

M.Ed., (SEMESTER-II)

COURSE - FUNDAMENTAL OF RESEARCH METHODOLOGY

COURSE CODE - (CC-6)

UNIT-IV; QUANTITATIVE METHODS OF RESEARCH

VARIABLES OF EXPERIMENTAL RESEARCH

What is Variable?

Variable is an important part of an eye tracking experiment. A variable is anything that can change or be changed. In other words, it is any factor that can be manipulated, controlled for, or measured in an experiment. Very simply, a variable is a measurable characteristic that varies. It may change from group to group, person to person, or even within one person over time.

Types of experimental variables:

➤ Independent Variables:

The independent variable is the core of the experiment and is isolated and manipulated by the researcher. These are the factors or conditions that you manipulate in an experiment. Your hypothesis is that this variable causes a direct effect on the dependent variable. Independent variables are those that the researcher has control over. This "control" may involve manipulating existing variables (e.g., modifying existing methods of instruction) or introducing new variables (e.g., adopting a totally new method for some sections of a class) in the research setting. Whatever the case may be, the

researcher expects that the independent variable(s) will have some effect on (or relationship with) the dependent variables.

➤ **Dependent Variables:**

The dependent variable is the variable that is being measured or tested in an experiment. For example, in a study looking at how tutoring impacts test scores, the dependent variable would be the participants' test scores, since that is what is being measured.

These are the factor that you observe or measure. As you vary your independent variable you watch what happens to your dependent variable. Dependent variables show the effect of manipulating or introducing the independent variables. For example, if the independent variable is the use or non-use of a new language teaching procedure, then the dependent variable might be students' scores on a test of the content taught using that procedure. In other words, the variation in the dependent variable depends on the variation in the independent variable.

➤ **Confounding Variables:**

A confounding variable is an “extra” variable that you didn’t account for. They can ruin an experiment and give you useless results. They can suggest there is correlation when in fact there isn’t. They can even introduce bias. That’s why it’s important to know what one is, and how to avoid getting them into your experiment in the first place?

In an experiment, the independent variable typically has an effect on your dependent variable. For example, if you are researching whether lack of

exercise leads to weight gain, lack of exercise is your independent variable and weight gain is your dependent variable. Confounding variables are any other variable that also has an effect on your dependent variable. They are like extra independent variables that are having a hidden effect on your dependent variables

➤ **Intervening Variables:**

Intervening variables refer to abstract processes that are not directly observable but that link the independent and dependent variables. In language learning and teaching, they are usually inside the subjects' heads, including various language learning processes which the researcher cannot observe. For example, if the use of a particular teaching technique is the independent variable and mastery of the objectives is the dependent variable, then the language learning processes used by the subjects are the intervening variables.

Intervening variables link the independent and dependent variables, but as abstract processes, they are not directly observable during the experiment. For example, if studying the use of a specific teaching technique for its effectiveness, the technique represents the independent variable, while the completion of the technique's objectives by the study participants represents the dependent variable, while the actual processes used internally by the students to learn the subject matter represents the intervening variables.

➤ **Extraneous variable:**

An extraneous variable is any extra factor that may influence the outcome of an experiment, even though it is not the focus of the experiment. Ideally,

these variables won't affect the conclusions drawn from the results as a careful experimental design should equally spread influence across your test conditions and stimuli. Nevertheless, extraneous variables should always be considered and controlled when possible as they may introduce unwanted variation in your data. All experiments have extraneous variables. A well-designed experiment eliminates as many unmeasured extraneous variables as possible. This makes it easier to observe the relationship between the independent and dependent variables. These extraneous variables, also known as unforeseen factors, can affect the interpretation of experimental results.

➤ **Moderator Variables:**

Moderators variables refer to abstract processes affect the relationship between the independent and dependent variables by modifying the effect of the intervening variable(s). Unlike extraneous variables, moderator variables are measured and taken into consideration. Typical moderator variables in TESL and language acquisition research (when they are not the major focus of the study) include the sex, age, culture, or language proficiency of the subjects.

➤ **Control Variables:**

Language learning and teaching are very complex processes. It is not possible to consider every variable in a single study. Therefore, the variables that are not measured in a particular study must be held constant, neutralized/balanced, or eliminated, so they will not have a biasing effect on the other variables. Variables that have been controlled in this way are called control variables.

