

Encyclopedia of Research Design

Triangulation

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The term *triangulation* refers to the practice of using multiple sources of data or multiple approaches to analyzing data to enhance the credibility of a research study. Originating in navigational and surveying contexts, triangulation aligns multiple perspectives and leads to a more comprehensive understanding of the phenomenon of interest. Researchers differ in the emphasis placed on the purposes of triangulation; some investigators view it as critical to establishing corroborating evidence, and others focus on its potential to provide multiple lines of sight and multiple contexts to enrich the understanding of a research question. Particularly associated with qualitative research methods, triangulation typically involves examining data from interviews, focus groups, written archives, or other sources. Triangulation is often used in studies that combine both quantitative and qualitative approaches, and it is sometimes referred to as mixed methods or multimethod research.

Types

Norman Denzin identified four types of triangulation. First, *data triangulation* involves using multiple sources of data in an investigation. In a research study examining hospital staff morale, for example, interviews with medical personnel might be compared and cross-checked with staff surveys and records of focus groups consisting of hospital employees. Second, *investigator triangulation* involves employing several evaluators to engage in observations or analyze participant responses. Using multiple investigators allows for the auditing of data consistency and reduces the potential bias inherent in employing only one investigator or analyst. For example, a group of researchers analyzing responses to open-ended survey questions might be less likely to draw erroneous conclusions than a single investigator, whose expectations might color interpretations of the data. A related practice known as *member checking* involves having study participants review transcripts and the findings derived by investigators to verify the accuracy of their recorded responses and comment on the conclusions drawn. Third, in *theory triangulation*, multiple theoretical perspectives are considered either in conducting the research or in interpreting the data. Employing a multidisciplinary team is one approach that brings different theoretical perspectives to bear on the research question. Last, *methodological triangulation*, which is the most commonly used

form of triangulation, engages multiple methods to study a single problem. Typically employed to compare data collected through qualitative methods with quantitative data, methodological triangulation can establish the degree of compatibility between information obtained through different strategies. Qualitative and quantitative methods might be employed simultaneously (e.g., distributing a questionnaire and conducting a case study) or might be used in a sequential fashion (e.g., a pilot study serves as the foundation for a randomized controlled trial conducted at a later date). Methodological triangulation might take the form of within-methods triangulation, where multiple [p. 1538 ↓] quantitative or qualitative approaches are employed, or between-methods triangulation, where both quantitative and qualitative approaches are used. Within-methods triangulation, on the one hand, has been criticized as a weaker strategy, as it only employs one method (either qualitative or quantitative) and does not compensate for the limitations of the particular paradigm. Between-methods triangulation, on the other hand, offers the possibility that the biases inherent in one approach will be mitigated by the inclusion of other sources of data, methods, and investigators.

Studies that employ triangulation typically yield one of three outcomes: convergence, inconsistency, or contradiction. The particular outcome of the study challenges the researcher to bring together theory, research, and practice in the construction of a comprehensive explanation of the results.

Debates regarding the Purposes and Contributions of Triangulation

Researchers have disagreed regarding the purposes and potential contributions of triangulation. These differences emerge out of the paradigms underlying investigators' approaches to research. Researchers influenced by the positivist or postpositivist philosophies have viewed triangulation primarily as a means of overcoming the limitations inherent in using only one approach to research. They have viewed the benefits of employing multiple data sources as a means of verifying the findings of different methods, asserting that if data from two or more sources converge on the same information, the likelihood of error is reduced. This viewpoint is closely akin to the traditional criteria of reliability and validity in quantitative approaches. If a researcher

finds that data from multiple sources corroborate in support of the same conclusion, then the researcher can be more confident in its validity.

In contrast, researchers influenced by a constructivist philosophy consider the benefits of triangulation to lie not in its potential to verify information but in its capacity to provide multiple viewpoints on the phenomenon of interest and to amplify the perspectives of participants who have been ignored or overlooked in traditional scientific inquiry. To constructivists, triangulation offers the opportunity to deepen the understanding of the research question and to explore multiple realities. Rather than viewing participant checking as validation or verification, for example, constructivists conceptualize it as obtaining additional data to expand the understanding of the research problem. To constructivists, triangulation is less concerned with attending to converging data than attending to obtaining multiple perspectives.

