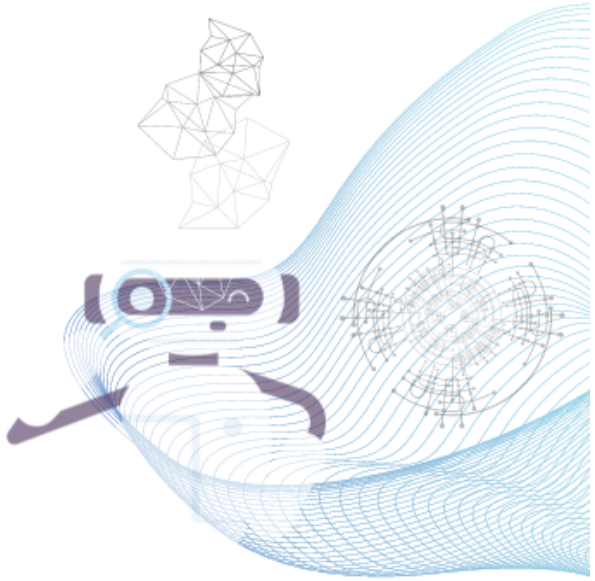
THE BIG BANG OF DATA SCIENCE

-from academia to industry

DAHMAN'S
Phi Services



RESEARCH
FROM THE START
TO THE END

by: Dr. Deniz Dahman's

BOOK ONE

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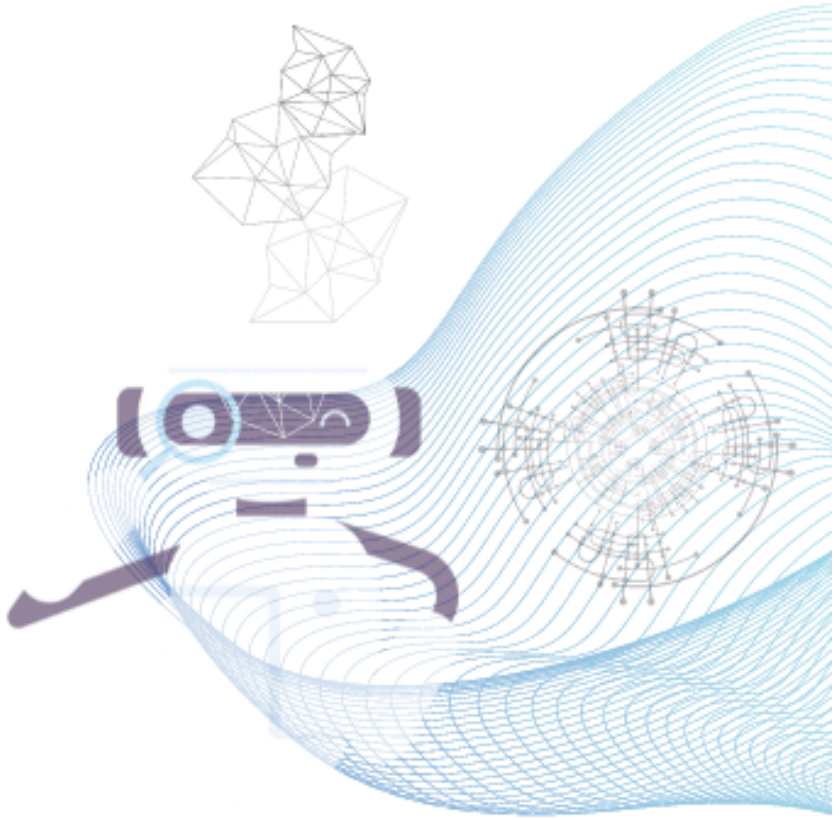
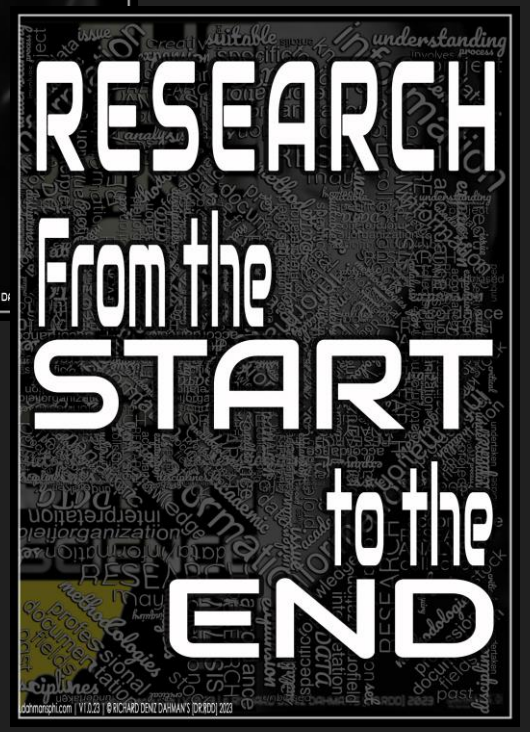
RESEARCH
FROM THE START TO THE END



by: Dr. Deniz Dahman's



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RESEARCH IN PRINCIPLE

- ✓ The Relevance of Research & Data Science to Task Right Accomplishment (TRA)
- ✓ The Philosophy of Descriptive & Inferential
- ✓ The Research Conductor & Categories
- ✓ Conclusion

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IMPLEMENTATION & APPROACHES TO RESEARCH

- ✓ Research Methodology/paradigms, philosophical review
- ✓ Structure of Research Conduct
- ✓ Ethical Factor & Research
- ✓ Conclusion

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Research Topic & Literature Review

- ✓ What is the research problem?
- ✓ Conduction the Literature Review
- ✓ Reviewing & Writing The sources of Literature
- ✓ Conclusion

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LAB- SECTION 01

- ✓ The story
- ✓ The consultancy
- ✓ Scientific implementation

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Chapter Seven

Framework & Research Design

- ✓ Philosophy of theory
- ✓ Philosophy of framework
- ✓ Research technical implementation
- ✓ Conclusion

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Chapter Seven

Execution of the research project

- ✓ The Philosophy of Measurement
- ✓ Philosophy of Subject
- ✓ Research Data
- ✓ Writing Formal Research
- ✓ Conclusion

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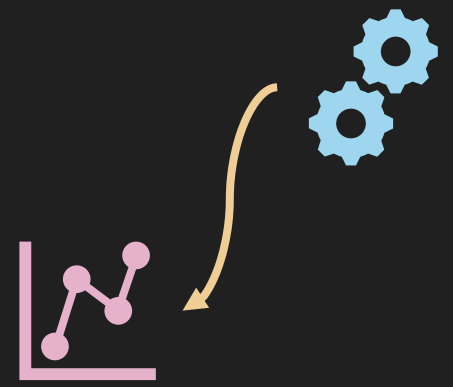
LAB- SECTION 02

- ✓ Induct or deduct the research
- ✓ What is in the literature review
- ✓ Framework implementation
- ✓ Articulate research question & hypothesis
- ✓ The research design
- ✓ Building the research instrument
- ✓ Research implementation

Chapter One

RESEARCH IN PRINCIPLE

- ✓ The Relevance of Research & Data Science to Task Right Accomplishment (TRA)
- ✓ The Philosophy of Descriptive & Inferential
- ✓ The Research Conductor & Categories
- ✓ Conclusion



The Relevance of Research & Data Science TO Task Right Accomplishment (TRA)

SECTION 1 -> α

- ✓ RESEARCH & DATA SCIENCE are working hand in hand to deliver successful results for any assigned task
- ✓ the life-cycle of natural phenomenon which without R&D (research and data) would lead to the world of *uncertainty*,
- ✓ research & data science can help *to reduce uncertainty* and lead to more *effective planning and decision making* in every aspects of our life.
- ✓ Through the application of methodical research design and data driven establishing procedures, it is possible to predict the future with some degree of accuracy

wherever we speak about research we can't divorce it from data

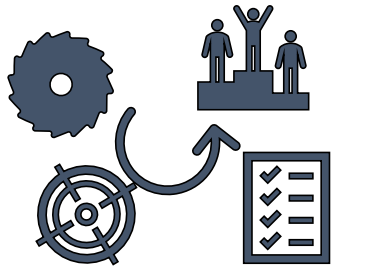
Next

The Relevance of Research & Data Science TO Task Right Accomplishment (TRA)

SECTION 1 -> α

- → Introductory
- → Research
- → Data

- ❑ define it :
  - ✓ Research is a system that comprises number of processes each process is considered as systematic enquiry or investigation into specific problem or issue that lead to new or improved knowledge
- ❑ fundamentals of it:
  - ✓ Research is a way to build knowledge.
  - ✓ It is an essential requirement to start analyzing, writing, reading, and distributing information.
  - ✓ it helps to dissipate the feeling of uncertainty.
  - ✓ With Research, different understanding issues seem easy.
  - ✓ Research helps to build confidence and positivity to try on opportunities



research is bigger than a definition, it's a torch guides through the exist from the dark of uncertainty

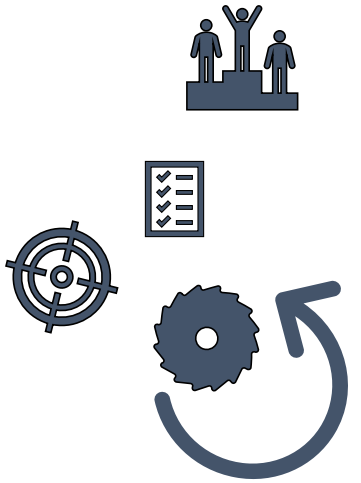
Next

The Relevance of Research & Data Science TO Task Right Accomplishment (TRA)

SECTION 1 -> α

- ✓ Personal story of others perceiving data
- ✓  Where is data?

