

Course: Research Methodology

ULP0010

FKK Code:

Master: MKW0010

PhD: PKW0010

The course outline

Module 1: INTRODUCTION

- What is knowledge?
- Philosophy of knowledge
- Type of research
- Why / Purpose of research?
- Level of research ; Master or PhD
- Research Process

Module 2: PROBLEM FORMULATION AND OBJECTIVES

- What is research problem?
- Why need to formulate the research problem?
- Step in formulating research problem
- How to identify the research problem?
- Formulation of Problem Statement
- Formulating research question and / or hypothesis
- Identify research objectives
- Scope of research: criteria for Masters vs Doctoral Level of research.
- Expected outcome of research

MODULE 3: LITERATURE REVIEW

- Rationale for literature review
- Approaches of Literature review
- Framework of literature review
- How to look for literature
- Making sense of information
- Writing critical review
- Managing reading material
- Making proper referencing

MODULE 4: LIBRARY SEARCH

- Session in library

MODULE 5: DISCUSSION

- Literature review
- Problem Statement
- Research Question
- Hypothesis
- Research Objectives
-
- Group presentation
(random selection)

MODULE 6: RESEARCH METHODOLOGY AND DESIGN

- Relationship between methodology & design
- Purpose of research design
- Developing Conceptual and operational framework
- Types of research design (Theory building/ testing/ extension; Inductive/ deductive)
- Steps in Research Design

RESEARCH DESIGN...CONTD

- Variables measurements
- Selecting and developing research instruments
- Quantitative vs. qualitative research design and method
- Evaluation of Research Methodology and design
- Gantt Chart and milestone

MODULE 7: DISCUSSION

- **DISCUSSION** of Research Methodology and Design

MODULE 8: DATA COLLECTION PROCEDURES (QUANTITATIVE / QUALITATIVE / HYBRID)

- What is data collection?
- Types of data:
 - primary vs secondary
 - qualitative and quantitative
- Selecting your data: sampling techniques and design
- Methods, tools and techniques for data collection

MODULE 9: DATA ANALYSIS

- - Types of Data Analysis
- - Steps in Data Analysis
- - Connecting research objective to data analysis
- - Quantitative
- Mathematical/statistical
- Data verification and validity
- Parametric/non-parametric analysis
- Survey to experimentation and data analysis
- - Qualitative analysis

MODULE 10:

- **DATA COLLECTION AND ANALYSIS (PRACTICAL)**

MODULE 11:RESEARCH PROPOSAL PREPARATION AND THESIS PREPARATION

- Research Proposal
 - What is Research Proposal
 - Types of Research Proposal
 - Component of Research Proposal
 - Assessment of Research Proposal
 - How to defend Research Proposal
- Thesis
 - Structure of thesis
 - Thesis format and styles
 - How to start writing a thesis
 - Planning and timeline for writing a thesis
 - Types of Thesis
 - Conventional
 - Compilation of paper
- Role of student and supervisor in thesis preparation
- Submission regulation
- Assessment of thesis
- Viva-voce Preparation of thesis
- Ethics and codes of Publication
- Plagiarism
- Referencing
-
- Technical Report and Publication (TRP)
 - What is TRP?
 - Types of TRP
 - Component of TRP
- Assessment of TRP

MODULE 12: RESEARCH MANAGEMENT

- Roles of student and supervisor and examination panels (Chairman, Internal / External Examiner)
- GOT
- Rules and regulation
- Ethics of doing research
- Funding for research
- Project planning
- Safety and health issues
- Managing conflict
- Maximizing your research output:
 - Intellectual Property
 - Commercialization (Copyright, Patent)
 - Publications
 - Exhibition
- Examination process (VIVA-VOCE)

MODULE 13: RESEARCH PROPOSAL PRESENTATION

- Each group will be given 10 minutes to present their research proposal to a panel of examiners
- Time, venue and date will be notified

MODULE 14: WRITING FOR PUBLICATION CAMP

- We are publication driven research
- Invited speaker with moderator teams
- Time, venue and date will be notify

