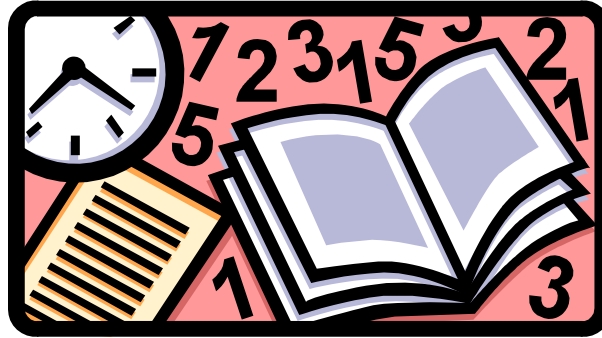


Methods of Data Collection (Quantitative)

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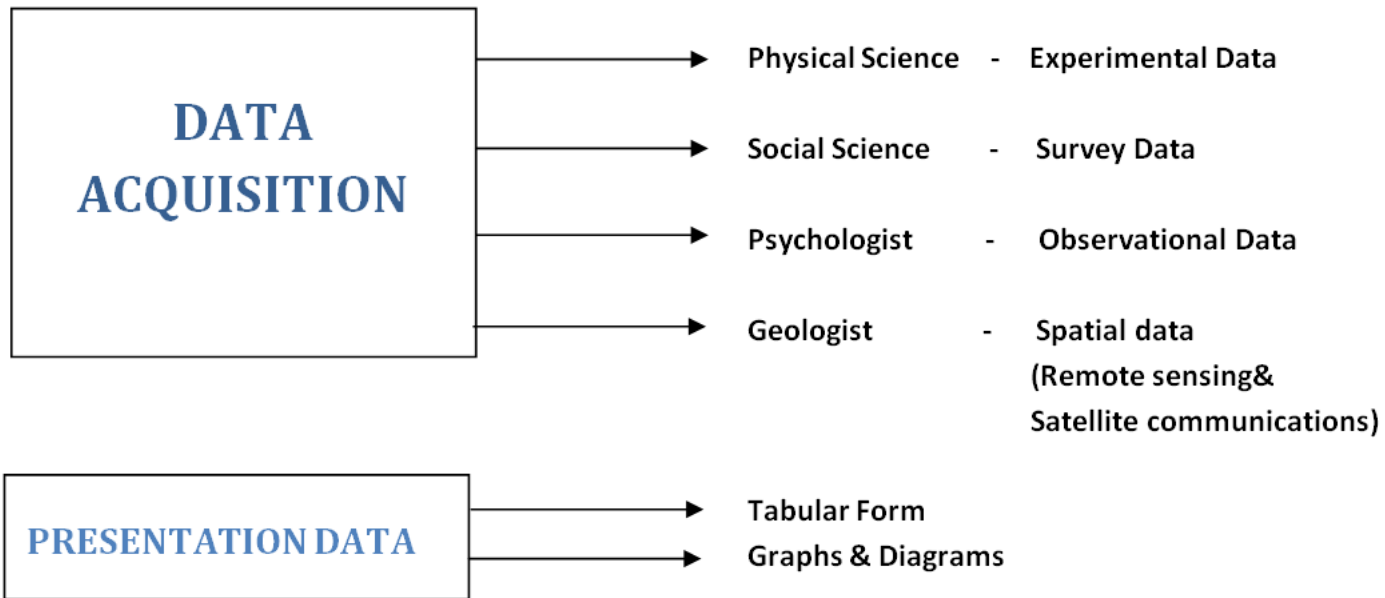
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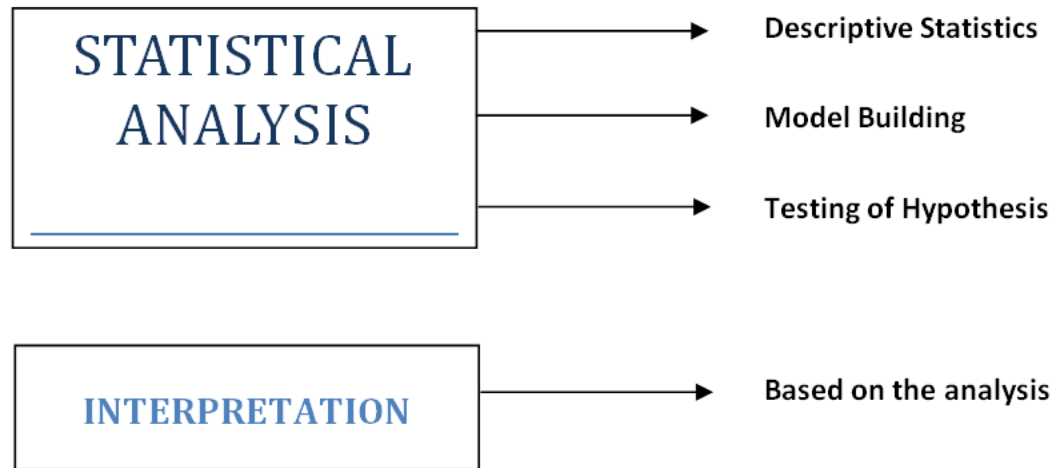
Quantitative Research



