



FROM QUESTIONS TO KNOWLEDGE

Understanding the Life Cycle of Research

CIPSRT
Canadian Institute for Public Safety
Research and Treatment



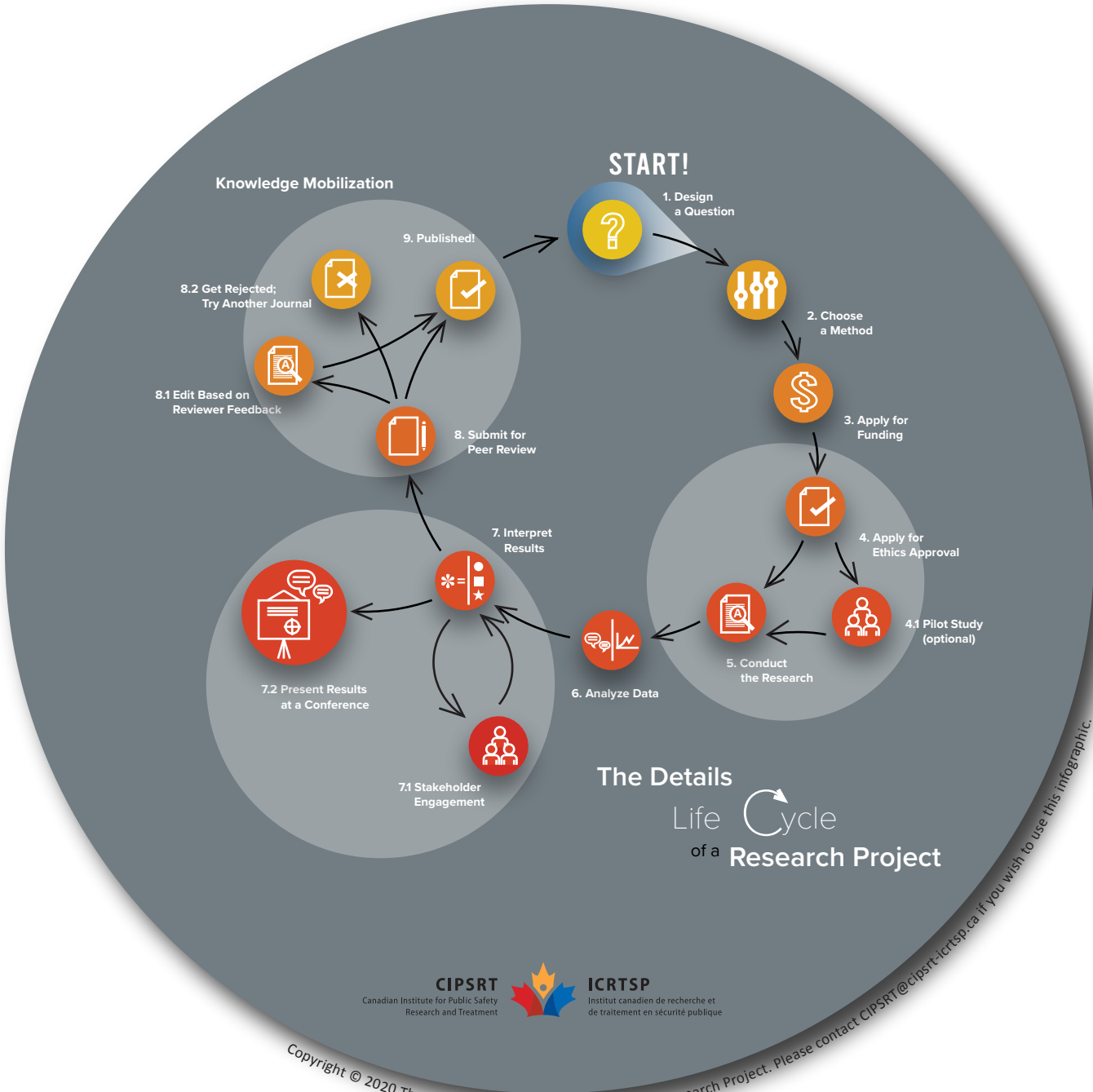
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Why is **RESEARCH** important?

When you think of research, you might imagine scientists in white lab coats, but research is often done in everyday settings. For example, when you ask your friends if they know a good plumber, in a way, you are conducting some basic research. Whenever you have to make an important decision, you likely take the time to gather information (statistics, reports, and/or opinions) to help you decide.

Good research helps us build a firm foundation for making important choices.

In most cases, conducting good research generally follows a standard path from start to finish.





Step 1 – Designing a question

This first step may seem simple, but it can be quite complicated. Good research often starts with observations. Through observation, researchers can get an idea of what questions might need to be asked. For instance, researchers might notice that there are many treatments for depression and may want to conduct a study to determine which treatment is most effective.

Once an observation is made and a specific research question is generated, a researcher needs to find out whether or not someone else has already addressed the question. This exploration involves more than just a basic internet search. A comprehensive review of all of the literature on the subject has to take place, which includes searching numerous scholarly databases and journals. Once this review is completed, the researcher can move on to the next step.