Module 1: Introduction to research methodology

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Module 1 content

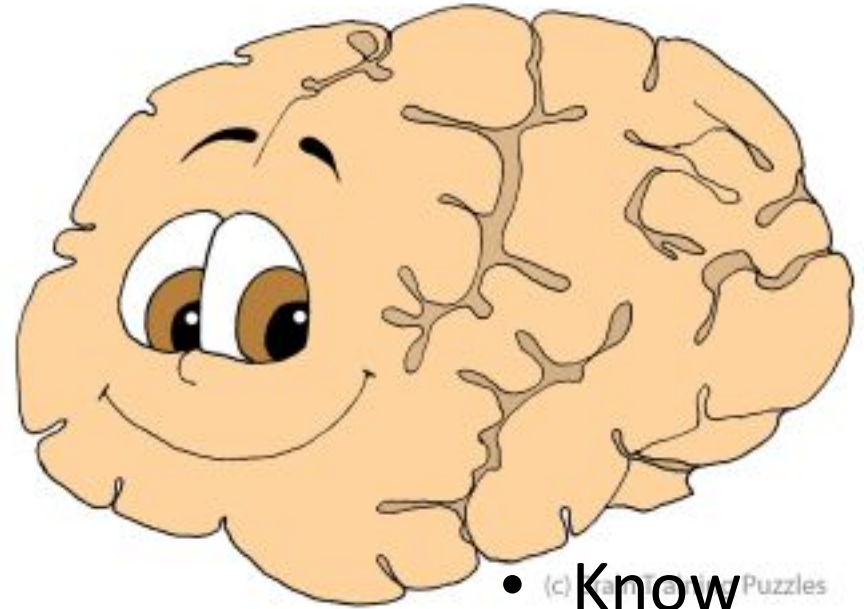
1. What is knowledge?
2. Philosophy of knowledge
3. Type of research
4. Why / Purpose of research?
5. Level of research ; Master or PhD
6. Research Process

What is knowledge?

- No brain



Hi! I'm Brainy, your guide to Brain Training Puzzles....



- (c) Know Puzzles
- Led
- Edge

What is your 'knowledge definition?



What wiki says?

Knowledge is a familiarity with someone or something

1. information, facts, descriptions, and/or skills acquired through experience or education
2. theoretical or practical understanding of a subject.
3. It can be implicit (as with practical skill or expertise) explicit (as with the theoretical understanding of a subject);
4. and it can be more or less formal or systematic.

Knowledge acquisition

- involves complex cognitive processes: perception, learning, communication, association and reasoning; while knowledge is also said to be related to the capacity of *acknowledgment* in human beings.

"justified true belief." *Plato (429/3 BC–348/7 BC)*

- In philosophy, the study of knowledge is called epistemology,
- the philosopher Plato famously defined knowledge as "justified true belief."



What is the true definition?

- There is however no single agreed upon definition of knowledge, and there are numerous theories to explain it.
- You may define one and one day someone will quote yours!

Philosophy of Knowledge



The science of knowing

Why you do research?

- Research allows you to pursue your interests, to learn something new, to hone your problem-solving skills and to challenge yourself in new ways.
- Being a good researcher involves more than "merely" coming up with brilliant ideas and implementing them. Most researchers spend the majority of their time reading papers, discussing ideas with colleagues, writing and revising papers, staring blankly into space -- and, of course, having brilliant ideas and implementing them.
- The process and importance of becoming part of a larger research community, which is a critical aspect of being a successful researcher. Keep track of where you're going, and where you've been, with your research, staying motivated, and how to spend your time wisely.

Doctoral degrees

The disposable academic

Why doing a PhD is often a waste of time

Dec 16th 2010 | from the print edition

ON THE evening before All Saints' Day in 1517, Martin Luther nailed 95 theses to the door of a church in Wittenberg. In those days a thesis was simply a position one wanted to argue. Luther, an Augustinian friar, asserted that Christians could not buy their way to heaven. Today a doctoral thesis is both an idea and an account of a period of original research. Writing one is the aim of the hundreds of thousands of students who embark on a doctorate of philosophy (PhD) every year.