- ✓ Subject of data science implies, *Depending on context*:
  - the actual data category;
  - characteristics of data such as an average or percentage;
  - techniques for the collection, presentation, analysis and interpretation of data for decision making;
  - and the science of developing and applying such techniques.
- ✓ The (COPA) box, **collect, organize, present and analyze**
- ✓ The **VARIABILITY** factor



understanding of data is the wonder that dissipated my ignorant decisions

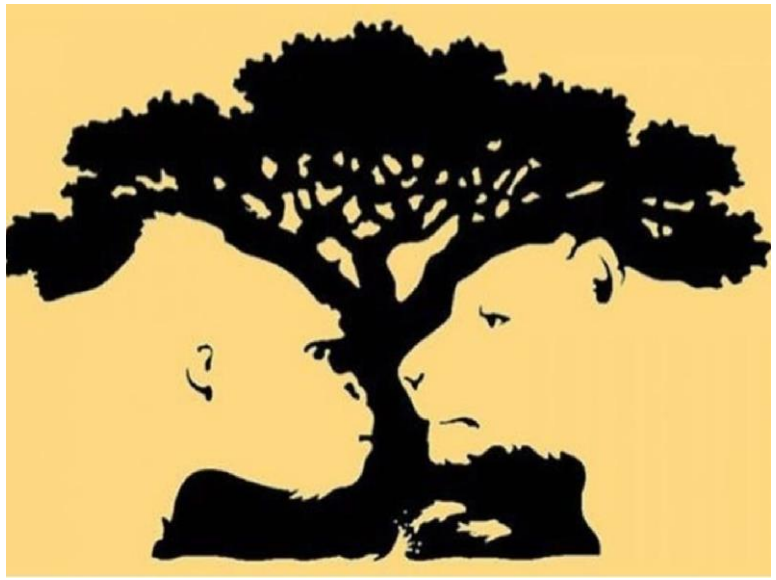
End

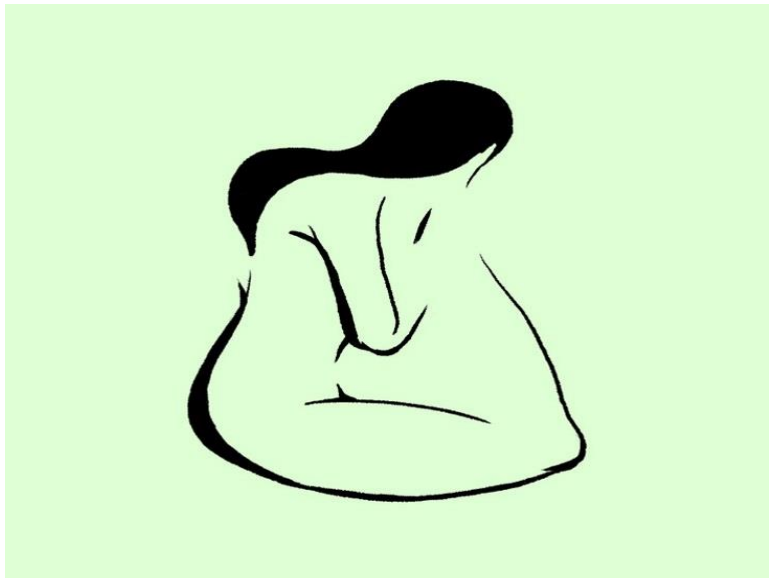
The Philosophy OF Descriptive & Inferential

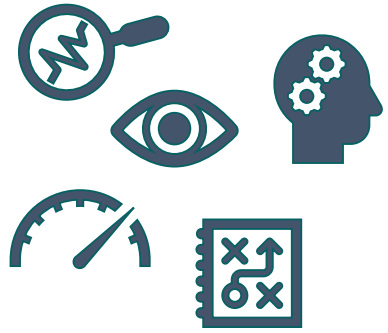
SECTION 2 -> ε

- → Introductory
- → descriptive transformation
- → inferential generalization

- ✓ How we do perceive things







It is not about what you see, but it is about how you see it

- ✓ 3Ts_ Stage
  - SOURCE-TRANSFORM-NUMBERS-TRANSFORM -SUMMARY– TRANSFORM – GRAPHICAL
- ✓ INF_Stage
  - Explain the 3Ts- REPRESENTATIV - GENERALIZATION

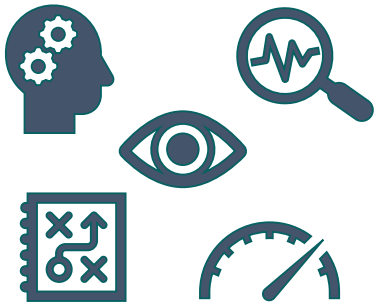
Next

The Philosophy OF Descriptive & Inferential

SECTION 2 -> ε

- → Introductory
- → descriptive transformation
- → inferential generalization

- ✓ The box of (collecting, organizing, sorting, presenting)
- ✓ Is there any relation between the gender distribution of this community and the age group



What you see describes who you are, i.e. it tells how you have put things together

- ✓ 3Ts_STAGE:
  - ✓ SOURCE -> TRANSFORM -> NUMBERS -> TRANSFORM -> SUMMARY -> TRANSFORM -> GRAPH

Next

The Philosophy OF Descriptive & Inferential

SECTION 2 -> ε

- → Introductory
- → descriptive transformation
- → inferential generalization

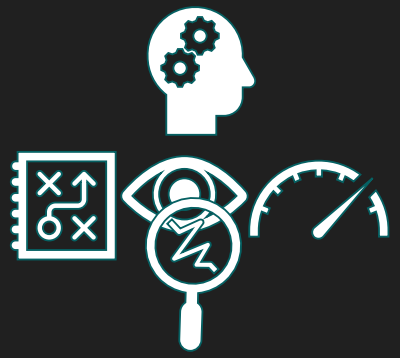
- ✓ Introduction to the idea of representative,
- ✓ Introduction to the idea of generalization,
- ✓ The pseudocode representation:

representative

- ✓ 3Ts_STAGE:
  - ✓ SOURCE -> TRANSFORM -> NUMBERS -> TRANSFORM -> SUMMARY -> TRANSFORM -> GRAPH **1**
- ✓ 3Ts_STAGE:
  - ✓ SOURCE -> TRANSFORM -> NUMBERS -> TRANSFORM -> SUMMARY -> TRANSFORM -> GRAPH **2**

⋮

- ✓ 3Ts_STAGE:
  - ✓ SOURCE -> TRANSFORM -> NUMBERS -> TRANSFORM -> SUMMARY -> TRANSFORM -> GRAPH **N**



Your opinion is the reflection of your identity

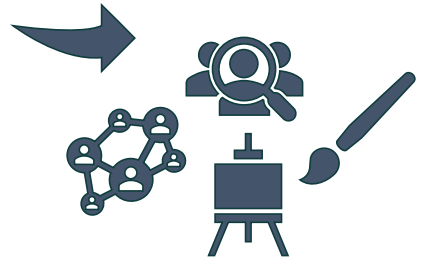
END

$$\Sigma \text{representatives} == !\,\text{generalization}$$

The Research Conductor AND Categories

SECTION 3 -> Ъ

- ✓ Introduction to the idea of researcher/ research conductor
- ✓ Formal and informal research conductor
- ✓ Source that is interested to conduct a research
- ✓ Options on selection for research conductor:
  - Internal
  - external



Researcher is not a title, it's a personal characteristic that defines the frame of the task

Next

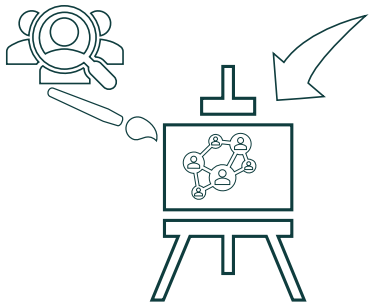
The Research Conductor AND Categories

SECTION 3 -> 5

- ✓ Introduction to the idea of categories
- ✓ Research categories
  - Basic
  - Applied

Why is this important?

How can I use it?

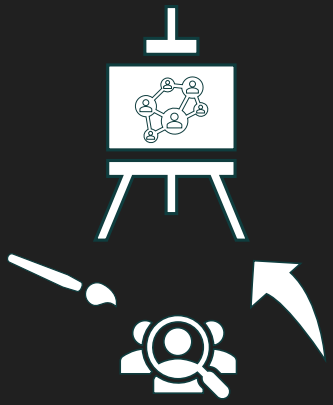


Research is not something to slice, it's a total, but might have different flavors

END

Conclusion

- ✓ Research & Data underpin the good results
- ✓ Research is more than a steps guide by academic book, it's a principle that is seen in natural behavior of human
- ✓ Data is the way to quantify elements of existence,
- ✓ Conduction of research by a conductor can be categorized in terms of the conductor
- ✓ Research can be categorized perceptually in terms of its implementation



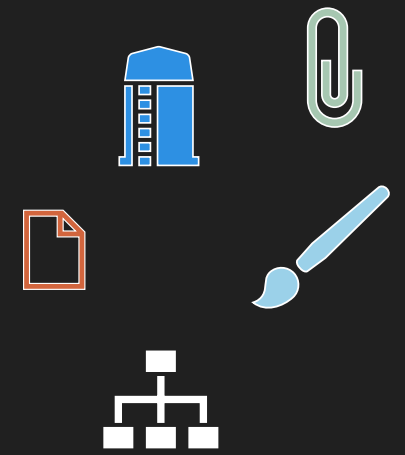
My words could be in a certain language, but I have tried to share my knowledge which can be applicable by every language,

END

Chapter Two

IMPLEMENTATION & APPROACHES TO RESEARCH

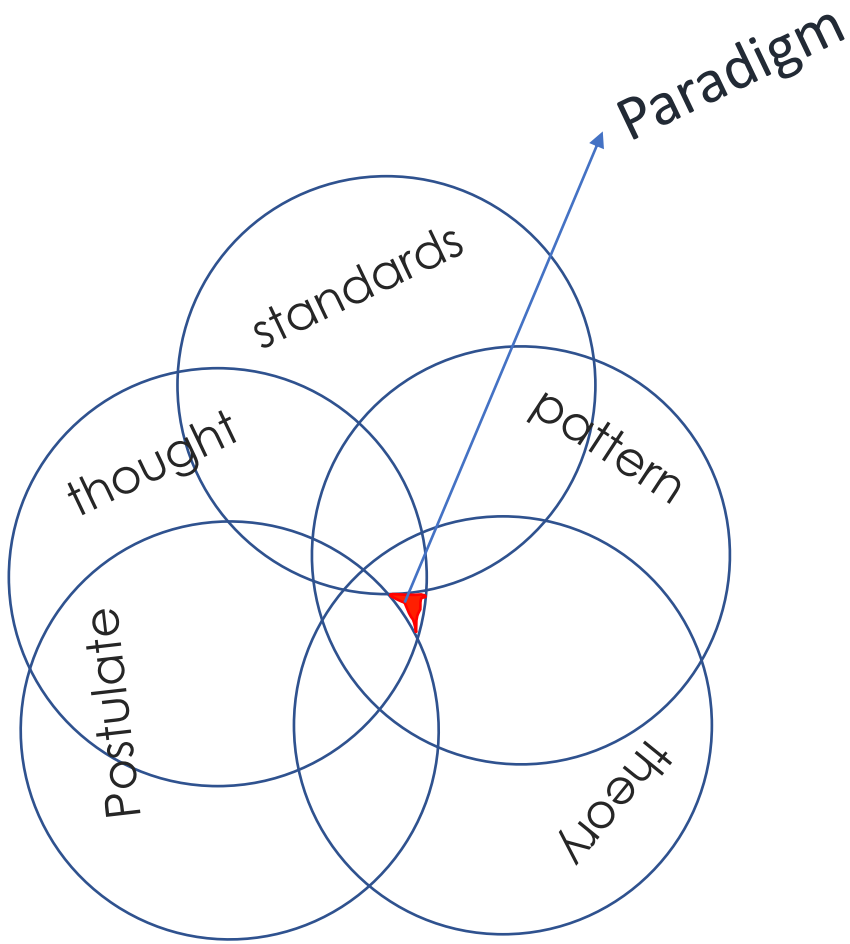
- ✓ Research Methodology/paradigms, philosophical review
- ✓ Structure of Research Conduct
- ✓ Ethical Factor & Research
- ✓ Conclusion

