Basic Research Methods

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Why is research important to both read and conduct?

- To remain both current and competent

- To maintain a scholarly attitude toward the things we do, teach, and understand

- To foster ideas for individual study and further understanding

The main types of research center around two concepts:

- Qualitative Research
- Quantitative Research

What is Qualitative Research?

This type of research is often based on interactions of subjects and asks questions such as why and how things happen. For example, you might be asking why an individual has a certain felt need when an immediate need logically looks more important. We learn more about the relation of one thing to another but cannot say anything in regards to validity. Instead, the guiding principle is trustworthiness.

Conducting Qualitative Research

1. Identify a research problem
2. Do a literature review
3. Select a research site
4. Address ethical issues
5. Collect data
6. Analyze the data
7. Interpret the findings

Qualitative Research (continued)

8. Communicate the findings.
9. Participate in the process of disseminating the findings.

What is Quantitative Research?

This is what is known as empirical research. You will be using data,statistics, computer models, and other aspects to determine the statistical probability of an effect. While this can be a much more detailed and even complicated method of research it is also one that is more likely to be taken seriously and even get published. We can understand an issue much better in many cases when we use this research method and are looking for a measurable aspect of one thing upon another.

Quantitative Research

1. Identify the research problem
2. Do a literature review
3. Frame the problem conceptually
4. Formulate hypotheses
5. Select a design
6. Identify the population and a sampling plan
7. Select and test methods to measure variables

Quantitative Research (continued)

9. Review and finalize the research plan.
10. Collect the data
11. Analyze the data
1. Interpret the findings
2. Communicate the findings
3. Participate in the process of disseminating the findings

Start at the Start!

- A good research project generally begins with a puzzle
- When asked, most researchers can immediately come up with one or two great questions
- We should always remember that the narrower the focus, the more likely we are to get meaningful answers

An Example of a Research Question

"What is the usefulness or accuracy of making IMO 1 in a field environment?"

Is this question able to be researched?

What are problems with this questions?

How could we make it better?

Characteristics of a Good Study Question

“FINER”

F= Feasible

I= Interesting

N= Novel

E= Ethical

R= Relevant

What is a Literature Review?

A literature review, or “lit review” as it is often called, is how we find out what has been done already. There are a large number of benefits to conducting a proper lit review, but it is sometimes the most crucial portion of any research outside of the experiment itself. Think of all the people that might have been working on something similar. What questions did they ask? How did they go about designing and carrying out their experiments? What did they discover along the way?

My favorite question to think about during the lit review is:

What did they miss?

References

It is important when you are conducting your literature review to know where the information you are reading came from. It is even more important to let others who will be reading about your research know. This is due to the fact that people have gone before you and spent time and effort to find things out. If you determine that what they found was important for your own research then you must give them credit. This avoids plagiarism, but it also allows others to follow up on these sources. We are all in this together, and if we properly show which research we gleaned information from then we can help the entire scientific community move forward.

Where Do We Look For Our Research?

Many people are tempted to find relevant information on blogs or Facebook, but the role of a researcher is to find useful information that is also valid. While there could be valid information on these and other sites, to be sure we are finding the research we need it is important to look in the right place. The goal is to find “peer reviewed” research. These are publications that have had impartial examinations of the information before it was published to ensure it was valid and is usable by the rest of the research community.

Finding Valid Research

There are a number of places to find the research you are looking for. Going to a university and using their library is certainly an option, but you may not be near one or have the journals you are interested in available. The newest and best research tends to be published in journals and not in books. Furthermore, we are usually looking for journals published in the last ten years. Depending on your field of study, two excellent resources are:

Scholar.google.com

Pubmed.gov

Finding Journals

Using these or other search engines will often yield us “abstracts”. The abstract is a summary of the research that was done. At times you can access the entire journal article and other times they want you to pay. Try an find key words in the abstract and use a search engine to pull them up. I have even had success finding out the author of the paper and calling them on the phone during office hours to ask for a copy of the paper. No one has ever turned me down.

These journal articles will give you the background information and data analysis you need to work on your own research. They will provide the backdrop of your literature review and will be cited as references.

How do we show our references?

Once we have determined the references we want to use there is still the issue of how to list them, or cite them. Much of this can be determined by where you are publishing your work as they will often require a certain style be used. In the end it really doesn't matter so long as you are consistent and using the style you have chosen correctly. Some of the more common ones are MLA, APA, Chicago, and Turabian. Again, there are many to choose from so find a good resource online or in print that will help you determine the way the style uses citations. The last word on this is to find out the general consensus on citation style based on where you are likely to publish. Many fields of study use the same style consistently.

References in Your Work

You should ensure that in your written work you give credit for the references you used. Simply sticking them all in a reference list is not a great idea. How you use them in your work will again depend on where you are publishing or presenting this information. The most common of these is end notes, footnotes, and in-text citations. Be consistent here as well and follow the correct protocols.

Is Your Research Valid?

You might think that the things you are working on are fascinating, and they might be! The question we need to constantly address is whether our research is meeting the tests of validity. There are two types of validity:

Internal Validity

External Validity

Threats to Internal Validity

Internal Validity:

Refers to the extent to which it is possible to make an inference that the independent variable is truly causing or influencing the dependent variable.

Threats to internal validity are:

History- occurrence of events concurrent with independent variable

Selection- biases resulting from preexisting differences between groups

Maturation- processes occurring as a result of time

Mortality- differential attrition from groups

External Validity

External validity is the generalizable aspect of research findings to other settings or samples.

Why might we need to generalize our findings to other settings?

Reliability

We need to always be sure that our measuring instruments are reliable. What are we using as far as equipment is concerned? Can it be considered a reliable instrument for measurement? Why or why not? What are some poor instruments to use?

Reliability and Validity

If an instrument is not reliable it cannot possibly be valid. In evaluating an instrument, the researcher cannot consider validity apart from reliability. Unfortunately, many published studies fail to give reliability and validity data on instruments used to measure study variables.

(Burns & Grove, 2007)

Basic statistics are usually grouped like this:

- **Descriptive** Measures of central tendency and correlation.
- **Non-parametric** Values cannot be inferred to a population.
- **Parametric** Values assumed to be representative of a population (normal distribution).

Helping the Typical Student Learn to Read Research

- Many students cannot differentiate between research and narratives
- Students often only read the abstract and the conclusion section
- Students tend to see one research report as “proof”
- Students are often afraid of tables, numbers, and symbols

How Do We Prepare the Student for Research

- Introduce and encourage library/internet searches for literature
- Introduce research terminology
- Help students identify published research
- Encourage a questioning attitude about issues
- Promote learning as a professional lifestyle
- Model scholarly approach to issues