In most countries a PhD is a basic...The Economist

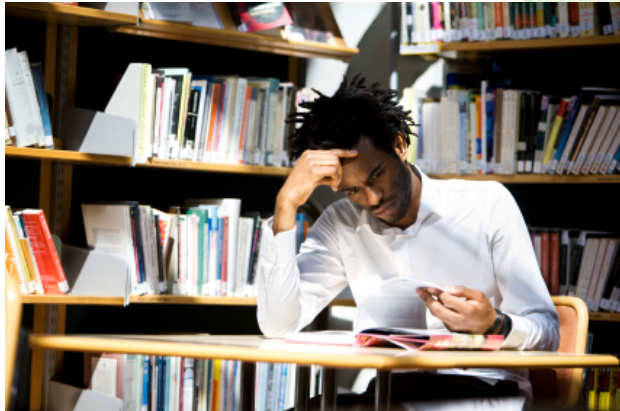
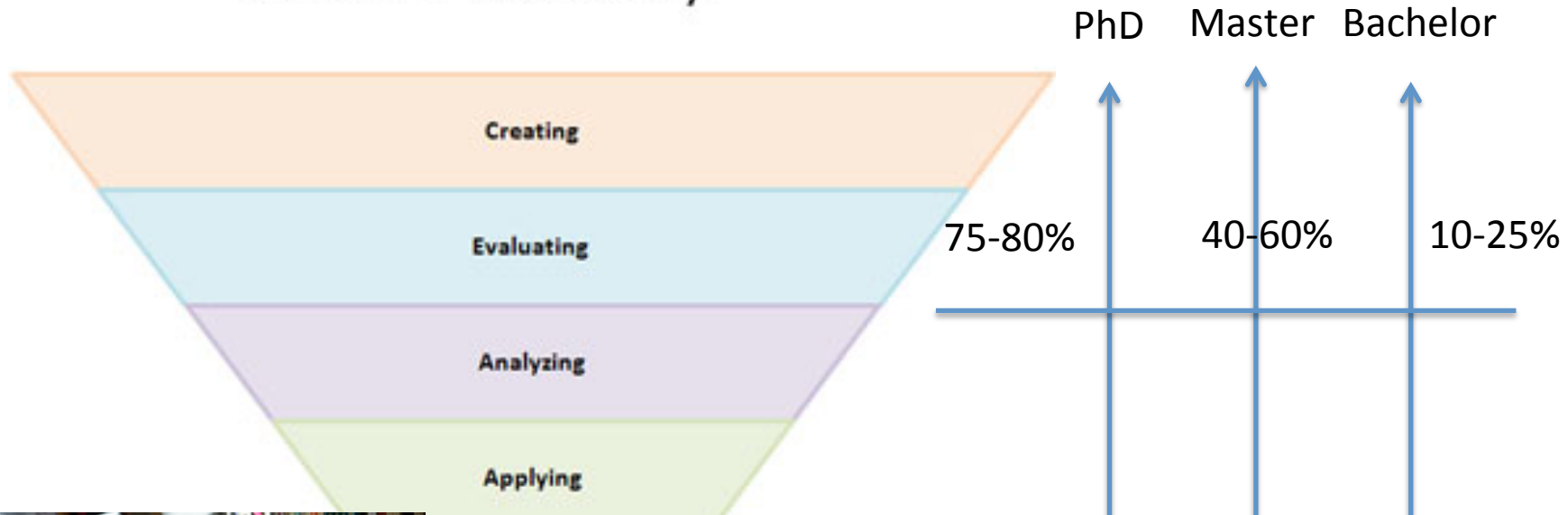


Educational/learning Domains

There is more than one type of learning
(Benjamin Bloom (1956)):

- 1 Cognitive:** mental skills (*Knowledge*)
- 2 Affective:** growth in feelings or emotional areas
(*Attitude*)
- 3 Psychomotor:** manual or physical skills (*Skills*)

Bloom's Taxonomy



Corin Anderson (a student)

Cognitive Domain

The cognitive domain (Bloom, 1956) involves knowledge and the development **of intellectual skills.** This includes the recall or recognition of specific facts, procedural patterns, and concepts that serve in the development of intellectual abilities and skills. There are six major categories, which are listed in order below, starting from the simplest behavior to the most complex. The categories can be thought of as degrees of difficulties. That is, the first ones must normally be mastered before the next ones can take place.

Category

Knowledge: Recall data or information. **Key Words:** defines, describes, identifies, knows, labels, lists, matches, names, outlines, recalls, recognizes, reproduces, selects, states.

Comprehension: Understand the meaning, translation, interpolation, and interpretation of instructions and problems. State a problem in one's own words. **Key Words:** comprehends, converts, defends, distinguishes, estimates, explains, extends, generalizes, gives an example, infers, interprets, paraphrases, predicts, rewrites, summarizes, translates.

