SP_ IRS : Research in Inclusive and Special Education

Lecture :Analysing Data.

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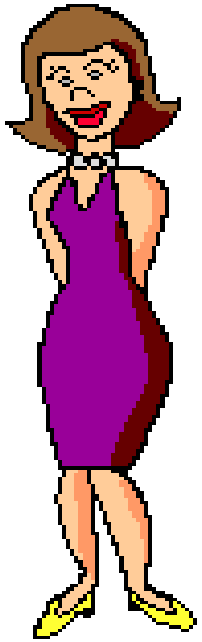
Lecturer Education

Presentation Outline



- Introduction
- Analysing qualitative data
- Analysing quantitative data
- Activities
- Conclusion

Introduction

- In the previous lectures we explored a number of different ways we can organize the data we have collected in order to support the analysis process.
- In this lecture we will look at how we can analyze data, identifying particular techniques and processes in both qualitative and quantitative designs.

What is data analysis?

- A complex process that involves moving back and forth
  - between concrete bits of data and abstract concepts
  - between inductive and deductive reasoning
  - between description and interpretation
- Simply put: Data analysis is the process of making meaning from the data

Analysis process needs to do four things

- Describe the data clearly.
- Identify what is typical and atypical among the data.
- Bring to light differences, relationships, and other patterns existent in the data; and
- Answer research questions or test hypotheses. (Mertler &Charles, 2005,p.170)

Effective Data Analysis

- Effective data analysis involves
  - keeping your eye on the main game
  - managing your data
  - engaging in the actual process of quantitative and / or qualitative analysis
  - presenting your data
  - drawing meaningful and logical conclusions

Data analysis and interpretation

- Think about analysis EARLY
- Start with a plan
- Code, enter, clean
- Analyze
- Interpret
- Reflect
  - What did we learn?
  - What conclusions can we draw?
  - What are our recommendations?
  - What are the limitations of our analysis?

Analyzing qualitative Data

- Considerable amount of text-based data and images that require analysis.
- Creswell (2003) suggests that it is useful to look at the codes that have emerged according to:

➢ Codes readers would expect to find;

➢ Codes that are uprising; and

➢ Codes that address a larger theoretical perspective in their research.

Why do I need an analysis plan?

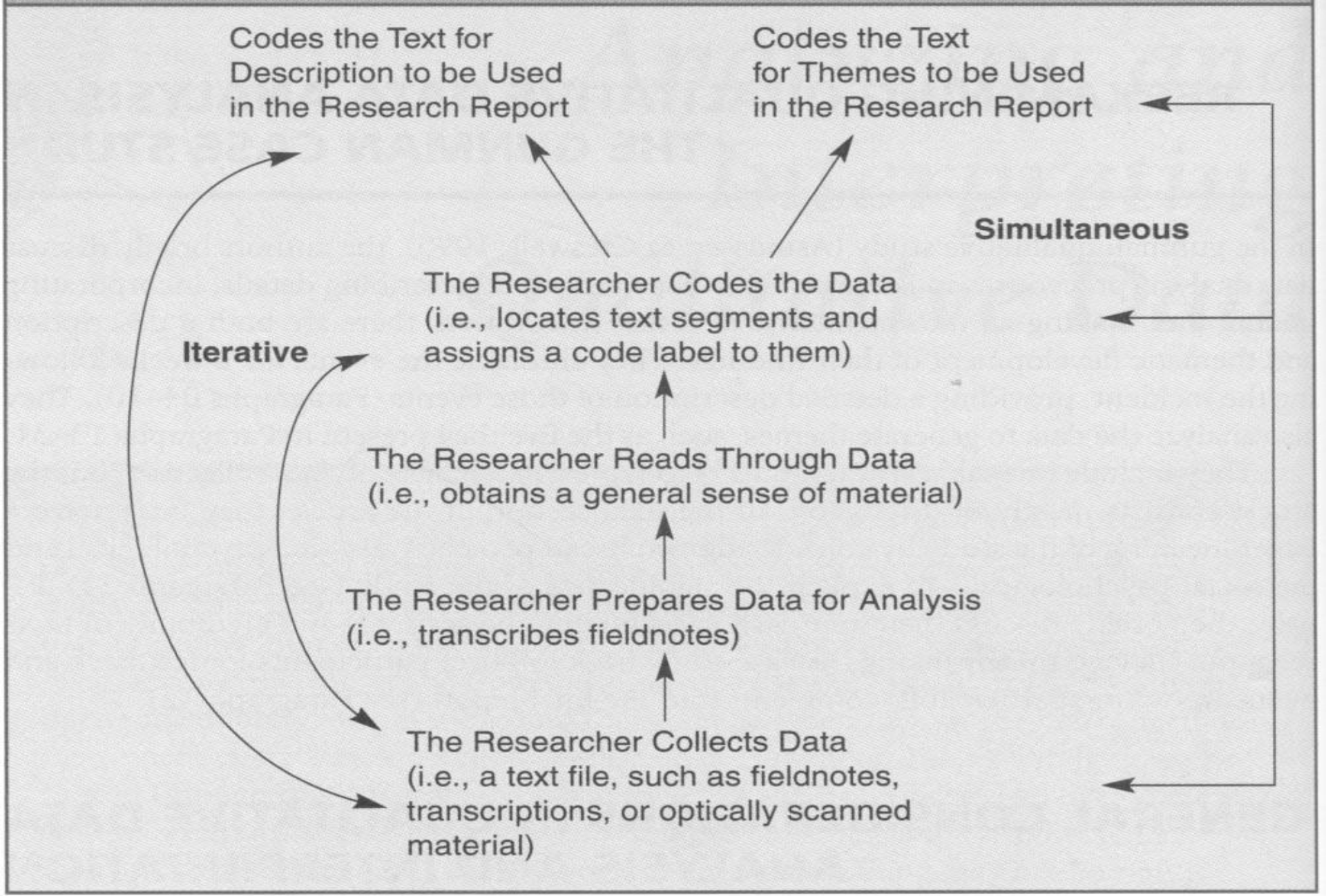
- To make sure the questions and your data collection instrument will get the information you want.
- To align your desired “report” with the results of analysis and interpretation.
- To improve reliability--consistent measures over time.