Functions of Statistics



Functions of Statistics



CONCEPT OF DATA COLLECTION

- Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes.
- The data collection component of research is common to all fields of study including physical and social sciences, humanities, business, etc.
- While methods vary by discipline, the emphasis on ensuring accurate and honest collection remains the same.

Types of Data

- Data are organized into two broad categories: qualitative and quantitative.

Quantitative Data

- Quantitative data is numerical in nature and can be mathematically computed.
- Quantitative data measure uses different scales, which can be classified as nominal scale, ordinal scale, interval scale and ratio scale.

Typical quantitative data gathering strategies include:

- Experiments/clinical trials.
- Observing and recording well-defined events (e.g., counting the number of patients waiting in emergency at specified times of the day).
- Obtaining relevant data from management information systems.
- Administering surveys with closed-ended questions (e.g., face-to face and telephone interviews, questionnaires etc).
- In quantitative research (survey research), interviews are more structured than in Qualitative research.
- In a structured interview, the researcher asks a standard set of questions.
- Face -to -face interviews have a distinct advantage of enabling the researcher to establish rapport with potential participants and therefore gain their cooperation.

Rules for Collecting Data

- Use multiple data collection methods
- Use available data, but need to know
 - how the measures were defined
 - how the data were collected and cleaned
 - the extent of missing data
 - how accuracy of the data was ensured

Structured/Unstructured Approach

- **Unstructured Approach:** Allow respondents to reply freely without having to select one of several provided responses (also called open-ended questions)
- Useful for exploratory studies in which various dimensions and facets of a problem are examined
- Usually difficult to analyze responses
 - What steps are required to improve the quality of National Service?
- Usually low response rate

Structured Approach

- **Dichotomous:** yes/no, true/false, agree/disagree
- **Multiple Choice:** What sources do you use for writing term reports?
(check all that apply)
 - How many hours do you exercise per week (check only one response)
 - How satisfied are you with the quality of canteen 'A' food?
- **Contingency:** Determine if the respondent is qualified to answer a subsequent question)
 - Do you use databases available through iGems? (If no, please move to question 15) *
 - Have you participated in DIS orientation? (Yes/No)
If yes, how effective was this briefing? (Very effective, effective, ineffective ...)

Characteristics of Good Measures

- Is the measure relevant?
- Is the measure credible?
- Is the measure valid?
- Is the measure reliable?

Relevance

- Does the measure capture what matters?
- Do not measure what is easy instead of what is needed.

Credibility

- Is the measure believable? Will it be viewed as a reasonable and appropriate way to capture the information sought?

Validity

- How well does the measure capture what it is supposed to?

Reliability

- A measure's precision and stability- extent to which the same result would be obtained with repeated trials.

How reliable are:

- birth weights of newborn infants?
- speeds measured by a stopwatch.

Which Data?

