



Chapter 2



Data Quality Considerations



The Importance of Data Quality

- As you begin to address your evaluation questions, it is important to consider the quality of the data you will use.



What Is Data Quality?

- Data quality involves the extent to which data accurately and precisely capture the concepts you intend to measure.^{1,2,3}
- With high-quality data, you can be confident in your findings.



Elements of Data Quality



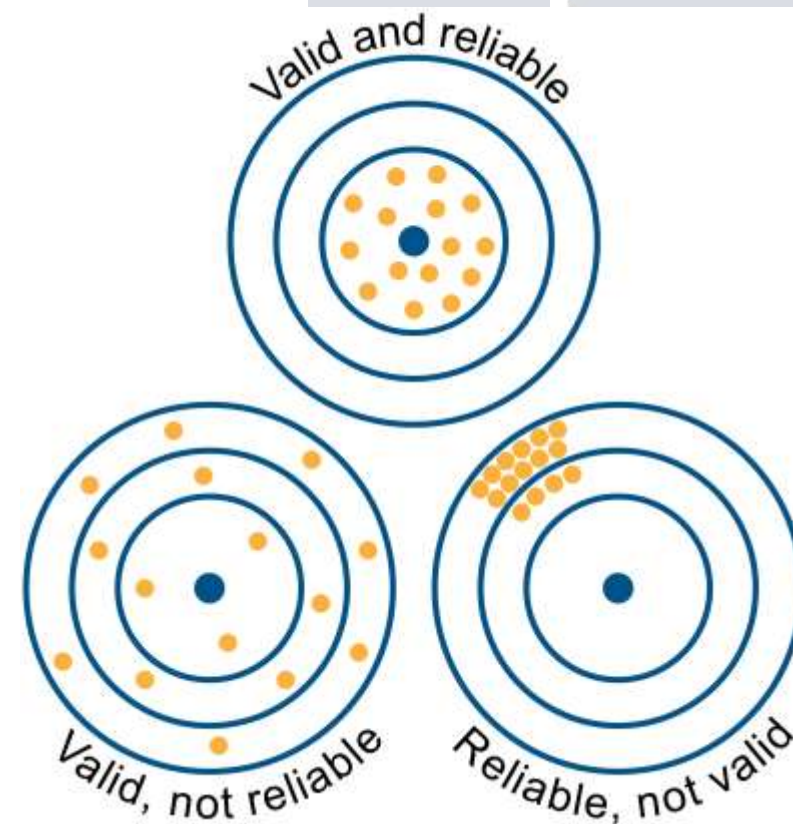
Validity

- *Validity* is the extent to which a data source really measures what it is intended to measure.⁴



Reliability

- *Reliability* is the extent to which a data source yields consistent results.
 - **Internal consistency:** A group of items consistently measure the same topic.
 - **Test–retest reliability:** An individual would receive the same score if tested twice on the same assessment.
 - **Inter-rater reliability:** Multiple raters or observers are consistent in coding or scoring.⁴



Timeliness

- *Timeliness* is the extent to which data are current and the results of data analysis and interpretation are available when needed.³



Comprehensiveness

- *Comprehensiveness* means that the data collected in an evaluation include sufficient details or contextual information and can therefore be meaningfully interpreted.^{3,4}



Trustworthiness

- *Trustworthiness* is the extent to which data are free from manipulation and entry error. Trustworthiness is often addressed by training data collectors.³



Completeness

- *Completeness* means that the data are collected from all participants in the sample and are sufficient to answer the evaluation questions. Completeness also relates to the degree of missing data and the generalizability of the dataset to other contexts.³