Preliminary Exploratory Analysis

- Explore the data by reading through all of your information to obtain a general sense of the information
- Memo ideas while thinking about the organization of the data and considering whether more data are needed
  - Jot memos in margins of fieldnotes, transcripts, documents, photos

FIGURE 9.1

The Qualitative Process of Data Analysis



Developing Descriptions & Themes from the Data

(case study approach)

- Coding data
- Developing a description from the data
- Defining themes from the data
- Connecting and interrelating themes

Codes

- Exploration of the different types of codes assist researchers in ensuring their analysis is balanced
- Share your codes with your colleagues this is a useful way building depth into analysis and ensuring accuracy in interpretation of data

Coding Data

- Open Coding
  - Assign a code word or phrase that accurately describes the meaning of the text segment
  - Line-by-line coding is done first in theoretical research
  - More general coding involving larger segments of text is adequate for practical research (action research)

Coding a Page from a Sample Interview Transcript

The Process of Reconstructing Curriculum in a Rural High School Setting

Codes Here		Themes (And other Ideas) Here
	JJ: One thing, Lucy, that I've heard talked about was the fact that schools reflect the strengths of communities. What do you perceive as strengths of Greenfield as a community and how that relates to schools?	
Close-knit community	LU: Well, I think Greenfield is a fairly close-knit community. I think people are interested in what goes on. And because of that, they have a sense of ownership in the schools. We like to keep track of what our kids are doing and feel a connection to them because of that. The downside of that perhaps is that kids can feel that we are looking TOO close. But most of the time, that is the nurturing environment that we do provide an atmosphere of concern and	Potential theme: The community Idea: getting a good sense here for the community and its values
Health of community or community values	care. To back up, you said the health of the community itself is reflected in schools. A lot of times communities look at schools and say they are not doing this or they aren't doing that, or we're missing something in our schools. I think perhaps we look at the school and see, this is probably a pretty conservative community overall, and look to make sure that what is being talked about in the schools really carries out the community's values. There is a little bit of an idealization I think, perhaps in terms of what we thought of "basic education." [And I think there might be a tendency to hold back a little bit too much because of that idealization of "you know, we learned the basics, the reading, the writing and the arithmetic."] So you know, any change is threatening. And I think that goes for the community as well as what we see reflected at the school. Sometimes that can get in the way of trying to do different things. I think, again, idealization, older members of the community forget, some of the immaturity that they experienced when they were in school and forgetting that kids are kids. So there is a little bit too much of that mental attitude. But for the most part, I think there is a sense of we're all in this together, and concern for the kids.	A good quote
Change is threatening		
	JJ: In terms of looking at leadership strengths in the community, where does Greenfield set in a continuum there with planning process, understanding the need to plan, forward-thinking, visionary people. You talked about that a little bit before.	Potential theme: Leade
Visionary skills of talented People	LU: I think there are people that have wonderful visionary skills. I would say that the community as a whole would be . . . would not reflect that. I think there are people who are driving the process, but the rest of the community may be lagging behind a little bit. I think we have some incredibly talented people who become frustrated when they try to implement what they see as their . . .	Idea: returns to description of community again

