

QUALITATIVE RESEARCH

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COURSE LEARNING OBJECTIVES

► The student is able to:

- Independently find literature on a specific research topic and conduct systematic literature review
- Identify qualitative and quantitative research approach and choose between them appropriately
- Explain qualitative data collection and data analysis approaches
- Explain quantitative data collection and data analysis approaches
- Demonstrate ethical approach and research integrity in their own research
- Identify common threats to quality of research and describe the validity and reliability of their own research
- Present, both orally and in writing, the research process for a specific research topic, findings, and conclusion in a coherent and concise manner.
- Write a scientific report covering a specific research topic using academic writing format and required content.

AGENDA

- ▶ Empirical research overview
- ▶ Qualitative research:
 - ▶ Qualitative Data Collection
 - ▶ Qualitative Data Analysis

EMPIRICAL RESEARCH

- ▶ Research that involves direct observations and experience from the researchers.
 - ▶ Case study, survey, experiment.
 - ▶ Collect qualitative and quantitative data.

MEASUREMENTS

- ▶ A measure is “a mapping from the attribute of an entity to a measurement value, usually numerical value” (Wohlin et al., 2012)
- ▶ Measurement scales: (Stanley Smith, 1946)
 - Nominal
 - Ordinal
 - Interval
 - Ratio

MEASUREMENTS

- ▶ Nominal (least powerful)
 - no numeric value,
 - to name or label things.
 - usually a category/ classification

Examples:

- ✓ gender (male, female),
- ✓ Place of residence (suburbs, town, city).

- ▶ Ordinal :
 - order/ranks the items of interest using ordinal numbers.
 - *difference between ranks cannot be measured*

Examples:

- ✓ Likert scale
- ✓ Stage of cancer: Stage I, II, III, or IV
- ✓ Level of agreement: Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree

MEASUREMENTS

▸ Interval

- values have a meaningful order
- difference between two values can be measured

Example: * 1. How likely is it that you would recommend this company to a friend or colleague?

NOT AT ALL LIKELY					EXTREMELY LIKELY					
0	1	2	3	4	5	6	7	8	9	10

Temperature in Celsius. Ratio is not meaningful, cannot say it's twice as hot here than there. 30 C is not twice as hot as 15 C.

▸ Ratio

- values have a meaningful order
- difference between two values can be measured
- ratio between two values can be measured

Examples:

- ✓ Income
- ✓ Distance travelled
- ✓ Length. You can say that 2 m is twice longer than 1 m,

MEASUREMENTS

- ▶ In an empirical study you want to (some degree) able measure the effect of an intervention.
- ▶ A measure is “a mapping from the attribute of an entity to a measurement value, usually numerical value” (Wohlin et al., 2012)

- ▶ Measurement scales:

- ▶ Nominal (least powerful) - no numeric value, usually a category/ classification

- ▶ Industry domain, gender.

Qualitative

- ▶ Ordinal - ranking

- ▶ Likertscale

- ▶ Interval - the difference between two measures are meaningful but not the value itself

- ▶ Temperature in Celcius. Ratio is not meaningful, cannot say it's twice as hot here than there. 30 C is not twice as hot as 15 C.

Quantitative

- ▶ Ratio - Ratio between two measures is meaningful

- ▶ Length. You can say that 2 m is twice longer than 1 m.

QUALITATIVE DATA COLLECTION

APPROACHES TO QUALITATIVE DATA COLLECTION

- ▶ Sampling:
 - ▶ Purposeful selection of participants. Not randomly selected.
- ▶ Data collection procedures:
 - ▶ (Qualitative) Interviews and Focus groups
 - ▶ Observation
 - ▶ Document analysis

INTERVIEWS AND FOCUS GROUP

INTERVIEWS (ROBSON, 2011)

- A type of data collection where the researcher asks questions and hopefully receives useful answers.
- “Conversation with a purpose” Dr. Gerben Moerman, University of Amsterdam.
- Can be done face-to-face, over phone or video call, even mail or e-mail.

INTERVIEWS (ROBSON, 2011)

- ▶ Fully-structured - Has predetermined set of questions with fixed wording and order.
- ▶ Semi-structured - Has an interview guide as a checklist of topics to be covered in the interview. Wording and order could be modified depending on the flow.
- ▶ Unstructured - No predetermined questions nor order. More like a conversation.