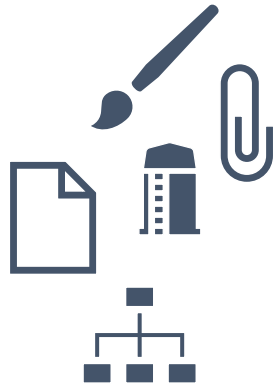


Research Methodology/paradigms, philosophical review

SECTION 1 -> Ų

- ✓ How we perceive thought
- ✓ How we perceive pattern
- ✓ How we perceive theory
- ✓ How we postulate
- ✓ How we perceive standard
- ✓ The circle of all





a distinct set of concepts or thought patterns, including theories, research methods, postulates, and standards for what constitute legitimate contributions to a field

Methodology is the way you express your understanding, Method is the tool you use to show your understanding

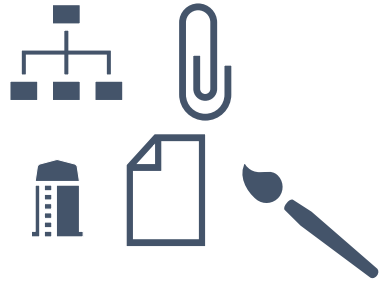
Next

Research Methodology/paradigms, philosophical review

SECTION 1 -> Ц

- → Introductory
- → Quantitative/Positivist
- → Qualitative/Interpretivist
- → Quanti X Qualti Graphical

- ✓ follows objective principle. It judges based on facts and meticulously execute the steps of research
- ✓ main elements of this approach:
  - depends on the principle of universal law and causality, extremely objective
  - free from criteria imposed by subjective values or standards;
  - subject of the research and research conductor, the researcher are separate
  - hypothesis testing, is the base of the research which is rigorous, linear, and rigid
- ✓ available methods of this approach includes:
  - experimental studies,
  - re-analysis of secondary data,
  - structured questionnaires and interviews



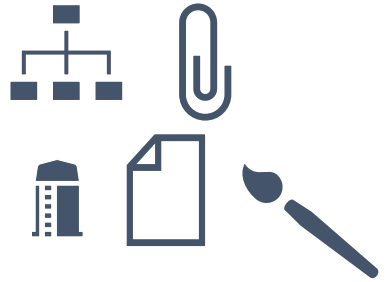
I discovered that my wat of quantifying just could tell on how much I value things

Research Methodology/paradigms, philosophical review

SECTION 1 -> IJ

- → Introductory
- → Quantitative/Positivist
- → Qualitative/Interpretivist
- → Quanti X Qualti Graphical

- ✓ Characteristics of the Approach:
  - Control : the idea of cause & affect
  - Variables definition: to identify number of variables that seems to convert the research environment into array of numbers
  - Hypothesis testing: creates a hypothesis with very specific operational variables and subject it to empirical testing
- ✓ Limitations of the Approach:
  - human subject in this line of research is treated very much in objective matter,
  - ethical consideration due to the first limitation since it cause heavy emphasis on objective measurement,
- ✓ Personal Opinion:
  - those limitation can be overcome by well designed instruments to define the measurement of the variables in question



I discovered that my wat of quantifying just could tell on how much I value things

Next

Research Methodology/paradigms, philosophical review

SECTION 1 -> Ų

✓ completely relays on subjective principle

Methods of this approach:

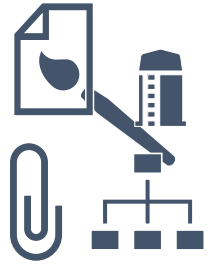
- ethnography,
- participant observation,
- focus groups,
- depth interviews

Characteristics of the approach:

- Dissimilarity & subjective world
- meaningfulness of experience for the individual
- the subject of the research and researcher are fully involved
- attribute values of the research are explicit

Limitation of the approach:

- Data collection, analysis, and interpretation of Data is a lengthy process.
- Subjects of study of Research can be affected by a researcher's presence.
- choosing an anonymity and confidentiality of issues can create hurdles.
- Reliability and validity of the study can be significant concerns.
- quality, experience and transparency of the researcher are very crucial.



Considering the factor of emotion while conducting a research needs well designed research

Next

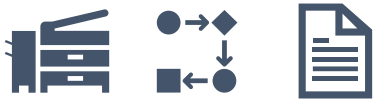
Research Methodology/paradigms, philosophical review

SECTION 1 -> 4

- → Introductory
- → Quantitative/Positivist
- → Qualitative/Interpretivist
- → Quanti X Qualti Graphical

- ✓ customer that have attribute such as (age, gender, education, etc), buys product the has attributes such as (price, color, components, etc), for a amount XX.

- ✓ machine X which has criteria a,b,c produces product A which has criteria a,b,c. A researcher is interested to estimate the maintenance time schedule for the machine, so the researcher considered the number of defect after some time of operating the machine



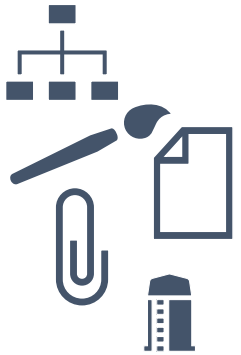


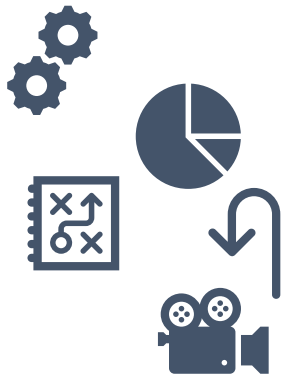
Illustration is the tool for discovery of differences between pairs

End

Structure OF Research Conduct

SECTION 2 -> ǂ

- ✓ Structure is an arrangement and organization between interrelated elements in any matter, e.g. subject or object.
- ✓ An argument consists of one or more premises from which a conclusion is inferred. The steps in this inference can be expressed in a formal way and their structure analyzed.
- ✓ Looking at the philosophy or research from categorizing perspective, you may think of it as two folds and something between: descriptive - STRUCTURE - inferential



Structuring your steps is the main principle to reach out to a sounding result

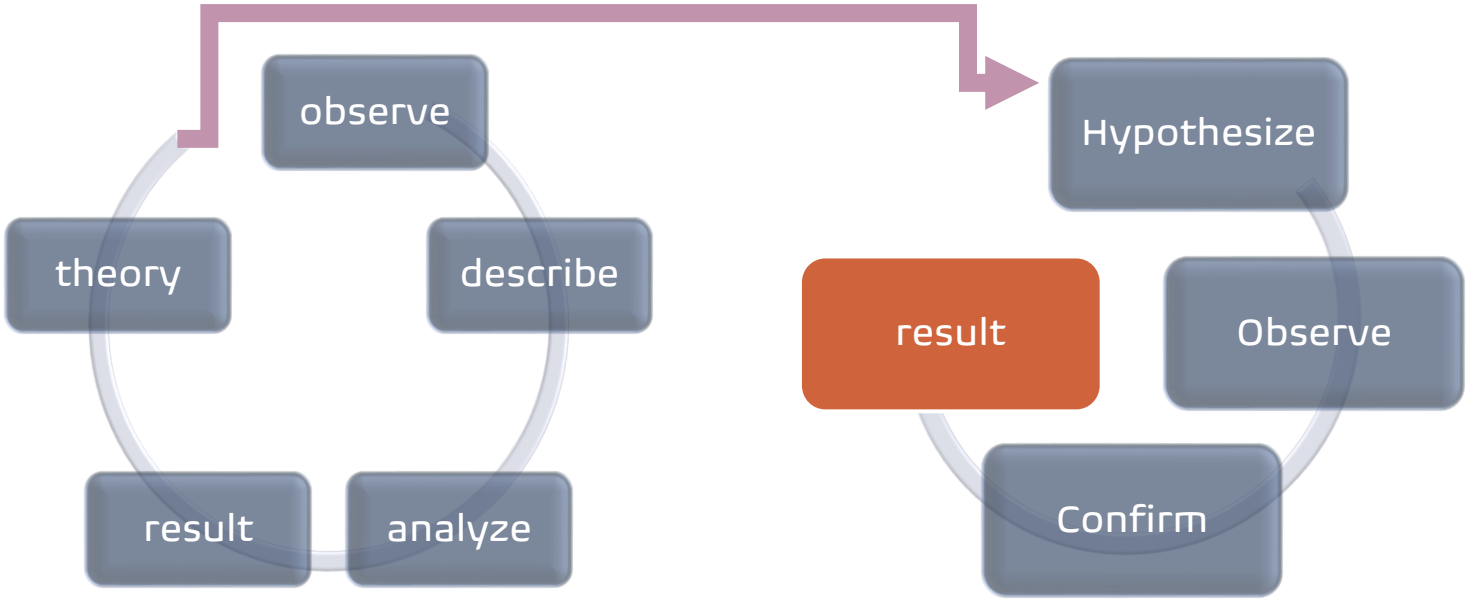
Next

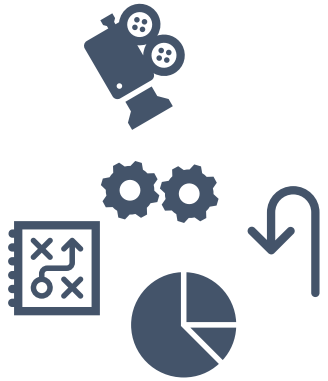
Structure OF Research Conduct

SECTION 2 -> ‡

- → Introductory
- → Inductive X Deductive
- → Subject Reaction

- ✓ inductive is making an inference based on an observation, often of a sample
- ✓ deductive is making an inference based on widely accepted facts or premises
- ✓ The cycle theory:





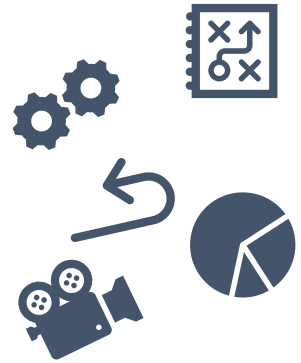
There is a start for everything that have an end, here is the trick the end of something could be just the start of other thing,….

Next

Structure OF Research Conduct

SECTION 2 -> ‡

- ✓ Subject awareness of the research conduct
- ✓ Genuine reaction
- ✓ The Hawthorn effect: no matter what experimental manipulation was tried, worker productivity improved.



