

Experimental Research

Definition

Experimental research is research conducted with a scientific approach using two sets of variables. The first set acts as a constant, which you use to measure the differences of the second set. Quantitative research methods, for example, are experimental.

What is the main purpose of experimental research?

Experimental research seeks to determine a relationship between two (2) variables—the dependent variable and the independent variable. After completing an experimental research study, a correlation between a specific aspect of an entity and the variable being studied is either supported or rejected.

What are the characteristics of experimental research?

True experiments have four elements: manipulation, control, random assignment, and random selection. The most important of these elements are manipulation and control. Manipulation means that something is purposefully changed by the researcher in the environment.

What are the 4 characteristics of experimental research?

- ❖ Dependent variables and independent variables. All experimental research starts from dependent or fixed variables (which serve as a control group).
- ❖ Controlled conditions
- ❖ Manipulation of variables
- ❖ Observation of the object of study

Where is experimental research used?

Experimental research design can be majorly used in physical sciences, social sciences, education, and psychology. It is used to make predictions and draw conclusions on a subject matter.

8 Advantages and Disadvantages of Experimental Research

Experimental research has become an important part of human life. Babies conduct their own rudimentary experiments (such as putting objects in their mouth) to learn about the world around them, while older children and teens conduct experiments at school to learn more science. Ancient scientists used experimental research to prove their hypotheses correct; Galileo Galilei and Antoine Lavoisier, for instance, did various experiments to uncover key concepts in physics and chemistry, respectively. The same goes for modern experts, who utilize this scientific method to see if new drugs are effective, discover treatments for illnesses, and create new electronic gadgets (among others).

Experimental research clearly has its advantages, but is it really a perfect way to verify and validate scientific concepts? Many people point out that it has several disadvantages and might even be harmful to subjects in some cases. To learn more about these, let's take a look into the pros and cons of this type of procedure.

List of Advantages of Experimental Research

1. It gives researchers a high level of control.

When people conduct experimental research, they can manipulate the variables so they can create a setting that lets them observe the phenomena they want. They can remove or control other factors that may affect the overall results, which means they can narrow their focus and concentrate solely on two or three variables.

In the pharmaceutical industry, for example, scientists conduct studies in which they give a new kind drug to a group of subjects and a placebo drug to another group. They then give the same kind of food to the subjects and even house them in the same area to ensure that they won't be exposed to other factors that may affect how the drugs work. At the end of the study, the researchers analyze the results to see how the new drug affects the subjects and identify its side effects and adverse results.

2. It allows researchers to utilize many variations.

As mentioned above, researchers have almost full control when they conduct experimental research studies. This lets them manipulate variables and use as many (or as few) variations as they want to create an environment where they can test their hypotheses — without destroying the validity of the research design. In the example above, the researchers can opt to add a third group of subjects (in addition to the new drug group and the placebo group), who would be given a well-known and widely available drug that has been used by many people for years. This way, they can compare how the new drug performs compared to the placebo drug as well as the widely used drug.

3. It can lead to excellent results.

The very nature of experimental research allows researchers to easily understand the relationships between the variables, the subjects, and the environment and identify the causes and effects in whatever phenomena they're studying. Experimental studies can also be easily replicated, which means the researchers themselves or other scientists can repeat their studies to confirm the results or test other variables.

4. It can be used in different fields.

Experimental research is usually utilized in the medical and pharmaceutical industries to assess the effects of various treatments and drugs. It's also used in other fields like chemistry, biology, physics, engineering, electronics, agriculture, social science, and even economics.

List of Disadvantages of Experimental Research

1. It can lead to artificial situations.

In many scenarios, experimental researchers manipulate variables in an attempt to replicate real-world scenarios to understand the function of drugs, gadgets, treatments, and other new discoveries. This works most of the time, but there are cases when researchers over-manipulate their variables and end up creating an artificial environment that's vastly different from the real world. The researchers can also skewer the study to fit whatever outcome they want (intentionally or unintentionally) and compromise the results of the research.

2. It can take a lot of time and money.

Experimental research can be costly and time-consuming, especially if the researchers have to conduct numerous studies to test each variable. If the studies are supported by the government, they would consume

millions or even billions of taxpayers' dollars, which could otherwise have been spent on other community projects such as education, housing, and healthcare. If the studies are privately funded, they can be a huge burden on the companies involved who, in turn, would pass on the costs to the customers. As a result, consumers have to spend a large amount if they want to avail of these new treatments, gadgets, and other innovations.

3. It can be affected by errors.

Just like any kind of research, experimental research isn't always perfect. There might be blunders in the research design or in the methodology as well as random mistakes that can't be controlled or predicted, which can seriously affect the outcome of the study and require the researchers to start all over again.

There might also be human errors; for instance, the researchers may allow their personal biases to affect the study. If they're conducting a double-blind study (in which both the researchers and the subjects don't know which the control group is), the researchers might be made aware of which subjects belong to the control group, destroying the validity of the research. The subjects may also make mistakes. There have been cases (particularly in social experiments) in which the subjects give answers that they think the researchers want to hear instead of truthfully saying what's on their mind.

4. It might not be feasible in some situations.

There are times when the variables simply can't be manipulated or when the researchers need an impossibly large amount of money to conduct the study. There are also cases when the study would impede on the subjects' human rights and/or would give rise to ethical issues. In these scenarios, it's better to choose another kind of research design (such as review, meta-analysis, descriptive, or correlational research) instead of insisting on using the experimental research method.

Conclusion

Experimental research has become an important part of the history of the world and has led to numerous discoveries that have made people's lives better, longer, and more comfortable. However, it can't be denied that it also has its disadvantages, so it's up to scientists and researchers to find a balance between the benefits it provides and the drawbacks it presents.

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