INTERVIEWS AND FOCUS GROUP



ADVANTAGES AND DISADVANTAGES???

INTERVIEW - ADVANTAGES AND DISADVANTAGES

- ▶ Advantages
 - ▶ Flexible and adaptable.
 - ▶ Can get rich and in-depth insights.
- ▶ Disadvantages
 - ▶ Time consuming. A lot of preparation - finding interviewees, getting their consent and willingness, site visit, etc.
 - ▶ Difficult to rule out bias (from researcher/interviewer).

QUESTIONS TO AVOID (ROBSON, 2011)

- ▶ Long questions.
- ▶ Double (multi) barrelled questions.
 - ▶ What do you think are the **benefits** and **limitations** of **TDD** compared to **Test-first development**?
- ▶ Questions with uncommon jargon.
 - ▶ (Ask to a practitioner) Have you ever used results from evidence-based software engineering?
- ▶ Leading questions
 - ▶ What problems do you have with the design team?
- ▶ Biased question
 - ▶ Why do you think TDD is better?

PROMPTS AND PROBES (ROBSON, 2011)

- ▶ Prompts
 - ▶ Suggest a range of possible answers.(without introducing bias)
- ▶ Probes
 - ▶ Asks the interviewee to expand or elaborate his/her answers.
 - ▶ Tactics:
 - ▶ Pause
 - ▶ Enquiring glance
 - ▶ “Mmmhmm”, or simply say “could you elaborate?”
 - ▶ Summarise and repeat back what the interviewee said to check if you miss something or not.

INTERVIEW FLOW/ PROTOCOL

- ▶ **Introduction.** Tell them who you are and why you want to do this interview. If it is recorded tell them in advance.
- ▶ **Warm-up.** Easy questions to get things going. “So tell me about your role?” “What is your typical day like? What you do from the time you came to the office until you leave?”
- ▶ The **main part** of the interview.
 - ▶ Use probes and prompts accordingly.
 - ▶ Have a logical flow of topic it helps when transcribing.
- ▶ **Cool-off.** Straight forward questions. “If I have any further question can I contact you again?”
- ▶ **Closure.** Thank you and good bye.

FOCUS GROUP

- ▶ An interview that takes place in a group context (8-12 people).
- ▶ Common approach used in marketing campaigns.
 - ▶ How people respond to new products
- ▶ Could be used as:
 - ▶ Pre-cursor to a more in-depth study.
 - ▶ A complement to another method, like observation or survey.

INTERVIEWS AND FOCUS GROUP



ADVANTAGES AND DISADVANTAGES???

FOCUS GROUP - ADVANTAGES AND DISADVANTAGES (ROBSON, 2011)

- ▶ Advantages:
 - ▶ Efficient way to collect rich qualitative data from several people at the same time.
 - ▶ Able to collect different perspective on a given topic.
 - ▶ Participant can feed off from each other. Provide complementary information or corrections.
 - ▶ Encourage people to share their views. Some people might be reluctant in one-on-one interview or fill in a survey.

FOCUS GROUP - ADVANTAGES AND DISADVANTAGES (ROBSON, 2011)

- ▶ Disadvantages:
 - ▶ Number of questions are limited. Otherwise the session runs too long.
 - ▶ Being a facilitator is not easy and require experience and expertise.
 - ▶ Conflict may arise.
 - ▶ Confidentiality is an issue. Everybody in the group knows who says what. Some people might reluctant to speak up.
 - ▶ They may influence each other.
 - ▶ One or two people might dominate.
 - ▶ Choice of homogenous or heterogenous groups

HOMOGENEOUS VS HETEROGENEOUS (ROBSON, 2011)

- Homogeneous - everyone has common background, position, and experience.
- Heterogeneous - varies in background, position, and experience.

HOMOGENEOUS VS HETEROGENEOUS (ROBSON, 2011)

Homogeneous:

- ▶ Facilitate communication and ideas exchange.
- ▶ Safe environment in expressing conflicts or concerns
- ▶ May result in a homogenous result. Everybody gives similar answers.

