

Triangulation as a Strategy for Increasing Rigor, Breadth, Depth

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Introduction

In evaluation work "triangulation" is a fancy word that stands for using multiple methods to collect data, data sources, perspectives and evaluators to develop a more in-depth understanding of whatever is being studied or evaluated. Independent corroboration of a result strengthens its utility for decision making as well as extending our knowledge.

Land surveyors used the term originally to describe the use of three points to locate oneself at particular intersections. Lincoln and Guba (1985, p. 305) state that the term probably came from determining the point of origin of a radio broadcast by using directional antennas set up at the two ends of a known baseline, and constructing a triangle based on the angles for the strongest signals at each antenna.

The concept of triangulation in social science is said to have originated in Campbell and Fiske's (1959) classic article on multi-trait multi-method matrix. Webb, Campbell, Schwartz & Sechrest (1966, pp. 3, 174, 179, 181) used the term in their treatise on nonreactive measures. Denzin (1989) wrote a detailed methodological treatise. In social science applications the key feature of triangulation is multiplicity, not the number three.

If the evidence:

- is consistent (at least not contradictory) from at least two independent data sources,
- or is consistent when it is obtained by using at least two different methods,
- or is consistent when it is obtained by at least two evaluators working independently,
- or can be organized to make sense within at least two different paradigms or theoretical frameworks;

then the object of study can be understood better.

The term is used most often to refer to multiple data sources (copies of one type of source such as interview respondents) or multiple methods for describing the same information (e.g., comparing written documentation about an event against verbal reports by those who were present at the event).

The purpose of this paper is to introduce different approaches to triangulation in relation to evaluating transformational development.

What is measurement

Triangulation involves measurement. Before we examine different approaches to triangulation let's clarify measurement. I find it helpful to think of measurement as a process with the following five elements.

- There is something that is measured. It can be an object like a cinder block. It can be a characteristic of a person such as height or weight. It can be a feeling like anger that varies in intensity. It can be a characteristic of a group: examples include the percent of Hispanics, the tendency of group members to obey the leader.
- There is an instrument that is used in the process. A tape measure can be used to measure the length, width and depth of a cinder block. A weight scale can be used to measure how much a person weighs.
- There is a procedure for using the instrument.
- There is a reading produced by the instrument that is usually called a result.
- There is a procedure for recording the reading.

Triangulation as validation of a measurement process

Triangulation is used to test the accuracy of measurement readings and to determine the extent to which a measurement process may be biased.

Multiple method perspective for assigning values.

One form of triangulation is multiple measurements (Brewer and Hunter, 1989, pp.17-18, 83, 127-129). A phenomenon is measured from different methodological viewpoints so that a set of values is assigned to it. If the set of values has internal consistency, then we have more confidence in the validity of the description based on those measurements. Often these multiple measurements are combined into an index with each element compensating for weaknesses in the others. (This compensation feature is an assumption that can be challenged.)

From the multimethod perspective, genuinely different methods of data collection must be used independently in triangulation. Also, data collection must be focused tightly on the phenomenon of interest. Otherwise, convergence or agreement in multiple measurements may indicate a shared methodological bias rather than validation of reality, while divergence or disagreement may indicate differences in focus.

This understanding of triangulation is associated with a particular definition of social scientific measurement as "the process of making and organizing research observations so that the resulting set of data reflects as precisely and accurately as possible the degree to which a

particular social characteristic is present in a sample of persons, groups, or events” (Brewer & Hunter, 1989, p. 127).

- Nominal measurement sorts the sample into the set of those elements that have the given characteristic and those that do not have it. This sorting is called qualitative measurement (although this use of “measurement” stretches the usual meaning of the term, which is associated with use of numbers to characterize something).
- Quantitative measurement assigns numbers to the elements such that they can be ordered by magnitude.

Multiple methods to manage bias.

The process of measurement has two phases. In the first phase instruments are developed to produce the readings related to the phenomenon of interest. (Instruments include questionnaires or interview guides, observation guides, rating scales, as well as devices like blood pressure cuffs.) In the second phase the readings from the instruments are examined to determine how precisely and accurately they represent the phenomenon. That is, the instruments are validated. This approach to triangulation is designed to minimize measurement method bias.