If you:

Then Use:

-
- want to conduct statistical analysis
 - want to be precise
 - know what you want to measure
 - want to cover a large group

Quantitative

-
- want narrative or in-depth information
 - are not sure what you are able to measure
 - do not need to quantify the results

Qualitative

Obtrusive vs. Unobtrusive Methods

Obtrusive

data collection methods that directly obtain information from those being evaluated

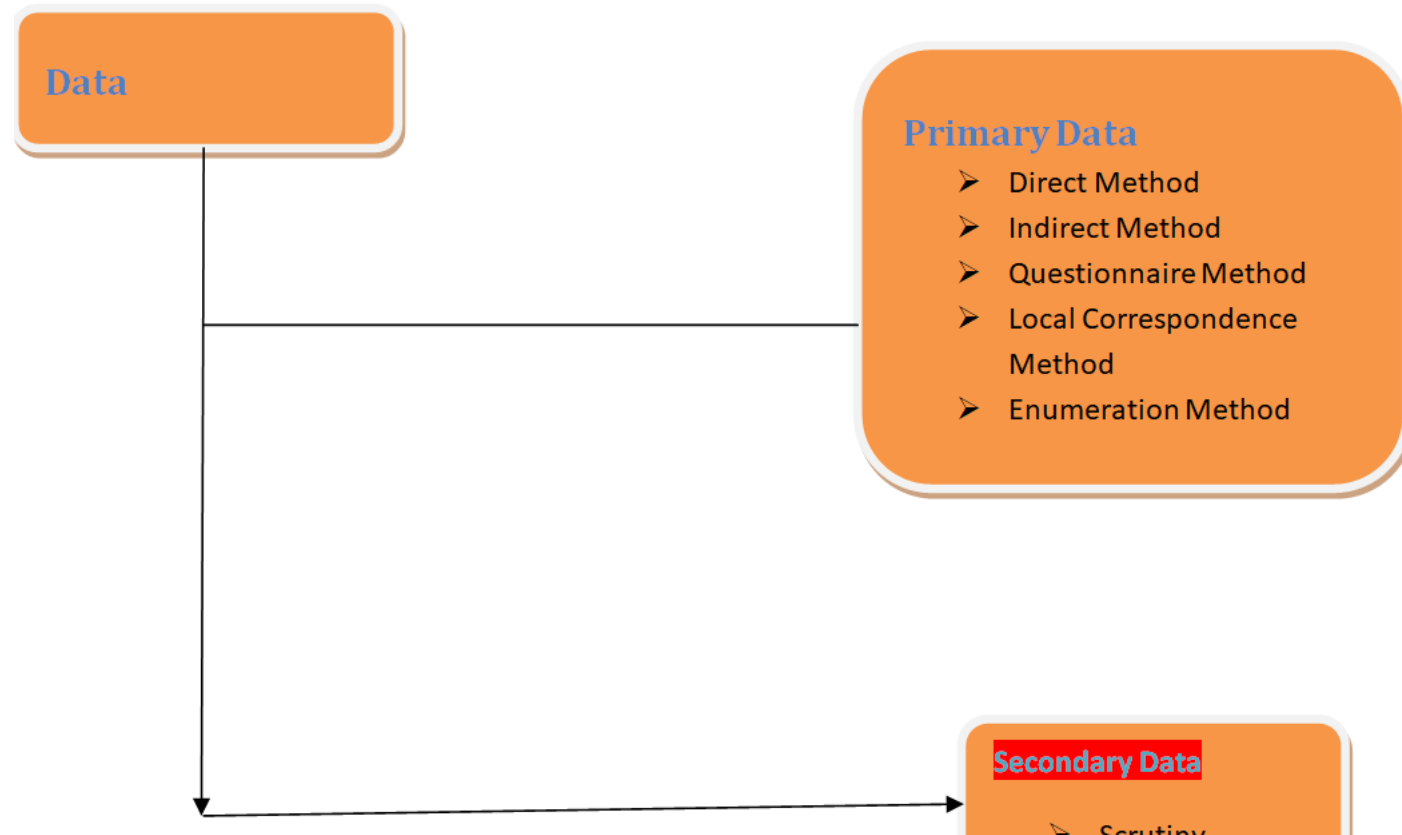
e.g. interviews, surveys, focus groups

Unobtrusive:

Data collection methods that do not collect information directly from the respondents.

e.g., document analysis, Google Earth, observation at a distance, GIS.

Data Collection



How to Decide on Data Collection Approach

- Choice depends on the situation.
- Each technique is more appropriate in some situations than others.
- Caution: All techniques are subject to bias.