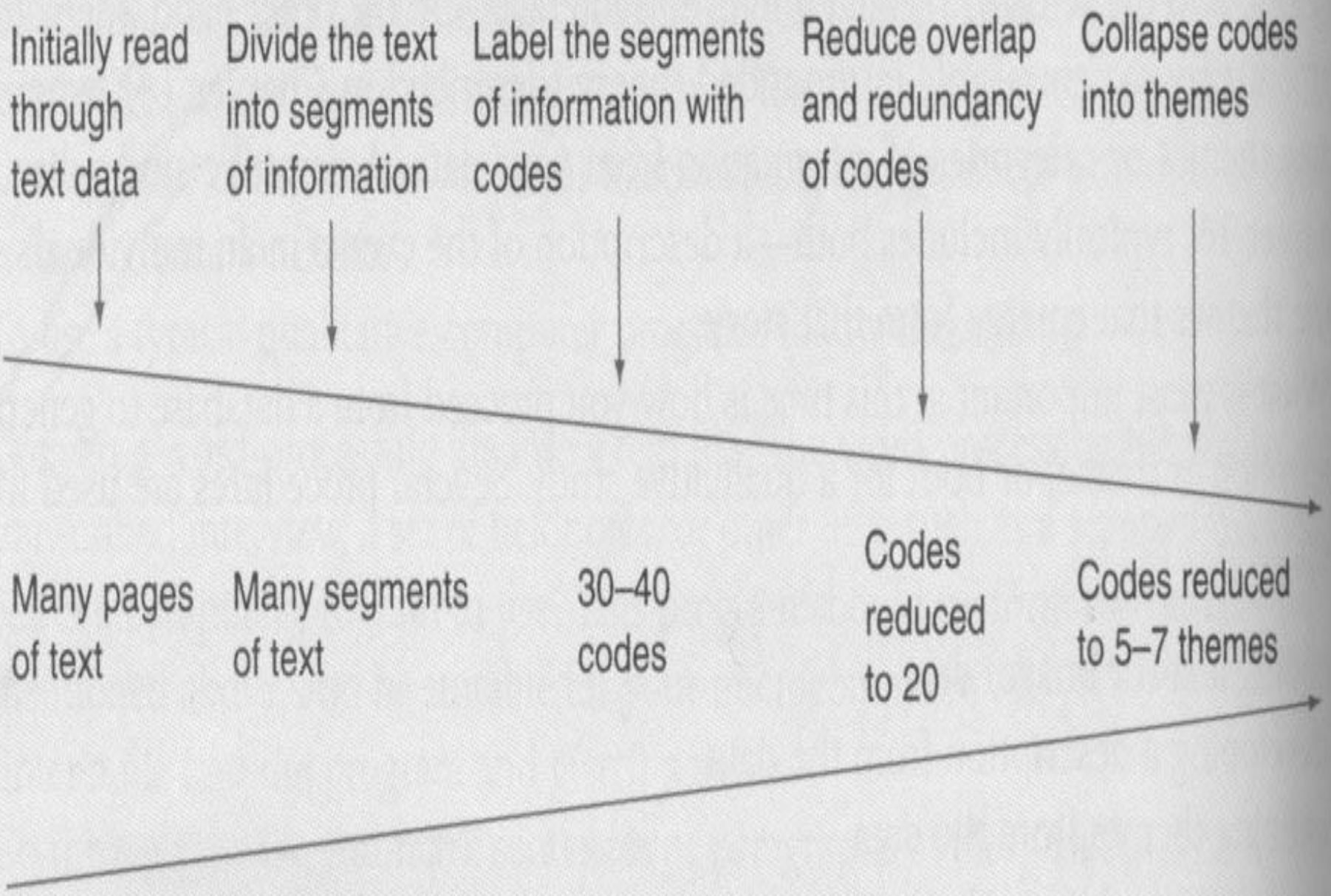
Axial Coding

- The process of looking for categories that cut across all data sets
- After this type of coding, you have identified your themes
- You can't classify something as a ***theme*** unless it cuts across *the majority* of the data