Subject of a research is something of interest to the research conduct, however, the subject might has different reaction to that interest

End

Ethical Factor & Research

SECTION 3 -> fl

→ Conde of Conduct
→ Guidelines

- ✓ The Nuremburg war trail following the second world war,
- ✓ The Nuremburg guidelines:
  - Informed consent is essential.
  - Research should be based on prior animal work, if it's clinical.
  - The risks should be justified by the anticipated benefits.
  - Research must be conducted by qualified scientists.
  - Physical and mental suffering must be avoided.
  - Research in which death or disabling injury is expected should not be conducted

There are personal principles we develop over life-time, and there are those we just follow,

Next

Ethical Factor & Research

SECTION 3 -> fl

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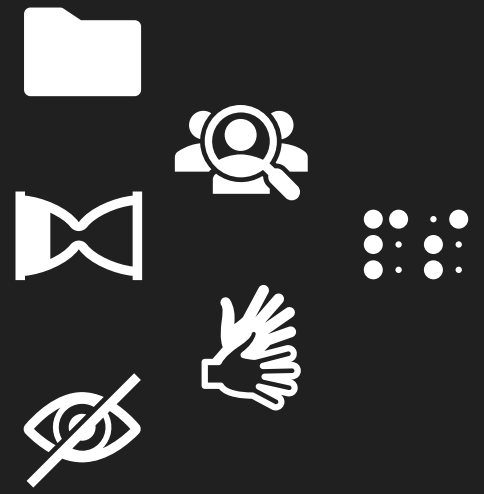
End

Conclusion

- ✓ Philosophy of contrasting approaches to research implementation
- ✓ Exploring the magnitude of quantitative approach and its properties, limitations
- ✓ Exploring the magnitude of qualitative approach and its properties, limitations
- ✓ Exploring different structures that can be used in research implementation, the inductive and deductive
- ✓ Challenge with respect to known phenomenon as subject reaction
- ✓ Finally, discus the ethical factor while research design



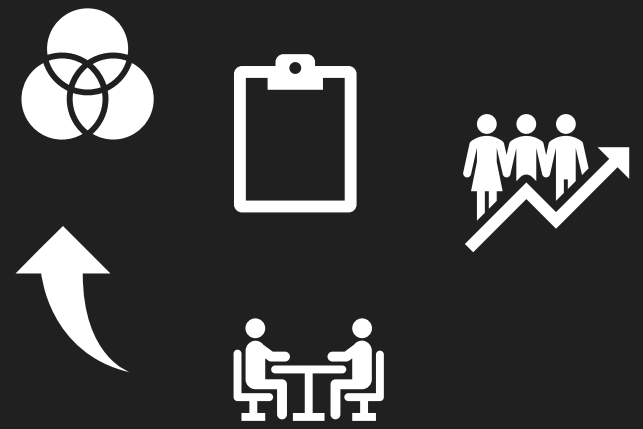
There are personal principles we develop over life-time, and there are those we just follow,

End

Chapter Three

Research Topic & Literature Review

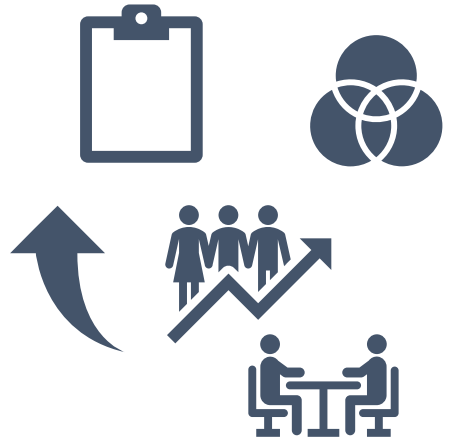
- ✓ What is the research problem?
- ✓ Conduction the Literature Review
- ✓ Reviewing & Writing The sources of Literature
- ✓ Conclusion



What is the research problem?

SECTION 1 -> 4

- ✓ Understanding of problem and its relevant to research
- ✓ Understanding of the environment where the problem is:
  - Culture
  - Space
  - Time
- ✓ Defining if possible source and causes for the problem to happen
- ✓ History review on the problem, it's as known to be literature



Problem is the best motivation to start a research

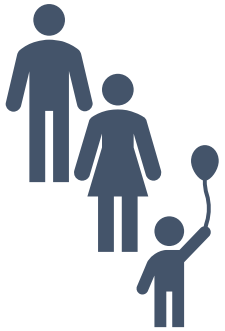
Next

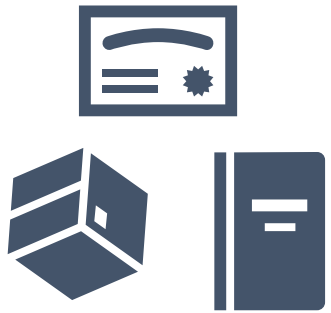
What is the research problem?

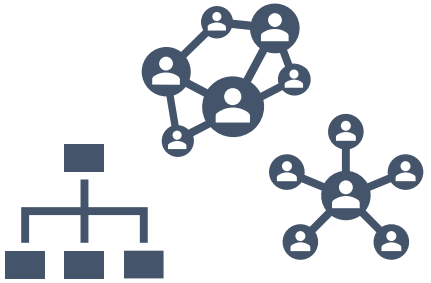
SECTION 1 -> 4

- Introductory
- Research problem identification
- Research focus

- ✓ the personal experience
- ✓ models & theories
- ✓ discussion & social network







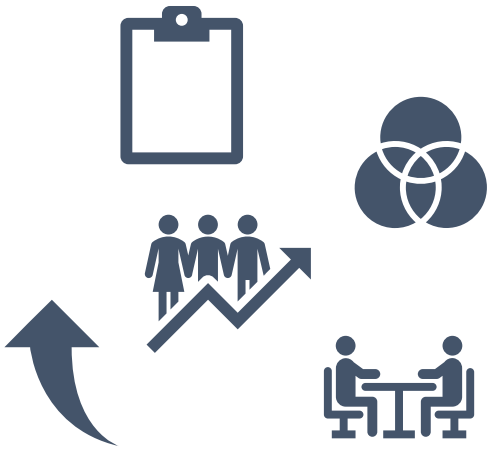
There is no solution for a problem that has no predefined identity

Next

What is the research problem?

SECTION 1 -> 1.1

- ✓ focus is an important first step in order to identify research problem
- ✓ second important step is to have sort of guidelines:
  - to read and understand the general background
  - to identify useful keywords for the literature search
  - preliminary search on available or similar research and solutions. This search must include available literature search
  - to define the topic as a research question within a conceptual and theoretical framework
  - as the research question/framework is articulated at this stage, you must revisit the literature and search on that
  - formulate the testable hypothesis



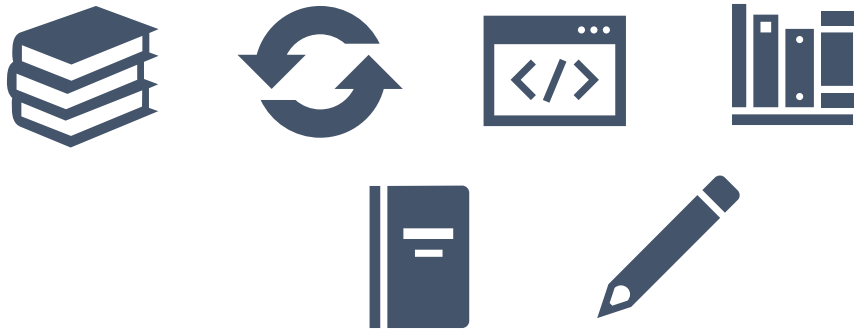
Focus is the arrow for the research target/ bow

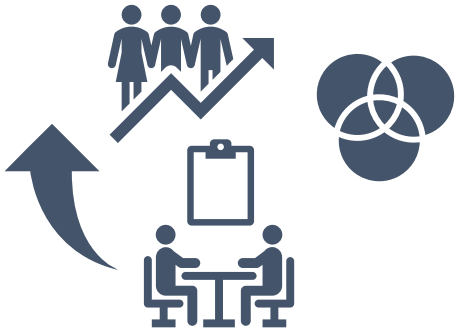
End

Conduction THE Literature Review

SECTION 2 -> ‰

- ✓ Literature, all the information relating to a subject, especially information written by experts
- ✓ problem domain, is simply looking at only the topics you are interested in, and excluding everything else. It is the area where the problems your application is intended to solve, belong to





What has been written by others as finding is the literature for what I am about to write, unless…

Next

Conduction THE Literature Review

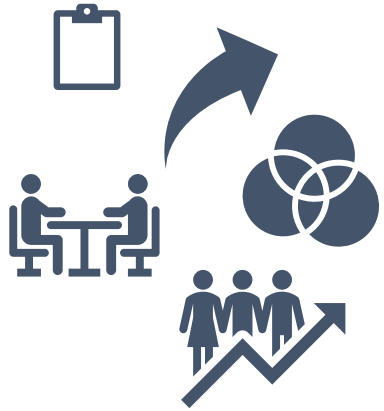
SECTION 2 -> ‰

- → Introductory
- → Why literature
- → Forming literature

- ✓ It is a critical review of what has been done, pulling contrasting ideas together, and identifying relationships a
- ✓ skill of conducting literature review:
  - broaden your perspective on the subject of interest
  - exploring the work of similar research interest
  - placing your work in context where it becomes relative to other work
  - identify right research methods, instruments, and statistical tools

Considerations:

- decide before hand the sources you intend to search from. sources could be a place such as library, company premises, or so, Also, could be parliamentary sources, corporate reports, dissertations, audio-visual material, etc
- type of literature: book, article, paper work, etc.
- access and permissions
- Age of the source, depends on the subject of research



Sort the knowledge that you learn from others, use it as an input to your box of process,

Next

Conduction THE Literature Review

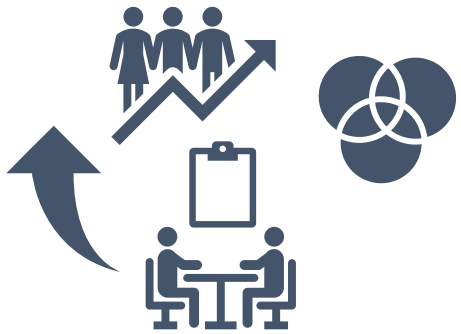
SECTION 2 -> ‰

✓ Forming the literature review could be seen from data & information sources

Data source: primary & secondary type of data:

Primary data is information collected through original or first-hand research. For example, surveys and focus group discussions.

secondary data is information which has been collected in the past by someone else. For example, researching the internet, newspaper articles and company reports



✓ Information sources:

- Journals & Articles: Journals & articles provide the most up-to-date source of published results on the subject
- Textbooks: They can be valuable in providing an overview of a subject, however consider the date and age of the source
- Grey literature: this type of literature are university theses, government, and business reports
- Internet
- databases

What has been written by others as finding is the literature for what I am about to write, unless…

End

Reviewing & Writing The sources of Literature

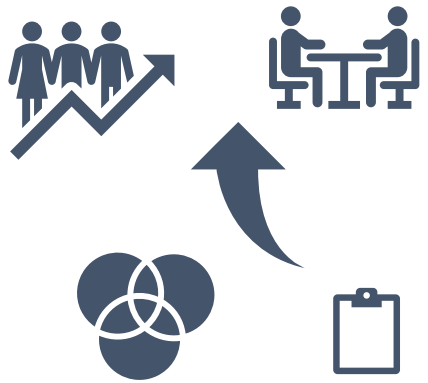
SECTION 3 -> ī

✓ Evaluation on the source for your literature can vary, here are guidelines in general:

Whether the source digital or physical just consider:

- Identify the financial support if any
- Review the research question and check out the argument
- Define the research paradigm
- Look and evaluate the result

- For each section in the literature consider:
  - (Introduction): ask why the researcher undertake the research
  - (method): ask what method/s the researcher employed
  - (result): what are the findings?
  - (discussion): what are implications and interpretations of the result
- In case your source is internet:
  - The audience for whom the website aimed at
  - Try to understand the researcher philosophy and approach, don't only relay on pre-determined merit of the researcher
  - Evaluate the content of the research,



Review is a principle from which you evaluate the value of the source

Next

Reviewing & Writing The sources of Literature

SECTION 3 -> ī

→ Reviewing the literature
→ Writing the literature

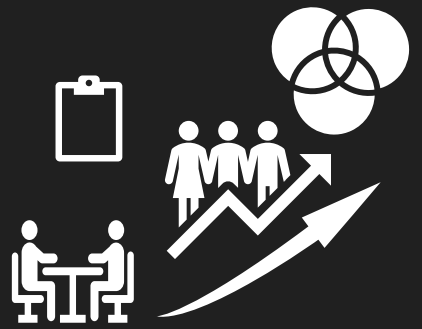
- ✓ This material doesn't really focus on the formal or academic writing of literature. However, to complete the image you may consider some important facts while you decided to prepare a draft for official project
- ✓ General guidelines:
  - In the introduction: Identify the general issue, so that an appropriate context is provided for the rest of the review.
  - In the body section: Group research studies in intercept sections, like qualitative, quantitative, purposes, types of population, etc. Then, summarize each study or subgroup within the group. After that, provide strong signposts throughout each section giving direction with summary statements at the end of each section
  - In the conclusion: Summarize the results. Evaluate the current situation, pointing out gaps, and inconsistencies. Then, conclude
  - Don't forget to to provide full bibliographical details of the books, journal articles, etc.

Writing is skill of rhetoric and composition which you can learn, but the soul of it you must have

End

Conclusion

- ✓ Essentially, we saw how to identify the research problem and create the structural view on that. Then
- ✓ we come establish the essential and very important section of research that is the literature review
- ✓ we have seen how important it is to understand the concept of literature review and some skills you must attain to make one
- ✓ Also, we discussed some source types to get the information you need for the literature review
- ✓ Finally, we discussed the reviewing and writing steps to form a literature review



Review is a principle from which you evaluate the value of the source

End

Chapter Four

LAB- SECTION_01

®

This is the first lab section in series yet to follow. I will take this lab problem from scratch and develop a complete digital solution over the following 5 books of (the big bang of data science).
Lab sections of this book and the following one, can be used by everyone, regardless the field of expertise. e.g. executive level, managerial level, academic & scholars, under and post graduate, or even layperson with interest to learn.

- ✓ The story
- ✓ The consultancy
- ✓ Scientific implementation

The story

SECTION 1 -> ī

- ✓ The municipality of Cityhood decided to launch a project, back in 2010, which would server the local residence of the metropolitan city.
- ✓ The project (LEARN) aims to be the best lifelong learning center.
- ✓ Since it started to the current date the project has trained 2,619,530 trainees across 652 branches within 235 training centers.

Implementation is the best tool to learn a theory

Next

The story

SECTION 1 -> ī

- → Introductory
- → Project characteristic
- → Operational Flow

- ✓ LEARN Project aims to:
  - improving the vocational and artistic knowledge.
  - Also seeks to raise people's understanding of culture and improve life experience
  - help residents become an active producer, contributing to their standard of living and improving their rate of employment
- ✓ important to mention the characteristic of the project, that is FREE admission to all the local residence of the city

Characteristics are important measures to build a strorng foundation on the problem

Next

The story

SECTION 1 -> ī

- ✓ local residence reach out to the project website
- ✓ select the desirable course according to personal need
- ✓ fill up the application and provide information
- ✓ once the application is submitted, the residence receives acknowledgement,
- ✓ the application will be processed by the local administration from the project team
- ✓ once it's confirmed, it checks available and open course as application stated,
- ✓ once the course is available, then a confirmation of enrollment is sent back to the residence
- ✓ specific characteristics about the course, each course operates as follows:
  - classroom, equipped according to the course demand,
  - shall the number of participant not exceed 23,
  - specialized teacher is assigned, (d) starting and ending date of the course,
  - finally testing and certification

Lay the ground of understanding by visualization, that is to graph

End

The consultancy

SECTION 2 -> ċ

- ✓ The Problem:
  - The management had observed a problem in the yearly report of accomplishment. every class the project offer is opened once 23 participants are confirmed.
  - On the starting date of the course the number of participants are 23, however, they observe that by the end of the course, which last 2 months or so, the number of participants drop to 13-17.
- ✓ The assignment:
  - the management wants to learn the real reason of that high number of dropouts,
  - in addition they want to have number of possible recommendation to contain the problem
  - and then find a way to prevent such high rate of dropouts.

Lay the ground of understanding by visualization, that is to graph

Next

The consultancy

- ✓ as a data scientist not to consider things at face value only. I prefer to be objective in many situation
- ✓ first, I have in-depth meeting with management who were concerned about the issue. I have few outlines:
  - what the management think about the issue and its causes?
  - how serious the management is to tackle the challenge and make a solution?
  - why are they very much concerned about the problem?
  - are there any strains for me as a data scientist to start working on the project?
  - Is it OK for the management in case of success to scientifically find the cause and suggest the
  - solution to publish that as a case study?

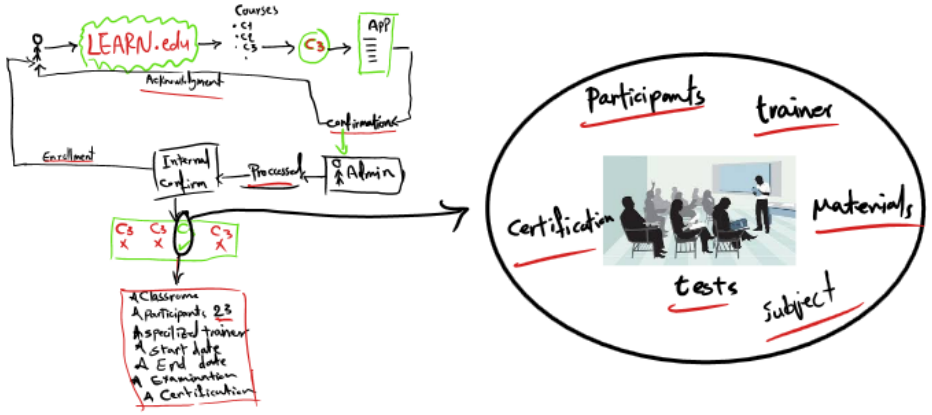
Lay the ground of understanding by visualization, that is to graph

Next

The consultancy

SECTION 2 -> ċ

✓ Let's graph the problem:



Lay the ground of understanding by visualization, that is to graph

End

Scientific implementation

✓ Follow what we have learned so far:

- converting the problem into research setup philosophy,
- defining space of data
- highlighting the knowledge of descriptive and inferential principles
- deciding on the research paradigm/methodology quantitative or qualitative
- what is the structure is going to be, inductive or deductive
- considering any ethical factor
- working on draft of the research topic and aim, then deciding on the literature review and
- sources that are needed to address the matter

Science is not a book but it's the mirror of universe that we very much less understand

Next

Scientific implementation

- ✓ Define the problem, just the general language:
  - There are factors contribute to the decision of participants to dropout a class; what are they?, and can we find out about the decision, learners make to drop out, before it happens?
- ✓ Define the data space:
  - we have participant data (demographical and variable); we have trainer data (demographical and variable); we have material data (type, date, publication center, etc.); we have subject data (title, popularity, etc.); we have test data (types, samples, etc.); we have certification data (process, requirements, procedures, etc.)
- ✓ Research Structure:
  - going to be as inductive-deductive; where we start to observe, then describe, analysis then make some results; as essential stage to theorize and hypothesis observe, confirm and produce results
- ✓ Ethical concerns as discussed before
- ✓ Literature Review: to be done later in the second LAB

→ Introductory
→ Implementation steps

Follow methodical steps in order to accomplish your endeavor

End

Chapter Five

Framework & Research Design

- ✓ Philosophy of theory
- ✓ Philosophy of framework
- ✓ Research technical implementation
- ✓ Conclusion

The Philosophy of theory

SECTION 1 -> ī

- → Introductory
- → Illustration of theory
- → Expression of variables

- ✓ Revisit the:
  - Qualitative – start – observation – procced....
  - quantitative –start – theory – procced ....
- ✓ Bouncing fact
- ✓ Understanding of the problem
- ✓ Understanding of the research environment

Theory is a process that have led to a statement that explains a phenomenon, that is theory

Next

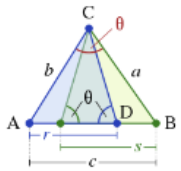
The Philosophy of theory

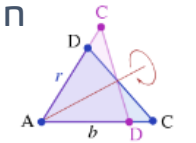
SECTION 1 -> ī

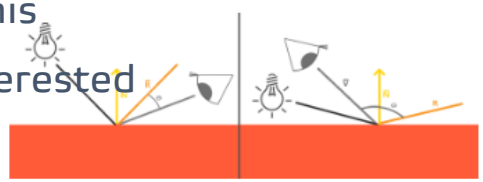
- Introductory
- Illustration of theory
- Expression of variables

Definition: Theory in principle is something suggested as a reasonable explanation for facts, a condition, or an event. Two groups:

- **Objective** one: in the law of mathematics, e.g. The computation of the length of any side of any triangle, given the lengths of the other two sides and the angle between them. If the angle between the other sides is a right angle, the law of cosines reduces to the Pythagorean equation $c = \sqrt{a^2 + b^2 - 2ab * cos\theta}$. Based on this theory, I could construct a research to solve, e.g. if I am interested to find out the affect of the position of light source.







- **Subjective** one: in the field of sociology and psychology, e.g. Maslow's theory is that we are motivated by our needs as human beings, From the bottom of the hierarchy upwards, the needs are: physiological (food and clothing), safety (job security), love and belonging needs (friendship), esteem, and self-actualization

It is easy to say, in fact it doesn't really matter. The point is to prove it. MATH is your ultimate weapon.

