Learn and Thinking Skills

Summarized & Presented By Dr.Engineer

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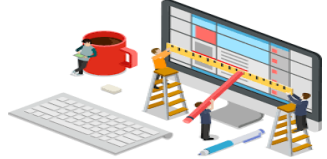
What Research Is and What It Isn't

Research is a process through which new knowledge is discovered.

Theories are an important part of science. It is at the ground-floor level, however, that the researcher works to get the ball rolling, adding a bit of new insight here and a new speculation there, until these factors come together to form a corpus of knowledge.

a theory was defined as a set of statements that predict things that will occur in the future and explain things that have occurred in the past.

What Research Is and What It Isn't



High-quality research is characterized by many different attributes, many of which tend to be related to one another and also tend to overlap. High-quality research

- **is based on the work of others,**
- **can be replicated,**
- **is generalizable to other settings,**
- **is based on some logical rationale and tied to theory,**
- **is doable,**
- **generates new questions or is cyclical in nature,**
- **is incremental**

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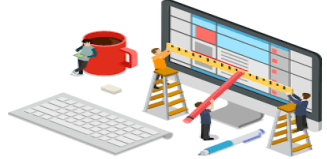

First, research is an activity based on the work of others. No, this does not mean that you copy the work of others (that's plagiarism), but you always look to the work that has already been done to provide a basis for the subject of your research and how you might conduct your own work.

Example of this principle is the Manhattan Project, the tremendous intellectual and scientific effort that went into the creation of the atomic bomb. Hundreds of top scientists from all over the world were organized at different locations in an intense and highly charged effort to combine their knowledge to create this horrible weapon.

What was unique about this effort is that it was compressed in time; many people who would probably share each other's work in any case did so in days rather than months because of the military and political urgency of the times. What was discovered 1 day literally became the basis for the next day's experiments (see Richard Rhodes' Pulitzer Prize–winning book, The Making of the Atomic Bomb, for the whole story).

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Second, while we're talking about other studies, research is an activity that can be replicated. If someone conducts a research study that examines the relationship between problem-solving ability and musical talent, then the methods and procedures (and results) of the experiment should be replicable with other groups for two reasons.

First, one of the hallmarks of any credible scientific finding is that it can be replicated. Second, if the results of an experiment can be replicated, they can serve as a basis for further research in the same area.

For example, if there have been 200 studies on gender differences in aggression, the results of those studies should not be ignored. You may not want to exactly replicate any one of these studies (but note that replication is sometimes called for an appropriate), but you certainly should take methodologies that were used and the results into consideration when you plan your own research in that area

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Third, good research is generalizable to other settings.

Fourth, research is based on some logical rationale and tied to theory. Research ideas do not stand alone only as interesting questions. Instead, research activity provides answers to questions that help fill in pieces to what can be a large and complicated puzzle. No one could be expected to understand, through one grand research project.

Fifth, and by all means, research is doable! Too often, especially for the young or inexperienced scientist the challenge to come up with a feasible idea is so pressing that al most anything will do as a research topic. Professors sometimes see thesis statement from students such as, "The purpose of this research is to see if the use of drugs can be reduced through exposure to television commercials." This level of ambiguity and lack of a conceptual framework makes the statement almost useless and certainly not doable.

Good research poses a question that can be answered, and then answers it in a timely fashion.

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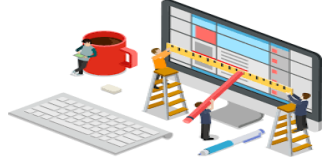

Sixth, research generates new questions or is cyclical in nature. Yes, what goes around comes around. The answers to today's research questions provide the foundation for research questions that will be asked tomorrow.

Seventh, research is incremental. No one scientist stands alone; instead, scientists stand on the shoulders of others. Contributions that are made usually take place in small, easily definable chunks. Rather, all the studies in a particular area come together to produce a body of knowledge that is shared by different researchers and provides the basis for further research. The whole, or all the knowledge about a particular area, is more than the sum of the parts, because each new research advance not only informs us but it also helps us place other findings in a different, often fruitful perspective.