Triangulation to Increase Accuracy of Data

- Triangulation of methods
 - collection of same information using different methods
- Triangulation of sources
 - collection of same information from a variety of sources
- Triangulation of evaluators
 - collection of same information from more than one evaluator

Data Collection Tools

- Participatory Methods
- Records and Secondary Data
- Observation
- Surveys and Interviews
- Focus Groups
- Diaries, Journals, Self-reported Checklists
- Expert Judgment
- Delphi Technique
- Other Tools

Tool 1: Participatory Methods

- Involve groups or communities heavily in data collection
- Examples:
 - community meetings
 - mapping
 - transect walks

Community Meetings

- One of the most common participatory methods
- Must be well organized
 - agree on purpose
 - establish ground rules
 - who will speak
 - time allotted for speakers
 - format for questions and answers

Mapping

- Drawing or using existing maps
- Useful tool to involve stakeholders
 - increases understanding of the community
 - generates discussions, verifies secondary sources of information, perceived changes
- Types of mapping:
 - natural resources, social, health, individual or civic assets, wealth, land use, demographics

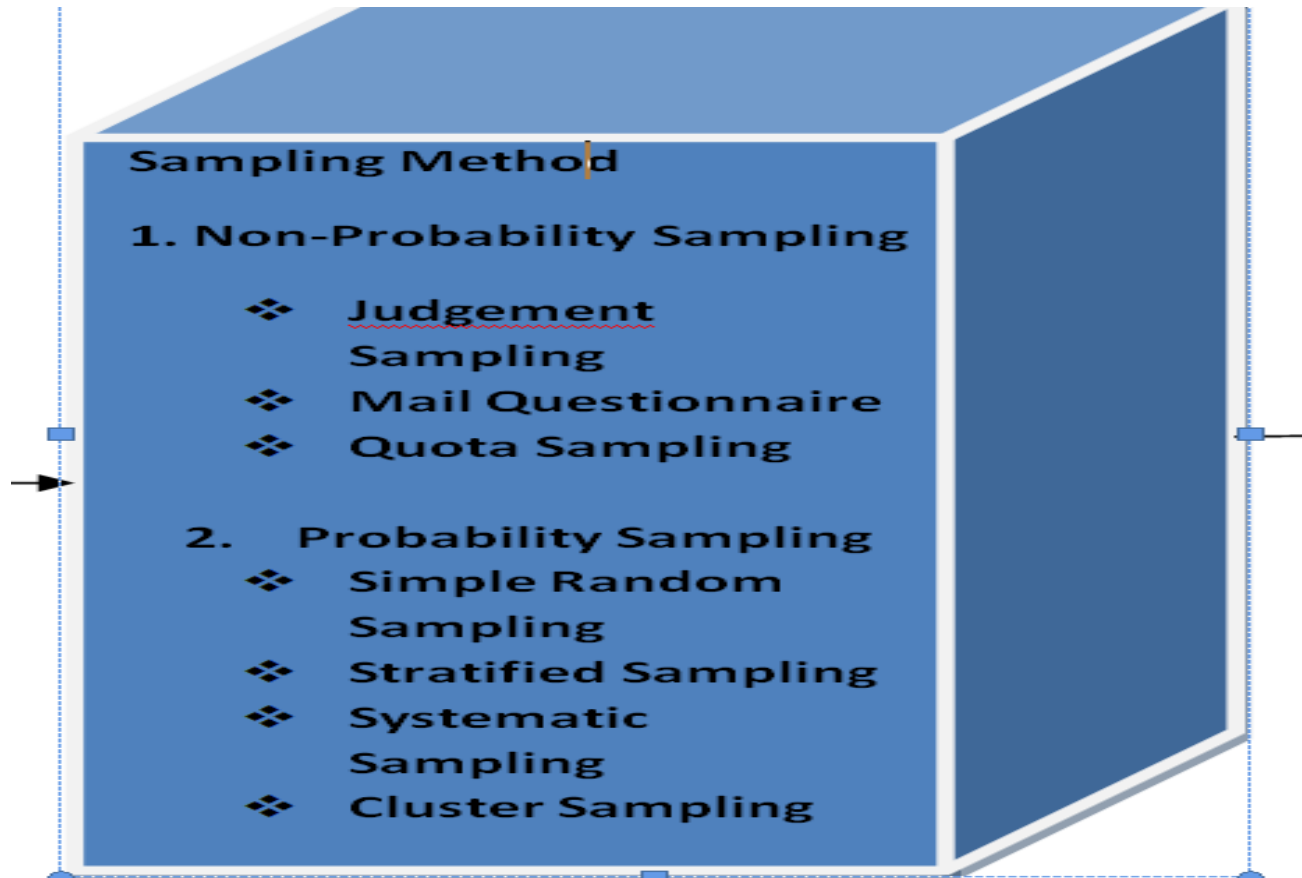
Transect Walks

- Evaluator walks around community observing people, surroundings, and resources
- Need good observation skills
- Walk a transect line through a map of a community — line should go through all zones of the community