Application: Use a concept in a new situation or unprompted use of an abstraction. Applies what was learned in the classroom into novel situations in the work place. **Key Words:** applies, changes, computes, constructs, demonstrates, discovers, manipulates, modifies, operates, predicts, prepares, produces, relates, shows, solves, uses.

Analysis: Separates material or concepts into component parts so that its organizational structure may be understood. Distinguishes between facts and inferences. **Key Words:** analyzes, breaks down, compares, contrasts, diagrams, deconstructs, differentiates, discriminates, distinguishes, identifies, illustrates, infers, outlines, relates, selects, separates.

Synthesis: Builds a structure or pattern from diverse elements. Put parts together to form a whole, with emphasis on creating a new meaning or structure. **Key Words:** categorizes, combines, compiles, composes, creates, devises, designs, explains, generates, modifies, organizes, plans, rearranges, reconstructs, relates, reorganizes, revises, rewrites, summarizes, tells, writes.

Evaluation: Make judgments about the value of ideas or materials. **Key Words:** appraises, compares, concludes, contrasts, criticizes, critiques, defends, describes, discriminates, evaluates, explains, interprets, justifies, relates, summarizes, supports.

Example and Key Words (verbs)

Examples: Recite a policy. Quote prices from memory to a customer. Knows the safety rules.

Examples: Rewrites the principles of test writing. Explain in one's own words the steps for performing a complex task. Translates an equation into a computer spreadsheet.

Examples: Use a manual to calculate an employee's vacation time. Apply laws of statistics to evaluate the reliability of a written test.

Examples: Troubleshoot a piece of equipment by using logical deduction. Recognize logical fallacies in reasoning. Gathers information from a department and selects the required tasks for training.

Examples: Write a company operations or process manual. Design a machine to perform a specific task. Integrates training from several sources to solve a problem. Revises and process to improve the outcome.

Examples: Select the most effective solution. Hire the most qualified candidate. Explain and justify a new budget.

Affective Domain

CHARACTERIZATION BY VALUE SET

to revise, to require, to be rated high in the value, to avoid, to resist, to manage, to resolve

ORGANIZATION

to discuss, to theorize, to formulate, to balance, to examine

VALUING

To increase measured proficiency in, to subsidize, to support, to debate

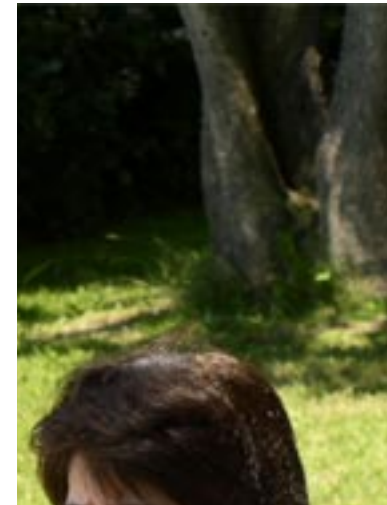
RESPONDING

to comply with, to follow, to commend, to volunteer, to spend leisure time, to acclaim

RECEIVING

to differentiate, to accept, to listen for, to respond to

The affective domain (Krathwohl, Bloom, Masia, 1973) includes the manner in which we deal with things emotionally, such as feelings, values, appreciation, enthusiasms, motivations, and attitudes. The five major categories are listed from the simplest behavior to the most complex