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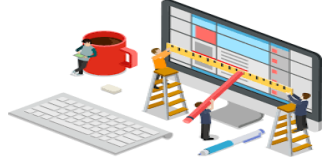

what is bad research? It takes the opposite approach of all the things stated earlier and then some. In sum, bad research is the fishing trip you take looking for something important when it simply is not to be found.

It is plagiarizing other people's work, or falsifying data to prove a point, or misrepresenting information and misleading participants. Unfortunately, there are researchers whose work is characterized by these practices, but they are a small minority.

A Model of Scientific Inquiry

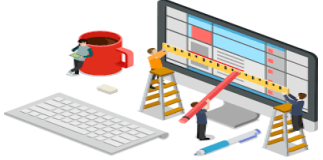

Figure 1.1 The steps in the research process, wherein each step sets the stage for the next.

A Model of Scientific Inquiry

Asking the Question

Remember the story of The Wizard of Oz? When Dorothy realized her need to get to the Emerald City, she asked Glinda, the good witch, "But where do I begin?" Glinda's response, "Most people begin at the beginning, my dear,"as is also the case in almost any scientific endeavor .

Identifying the Important Factors

Once the question has been asked, the next step is to identify the factors that have to be examined to answer the question.

In general, you should select factors that

- have not been investigated before,
- will contribute to the understanding of the question you are asking,
- are available to investigate,
- hold some interest for you personally or professionally, and
- are based on an earlier question and lead to another question.

A Model of Scientific Inquiry

For example, if the question is, "What effects does using Facebook have on the development of friendships?" then the hypothesis could be, adolescents who use Facebook as their primary means of maintaining social contact have fewer close friends.

Collecting Relevant Information

Hypotheses should posit a clear relationship between different factors, such as a correlation between number of followers on Twitter and quality of social skills. That is the purpose of the hypothesis. Once a hypothesis is formulated, the next step is the collection of information or empirical data that will test the hypothesis or confirm or refuse it. So, if you are interested in whether or not participating in social media has an impact on adolescent's social skills, the kinds of data that will allow the hypothesis to be tested must be collected.

A Model of Scientific Inquiry

Testing the Hypothesis

Is it enough simply to collect data that relate to the phenomena being studied? Not quite. What if you have finished collecting data and find that adolescents who spend more than 10 hours a week involved in social media have 50% fewer qualitatively good relationships with peers than those who spend less than 10 hours? What would your conclusion be?

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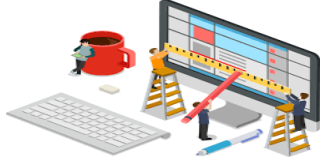
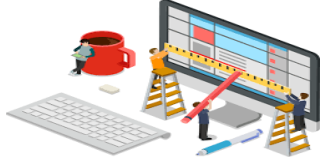


Working with the Hypothesis

Once you have collected the required data and have tested the hypothesis, as a good scientist you can sit down, put up your feet, look intellectual, and examine the results. The results may confirm or refute the hypothesis. In either case, it is off to the races. If the data confirm your hypothesis, then the importance of the factors that were hypothesized to be related and conceptually important were borne out and you can go on your merry way while the next scientific experiment is being planned. If the hypothesis is not confirmed, it may very well be a time for learning something that was not known previously. In the example used earlier, it may mean that involvement in social media has no impact on social skills or social relations hips. Although the researcher might be a bit disappointed that the initial hypothesis was not supported, the results of a well-run study always provide valuable information, regardless of the outcome.

A Model of Scientific Inquiry



Reconsidering the Theory

Finally, it is time to take stock and relate all these research efforts to what guides our work in the first place: theory.

very nature of theories is that they can be modified according to the results of research based on the same assumptions on which the theory is based.

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THANK YOU!