“The general rule in validation is that if two measures really do point to the same phenomenon, then their readings should agree” (Brewer & Hunter, p.128). If the methods that produce the readings, however, share a common source of error, then the validation process can produce misleading results. Therefore, “multimethod research stresses the need to analyze different measures’ weaknesses as well as their strengths in relation to the particular measurements that the measures will be called upon to perform.”

Examine assumptions associated with triangulation

Lincoln and Guba (1985, pp. 305-307) point out limitations of triangulation within naturalistic inquiry, especially regarding the use of multiple evaluators to confirm each other's conclusions or the use of multiple perspectives to determine which perspective is correct. However, they appear to believe that use of multiple evaluators can lead to better understanding if they engage in dialogue throughout the study.

Two common assumptions about the value of triangulation need to be examined closely.

Does it eliminate bias?

The first assumption is that bias will be eliminated in a multimethod design. Although different methods can yield different understandings of the object of investigation it is difficult to conclude that those different understandings somehow neutralize any biases present. Each method has limitations and strengths but the combination of strengths in a particular study may not compensate for the limitations.

Patton (1980, pp. 157-159) provides a concise list of limitations for three common methods of collecting information.

Limitations for observation.

The evaluator may affect the situation being observed in unknown ways; people being observed may behave in atypical ways; the evaluator's way of perceiving the world may distort the information; the evaluator cannot observe what is happening inside people; only some aspects of the program may be observed.

Limitations for interviews.

Responses may be distorted due to personal bias or lack of awareness about the interview topics; responses may be affected greatly by the emotional state of the respondents at the time of the interviews; responses are affected by recall error, perceptions about the interviewer, and self interest.

Limitations for document analysis.

Documents or other forms of documentation may be incomplete, inaccurate, selective, or uneven in quality. If this is the case then no matter how careful the evaluator is when reviewing them or taking notes about them the results may be biased.

Does it reveal true propositions?

The second common assumption is that use of triangulation will lead to convergence upon true propositions. But there is no magic in triangulation. Conflicting findings is a typical outcome of using different methods for collecting information especially if there is both quantitative and qualitative information. The evaluator must be prepared to wrestle with ambiguity creatively and to encourage others to do so. Exploration of possible explanations for differences in findings may lead to valuable conclusions that otherwise would not be included.

Patton (1980, pp. 329-332) recommends triangulation during analysis of the information, where different teams of evaluators or different members of the same evaluation team use different analysis approaches. Exploration of differences in conclusions may lead to additional insights about the object of evaluation.

The metaphor behind this assumption is navigational in the sense that different perspectives lead to one destination. But perhaps the detective or car mechanic provides a more useful metaphor where intuition and uncertainty determine purposive action.

Triangulation to reach agreement

Kidder and Fine (1987) discuss three broad uses of "triangulation." The most common use refers to measurement, which involves locating a point in space along one or more dimensions to describe a single unit (person, object, or group).

A second use refers to agreement about conclusions within a single study, which involves identifying consistencies and inconsistencies in different collections of information about the same object of study. Analysis of the evidence eventually leads to a common story that describes the experience of a number of people. The story's beginning, ending, and major intermediate points are verified by the different types of evidence. This type of triangulation is especially relevant to evaluating transformational development programs.

The third use refers to agreement between conclusions across studies that use different methods. This poses great challenges. Caution should be exercised when attempting to make a case for such agreement.

Triangulation as crystallization

Richardson (1994, p. 522) provides another provocative perspective on triangulation. Triangulation has been discussed as a way of validating findings, where it is assumed that there is something fixed that can be triangulated. But if something is studied from radically different perspectives the crystal rather than the triangle provides a more useful central image for validity.

The crystal combines symmetry and substance with an infinite variety of shapes, substances, transmutations, angles of approach. What we see through a crystal changes as the crystal changes, what we expect to see becomes less predictable as we view it from different angles. Crystallization, without losing structure, goes beyond the search for a single truth to a deepened, complex, thoroughly partial understanding of the object of study.

Final thought

Triangulation is critical for evaluating transformational development in meaningful ways. Revisit the concept periodically to discover new skill sets to add to your evaluation practice.

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