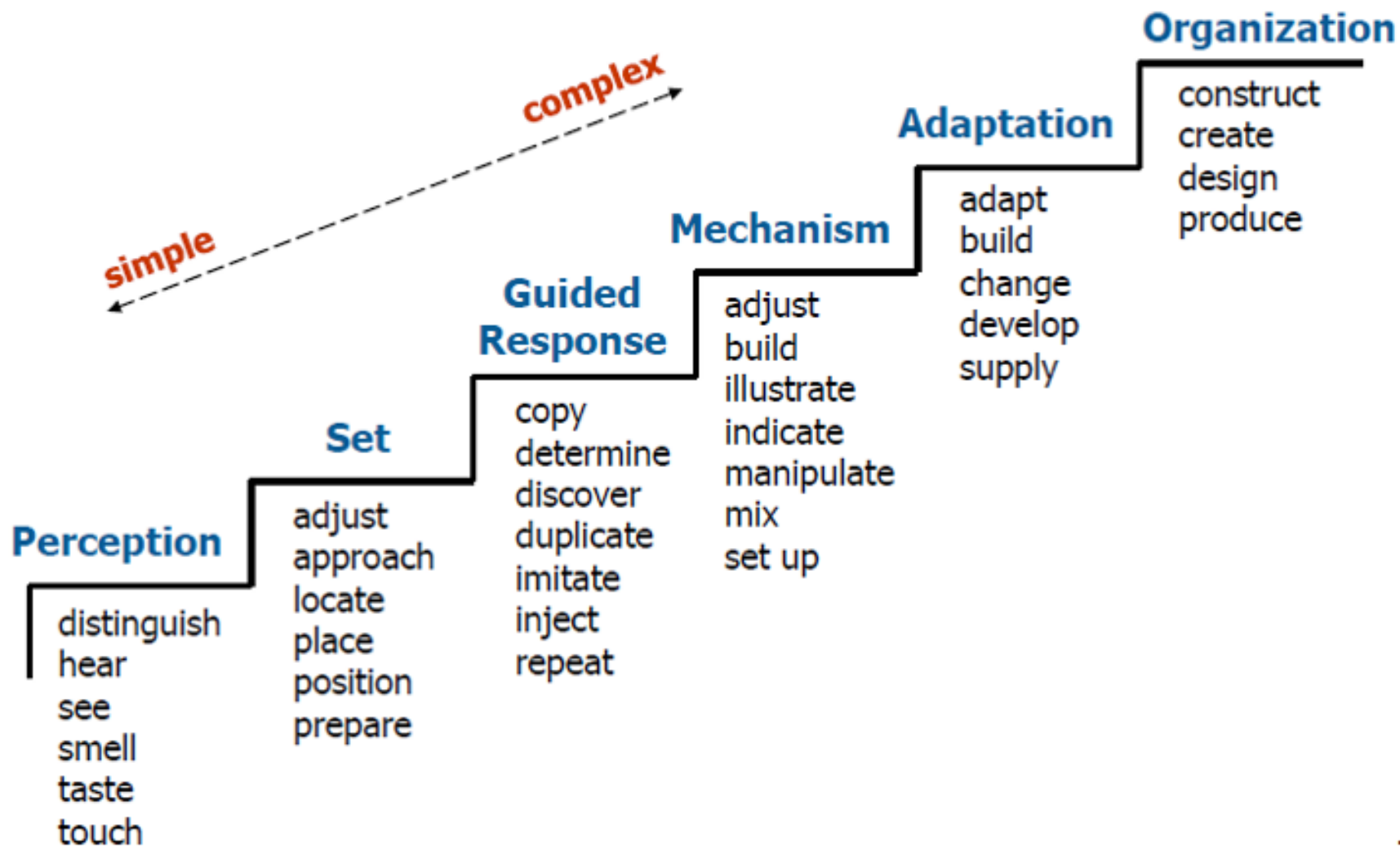
Psychomotor Domain

The psychomotor domain (Simpson, 1972) includes physical movement, coordination, and use of the motor-skill areas. Development of these skills requires practice and is measured in terms of speed, precision, distance, procedures, or techniques in execution. The seven major categories are listed from the simplest behavior to the most complex:



Psychomotor Domain

"What Should I Be Able to Do?"



Types of Research - Definitions

1. **Action research** is a methodology that combines action and research to examine specific questions, issues or phenomena through observation and reflection, and deliberate intervention to improve practice.
2. **Applied research** is research undertaken to solve practical problems rather than to acquire knowledge for knowledge sake.
3. **Basic research** is experimental and theoretical work undertaken to acquire new knowledge without looking for long-term benefits other than the advancement of knowledge.
4. **Clinical trials** are research studies undertaken to determine better ways to prevent, screen for, diagnose or treat diseases.
5. **Epidemiological research** is concerned with the description of health and welfare in populations through the collection of data related to health and the frequency, distribution and determinants of disease in populations, with the aim of improving health.
6. **Evaluation research** is research conducted to measure the effectiveness or performance of a program, concept or campaign in achieving its objectives.
7. **Literature review** is a critical examination, summarisation, interpretation or evaluation of existing literature in order to establish current knowledge on a subject.
8. **Qualitative research** is research undertaken to gain insights concerning attitudes, beliefs, motivations and behaviours of individuals to explore a social or human problem and include methods such as focus groups, in-depth interviews, observation research and case studies.
9. **Quantitative research** is research concerned with the measurement of attitudes, behaviours and perceptions and includes interviewing methods such as telephone, intercept and door-to-door interviews as well as self-completion methods such as mail outs and online surveys.
10. **Service or program monitoring and evaluation** involves collecting and analysing a range of processes and outcome data in order to assess the performance of a service or program and to determine if the intended or expected results have been achieved.