Step 2 – Choosing a Method

Surveys, interviews, experiments in a lab ... there are so many methods that can be used to answer research questions. When selecting a method, a researcher must consider many factors, including:

- the type of question they are asking;
- their hypothesis (the answer they think/hope they will get) if they have one (because sometimes a study may be more exploratory);
- the number of participants needed to answer the question (one person's experience is generally not enough, but ten thousand people might be too many); and
- the resources they will need (equipment, student researchers, funding).

The method the researcher chooses might also depend on how much research has already been done on this topic. If not much is known, then a survey of a sample of people who are representative of the larger population of interest might be the way to start. If a lot of research has already been done, then more advanced methods (e.g., a randomized controlled trial that can control for numerous variables in order to determine whether changing one condition has an impact on an outcome) might be the best choice.



Step 3 – Apply for Funding

Once researchers have designed their questions, determined their hypotheses (if applicable), and chosen their research method, they will generally need to apply for funding. The funding level they look for will depend on the methods they choose and how many participants they intend to include. A proposal that includes the details of why the study should be done and how it will be conducted is given to possible funders (e.g., governments, national funding bodies, not-for-profit agencies, private companies, universities). Writing grant applications is time-consuming, and there are a limited number of projects that will be successful.



Step 4 – Apply for Research Ethics Approval

Before conducting any research, especially research involving humans, a researcher's proposed study must go through an ethics review. These reviews create an essential system of checks and balances on the work that researchers are doing and are required for both funded and unfunded research. Among the responsibilities of the Research Ethics Board (REB) is to ensure that there is limited harm to anyone participating in a study, that the benefits of performing the research outweigh any possible harms, and that the confidentiality of participants is protected. REBs also consider the scientific merits of a study when determining whether or not it should be approved; poorly designed research is itself unethical.



Step 5 – Conducting Research

At this stage, the researcher will recruit participants and collect data. Depending on the type of study, sometimes, it is necessary for the researcher to explain the study in a manner that does not give away what the researcher hopes to find. It also involves the researcher getting informed consent from the participants. Informed consent means clearly outlining everything about the study that a person may reasonably want to know before they agree to participate. The data that a scientist will collect once again depends on the method they have chosen. A survey will have questionnaires. An interview will usually be recorded and transcribed. With many studies, there are multiple types of data collected.



Step 6 – Analyzing the Data

The type of data that is gathered dictates the ways it can be analyzed. If a researcher collects quantitative data (data in the form of numbers), they will use statistical procedures that line up with their research questions and hypotheses. If a researcher gathers qualitative data (data from interviews or open-ended questions), they will have to review the data and categorize it based on a set method they have chosen.



Step 7 – Analyzing the Data

Once researchers complete data analysis, they must interpret what they found. Again, the research question, hypothesis, and method of the study shape how the results are interpreted. Depending on the research question, this could be as easy as confirming that a change occurred. But for more complex questions, researchers must dig deeper to understand the results of the study. Researchers must also be careful to describe their results accurately. If a researcher suspects that two things might be related and the results suggest that a relationship (or “correlation”) does exist, the researcher must be careful not to overstate the findings by saying, “A caused B.” Despite what you might think, there are very few research methods that show causation. Part of the process of interpreting complex results can involve going back to the research participants to share the data and see if they propose explanations for results you might have missed. At this stage, researchers make conclusions about what they found in their studies.



Step 8 – Submitting for Peer-review

Researchers routinely share the results of their work for many important reasons. Understandably, the agencies that fund research studies want to know the outcomes. Sharing the findings might also benefit the general public. In addition, when researchers share their results in scientific journals, they contribute to the pool of scientific knowledge on various topics. Before a research study is published in a reputable academic journal, it is always reviewed by a panel of experts who review the question, method, data analyses, and conclusions of the researcher. This review is known as the “peer-review” process. The peer-review process is often lengthy and challenging for researchers, as it may involve extensive edits (if accepted) and often, rejection and resubmission to a different journal.



Step 9 – Publication

Once researchers publish their work, it becomes available to the research community. Traditionally, academic publications were kept behind a paywall and were only accessible to people working or studying at institutions that held a subscription. Today, federal funding bodies (and increasingly, other types of funders) insist that research be publicly accessible so that stakeholders outside the research community can freely assess research findings. Access is essential because stakeholders can use research in a wide variety of ways (e.g., to improve health, education, business practices, leisure, or governance). Published work also leads to new avenues of exploration. Every study is an opportunity for researchers to continue to build on scientific knowledge.

How long does research take?

There are no firm timelines for any of the steps above. Each step has to be completed carefully to ensure that the study provides sound information. Outside factors can also influence the progress of research. These delays can be common, like delays in funding, difficulty recruiting participants, multiple publication rejections, or more major ones like the recent pandemic that limited researchers’ ability to conduct in-person research. A study’s scale also has an impact on how long it takes for results to be gathered and shared. Depending on the type of research, it can take a year (if it is a basic survey with a moderate sample size) to decades (if it is an in-depth, longitudinal study looking at changes over time). Results are important in research, but a researcher can’t rush through the steps. Each step is essential to ensure the accuracy of the results.

For more information about our research contact: CIPSRT@cipsrt-icrtsp.ca
Or visit our website: www.cipsrt-icrtsp.ca