Clustering

- After open coding an entire text, make a list of all code words
- Cluster together similar codes and look for redundant codes
- Objective: reduce the long list of codes to a smaller, more manageable number (25 or 30)

A Visual Model of the Coding Process in Qualitative Research



Preliminary organizing scheme

- Take this new list of codes and go back to the data
- Reduce this list to codes to get 5 to 7 themes or descriptions
- Themes are similar codes aggregated together to form a major idea in the database
- Identify the 5-7 themes by constantly comparing the data (Constant Comparative Analysis)

Constant Comparative Analysis

(Glaser & Strauss; p. 86, The Art of Classroom Inquiry)

- A process whereby the data gradually evolve into a core of emerging theory
- This core is a theoretical framework that further guides the collection of data
- Major modifications are lessened as comparisons of the next incidents of a category to its properties are carried out (Merriam, 1998).

Why themes?

- It is best to write a qualitative report providing detailed information about a few themes rather than general information about many themes
- ***Themes*** can also be referred to as ***Categories***

Naming the Themes or Categories

- The names can come from at least three sources:
  - The researcher
  - The participants
  - The literature
- Most common: when the researcher comes up with terms, concepts, and categories that reflect what he or she sees in the data

Themes should…

- Reflect the purpose of the research
- Be exhaustive--you must place all data in a category
- Be sensitizing--should be sensitive to what is in the data
  - i.e., “leadership” vs. “charismatic leadership”
- Be conceptually congruent--the same level of abstraction should characterize all categories at the same level

Types of themes

- Ordinary: themes a researcher expects
- Unexpected: themes that are surprises and not expected to surface
- Hard-to-classify: themes that contain ideas that do not easily fit into one theme or that overlap with several themes
- Major & minor themes: themes that represent the major ideas, or minor, secondary ideas in a database
  - Minor themes fit under major themes in the write up

A Description

- A detailed rendering of people, places, or events in a setting in qualitative research
- Codes such as “seating arrangements,” “teaching approach,” or “physical layout of the room,” might all be used to describe a classroom where instruction takes place

Narrative description

- From the coding and the themes, construct a narrative description and possibly a visual display of the findings for your research report
- Use the assigned format

Constructing the narrative

- Identify dialogue that provides support for themes
- Look for dialogue in the participants' own dialect
- Use metaphors and analogies
- Collect quotes from interview data or observations
- Locate multiple perspectives & contrary evidence
- Look for vibrant detail
- Identify tensions and contradictions in individual experiences

