Quantitative Research Design

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Quantitative research design is the standard experimental method of most scientific disciplines.

These experiments are sometimes referred to as true science, and use traditional mathematical and statistical means to measure results conclusively.

They are most commonly used by physical scientists, although social sciences, education and economics have been known to use this type of research. It is the opposite of qualitative research.

Quantitative experiments all use a standard format, with a few minor inter-disciplinary differences, of generating a hypothesis to be proved or disproved. This hypothesis must be provable by mathematical and statistical means, and is the basis around which the whole experiment is designed.

Randomization of any study groups is essential, and a control group should be included, wherever possible. A sound quantitative design should only manipulate one variable at a time, or statistical analysis becomes cumbersome and open to question.

Ideally, the research should be constructed in a manner that allows others to repeat the experiment and obtain similar results.

When to perform the quantitative research design.

Advantages

Quantitative research design is an excellent way of finalizing results and proving or disproving a hypothesis. The structure has not changed for centuries, so is standard across many scientific fields and disciplines.

After statistical analysis of the results, a comprehensive answer is reached, and the results can be legitimately discussed and published. Quantitative experiments also filter out external factors, if properly designed, and so the results gained can be seen as real and unbiased [1].

Quantitative experiments are useful for testing the results gained by a series of qualitative experiments, leading to a final answer, and a narrowing down of possible directions for follow up research to take.

Disadvantages

Quantitative experiments can be difficult and expensive and require a lot of time to perform. They must be carefully planned to ensure that there is complete randomization and correct designation of control groups [2] .

Quantitative studies usually require extensive statistical analysis, which can be difficult, due to most scientists not being statisticians. The field of statistical study is a whole scientific discipline and can be difficult for non-mathematicians

In addition, the requirements for the successful statistical confirmation of results are very stringent, with very few experiments comprehensively proving a hypothesis [3]; there is usually some ambiguity, which requires retesting and refinement to the design. This means another investment of time and resources must be committed to fine-tune the results [4].

Quantitative research design also tends to generate only proved or unproven results, with there being very little room for grey areas and uncertainty. For the social sciences, education, anthropology and psychology, human nature is a lot more complex than just a simple yes or no response.

Links
[1] https://verify.explorable.com/research-bias
[2] https://verify.explorable.com/scientific-control-group
[3] https://verify.explorable.com/hypothesis-testing
[4] https://verify.explorable.com/statistically-significant-results