Data Collection

- **Data collection:**
- At the time of data collection we may choose any one of the following :
- Complete Enumeration method
- Sampling method
- Both have their own merits and demerits.

Sampling Method



Tool 2: Records and Secondary Data

- Examples of sources:
 - files/records
 - computer data bases
 - industry or government reports
 - other reports or prior evaluations
 - census data and household survey data
 - electronic mailing lists and discussion groups
 - documents (budgets, organizational charts, policies and procedures, maps, monitoring reports)
 - newspapers and television reports.

Using Existing Data Sets

- Key issues: validity, reliability, accuracy, response rates, data dictionaries, and missing data rates

Advantage/Challenge: Available Data

Advantages

- Often less expensive and faster than collecting the original data again

Challenges

- There may be coding errors or other problems. Data may not be exactly what is needed. You may have difficulty getting access. You have to verify validity and reliability of data

Tool 3: Observation

- See what is happening
 - traffic patterns
 - land use patterns
 - layout of city and rural areas
 - quality of housing
 - condition of roads
 - conditions of buildings
 - who goes to a health clinic

Observation is Helpful when:

- need direct information
- trying to understand ongoing behavior
- there is physical evidence, products, or outputs that can be observed
- need to provide alternative when other data collection is infeasible or inappropriate

Degree of Structure of Observations

- Structured: determine, before the observation, precisely what will be observed before the observation
- Unstructured: select the method depending upon the situation with no pre-conceived ideas or a plan on what to observe
- Semi-structured: a general idea of what to observe but no specific plan

Google Earth

- Maps and satellite images for complex or pinpointed regional searches
- Has an Advanced version and an Earth Outreach version
- Web site for Google Earth
 - <http://earth.google.com/>

Ways to Record Information from Observations

- Observation guide
 - printed form with space to record
- Recording sheet or checklist
 - Yes/no options; tallies, rating scales
- Field notes
 - least structured, recorded in narrative, descriptive style

Guidelines for Planning Observations

- Have more than one observer, if feasible
- Train observers so they observe the same things
- Pilot test the observation data collection instrument
- For less structured approach, have a few key questions in mind

Advantages and Challenges: Observation

Advantages

- Collects data on actual vs. self-reported behavior or perceptions. It is real-time vs. retrospective

Challenges

- Observer bias, potentially unreliable; interpretation and coding challenges; sampling can be a problem; can be labor intensive; low response rates

Tool 4: Surveys and Interviews

- Excellent for asking people about:
 - perceptions, opinions, ideas
- Less accurate for measuring behavior
- Sample should be representative of the whole
- Big problem with response rates

Modes of Survey Administration

- Telephone surveys
- Self-administered questionnaires distributed by mail, e-mail, or websites
- Administered questionnaires, common in the development context
- In development context, often issues of language and translation