Doctorate

- A **doctorate** is an academic degree or professional degree that in most countries refers to a class of degrees which qualify the holder to teach in a specific field, (e.g. a Doctor of Philosophy [Ph.D.]).

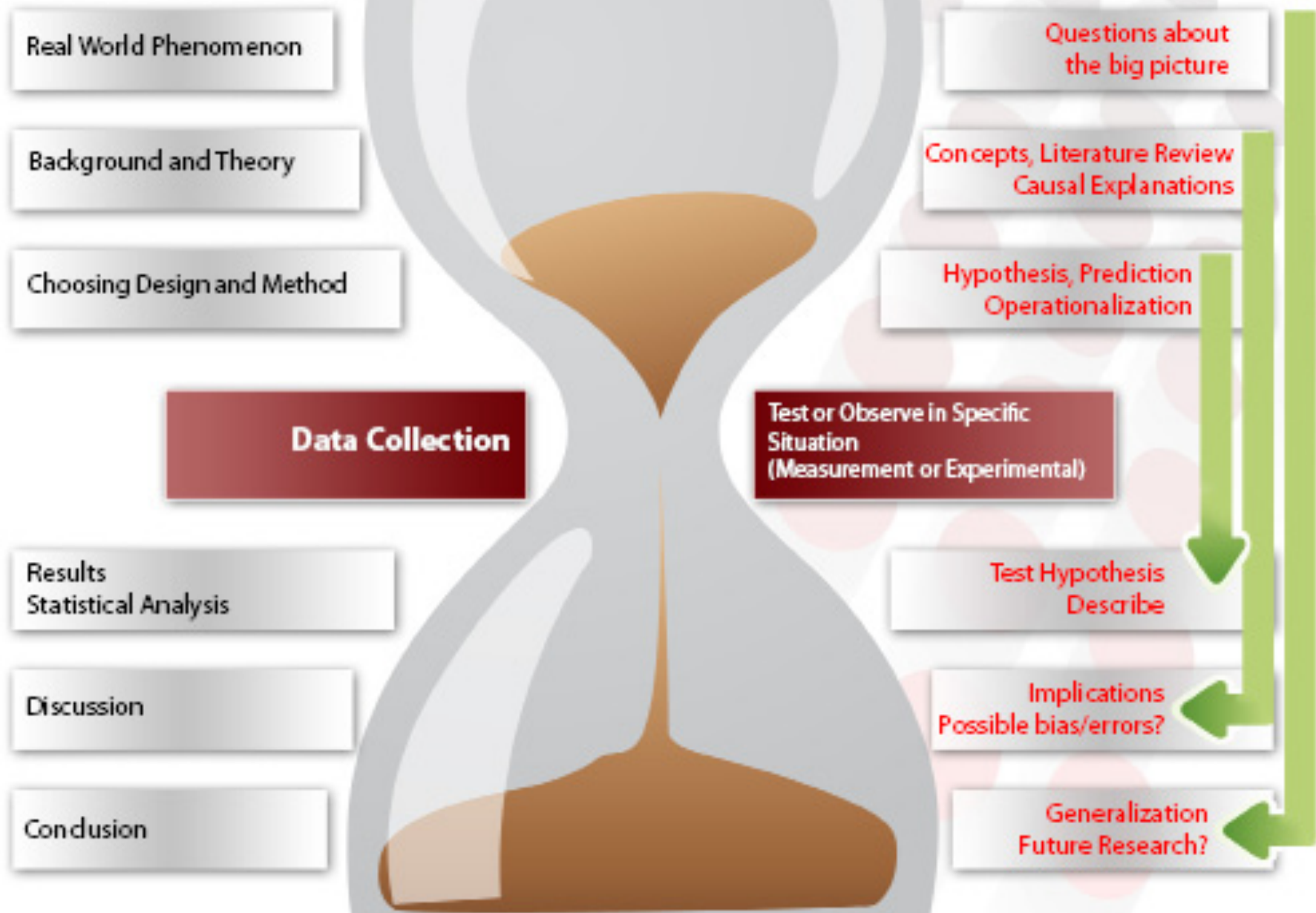


Master Degree



- A master's is an academic degree granted to individuals who have undergone study demonstrating a mastery or high-order overview of a specific field of study or area of professional practice.[1] Within the area studied, graduates are posited to possess advanced knowledge of a specialized body of theoretical and applied topics; high order skills in analysis, critical evaluation or professional application; and the ability to solve complex problems and think rigorously and independently.