HOMOGENEOUS VS HETEROGENEOUS (ROBSON, 2011)

Heterogeneous:

- ▶ Rich discussion.
- ▶ Inspire each other.
- ▶ Power imbalance.

FOCUS GROUP PROTOCOL

- ▶ Similar to interview protocol. Think about the flow. Introduce the intention of the focus group.
- ▶ Think about how to moderate the group.
 - ▶ How are you going to give people turns to talk. Round-robin is common and simplest.
- ▶ It is recommended to have two people in a focus group. One moderates and another takes care of recording and taking notes.

RECORDINGS AND TRANSCRIPTION

- ▶ In interviews and focus group it is common to have an audio recording. In some focus group video could be allowed.
- ▶ Ideally, audio or video recordings are transcribed into text to support analysis.
 - ▶ 1h of interview may need 3h of transcription (especially if the interview is done in the participant's native language).
- ▶ There are services (quite expensive). However, they may be missing some contexts (not familiar with SE, they were not there to pick up physical cues from the participants).
 - ▶ Also, if you were there in the interview, you may know which part to skip.



Break (10 min)

OBSERVATION

OBSERVATION

- ▶ An approach commonly used in anthropology.
- ▶ The researcher directly observe a specific group when they work or perform certain things. There needs to be a purpose.
 - ▶ The group dynamic during a stand up meeting.
- ▶ Could be used as a pre-cursor to another data collection or used in conjunction to other data collection.

WHAT TO OBSERVE (ROBSON, 2011)

- ▶ Space. Layout of the rooms, etc.
- ▶ Actors. Who participate and their details
- ▶ Activities. What they are doing
- ▶ Object. Physical elements, things they interact with
- ▶ Acts. Specific individual action.
- ▶ Events. Particular occasion.
- ▶ Time. Sequence of events
- ▶ Goals. What actors are trying to achieve.
- ▶ Feelings. Emotions evoked in particular activities, events, or action.

INTERVIEWS AND FOCUS GROUP

OBSERVATION TYPES (CRESWELL AND CRESWELL, 2018)

- **Complete participant** - researcher participates in group under observation and conceals who he/she is.
- **Observer participant** - researcher participates in the group and makes his/her role known.
- **Participant observer** - mainly becomes part of the group under observation, but also acts as an observer.
- **Complete observer** - not participating in the group just observing.



INTERVIEWS AND FOCUS GROUP



ADVANTAGES AND DISADVANTAGES???

OBSERVATION - ADVANTAGES AND DISADVANTAGES

- ▶ Advantages:
 - ▶ Directness. People doing what they do in their natural settings.
 - ▶ Minimise “doing one thing saying another”.

OBSERVATION

OBSERVATION - ADVANTAGES AND DISADVANTAGES

- ▶ Disadvantages:
 - ▶ Hawthorne effect - people may change their behaviour knowing they are being observed.
 - ▶ Difficult to really pin point what is to observe, what level of granularity.
 - ▶ What constitute an action?
 - ▶ Time consuming.

OBSERVATION

TYPES OF OBSERVATION

- ▶ Structured
- ▶ Unstructured

TYPES OF OBSERVATION

- ▶ Structured
 - ▶ You have specific aspect to observe, e.g., specific actors, artefacts, activities, etc, and how the measurements are to be recorded
- ▶ Unstructured
 - ▶ the observer monitors all aspects of the phenomenon that seem relevant to the problem at hand, e.g., observing children playing with new toys,

POSSIBLE BIASES

- Bias is inherent to everyone, and each person has their own personal biases, including an observer.
- Selective attention. An observer may focus on specific aspects and neglect other things.
- Selective memory. If you don't immediately write down what you observed, you may forget things.
- Interpersonal factors. You may befriend specific individuals in the team, which could bias your observation.

FIELD NOTES

- ▶ In observation, there is no audio recording. Nothing to transcribe.
- ▶ Making notes of the observation is critical.
 - ▶ It is the basis of the data that you will analyse.

TOOLS THAT CAN BE USED TO “OBSERVE”

- ▶ Event-logs
 - ▶ Most software have a mechanism to log what the users are doing which feature they often use or not.
- ▶ Interaction tracking tools
 - ▶ Biosensors (eye-tracker)
 - ▶ Key logger and interaction data (mouse clicks).