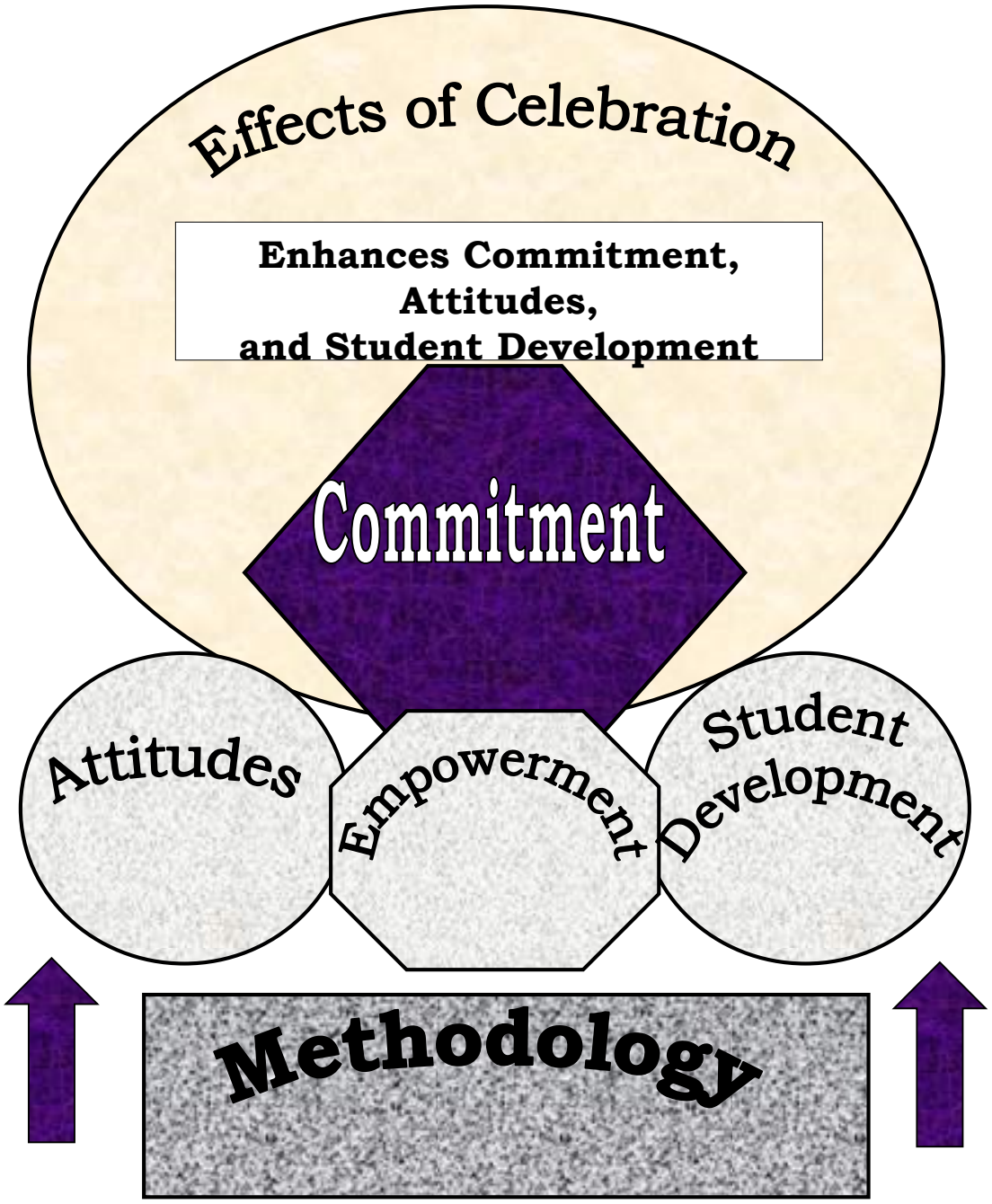
Conveying personal reflections

Because qualitative researchers believe that personal views can never be kept separate from interpretations, personal reflections about the meaning of the data are included in the research study

- "David had been diagnosed with AD/HD and also with mild Tourette Syndrome. He took medication for AD/HD. He was selected to participate in the project as a confirming participant because he was so involved with the project and so intense during the first observation. Unaware that he had AD/HD and Tourette Syndrome until I interviewed his mother during the second year of the project, I was surprised because he was the most focused student in the classroom."(Terry, 2003)

Providing Visual Data Displays

- Qualitative researchers often display their findings visually
  - Comparison table or matrix
  - Hierarchical tree diagram that represents themes and their connections
  - Boxes that show connections between themes
  - Physical layout of the setting
  - Personal or demographic information for each person or site


Effects of Celebration
Enhances Commitment,
Attitudes,
and Student Development
Commitment
Attitudes
Empowerment
Student
Development
Methodology

Making comparisons with the Literature

- Interpret the data in view of past research
- Show how the findings both support and contradict prior studies
  - "These findings are consistent with other studies in regard to duration. It has been found that the length or duration of service learning projects has an impact on student outcomes, with the longer duration projects having greater impacts. However, significant differences are not found in projects lasting over 18 weeks (Conrad & Hedin, 1981). The project on which this study focused was examined over a year and a half period of time; thus it is considered to be long in duration which helps to explain its impact on student outcomes."

Synthesis of the data

- Once researchers have a sense of what data mean and have identified categories and themes , it is time to start offering some hypothesis or propositions from the study.
- This may describe the relationships among the categories that have been identified.
- They may also show how the data fit with the proposed research problem at the beginning of the study

- As researchers move through this process, they may discover that their initial guiding questions do not relate to what it is that the data reveal.
- This is normal and quite acceptable in qualitative research designs.
- It is important that research questions in qualitative studies evolve and change as directed by the data

- Revisit some of the techniques, look for correlation, how well is your problem, research question and methods are correlated.
- For example, using diagram, a table, or a flow chart may help researcher communicate the findings they have come up through analysis

- The ultimate goal of synthesizing the analysis of data is to ensure that interpretation are clearly communicated to the readers of the research
- It is therefore necessary that there is a clear connection between the data, the categories that emerge from the coding process and the interpretations offered.
- It must be clear to the reader how the researchers drew their conclusions in relation to the identified study and the collected data


Collected data
Categories and themes
interpretations

Analysing quantitative data

- Researchers' who have completed quantitative data gathering techniques will typically have considerable numerical data that require analysis .
- As data are gathered, they are typically disorganised and made up of separate bits of information.
- When numbers look this way , the meaning is not clear

- Statistical analysis of these numbers is a way to focus and manage data.
- Mertler and Charles (2005) identify a number of different purposes for using statistics. Specifically, statistics can:

➢ Summarise data and reveal what is typical and atypical within a group;

➢ Identify the relative standing of individuals within an identified cohort;

- Show relationship between and among variables;
- Show similarities and differences among groups;
- Identify error that is inherent in a sample selection;
- Test for significance of findings; and
- Support the researchers in making other inferences about population

- Statistics help to condense a vast body of data into an amount of information that the mind can more easily understand.
- Statistics identifies patterns and relationships within the data that they may otherwise go unnoticed.