Next

✓ **Math is the best weapon to cut short the argument**

The Philosophy of theory

SECTION 1 -> ī

- → Introductory
- → Illustration of theory
- → Expression of variables

- ✓ Quantifying and image recognition
- ✓ The idea of measuring
- ✓ Defining the space of measuring

Theory is a process that have led to a statement that explains a phenomenon, that is theory

End

Philosophy of framework

SECTION 2 -> 0

- ✓ We have seen **Fragments**:
  - Working on research problem
  - Building literature store
  - Imagine beginning & ending
- ✓ In **definition**:

  It is a support structure or system that holds parts together,

  has something stretched over it or acts as the main structure

You need a step guidness to start working on your target, that is the framework

Next

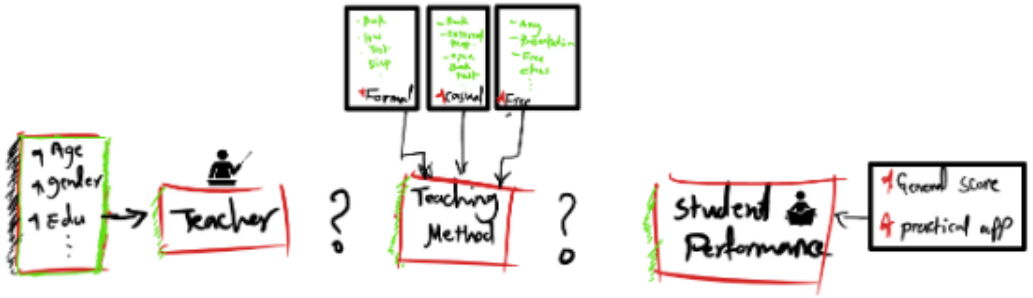
Philosophy of framework

SECTION 2 -> 0

- Introductory
- Conceptual framework
- Theoretical framework

✓ the conceptualize framework is:

- to decide on the number of factors or in other words, variables, which you believe are contributing to answer your research aim
- To decide on their measurement, if the variable is no quantified, e.g. happiness, then you shall design its instrument
- Graph them to move forward to their relationships and directions



Concept, conceptualize, see, observe, all to be in such a backage that is called the framework

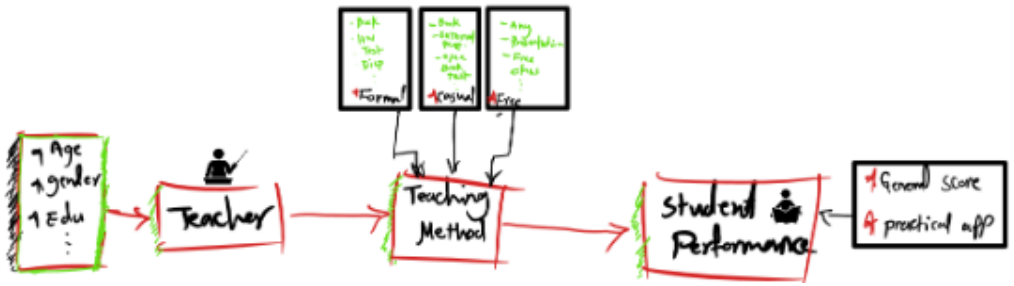
Next

Philosophy of framework

SECTION 2 -> 0

✓ The theoretical framework:

- introduces and describes the theory which explains why the research problem under study exists.
- It seems as if we already have defined the variables that will answer the research question, we also quantified them,
- and we left to work on the direction between those variables



Relationship between the elements of your systems define the theoretical implication of your aim

End

Research technical implementation

SECTION 3 -> æ

- → Articulating research Questions
- → Ground on Hypothesis
- → Design of research

- ✓ The research question:

  forming research question is the most, if not the super most and

  crucial important aspect to design sound research

- ✓ Skills towards that:
  - articulating the general problem question
  - articulate the research problem
  - articulate the research problem
- ✓ E.g. (the market, the product, new production line)

Research question could tell how smart the result is

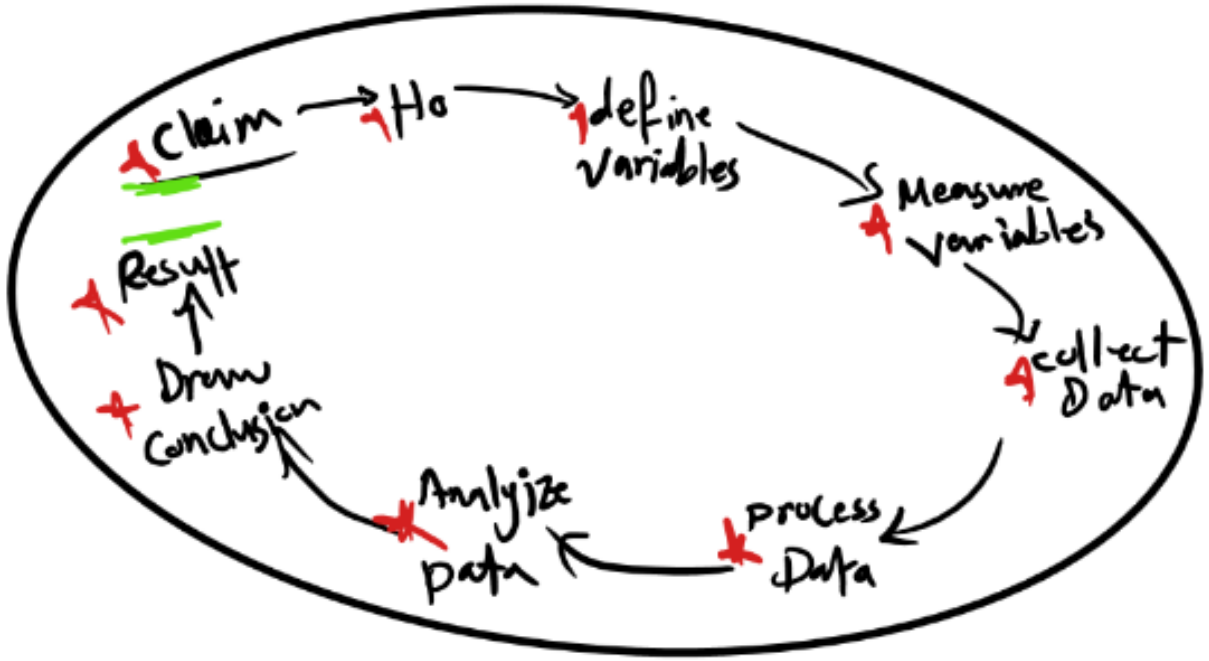
Next

Research technical implementation

SECTION 3 -> æ

- → Articulating research Questions
- → Ground on Hypothesis
- → Design of research

- ✓ The hypothesis:
- ✓ The lifecycle



Hypothesis is the resemblant of nature, that is in simple term, the language of 1, and 0.

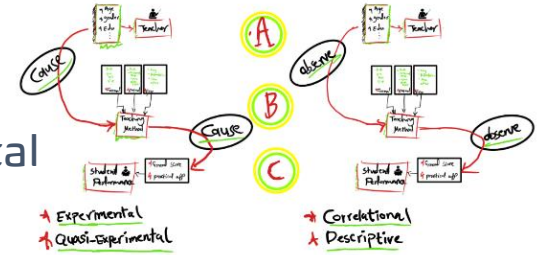
Next

Research technical implementation

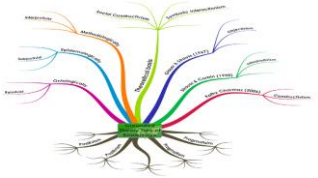
SECTION 3 -> æ

- → Articulating research Questions
- → Ground on Hypothesis
- → Design of research

- ✓ Having you decided on your research methodology/paradigm (quantitative, qualitative)? Next, your design for the research?
- ✓ Group the research design in terms of:
  - Causational – the use of
    Experimental & Quasi-experimental
  - Observational – the use of
    Descriptive & correlational



- ✓ Categorize the research design:
  - Generalized
  - Case study
  - Ethnography
  - Grounded theory
  - Phenomenology



Designing your research is the starting to implement for successful endeavor

End

Conclusion

- ✓ the philosophy of theory. How to understand theory from general and specific perspectives
- ✓ wo perspectives, math driven proven perspective, and the subjective proven perspective
- ✓ principle of expression of variables, how define variable, how to measure the variable
- ✓ review on the research technical implementation. We saw how to articulate research question. how to hypothesis the research looking at the hypothesis research life cycle
- ✓ different research design methods. we categorized those designs in terms of causational & observational
- ✓ the general title of the research design based on the generalization concept

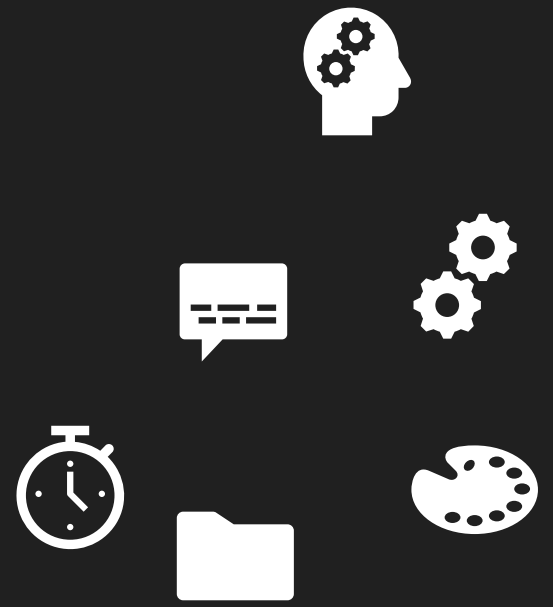
you have established the last foundation, it's almost the time to do it

End

Chapter Six

Execution of the research project

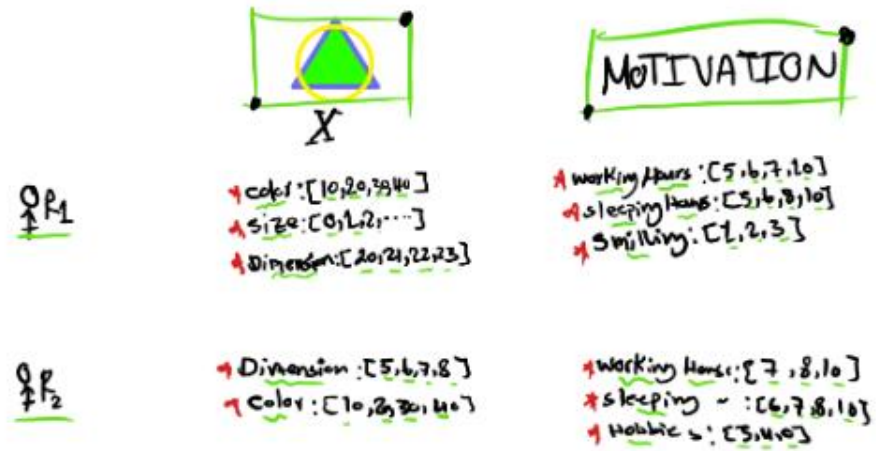
- ✓ The Philosophy of Measurement
- ✓ Philosophy of Subject
- ✓ Research Data
- ✓ Writing Formal Research
- ✓ Conclusion



The Philosophy of Measurement

SECTION 1 -> æ

- ✓ It is very important to establish and build up a skill on the subject of measurement form philosophical perspective before taking it into practical field. Measurement is the way as human are justifying & perceiving things
- ✓ Philosophy of measuring



Introductory to measuring is relevant to the way people understand and quantify things

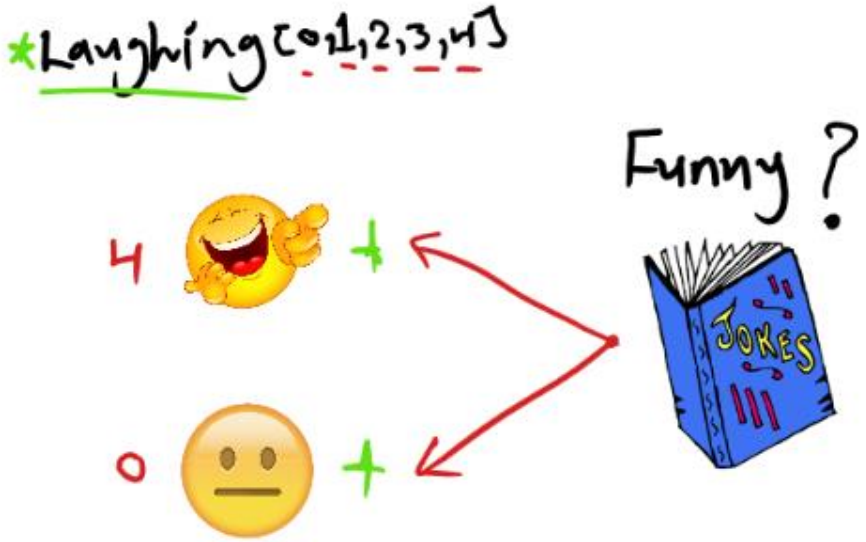
Next

The Philosophy of Measurement

SECTION 1 -> æ

- → Introductory
- → Presentation of Measurement
- → Instrument Design

✓ The idea of representation is kind of reaction in real world. Let me give you an example, when you see something or hear something you think is funny, then you laugh. In this case laughing is the representation of how much the joke was actually funny.



