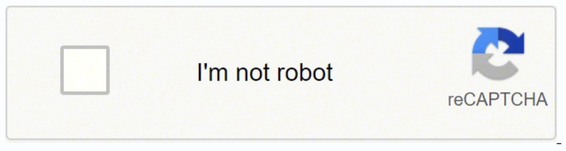

Next

Qualitative evaluation and research methods pdf

Photo Courtesy: BraunS/E+/Getty Images If you've ever had a great idea for something new, then you know some testing is necessary to work out the kinks and make sure you get the desired result. When it comes to developing and testing hypotheses in the scientific world, researchers use an eight-step process known as the scientific method to prove or disprove ideas that could ultimately lead to more concrete scientific theories. Aristotle was the first known person to suggest using observation and experimentation to prove various hypotheses proposed by scientists, philosophers and mathematicians. Over time, his initial ideas were tweaked and improved until they evolved into what we know today as the scientific method. Before you tackle your next science experiment, let's take a look at the steps you need to include to validate your findings.Observation (Steps One Through Four)The steps that make up the scientific method generally fall into three phases: observation, experimentation and conclusion. The first four steps in scientific research all fall into the observation phase and include initial observations, asking questions, gathering information and forming hypotheses. The concept is simple: Before you can conduct any experiments, you must first observe something in nature that raises questions and prompts you to consider new ideas or solutions to a problem. In many cases, step one takes place without any conscious effort on the part of the observer. Photo Courtesy: Anchalee Phanmaha/Moment/Getty Images After observing something that catches your eye, you may decide you want to know more about it, which requires you to ask a question. Example questions could relate to why something happens or what makes it occur. Asking a relevant question is the second step in the scientific method. Next, you want to do some research to find the answer to the question. For instance, if you are wondering why plants respond to sunlight, you would want to thoroughly research the topic of photosynthesis and perform your own experiments to increase your understanding. The research you conduct is the backbone of step three. In some cases, you may discover evidence already exists to answer the question without any further effort on your part, but your own research could lead you in a new direction and expand on what you already know. Once you have made an observation, asked a relevant question and carried out your own research, you can complete step four by developing a hypothesis based on everything you learned. Think of a hypothesis as an educated guess. It's based on what seems to be true based on preliminary evidence, but it hasn't been conclusively proven to be true.More About a HypothesisThe hypothesis is one of the cornerstones of the entire scientific method. It doesn't offer proof when first presented, but it does require researchers to analyze the limited evidence available and use sound logic and reasoning to draw potential conclusions. The actual statements are typically written in an if/then format, with scientists predicting the outcomes of future experiments or the causes of particular events. They usually make these predictions based on the results of their own initial research. Photo Courtesy: Prasngkh Ta Kha/EyeEm/Getty Images Despite a common misconception, a hypothesis is not the same thing as a theory. If a hypothesis is tested, and the outcome is favorable — in other words, the scientist's initial educated guess was proven correct — then it could eventually become a much more concrete theory. Typically, a hypothesis is tested several times and by different scientists before it can be classified as a theory. It's also common for scientists to combine several different hypotheses to develop a single working theory. Experimentation (Step Five)Once the observation phase is complete, things typically get a little more hands-on in the experimentation phase. As the name would imply, this phase involves conducting tests designed to (hopefully) prove a hypothesis. At this point, scientists and researchers gather their research, their hypotheses and maybe even their imaginations and use it all to conduct experiments. Photo Courtesy: Catherine Falls Commercial/Moment/Getty Images The types of experiments conducted could take many different forms. Some include simple observation of a subject, such as a human or an animal, in their natural surroundings, while others are completely conducted in laboratories. In most cases, researchers will conduct the same experiments several times using different variables to try to prove their ideas are valid.Conclusion (Steps Six Through Eight)Once all the official data has been collected and recorded, it's time to initiate the conclusion phase by first analyzing all the information and then forming a conclusion in step six. If the analysis indicates the results are inconclusive, researchers may choose to repeat certain experiments or conduct new ones. Photo Courtesy: skynesher/E+/Getty Images If the results indicate a definite conclusion, then that conclusion is reported in step seven to the scientific community and possibly the public. Depending on the type of experiment and the results, researchers may even publish the results and the information in a peer-reviewed medical journal to ensure other researchers in the field are aware of the information. Finally, the results of associated experiments and the conclusion drawn will continue to be evaluated (step eight) for potential modifications as new experiments are conducted and new evidence emerges over time. This phase only stops if the conclusion is proven to be a scientific law (doesn't change over time), such as Newton's laws of motion. MORE FROM REFERENCE.COM Loading... The American Heritage Dictionary defines statistics as: "The mathematics of the collection, organization, and interpretation of numerical data, especially the analysis of population characteristics by inference from sampling." The Merriam-Webster's Collegiate Dictionary definition is: "A branch of mathematics dealing with the collection, analysis, interpretation, and presentation of masses of numerical data." The steps of statistical analysis involve collecting information, evaluating it, and drawing conclusions.Statisticians provide crucial guidance in determining what information is reliable and which predictions can be trusted. They often help search for clues to the solution of a scientific mystery, and sometimes keep investigators from being misled by false impressions. Statisticians help determine the sampling and data collection methods, monitor the execution of the study and the processing of data, and advise on the strengths and limitations of the results. They must understand the nature of uncertainties and be able to draw conclusions in the context of particular statistical applications.Statistical planning, analysis, and inference is so crucial to the kind of research conducted by Hopkins GIM researchers that the Division has built a cadre of in-house methodologists, trained in epidemiology and biostatistics, who work side-by-side with content-oriented clinical researchers and their trainees.Return to Hopkins GIM Research section Qualitative research is a field of inquiry that crosscuts disciplines and subject matters. There are three major approaches to qualitative research: ethnography (drawn from anthropology); phenomenology (drawn from philosophy) and grounded theory (drawn from sociology). Typically, the research questions addressed by qualitative methods are discovery-oriented, descriptive and exploratory in nature. Qualitative researchers aim to gather an in-depth understanding of human behavior and the reasons that govern human behavior. Various aspects of behavior could be based on deeply held values, personal perspectives, experiences and contextual circumstances. Qualitative research investigates the why and how of decision making, not just what, where, and when. Therefore, the need is for smaller but focused samples rather than large random samples. Qualitative analysis involves categorizing data into patterns as the primary basis for organizing and reporting results. Qualitative researchers typically rely on several methods for gathering information: (1) participation in the setting, (2) direct observation, (3) in depth interviews, (4) focus groups, and (5) analysis of documents and materials. Although it is common to draw a distinction between qualitative and quantitative aspects of scientific investigation, a mixed-methods approach (a combination of qualitative and quantitative techniques) is often used. Qualitative research is, in some cases, instrumental to developing an understanding of a phenomenon as a basis for quantitative research. In other cases, it can inform or enrich our understanding of quantitative results. Similarly, quantitative research may inform, or be drawn upon in the process of qualitative research. Return to Hopkins GIM Research section

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