Some constructivists caution that researchers should avoid drawing links between qualitative research and quantitative methods as it might be construed as an effort to legitimize qualitative research to traditional quantitative audiences. They argue that by framing triangulation as a means of establishing validity or reliability, constructivists take an apologetic stance in trying to fit their methods into a traditional paradigm that postpositivists will appreciate and accept. This practice perpetuates the belief that qualitative research is not as rigorous or legitimate as “real science.”

Benefits

The benefits of triangulation vary depending on the perspective of the researcher. Postpositivists assert that triangulation enables researchers to minimize the biases inherent in using a single research approach. Studies that employ several methods and yield multiple types of data provide the opportunity for comparing and cross-checking findings. Because every type of data has strengths and limitations, using a combination of techniques helps compensate for the weaknesses found in one approach. Observations, for example, are limited in that the observer might focus attention on one particular aspect of the situation, while overlooking other, more significant events. The presence of the observing researcher might impact the participants in undetected ways. Likewise, it is difficult to determine whether the behaviors observed are typical

of the participants or represent a limited snapshot of an uncommon action. Interviews might yield data that are affected by the interviewer's unique style of communication, by the personal recall or interpretation of responses, or by the interviewees' assumptions about, or reactions to, the interviewer. Archived documents tend [p. 1539 ↓] to be limited by the specificity of the information contained in written records, biases of the document writer, or distortion of information. Because of the inherent limitations of these and other research approaches, investigators can enhance the credibility of findings by building in the use of multiple sources of data through triangulation. This strategy enables the researcher to capitalize on the strengths of each approach and reduce the impact of the weaknesses inherent in a single approach.

Constructivist researchers, in contrast, assert triangulation is beneficial in that it allows the airing of multiple perspectives on the problem and prompts the researcher to consider multiple realities. They argue that traditional approaches to scientific inquiry have largely overlooked individuals who have had less power and influence. Triangulation invites members of these groups to have a voice in determining reality and in contributing to the expansion and proliferation of knowledge.

Limitations

Although triangulation offers many benefits to the study of complex phenomena, several limitations have been identified. From a postpositivist perspective, triangulation does not always reduce bias. A researcher might triangulate using data collected through different methods (e.g., self-reports, diaries, and political speeches), but if that data come from a common source, such as a single person, then bias remains. Even if findings are corroborated from two different sources, a researcher cannot guarantee that both sources do not yield data that are flawed. A researcher's conclusions based on this information inevitably will be impacted. Thus, using triangulation to strengthen a study's validity is not always an effective strategy.

In studies that use methodological triangulation, it is not uncommon to obtain conflicting data. Investigators disagree regarding how to interpret discrepant findings. Constructivists argue that one should not necessarily expect triangulation to lead a researcher to a single truth, as there are multiple constructions of truth. Triangulation,

they assert, should be viewed as a tool to enrich the process of inquiry and to allow multiple perspectives to emerge. Others note that discrepancies indicate different methodologies have captured different information. The skilled researcher is then challenged to make sense of the differences.

Some researchers have cautioned that different research methodologies should not be combined without a clear rationale. Data derived from different approaches cannot necessarily be compared and viewed as equivalent in their ability to address a research question. For example, data collected from journal entries might differ dramatically from data collected in interviews, because one approach elicits private thoughts, whereas the other taps communication within a social context. When using methods triangulation, researchers should be able to articulate a clear rationale for combining different methods.

Triangulation can be expensive and time consuming. Most research projects are limited by financial and time constraints. Therefore, using multiple investigators, measures, theoretical perspectives, and methods will depend on the resources allocated for the study. The potential benefits of triangulation must be weighed against the practicalities of budget and time frame.

An additional consideration in using triangulation involves the experience level of the primary investigator and the research team. Because studies employing triangulation can be complex, it is critical that the researchers involved are experienced and knowledgeable regarding the strategies used and the data obtained. Novice researchers will struggle to interpret divergent results. Experienced qualitative researchers, regardless of their philosophical bent, generally agree that inconsistencies are common in studies using triangulation. Rather than unraveling the credibility of the findings, divergent results often direct the researcher to a deeper appreciation for the multidimensionality of the research question and point to new avenues of inquiry.

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See also

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