

Outline of the Course

- **Introduction**
- **Research: Contextualized Definition**
- **Characteristics**
- **Qualities of Good Research**
- **Qualities of a Good Researcher**

Introduction :

“Thus, by science I mean, first of all, a worldview giving primacy to reason and observation and a methodology aimed at acquiring accurate knowledge of the natural and social world. This methodology is characterized, above all else, by the critical spirit: namely, the commitment to the incessant testing of assertions through observations and/or experiments — the more stringent the tests, the better — and to revising or discarding those theories that fail the test. One corollary of the critical spirit is fallibilism: namely, the understanding that all our empirical knowledge is tentative, incomplete and open to revision in the light of new evidence or cogent new arguments (though, of course, the most well-established aspects of scientific knowledge are unlikely to be discarded entirely) [. . . .] I stress that my use of the term 'science' is not limited to the natural sciences, but includes investigations aimed at acquiring accurate knowledge of factual matters relating to any aspect of the world by using rational empirical methods analogous to those employed in the natural sciences. (Please note the limitation to questions of fact. I intentionally exclude from my purview questions of ethics, aesthetics, ultimate purpose, and so forth.) Thus, 'science' (as I use the term) is routinely practiced not only by physicists, chemists and biologists, but also by historians, detectives, plumbers and indeed all human beings in (some aspects of) our daily lives. (Of course, the fact that we all practice science from time to time does not mean that we all practice it equally well, or that we practice it equally well in all areas of our lives.)” Alan

Sokal (2014), in <https://www.goodreads.com/quotes/709699-thus-by-science-i-mean-first-of-all-a-worldview>.

Research: Contextualized Definition

Research is a process of collecting, analysing and interpreting data to answer questions. But to qualify as research, the process must have certain characteristics: It must, as far as possible, be controlled, rigorous, systematic, valid and verifiable, empirical and critical.

Research is the systematic study of trend or event which involves careful collection, presentation, analysis and interpretation of quantitative and qualitative data or facts that relate man's thinking with reality.

Research characteristics are important for two reasons:

- 1) They help you identify which research programs are the best fit for your research statement, and
- 2) Clearly addressing these characteristics in your research statement and increases your chances of selection.

Characteristics and Requirements:

- ❖ It originates with a question or a problem.
- ❖ Requires clear articulation of a goal.
- ❖ Follows a specific plan or procedure.
- ❖ Often divides main problem into sub-problems.
- ❖ Guided by a specific problem, question, or hypothesis.

A question is what you raise to find answers. A question is something you ask, hoping for an answer (Merriam Webster Dictionary, 2017).

A problem is what you encounter as difficulties. A problem refers to any question calling for solution or answer or to any factor causing perplexity and concern (Merriam Webster Dictionary, 2017).

A hypothesis is a supposition or explanation (theory) that is provisionally accepted in order to interpret certain events or phenomena, and to provide guidance for further investigation. A hypothesis may be proven correct or wrong, and must be capable of refutation. If it remains unrefuted by facts, it is said to be verified or corroborated (strengthened or supported with other evidence; make more certain.) (Merriam Webster Dictionary, 2017).

- ❖ Accepts certain critical assumptions.
- ❖ Requires collection and interpretation of data.

Characteristics and Requirements .../...

✓ Controlled

In real life, there are many factors that affect an outcome. A particular event is seldom the result of a one-to-one relationship. Some relationships are more complex than others. Most outcomes are a sequel to the interplay of a multiplicity of relationships and interacting factors.

In a study of cause and effect relationships, it is important to be able to link the effect(s) with the cause(s) and vice versa. In the study of causation, the establishment of this linkage is essential; however, in practice, particularly in the social sciences, it is extremely difficult, and often impossible to make the link.

The concept of control implies that, in exploring causality in relation to two variables, you set up your study in a way that minimises the effects of other factors affecting the relationship. This can be achieved to a large extent in the physical sciences, as most of the research is done in a laboratory. However, in the social sciences, it is extremely difficult as research is carried out on issues relating to human beings living in society, where such controls are impossible. Therefore, in the social sciences, as you cannot control external factors, you attempt to quantify their impact (Ranjit Kumar, 2009, p. 28).

✓ Rigorous

You must be scrupulous in ensuring that the procedures followed to find answers to questions are relevant, appropriate and justified. Again, the degree of rigour varies markedly between the physical and the social sciences. Rigorous research should begin with a clear educational question with the study design built to address that specific research question. The researcher should state his or her hypothesis before the study commences and data needs to be collected and analysed honestly.