DOCUMENT ANALYSIS

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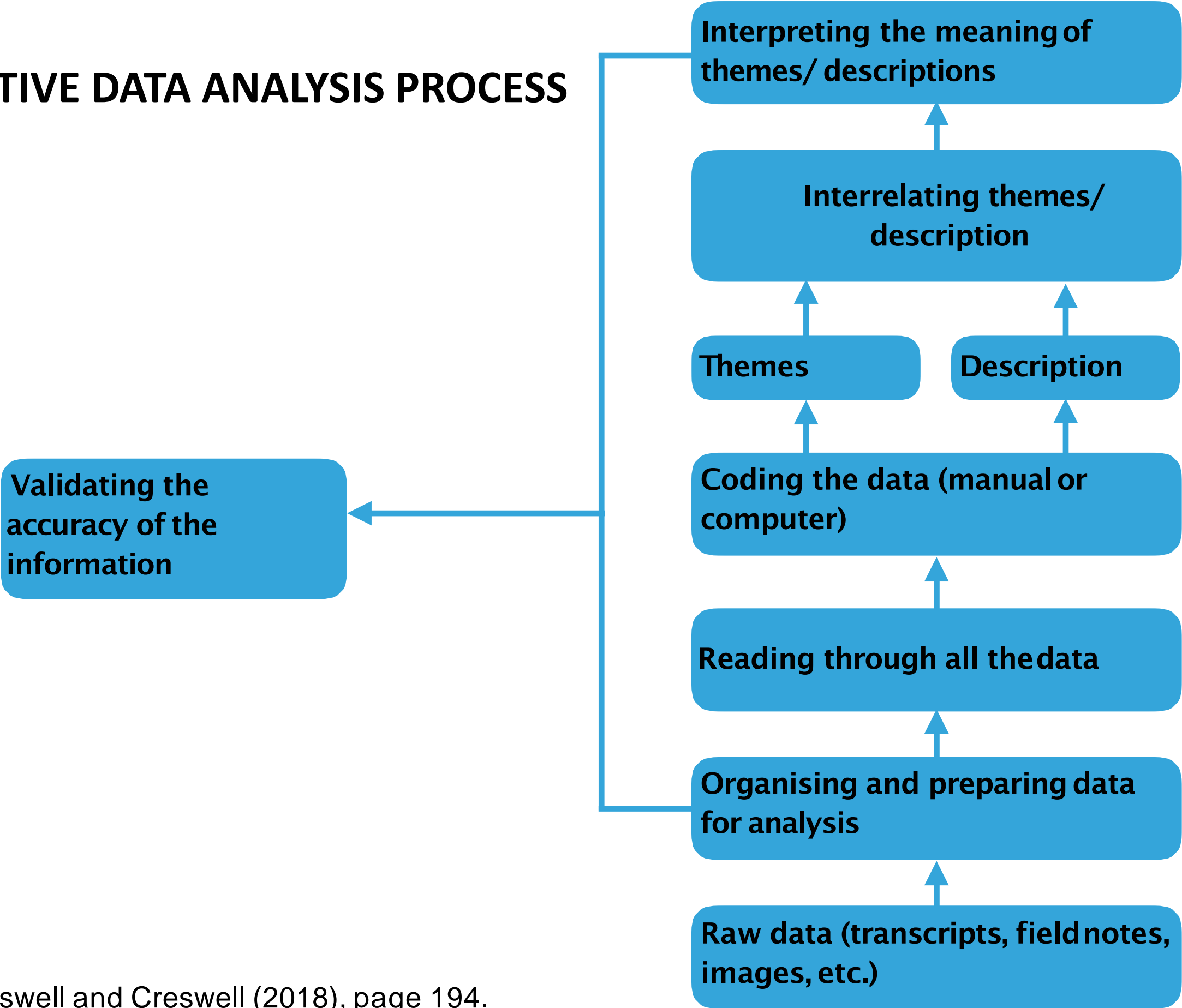
- ▶ Analysis of non-confidential documents.
 - ▶ Project summary
 - ▶ Minutes of meeting
 - ▶ Official reports
 - ▶ Training materials
 - ▶ Webpage content
 - ▶ E-mail or chat (with consent and guaranteed privacy).

