

# Research Methodology

Arpita Maitra

TCG CREST  
[arpita76b@gmail.com]

30th August, 2022

## Concepts and Variable

- Let us consider the following objectives for our studies
  - ① To find out the number of children living under the poverty line in India
  - ② To ascertain the impact of immigration on family roles in immigrants
  - ③ To measure the effectiveness of retraining programme designed to help young people
- Though these objectives clearly defines the thrust of the studies, however, there are some parameters which need to be mentioned specifically

# Concepts and Variables

- When you use the term “children” or “poverty”, you need to specify a bound
- In case of children, that will be the age limit, i.e., we need to define what we mean by ‘children’
- For poverty, we need to decide what constitute the poverty line
- To ascertain the impact of immigration on family roles, we need to identify which roles constitute the family roles
- And also, what is meant by ‘immigrants’
- Do we consider immigrants for every country or a few?
- Again, we can not measure effectiveness unless we specifically define what effectiveness is
- What is meant by ‘young’ etc.

- Let us consider some other examples too.
  - This programme is *effective*
  - This programme is not *effective*
  - We are providing a *quality service* to our client
  - This is a *waste of time*
  - There is no *accountability* in this office
  - This product is not doing *well*
- All these statements are given from some perceptions
- Perception may vary person to person

# Concept and Variable

- When you say *This food is excellent*, that food is “**Excellent**” from your point of view
- It might be tasted “**Awful**” by other
- This perception is called **Concept**
- However, when you clearly define your perception in a measurable scale, it becomes **Variable**

# Concept and Variable

- Until you define what is meant by *Effectiveness*, “*This programme is effective*” is a concept
- When you define *Effectiveness* in terms of time or space complexity, it will become a *Variable*
- Variable may take different values
- According to Kerlinger; A variable is a property that takes on different values. Putting in redundantly, a variable is something that varies....A variable is a symbol to which numerals or values are attached”

# Concept and Variable

- Black and Champion define variables as 'rational units of analysis that can assume any one of a number of designated sets of values'
- A variable, then, is a concept that can be measured on a measurement scale which has varying degree of precision in measurement



# Concept and Variable

- Definition: An image, perception or concept that is capable of measurement, hence capable of taking on different values, is called a variable
- In other words, a concept that can be measured is called variable
- A variable is a property that takes on different values
- It is a rational unit of measurement that can assume any one of a number of designated values

# Measurement Scale

- Measurement scale: A system of classifying objects, responses, characteristics, and attributes into different categories
- These categories could be very subjective or objective depending upon the scale used
- Four commonly used scales are nominal, ordinal, interval, ratio
- However, some analysts feel that scientific methods are incapable of measuring feelings, preferences, values, and sentiments
- Others believe that most of these things can be measured

# Measurement Scale

- According to that point of view, there must be some situations where those can be measured indirectly through appropriate indicators rather than directly
- These feelings and judgements are based upon observable behaviours in real life
- For example, amount of 'Adrenaline' in our blood stream at a point of time may be exploited as an indicator if we are angry at that point of time
- Spike in 'Dopamine' level will tell how much happy you are, etc.

- However, in such scale there is no absolute 'TRUE' or absolute 'FALSE'
- Suppose, you say "This food is good" and define 'good' as the amount of sweetness in it, i.e, if the food has a specific value of sweetness, according to you that would be good
- This might not be true for other individual
- Such judgement cannot be said to be true or false though those are defined clearly

# The Difference Between a Concept and a Variable

- The main difference between a concept and a variable is the measurability
- Concepts are mental images or perceptions and therefore their meanings vary markedly from individual to individual
- Variables are measurable, though of course, with varying degrees of accuracy depending upon the measurement scale used
- A concept, as such, can not be measured
- A variable can be subjected to measurement by crude/refined or subjective/objective units of measurement

# Roles of Concept and Variable in Research

- Each collaborator must have the same understanding of the concepts as the collaborative data are to be similarly classified, findings need to be pooled and tested and reproduced
- Classification and comparison demand uniform and precise definitions of categories expressed in concepts
- It is therefore important for the concepts to be converted into variables; either directly or through a set of indicators
- This is because they can then be subjected to measurement
- Though there is possibility that the degree of precision with which they can be measured markedly varies from one measurement scale to other

# Examples of Concepts and Variables

<b>Concepts</b>	<b>Variables</b>
Effectiveness	Gender (Male/Female)
Satisfaction	Attitude
Impact	Age ( $x$ years, $y$ months)
Excellence	Income (Rs. —per year)
High Achiever	Weight (—Kg)
Self Esteemed	Height (—cm)
Rich	Religion (Hindu, Muslim, Catholic, Protestant, Jewish)

# Converting Concepts into Variables

- If you use a concept in your study, you need to consider its operationalisation, i.e., how it will be measured
- For that you first need to go through the process of identifying indicators—a set of criteria which can quantify the concepts
- The choice of indicators for a concept might vary with the researcher
- However, the indicators must be relevant to the concept



# Converting Concepts into Variables

- Some concepts, say 'rich', can easily be converted to variable by setting an indicator
- For example, income/annum might be an indicator
- Assets like houses, car, boat etc. can also be the indicators
- Then we need to fix a level
- That will be set based upon the available information on income distribution and an average level of assets owned by the members of a community
- This will act as a basis for classification
- Then analyse the information on income and the total value of the assets to make a decision whether the person can be classified as 'rich'

# Converting Concepts into Variables

- The operationalisation of the other concepts, such as “Effectiveness” or “impact” of a programme may prove difficult
- However, that can also be done; for example, “Effectiveness” of an algorithm can be quantify by measuring its time complexity which is polynomial in its input

# Converting Concepts into Variables

- One of the main differences between quantitative and qualitative research studies is in the area of variables
- In qualitative research, as it usually involves studying perceptions, beliefs or feelings, you do not make any attempt to establish uniformity in them across respondents
- And hence measurements and variables do not carry much significance
- On the other hand, in quantitative research, we need to convert concepts into variables

- Research Methodology; a step by step guide for beginners, Ranjit Kumar, Fifth Edition, 2019