Present your measurement and you will have whole lot of different opinions

Next

The Philosophy of Measurement

SECTION 1 -> æ

- ✓ Object instrument: device, sensors, observation list, or similar
- ✓ Human instrument: survey, questionnaire, observation list, and similar,

  personal experience, you will find yourself most of the time shall intervene to modify those instruments, or even you have to build up one on your own.
- ✓ Explore existing methods to design instrument for human subject:
  - Thurstone Scale
  - Likert Scale
  - Other techniques
  - Author personal method

Design your tool the instrument that measure what you see

End

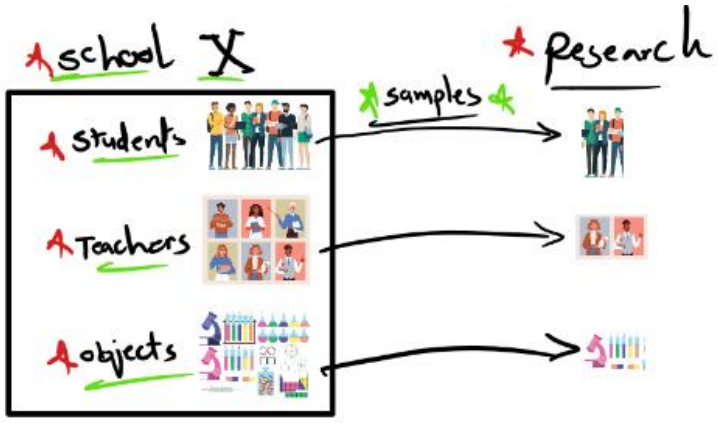
Philosophy of Subject

SECTION 2 -> H

- ✓ subject of the research is as if a customer of a product
- ✓ In the world of research there are two terminologies you must be familiar with:

  population: this term represent the ALL. every element in the circle. e.g. a school X, every student, teacher, and object is element of that that school. the sum of all these elements are the population of school X

  sample: the term represents the selection (could be random or not) from the elements, that comprise the population



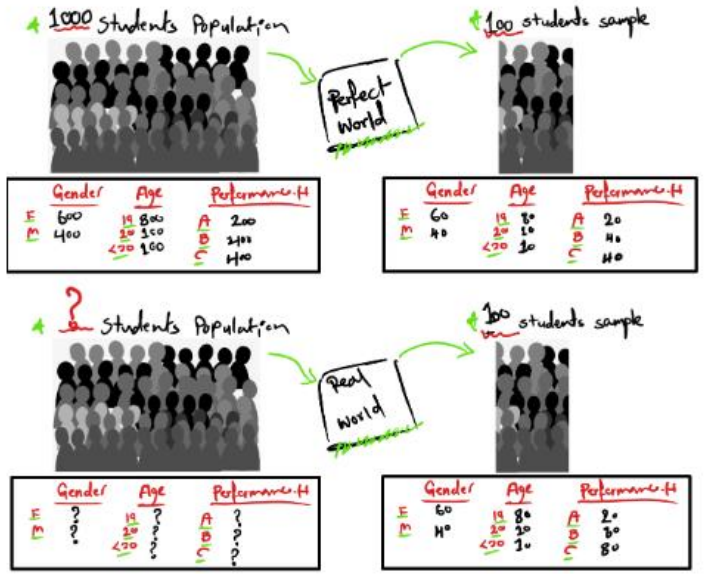
Subject is the center for your data, it's the source that emit the data you need to reach your conclusion

Next

Philosophy of Subject

SECTION 2 -> H

- ✓ How to draw a sample? Or first, what I see important is that the researcher must be able to define the population first.
- ✓ Consider to:
  - ✓ defining the population
  - ✓ Define the sample frame
  - ✓ Define the sample size
- ✓ Sampling reality:



Sample is an essential step and actually a skill you need to have a representative of the population

Next

Philosophy of Subject

SECTION 2 -> H

✓ Categories of sampling can be as:

- Probability sampling: we are aware, in a sense, about the population. we have set 10% target sample. If you can go ahead and draw as many 10% as you can. you have the time and budget then do it.
  - ➢ Its techniques (random, systematic, stratified, cluster)
- Non-probability sampling: it represents the case when you have no knowledge about the total of the population, also, when you have limit access in terms of time and budget
  - ➢ Its techniques (opportunity, judgement, quota, purposive, snowball)

Get some skills by learning different techniques

End

Research Data

SECTION 3 -> H

- → Data source
- → Data validity & reliability
- → Data management

- ✓ In case of primary data sources you have three available options:
  - Surveying option
  - Observation option
  - Other option
- ✓ In case of secondary data sources:
  - datasets from government surveys
  - or previous studies on your topic.

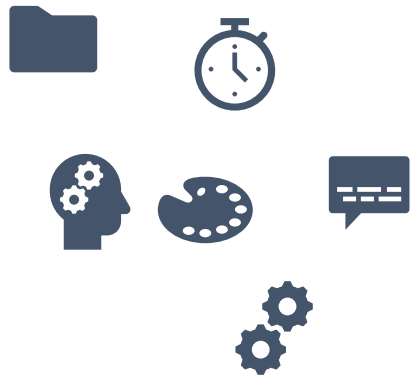
Subject is the center for your data, it's the source that emit the data you need to reach your conclusion

Next

Research Data

- Data source
- Data validity & reliability
- Data management

- ✓ Reliability means your results can be consistently reproduced.
- ✓ For valid and reliable results, your measurement materials should be thoroughly researched and carefully designed.
- ✓ Plan your procedures to make sure you carry out the same steps in the same way for each participant



Be sure to consider the validity of your data, that is the stage for reliability

Next

Research Data

SECTION 3 -> H

- → Data source
- → Data validity & reliability
- → Data management

- ✓ It's important to create a data management plan for organizing and storing your data. Will you need
- ✓ to transcribe interviews or perform data entry for observations? You should safeguard any sensitive
- ✓ data, and make sure it's backed up regularly. Keeping your data well-organized will save time when
- ✓ it comes to analyzing it. It can also help other researchers validate and add to your findings

Manage the data by creating a plan for that, that include the storage the distribution and etc.

End

Writing Formal Research

SECTION 4 -> H

- ✓ Title and authorship: front page that presents the title of the report,
- ✓ abstract or executive summary: the abstract is usually the last section to be written.
- ✓ Introduction: introduce the reader to the general topic to be discussed, with a general and broad-based discussion of the topic, the focus of the introduction should be on developing a framework of past research on which to form the hypothesis of the current study
- ✓ method section: to inform readers of the details of the study undertaken, with information relating to the design and procedures,
- ✓ Reporting results: The primary purpose of the results section is to present the data, and a standard way to structure the results section
- ✓ Discussion and conclusion: provide a more detailed analysis
- ✓ Reference list:
- ✓ Appendices

Writing is a skill, in academic that could be a matter of concern, however, structuring the writing is must

End

Conclusion

- ✓ the principle of measurement from philosophical perspective
- ✓ how to measure variables based on the nature of the variable and we have visual presentation on the concept
- ✓ we introduced the concept of subject of the research. How to
- ✓ perceive the subject of your research in terms of elements
- ✓ concept of population and sample.
- ✓ Available sampling techniques
- ✓ type of research data and how to collect and manage them
- ✓ how validate the data, and finally we saw how to produced a formal written research.

