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Course Three: Unit of Analysis, Concepts and Constructs

Introduction

One of the main constraints in social science research is that instead of investigating the relationships between measurable variables, as is the case in natural sciences, we examine concepts and constructs relationships.
In the present lesson, we provide an explanation of four elements in social sciences investigations: The unit of analysis, variables, concepts and constructs.

1- Unit of Analysis

The unit of analysis refers to the person, collective, or object that is the target of the investigation. Typical unit of analysis includes individuals, groups, organizations, countries, technologies, objects, and such. For instance, if we are interested in studying people's shopping behavior, their learning outcomes, or their attitudes to new technologies, then the unit of analysis is the individual. If we want to study characteristics of street gangs or teamwork in organizations, then the unit of analysis is the group. If the goal of research is to understand how firms can improve profitability or make good executive decisions, then the unit of analysis is the firm.
If research is directed at understanding differences in national cultures, then the unit of analysis becomes a country. Even inanimate objects can serve as units of analysis. For instance, if a researcher is interested in understanding how to make web pages more attractive to its users, then the unit of analysis is a web page and not users.
Understanding the units of analysis can sometimes be fairly complex. For instance, if we wish to study why certain neighborhoods have high crime rates, then our unit of analysis becomes the neighborhood, and not crimes or criminals committing such crimes because the object of our inquiry is the neighborhood and not criminals. However, if we wish to compare different types of crimes in different neighborhoods, such as homicide, robbery, assault, and so forth, our unit of analysis becomes the crime.

1-2 Understanding the Unit of Analysis

Understanding the unit of analysis is important because it shapes what type of data you should collect for your study and who you collect it from. If your unit of analysis is a web page, you should be collecting data about web pages from actual web pages, and not surveying people about how they use web pages. If your unit of analysis is the organization, then you should be measuring organizational-level variables such as organizational size,

revenues or hierarchy. Many investigations fail to provide a real contribution because data was collected from a wrong source.

2- Concepts, Constructs, and Variables

Research can be exploratory, descriptive, or explanatory, most scientific research tend to be of the explanatory type in that they search for potential explanations of observed natural or social phenomena. Explanations require development of concepts or generalizable properties or characteristics associated with objects, events, or people. For instance, the idea of gravitation borrowed from physics can be used in business to describe why people tend to "gravitate" to their preferred shopping destinations. Likewise, the concept of distance can be used to explain the degree of social separation between two otherwise collocated individuals. Sometimes, we create our own concepts to describe a unique characteristic not described in prior research. For instance, technostress is a new concept referring to the mental stress one may face when asked to learn a new technology.

2-1 Definition of Concept and Construct

- Concepts are defined as generalizable properties or characteristics associated with objects. They may also have progressive levels of abstraction. Some concepts such as a person's weight are precise and objective, while other concepts such as a person's personality may be more abstract and difficult to visualize.
- A construct is an abstract concept that is specifically chosen (or "created") to explain a given phenomenon.
- A construct may be a simple concept, such as a person's weight, or a combination of a set of related concepts such as a person's communication skill, which may consist of several underlying concepts such as the person's vocabulary, syntax, and spelling.

Constructs used for scientific research must have precise and clear definitions that others can use to understand exactly what it means and what it does not mean. For instance, a seemingly simple construct such as income may refer to monthly or annual income, before-tax or after-tax income, and personal or family income, and is therefore neither precise nor clear.

2-2 Operational Definition in Research

There are two types of definitions: dictionary definitions and operational definitions. In the more familiar dictionary definition, a construct is often defined in terms of a synonym. For instance, attitude may be defined as a disposition, a feeling, or an affect, and affect in turn is defined as an attitude. Such definitions of a circular nature are not particularly useful in scientific research for elaborating the meaning and content of that construct. Scientific research requires "operational definitions" that define constructs in terms of how they will be empirically measured.

A construct such as income should be defined in terms of whether we are interested in monthly or annual income, before-tax or after-tax income, and personal or family income. One can imagine that constructs such as learning, personality, and intelligence can be quite hard to define operationally. If we investigate a cultural awareness , we

need to give an operational definition that will be used in the investigation. For example, a term that is interchangeably used with this term.

2-2 Definition of the variable

A variable is a quantity that can vary like: from low to high, negative to positive in contrast to constants that do not vary or remain constant.. However, in scientific research, a **variable** is a measurable representation of an abstract construct. As abstract entities, constructs are not directly measurable, and hence, we look for proxy measures called variables. For instance, a person's intelligence is often measured as his or her IQ (intelligence quotient) score, which is an index generated from an analytical and pattern-matching test administered to people. In this case, intelligence is a construct, and IQ score is a variable that measures the intelligence construct. Whether IQ scores truly measures one's intelligence is anyone's guess (though many believe that they do), and depending on whether how well it measures intelligence, the IQ score may be a good or a poor measure of the intelligence construct.

Depending on their intended use, variables may be classified as independent, dependent, moderating, mediating, or control variables. Variables that explain other variables are called independent variables, those that are explained by other variables are dependent variables, those that are explained by independent variables while also explaining dependent variables are mediating variables (or intermediate variables), and those that influence the relationship between independent and dependent variables are called moderating variables.

As an example, if we state that higher intelligence causes improved learning among students, then intelligence is an independent variable and learning is a dependent variable. There may be other extraneous variables that are not pertinent to explaining a given dependent variable, but may have some impact on the dependent variable. These variables must be controlled for in a scientific study, and are therefore called control variables.

2-3 The Difference Between Constructs and Variables

Constructs are conceptualized at the theoretical (abstract) plane, while variables are operationalized and measured at the empirical (observational) plane.

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