THE RESEARCH PROCESS



WHAT IS RESEARCH? - THE GUIDELINES

- [What is research? For a successful career in science, you must understand the methodology behind any research and be aware of the correct protocols.](#)
- Science has developed these guidelines over many years as the benchmark for measuring the [validity of the results obtained.](#)
- Failure to follow the guidelines will prevent your findings from being accepted and taken seriously. These protocols can vary slightly between scientific disciplines, but all follow the same basic structure.

- Read more:

<http://www.experiment-resources.com/what-is-research.html#ixzz1eJXh1wH0>

STEPS OF THE SCIENTIFIC PROCESS

- **1) SETTING A GOAL**

- Research in all disciplines and subjects, not just science, must begin with a clearly [defined goal. This usually, but not always, takes the form of a hypothesis.](#)
- For example, an anthropological study may not have a specific hypothesis or principle, but does have a specific goal, in studying the culture of a certain people and trying to understand and interpret their behavior.
- The whole study is designed around this clearly defined goal, and it should address a unique issue, building upon previous research and scientifically accepted fundamentals. Whilst nothing in science can be regarded as truth, basic assumptions are made at all stages of the research, building upon widely

- Read more:

<http://www.experiment-resources.com/what-is-research.html#ixzz1eJY7Pm8A>

2) INTERPRETATION OF THE RESULTS

- Research does require some interpretation and [extrapolation of results](#).
- In scientific research, there is always some kind of connection between data (information gathered) and why the scientist think that the data looks as it does. Often the researcher looks at the data gathered, and then comes to a [conclusion of why the data looks like it does](#).
- A history paper, for example, which just reorganizes facts and makes no commentary on the results, is not research but a [review](#).
- If you think of it this way, somebody writing a school textbook is not performing research and is offering no new insights. They are merely documenting pre-existing data into a new format.
- If the same writer interjects their personal opinion and tries to prove or disprove a [hypothesis, then they are moving into the area of genuine research. Science tends to use experimentation to study and interpret a specific hypothesis or question, allowing a gradual accumulation of knowledge that](#)

3) REPLICATION AND GRADUAL ACCUMULATION

- For any study, there must be a clear procedure so that the experiment can be replicated and the results verified.
 - Again, there is a bit of a grey area for observation-based research, as is found in anthropology, behavioral biology and social science, but they still fit most of the other criteria.
 - Planning and designing the experimental method, is an important part of the project and should revolve around answering specific predictions and questions. This will allow an exact duplication and verification by independent researchers, ensuring that the results are accepted as real.
 - Most scientific research looks at an area and breaks it down into easily tested pieces.
 - The gradual experimentation upon these individual pieces will allow the larger questions to be approached and answered, breaking down a large and seemingly insurmountable problem, into manageable chunks.
 - True research never gives a definitive answer but encourages more research in another direction. Even if a hypothesis is disproved, that will give an answer and generate new ideas, as it is refined and developed.
 - Research is cyclical, with the results generated leading to new areas or a refinement of the original process.
- Read more: <http://www.experiment-resources.com/what-is-research.html#ixzz1eJYoKJsD>

4) CONCLUSION

- The term, research, is much stricter in science than in everyday life.
- It revolves around using the scientific method to generate hypotheses and provide analyzable results. All scientific research has a goal and ultimate aim, repeated and refined experimentation gradually reaching an answer.
- These results are a way of gradually uncovering truths and finding out about the processes that drive the universe around us. Only by having a rigid structure to experimentation, can results be verified as acceptable contributions to science.
- Some other areas, such as history and economics, also perform true research, but tend to have their own structures in place for generating solid results. They also contribute to human knowledge but with different processes and systems.

- Read more: <http://www.experiment-resources.com/what-is-research.html#ixzz1eJZFZtuy>