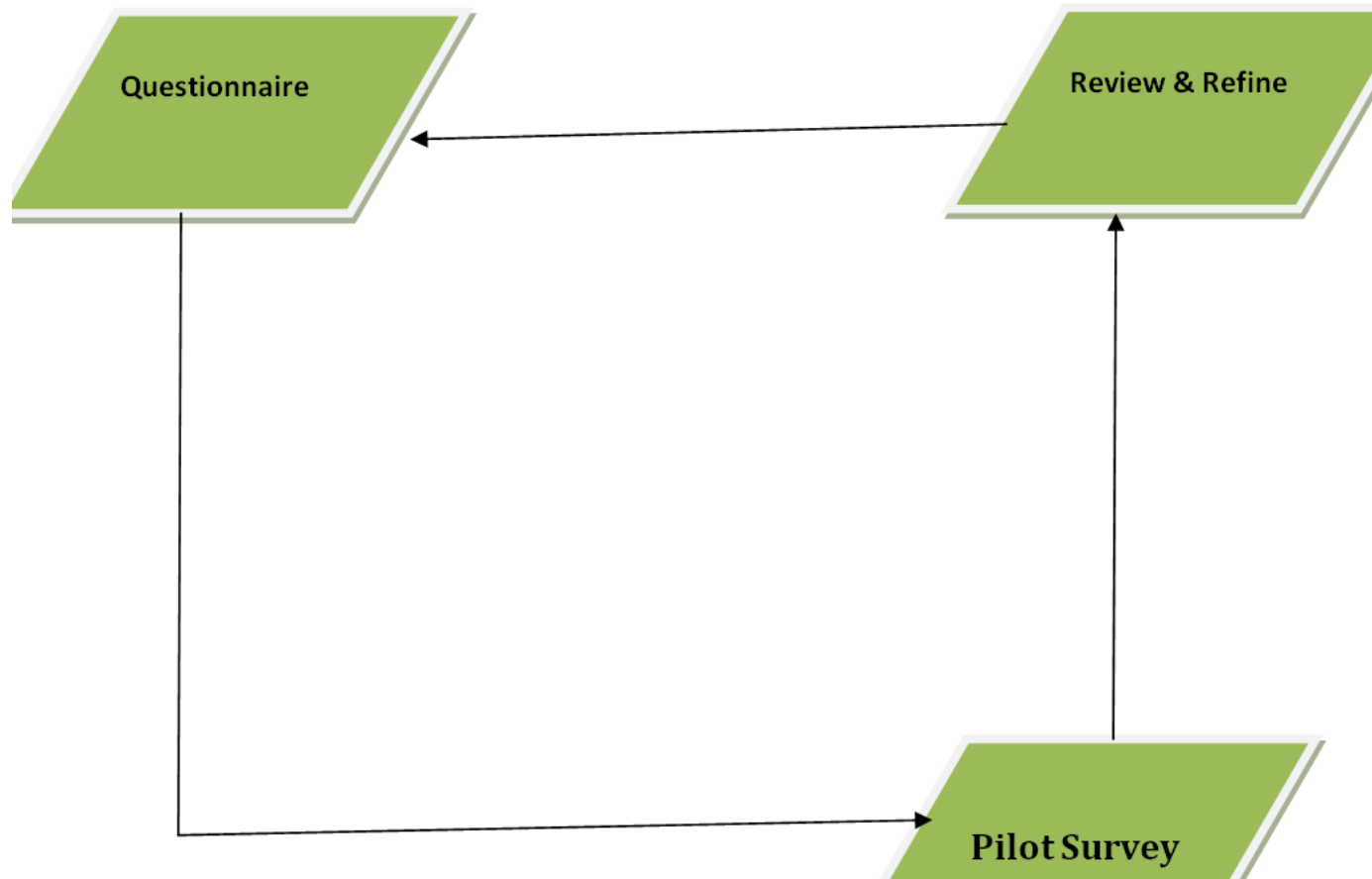
Mail / Phone / Internet Surveys

- Literacy issues
- Consider accessibility
 - reliability of postal service
 - turn-around time
- Consider bias
 - What population segment has telephone access?
Internet access?

Pilot Study

- After the questionnaire has been prepared pilot survey/pretest is to be considered. This practice often reveals certain shortcomings in the questions, which can be amended in the final form of the questionnaire. Sometimes the questionnaire is circulated among some competent investigators and they are asked to make suggestions for its improvement. Once this has been done and suggestions incorporated, the final form of the questionnaire is ready for the collection of data.

Pilot Study



Advantages and Challenges of Surveys

Advantages

- Best when you want to know what people think, believe, or perceive, only they can tell you that

Challenges

- People may not accurately recall their behavior or may be reluctant to reveal their behavior if it is illegal or stigmatized. What people *think they do* or *say they do* is not always the same as what they *actually do*.

Other Measurement Tools

- scales (weight)
- tape measure
- stop watches
- chemical tests :
 - i.e. quality of water

- health testing tools:
 - i.e. blood pressure
- aptitude and achievement tests
- citizen report card

Data Collection Summary

Choose more than one data collection technique

No “best” tool

Do not let the tool drive your work but rather choose the right tool to address the evaluation question

Questions



Thank You

