**PRINCIPLES OF RESEARCH DESIGN**

Research designs can be classified into three broad categories, according to the amount of control the researcher maintains over the conduct of the research study. The three general categories are experimental research, field research, and observational research.

* **Experimental Research**: In this kind of research study, the researcher controls the setting in which the research is conducted (the “laboratory”) and he also manipulates the levels of the independent variable or variables, and follows this by observation of the corresponding changes in the dependent variable or variables. By controlling the surroundings in which the research is conducted, the researcher can eliminate some environmental conditions that might confuse the results. This control improves the internal validity of the research study.
* **Field Research**: The second major category of research is field research. In this kind of research setting, the researcher retains control over the independent variables, but conducts the research in a natural setting, without any control over environmental influences.
* **Observational Research**: There are many instances in which the researcher can control neither the independent variable nor the research setting. In this situation, the researcher is limited to measuring, rather than manipulating the independent variable. Like field research, observational research designs exert no control over the setting in which the hypothetical process occurs.

Each of these categories varies on two important characteristics: internal validity and external validity. The terms internal and external validity refer to the overall validity of a research study, not to the measurement of the concepts used in the research.

**Internal validity** describes the ability of the research design to unambiguously test the research hypothesis. An internally valid design accounts for all factors, including those which are not directly specified in the theory being tested, which might affect the outcome of hypothesis tests. It insures that these factors do not confuse the results. Since it is impossible for any single research design to account for all such potentially confounding factors, we must speak of better or worse internal validity, not of perfect validity. But designs with higher internal validity will, for example, control or account for the actions of variables which might produce spurious relationships. They will use representative samples, so that subject or group differences will not be confused with the action of independent variables. In general, they will eliminate more of the alternative explanations of research findings (those which contradict the theory being tested) than will experimental designs with weak internal validity.

**External validity** refers to the generalizability of the research, that is, the ability of its conclusions to be validly extended from the specific environment in which the research study is conducted to similar “real world” situations. The results of an externally valid study can be used to predict the behaviour of the theoretical constructs outside the laboratory or data centre. Externally valid research with generalizable conclusions is obviously more valuable than externally invalid research, whose conclusions are restricted to specific research settings.

**Threats to Internal and External Validity: Single Time Point Issues in Internal Validity**

* **Instrumentation Reliability and Validity**: Without reliable measurement, we may falsely conclude that the independent and dependent variable do not covary, when in reality our measurements just can’t be trusted to be accurate. Likewise, if we are not measuring the theoretical concept that we think we are, the validity of our conclusions will be negligible. The solution to this problem is to pay significant attention to accurate conceptualization and operationalization, and check the reliability of measurement instruments.
* **Sampling**: In an experiment, field or observational study, if the subjects or respondents in different research groups are not randomly chosen, we may confuse differences in the individuals who make up the groups with the effect of the different experimental treatments.
* **Instrument Obtrusiveness**: Good internal validity depends upon measurement which does not disrupt or direct the processes being investigated. To the extent that measurement intrudes on the communication process that is being studied, we can expect to be led to incorrect conclusions. A questionnaire which annoys respondents with insensitive or leading questions (“How many hours of mindless television do you watch each week?”), or which is so long that respondents can’t fill it out without collapsing with fatigue is simply not going to give the accurate measurement that good internal validity requires.
* **Manipulation Effectiveness**: In experimental and field research, the researcher must assure themselves that the intended manipulation of the independent variable actually did produce enough difference in the levels of that variable that good tests of covariance with the dependent variable are possible.

**Threats to Internal and External Validity: Over-Time Issues in Internal Validity**

When measurements are made at two or more points in time, such as in experiments which use before- and aftermanipulation designs, some serious threats to internal validity can appear. The basic presumption in multiple time point measurement is that the only thing that differs between the first and the second or subsequent time points is the level of the independent variable. But this may not be true, and the researcher must take care not to confuse other factors which may affect later measurements with the effect of the independent variable.

* **History**: Significant social or personal events may intrude between the first measurement and subsequent measurements. If the proper research design is not used, these events can produce changes in the dependent variable which will be confused with the effect of the independent variable. This problem increases in magnitude when there is a longer time span between measurements.
* **Maturation**: A related over-time problem is produced by growth and changes that occur within the research subjects. Children and adults change in many ways which are simply due to the passage of time. Children develop new abilities, adolescents expand their intellectual horizons, and the value systems of adults change over time. An internally valid research design must not confuse these changes with the changes produced by the independent variable.
* **Measurement Instrument Instability**: If the measurement instrument “drifts” over time, different results will be obtained at different time points. Such drift can be confused with the action of the independent variable over the same time period. Whether such drift in fact exists can be determined by establishing the level of test-retest reliability. Only measures with high test-retest reliability should be used to avoid this threat.
* **Subject Mortality**: it refers to the loss of some subjects from a research study between the first measurement and later measurements. If random selection procedures are used to select subjects or construct the research groups, the resulting sample will initially be representative of the population from which it was drawn. But any loss of subjects from this sample between two measurement points may cause systematic differences in dependent observations that are not due to the independent variable.

**Threats to Internal and External Validity: Single Time Point Issues in External Validity**

* **Representativeness of the Sample**: Sampling errors can cause problems in external validity as well as in internal validity. In particular, groups which are self-selected can cause problems. Persons who volunteer for research projects can be expected to be very different from the typical person (who does not usually volunteer). Convenience samples pose the same problems. For example, much communication research is done on college and university undergraduates. The results of this research is open to questions of external validity, unless the phenomenon being investigated is not related to the social background, age, intelligence, economic status, or race of the research subject.
* **Reactive Effects of Setting**: The research setting itself can produce responses in subjects that limit their generalizability. Participants in communication research are often exposed to communications in an artificial setting which enhances their attention to messages, their motivation to process and/or act on the contents of the messages, etc. The effects of these deviations from “real world” conditions limit the generalizability of the results.

**Threats to Internal and External Validity: Over-Time Issues in External Validity**

* **Reactive Sensitization (to externals)**: Behavioral changes can be introduced by measurement and experimental manipulations. Subjects who leave controlled settings between measurement sessions may react differently to communications and other environmental stimuli, as a result of their participation in the research.
* **Subject Mortality**: The loss of subjects over time introduces a similar problem in external validity. Since the beginning and the finishing samples are different in makeup, due to mortality, it is difficult to determine exactly how much of the difference which occurs over time was due to mortality, and how much was due to the independent variable. It is thus difficult to generalize the effect observed in the research to the unmeasured population. This situation is much worse in observational designs which do not have a control or comparison group. In this case, subject mortality can be fatal to external validity.