The researcher's observations (qualitative data) should be used to interpret the results (quantitative data) of the study. An instructor's observations through a diary or students' surveys can offer valuable insight into the classroom setting. Together, both quantitative and qualitative analyses tell a powerful story about a learning intervention (Ranjit Kumar, 2009, p. 29).

✓ **Systematic**

This implies that the procedures adopted to undertake an investigation follow a certain logical sequence and follows a procedure. The different steps cannot be taken in a haphazard way. Some procedures must follow others. No research can be conducted haphazardly. (Ranjit Kumar, 2009, p. 29).

✓ **Logical**

Research is based on valid procedures and principles (Ranjit Kumar, 2009, p. 29).

✓ **Valid and Verifiable**

This concept implies that whatever you conclude on the basis of your findings is correct and be verified by you and others (Ranjit Kumar, 2009, p. 29).

✓ **Empirical**

Research is based on direct experience or observation by the researcher. This means that any conclusions drawn are based upon evidence gathered from information collected from real-life experiences or observations (Slide Share, 2017, in <https://www.slideshare.net/jhim1022/characteristics-ofresearch>)

✓ **Cyclical/ Helical**

Research starts with a problem and ends with a problem (Slide Share, 2017, in <https://www.slideshare.net/jhim1022/characteristics-ofresearch>).

✓ **Analytical**

Research utilizes proven analytical procedures in gathering data, whether historical, descriptive, experimental and case study (Slide Share, 2017, in <https://www.slideshare.net/jhim1022/characteristics-ofresearch>).

✓ **Critical**

Research exhibits careful and precise judgement. Critical scrutiny of the procedures used and the methods employed is crucial to a research enquiry. The process of investigation must be fool proof and free from any drawbacks. The process adopted and the procedures used must be able to withstand critical scrutiny (Slide Share, 2017, in <https://www.slideshare.net/jhim1022/characteristics-ofresearch>).

✓ **Methodical**

Research is conducted in a methodical manner without bias using systematic method and procedures (Slide Share, 2017, in <https://www.slideshare.net/jhim1022/characteristics-ofresearch>).

✓ **Replicability**

Research design and procedures are repeated to enable the researcher to arrive at valid and conclusive results(Slide Share, 2017, in <https://www.slideshare.net/jhim1022/characteristics-ofresearch>).

✓ **Originality**

This should go without saying but all work should be your own. Also, originality should apply to the overall idea driving the work, why cover something that has been covered hundreds of times before? Your work will stand out if it tackles something new or something old from an interesting or different angle not thought of before (Merriam Webster Dictionary, 2017).

Qualities of Good Research:

✓ **Reliability**

If any research yields similar results time when it is undertaken with similar population and with similar procedures it is called to be a reliable research (Trochim, 2006).

✓ **Validity**

It is the strength with which we call a research conclusions, assumptions or propositions true or false (Trochim, 2006).

Validity and Reliability are co-related. Validity is much more important than Reliability. Without Validity research goes in the wrong direction.

A test is reliable if it gets the same value over and over. A test is valid if it is truly measuring what the researcher thinks it is measuring.

A test can be reliable but not valid. Let us say I wanted to measure how smart people are by measuring their heads. I would get the same value (in inches or centimetres or whatever) every time I measured their head so the test would be reliable. But I would not be actually measuring their intelligence so the test would not be valid.

A test cannot be valid if it is not reliable. If the test is not reliable, that means it gives different results every time I do it. If it keeps giving different results, it cannot possibly be measuring what I think it is. Let us say I give a person multiple tests to measure intelligence and they get wildly different results the tests. Clearly, the test is not really measuring intelligence because if it truly measured intelligence it would have to yield results that were nearly the same every time (because we assume a person's intelligence does not change from moment to moment).

✓ **Accuracy**

Accuracy is the degree to which each research process, instrument and tool are related to each other (Merriam Webster Dictionary, 2017).

Qualities of a Good Researcher:

Research oriented

Efficient

Scientific

Effective

Active

Resourceful

Creative

Honest

Economical

Religious

References:

- Alan Sokal (2014) Quotes on Science [Online]
<https://www.goodreads.com/quotes/709699-thus-by-science-i-mean-first-of-all-a-worldview>.
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- Slide Share (2017) Characteristics of Research [Online] <https://www.slideshare.net/jhim1022/characteristics-ofresearch>.
- Trochim, W. M.K. (2006) Glossary: Web Centre for Research Methods [Online] <https://socialresearchmethods.net/kb/index.php>