you have established the last foundation, it's almost the time to do it

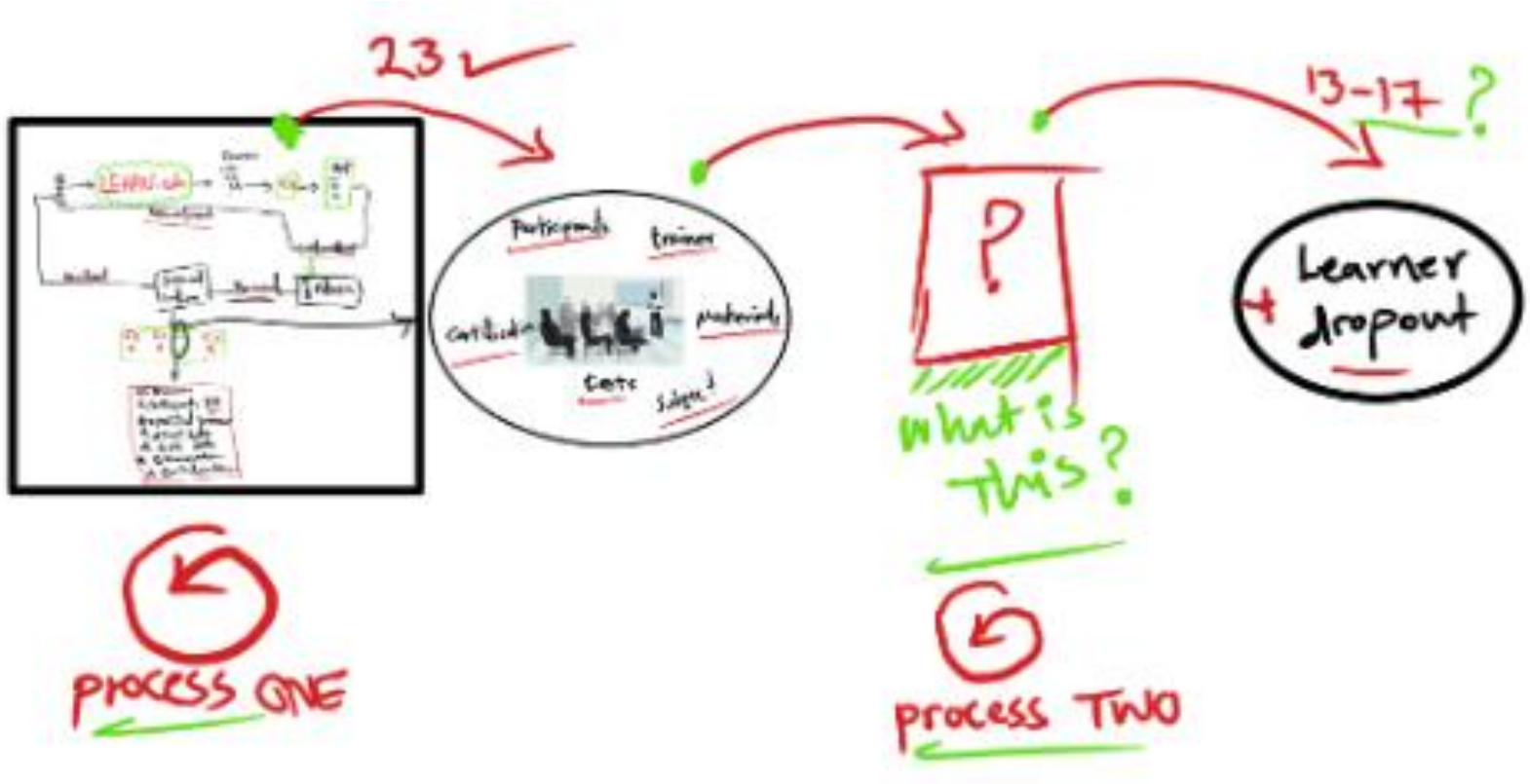
End

Chapter Seven

AB- SECTION_02

- ✓ Induct or deduct the research
- ✓ What is in the literature review
- ✓ Framework implementation
- ✓ Articulate research question & hypothesis
- ✓ The research design
- ✓ Building the research instrument
- ✓ Research implementation

Induct or deduct the research



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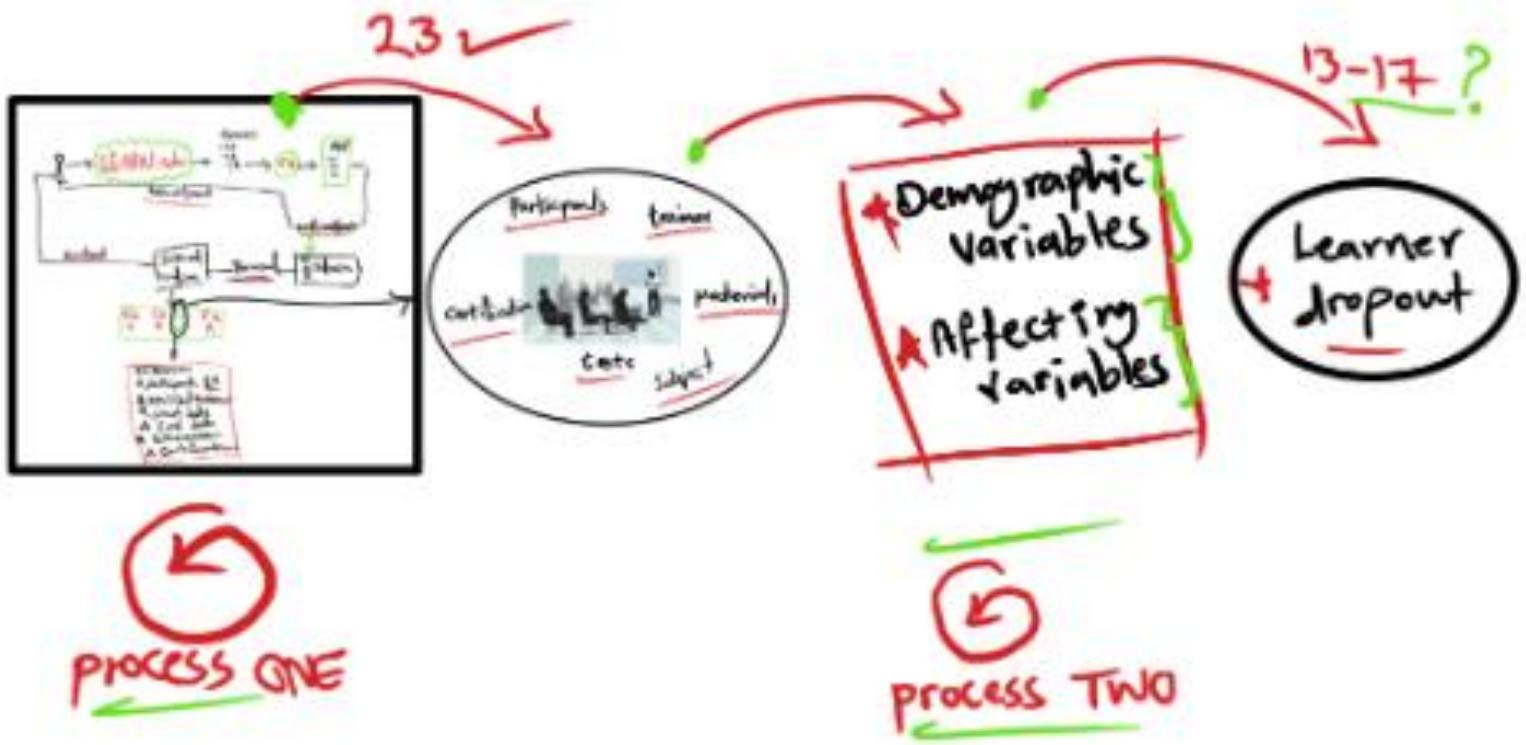
What is in the literature review



End

Framework implementation

- ✓ Circle component: that contains the trainer, trainees, subject, material, test and certifying process.
- ✓ Process two components: that have two groups of variables, demographic and affecting
- ✓ dropout components: that have status of yes and no

End

Articulating the research question, and Hypothesis

- ✓ Research Question:
  - do the demographic & the affecting variables affect the decision of a life long learner to drop out a life-long training course?
  - can those variables, collectively, subgroup or individually be predictive to the decision of dropping out the course?
- ✓ Research Hypothesis:
  - H_0: We believe that the demographic & affecting variables, collectively or subgroup have affect on the decision of a life-long learner to drop-out a life-long training course.
  - H_1: the demographic & affecting variables have no affect on the decision of a life-long trainer to drop-out the life-long training program.

End

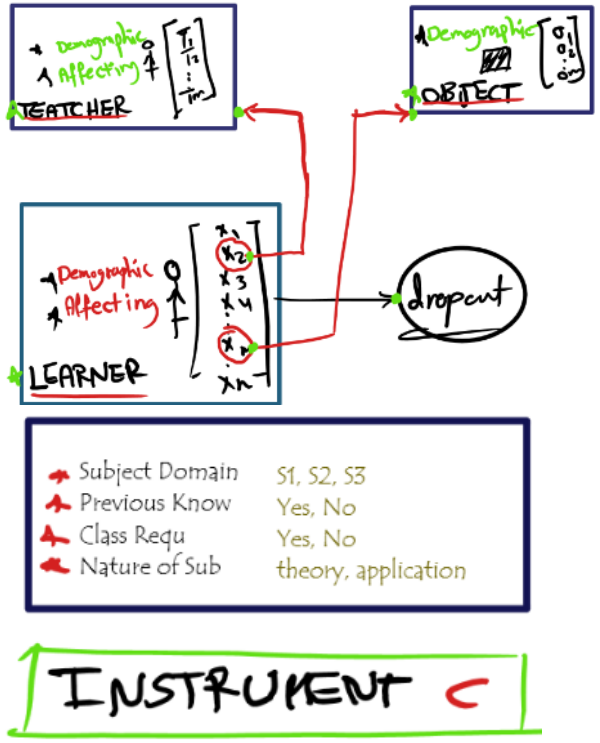
The research design

- ✓ research design is going to be based on observational research design
- ✓ both methods correlational & descriptive are going to be implemented.
  - the correlational will address the answer for the first research question,
  - whereby, the descriptive will address the answer for the second research question
- ✓ Categorizing the research design: Case Study- Research design: where we lay detailed information on the possible reason/s that causes a life-long trainee to drop out a lifelong training program that is offered by LEARN project, which is conducted by the Cityhood municipality

End

Building the research instrument

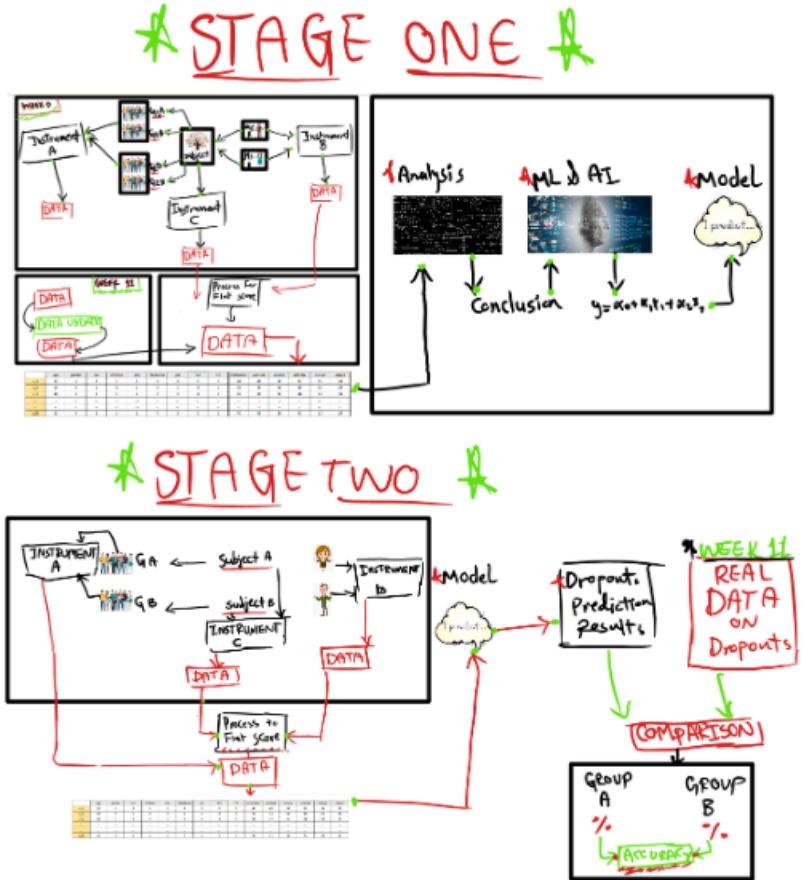
- ✓ Human Subjects: this category has learners and teachers
- ✓ Object Subjects: this category has subject of the course, material, teaching method, and testing.
- ✓ Instrument of the research



End

Research implementation

- ✓ Preparation steps:
  - Sampling
  - Research subjects
  - Instrument delivery
- ✓ Implementation steps



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