Data Quality Dimensions

Dimension	Definition	Examples
Validity	Validity is the extent to which a data source really measures what it is intended to measure.	A survey that is intended to measure pedagogical expertise measures an educator's pedagogical skills and knowledge and does not measure other topics such as motivation or subject content knowledge.
Reliability	Reliability is the extent to which a data source yields consistent results. There are three main types of reliability: <ul style="list-style-type: none"> • Internal consistency: The extent to which a group of items on a data source consistently measure the same topic. • Inter-rater reliability: The extent to which multiple raters or observers are consistent in coding or scoring. • Test-retest reliability: The extent to which an individual would receive the same score if tested twice on the same assessment. 	<p>Internal consistency: Survey participants who respond positively to certain items about educator professionalism also respond positively to other related items on the survey.</p> <p>Inter-rater reliability: Two principals evaluating the same teacher indicate a similar rating independently.</p> <p>Test-retest reliability: A diagnostic screening test (with multiple forms) yields the same results if administered to the same individual multiple times.</p>
Timeliness	Timely data are current, and the results of data analysis and interpretation are available when needed.	If the goal of a program is to improve students' academic motivation upon middle school entry, data are collected when students enter middle school, not when they leave middle school, to determine the extent to which they are motivated.
Comprehensiveness	The data collected in an evaluation include sufficient details or contextual information and can therefore be meaningfully interpreted.	If the evaluation focuses on differences in math performance among boys and girls, the data collected include both students' math scores and their gender.
Trustworthiness	Trustworthiness is the extent to which data are free from manipulation and entry error. This is often addressed by training data collectors.	An evaluation team trains data collectors to ensure that there is no opportunity for participants to answer questions in a biased way.



Additional Resources

- *Data Quality Dimensions*



Additional Considerations for Qualitative Data

- Validity and reliability look different for qualitative data.
- Data may vary considerably due to participants' unique perspectives, behaviors, or actions.
- Triangulation, member checks, and audit trails can help ensure that qualitative data are valid and reliable.^{4,5}



Additional Data Considerations

- Data quality is both objective and subjective.
- If stakeholders perceive that the quality of your evaluation data is poor, they will likely not trust the findings.



Checklist for Assessing Data Quality

- To help you evaluate the quality of your data, review the *Data Quality Checklist* on the resources page of the website.
- If you have doubts about the quality of your data, take steps to improve the quality.

Data Quality Checklist

Validity

- The extent to which a data source really measures what it is intended to measure.

Reliability

- Internal consistency:** The items in a data source (for example, an assessment) consistently measure the same topic (for example, ratios and proportional reasoning).
- Inter-rater reliability:** Processes, such as training on coding interviews or scoring observations, are in place to ensure that data are collected consistently by multiple raters..
- Test-retest reliability:** Individuals receive the same score if tested twice on the same assessment.

Timeliness

- The data are current and collected within an appropriate time frame.
- The results of data analysis and interpretation are available when needed.

Comprehensiveness

- The data include sufficient details or contextual information.
- The data can be meaningfully interpreted.

Trustworthiness

- The data are free from manipulation or entry error.
- The data are as free as possible from bias, and known biases are identified.
- Processes, including training of data collectors, are in place to address potential sources of bias and error.

Completeness

- The data are collected from all participants in the sample.
- The data are sufficient to address all evaluation questions.
- There is a sufficiently small degree of missing data.
- The results are generalizable to other contexts (for example, other schools, districts, or state education agencies).





Chapter 2 Complete

1

2

3

Recommended next: Chapter 3 – Data and Evaluation Questions



Thank You

Please visit our website and follow us on Twitter
for information about our events, priorities, and research alliances,
and for access to our many free resources.

ies.ed.gov/ncee/edlabs/regions/central/index.asp

@RELCentral

or contact us at

RELCentral@marzanoresearch.com

This presentation was prepared under Contract ED-IES-17-C-0005 by Regional Educational Laboratory Central, administered by Marzano Research. The content does not necessarily reflect the views or policies of IES or the U.S. of Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

References

1. Brown, W., Stouffer, R., & Hardee, K. (2007). *Data quality assurance tool for program-level indicators*. MEASURE/Evaluation Project.
<https://www.measureevaluation.org/resources/publications/ms-07-19>
2. Radhakrishna, R., Tobin, D., Brennan, M., & Thomson, J. (2012). Ensuring data quality in extension Research and evaluation studies. *Journal of Extension*, 50(3), Article 3TOT1.
<https://eric.ed.gov/?id=EJ1042539>
3. Pipino, L. L., Lee, Y. W., & Wang, R. Y. (2002). Data quality assessment. *Communications of the ACM*, 45(4), 211–218. <https://doi.org/10.1145/505248.506010>
4. Rossi, P. H., Lipsey, M. W., & Henry, G. T. (2018). *Evaluation: A systematic approach* (8th ed.). Sage.
5. Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Sage.