Generating statistics

- For many, the thought of generating statistics can be quite scary
- The process of engaging with formulas and completing complex calculation can be daunting.
- However modern technology, the software program such as SPSS (Statistical Package for the Social Sciences)

Measurement scales

- Any form of measurement fall into one of the following four categories(referred to scales within the literature

Measurement scale	Characteristics	Statistical possibilities
Nominal scale	Data are measured by assigning a name to identify specific categories. For example, when looking at data collected within a classroom we could distinguish between boys and girls within this group	•Frequency distribution (mode) •Proportions (percentage values) •Chi square
Ordinal Scale	Data are measured according to rank. Data are compared and contrasted to determine those that are greater than(>) compared to less than (<) within the data set. This scale can be used to rank students within a class according to their positions when compared with peers.	As for ordinal scale plus • Median •Percentile rank •Spearman rank order •Correlation •Mann- Whitney test
Ratio Scale		

Interval Scale	Two key features are incorporated within this approach 1. The data are measured by equal units of measurement; 2. A zero point is established. Temperature is measured on an interval scale	As for ordinal scale plus: ▪Mean ▪Standard deviation ▪Pearson Product-moment Correlation ▪Inferential procedures (e.g., t-test, ANOVA)
Ratio Scale	Two key features are incorporated within this approach 1. The data are measured by equal units (as in interval scale) 2. An absolute zero point is established 3. In the temperature example for interval scale, the material from which the temperature is obtained may have a different starting point (i.e. May be warmer or cooler than other materials measured.	As for ratio scale plus: ▪ Geometric mean ▪Percentage variance ▪Inferential procedures

How the above collected data can fit within each of these scales

- One object is different from another, you have a nominal scale
- One object is bigger or better or more of anything than another, you have an ordinal scale.
- One object is so many units (degrees, inches) more than another you have an interval scale;
- One object is so many times big or bright or bright or tall or heavy as another you have a ratio scale

Descriptive statistics

- Calculated in order to report on and describe what happened during the period of research.
- There are three basic categories of descriptive statistics, all of which are frequently used by teacher- researchers. These categories are:

❑Measures of central tendency.

❑Measures of dispersion

❑Measures of relationship

Measures of central tendency

- Statistical procedures that indicate, with a single score, what is typical or standard about a group of individuals. These indices are commonly used when trying to describe the collective level of performance, attitude, or opinion of a group of study participants. There are three measures of central tendency: the mean, the median, and the mode.

Measures of dispersion

- Indicates what is different within a group of scores,
- It also indicates how much spread or diversity exist within a group of scores.
- The two primary measures of dispersion

➢ Range (H-L)

➢ Standard deviation is formally designed as the average distance to scores away from the mean

Measures of relationship

- The third type of descriptive statistics measures relationship between variables. There are numerous types of correlation coefficients, the name given to these various measures the direction and degree of relation ship between two variables. It is calculated when analysing data from studies using correlation design.

Activity

- Look at the research paper. As you read the paper identify.

a. The research question and hypothesis

b. How the participants were selected.

c. The instrument used for measurement

d. How the statistics were generated

e. How the data and statistics have been analysed and

f. The relationship between the statistics , conclusions and research.

Workshop

- Discussion about Presentation
- Rubrics

Conclusion

The Big Picture

- Analysis should be approached as a critical, reflective, and iterative process that cycles between data and an overarching research framework that keeps the big picture in mind

Managing Data

- Regardless of data type, managing your data involves
  - familiarizing yourself with appropriate software
  - developing a data management system
  - systematically organizing and screening your data
  - entering the data into a program
  - and finally ‘cleaning’ your data

Drawing Conclusions

- Your findings and conclusions need to flow from analysis and show clear relevance to your overall project
- Findings should be considered in light of
  - significance
  - current research literature
  - limitations of the study
  - your questions, aims, objectives, and theory

Looking ahead

Ethics and Communicating research