariate, 119

Data analysis

meta-analysis, 21, 54

primary, 21

quantitative, 109

secondary, 21

Data tabulation, 110

Data

qualitative, 77

quantitative, 77, 96

Declarative statements, 38

Deductive approach, 40

Descriptive research questions, 40

Descriptive statistical technique, 111

Direct observation, 98

E

Experiment, 98

Experimental group, 16, 86

Experimental research, 9, 16–17, 39, 86

F

Frequency distribution, 111

H

Heterogeneous population, 128

Heterogeneous study, 54

Homogenous study, 54

Hypotheses

alternative, 46, 77

causal, 47

data-driven, 47

descriptive, 47

directional, 47

non-directional, 47

null, 46, 77

one-tailed, 47

theory-driven, 47

two-tailed, 47

I

Indirect observation, 96

Inductive approach, 40

Inductive thinking, 4

Inferential thinking, 45

Inquiry, 3

Interrogative statements, 38

Interview, 97

In-text citation, 54

Introduction, 138

Investigation, 4

J

Jargons, 76

L

Longitudinal study, 76

M

MANCOVA, 121

Mean, 111

Median, 111

Methodology, 138

Mode, 111

Multiple analysis of covariation, 121

Multiple treatment, 17

Multi-syllable words, 76

N

Non-experimental research design

comparative, 88

correlative, 88

descriptive, 88

ex post facto, 88

Non-experimental research, 9, 16–17, 21–22, 88

Numerical research, 8

O

One-way analysis of variance, 121

Operational definition, 40, 77

P

Pearson product-moment, 121

Population, 128

Q

Qualitative research, 9–10

Qualitative scales of measurement

interval, 99, 100

nominal, 99, 100

ordinal, 99, 100

ratio, 99, 100

- Quantitative analytical method
 analysis of variance, 113
 correlation, 113
 regression, 113
- Quantitative research, 8–10, 36–37, 85
- Quantitative research problem, 37
- Quantitative scales of measurement, 99
- Quasi-experimental research, 16–17, 23, 39, 86
 matched comparison, 17, 87
 single-subject, 17, 87
 time-series, 17, 87
- Question-driven methodology, 53
- Questionnaire, 97
- R**
- Recommendations, 138
- References, 138
- Referencing
 APA, 54
 MLA, 54
- Regression, 121
- Relation questions, 40
- Report writing, 137
- Research, 3–4
- Research design, 22
- Research problem, 37
- Research questions, 38, 46
- Research writing, 137
- Results of finding, 138
- Review of related literature, 52–53
- S**
- Sample, 128
- Sample size, 128
- Sampling
 availability, 130
 cluster, 129, 131
 frame, 128
 non-probability, 128, 130
 probability, 128–129
 purposive, 130
 quota, 130, 131
 random, 130, 131
 simple random, 129
 snowball, 130
 stratified, 129, 131
 systematic, 129, 131
 techniques, 128
 unit, 128
 voluntary, 130
- Spearman's rho, 121
- Standard deviation, 111
- Statistics
 descriptive, 119
 inferential, 119
- Students-contingency table, 120
- Survey, 96–98
- Survey research, 22–24, 88
- Systemic Functional Grammar, 67
- Systematic review, 53
- T**
- Theoretical definition, 77
- Theoretical framework, 68
- Title, 137
- Traditional review, 53
- Treatment evaluation, 17
- true experimental research, 16, 39, 86
- t-test, 121

U

Unit of analysis, 77

V

Variables

attribute, 31

confounding, 30, 77

constant, 31

continuous, 31

covariate, 31

dependent, 30, 77

dichotomous, 31

endogenous, 31

exogenous, 31

extraneous, 30, 77

independent, 30, 77

latent, 31

manifest, 31

nuisance, 31

participant, 30

situational, 30