USE OF DOCUMENT ANALYSIS

- ▶ Use as a complement to interviews or observation.
- ▶ Useful as preliminary study.
 - ▶ Training material could be useful to understand the overall process in the company.
- ▶ Useful to triangulate data. To double check if people say what is officially documented.
 - ▶ People say that their productivity increases, see if there is project documentation that supports that claim.

QUALITATIVE DATA ANALYSIS

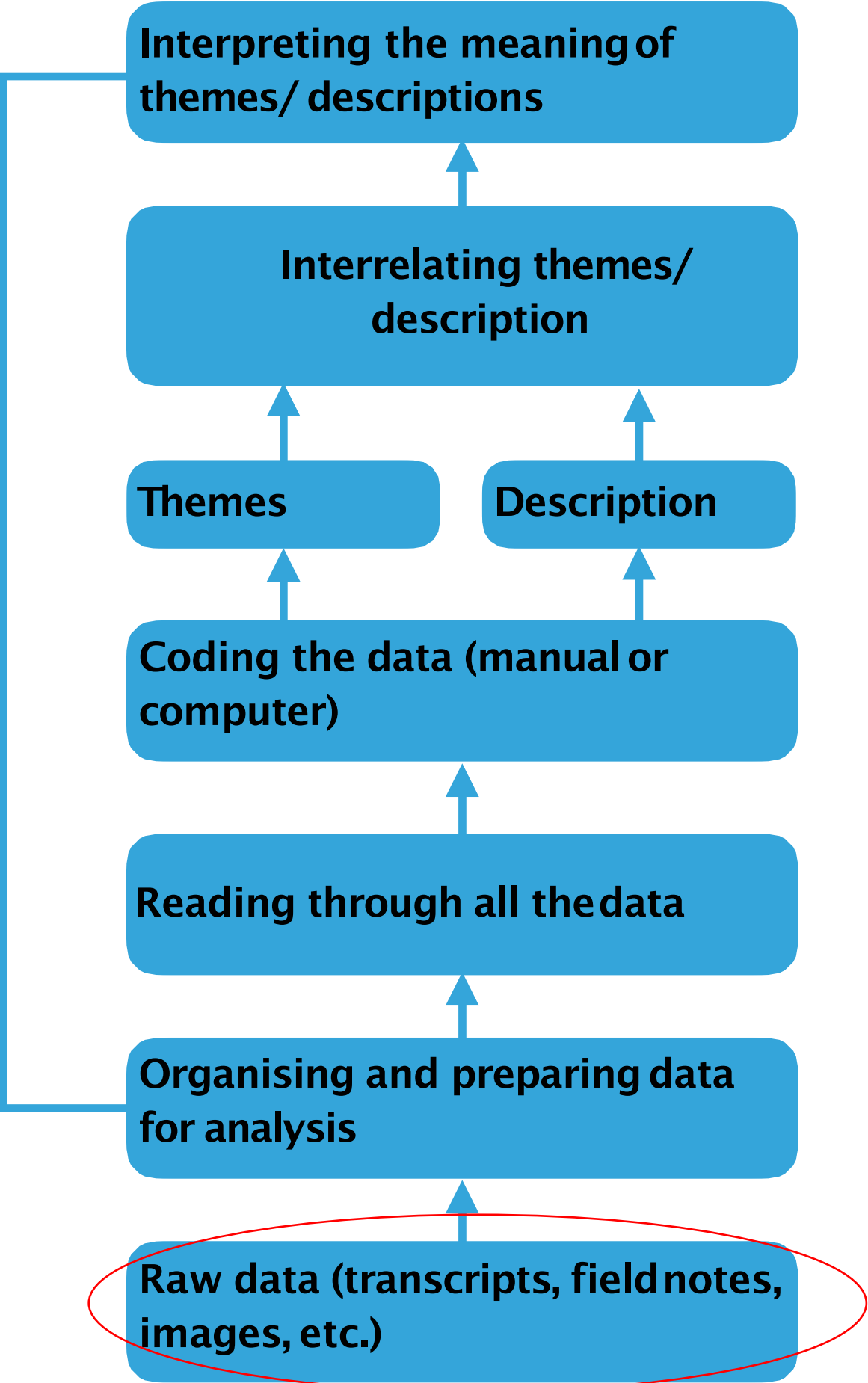
QUALITATIVE DATA ANALYSIS PROCESS



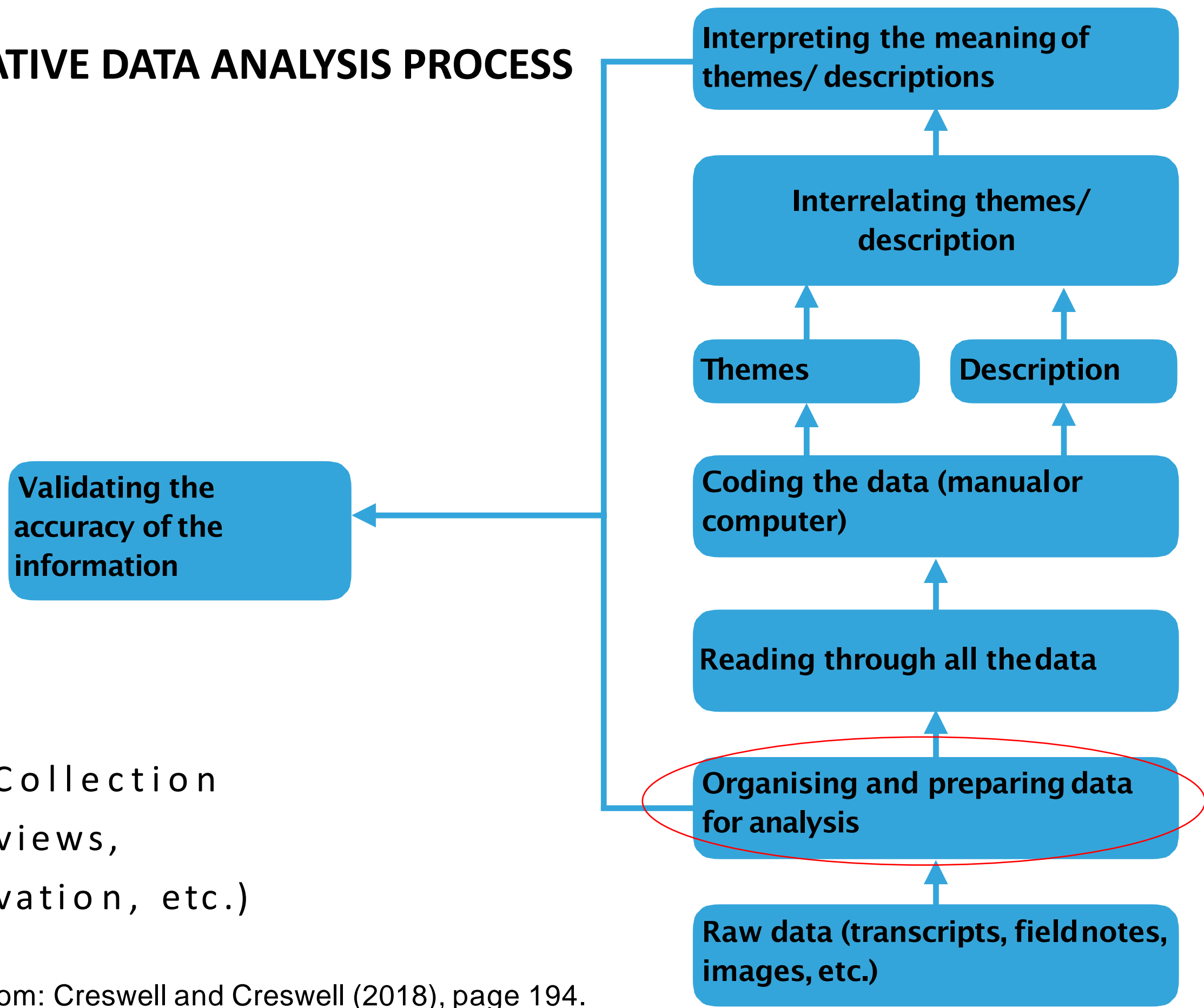
QUALITATIVE DATA ANALYSIS PROCESS

Validating the accuracy of the information

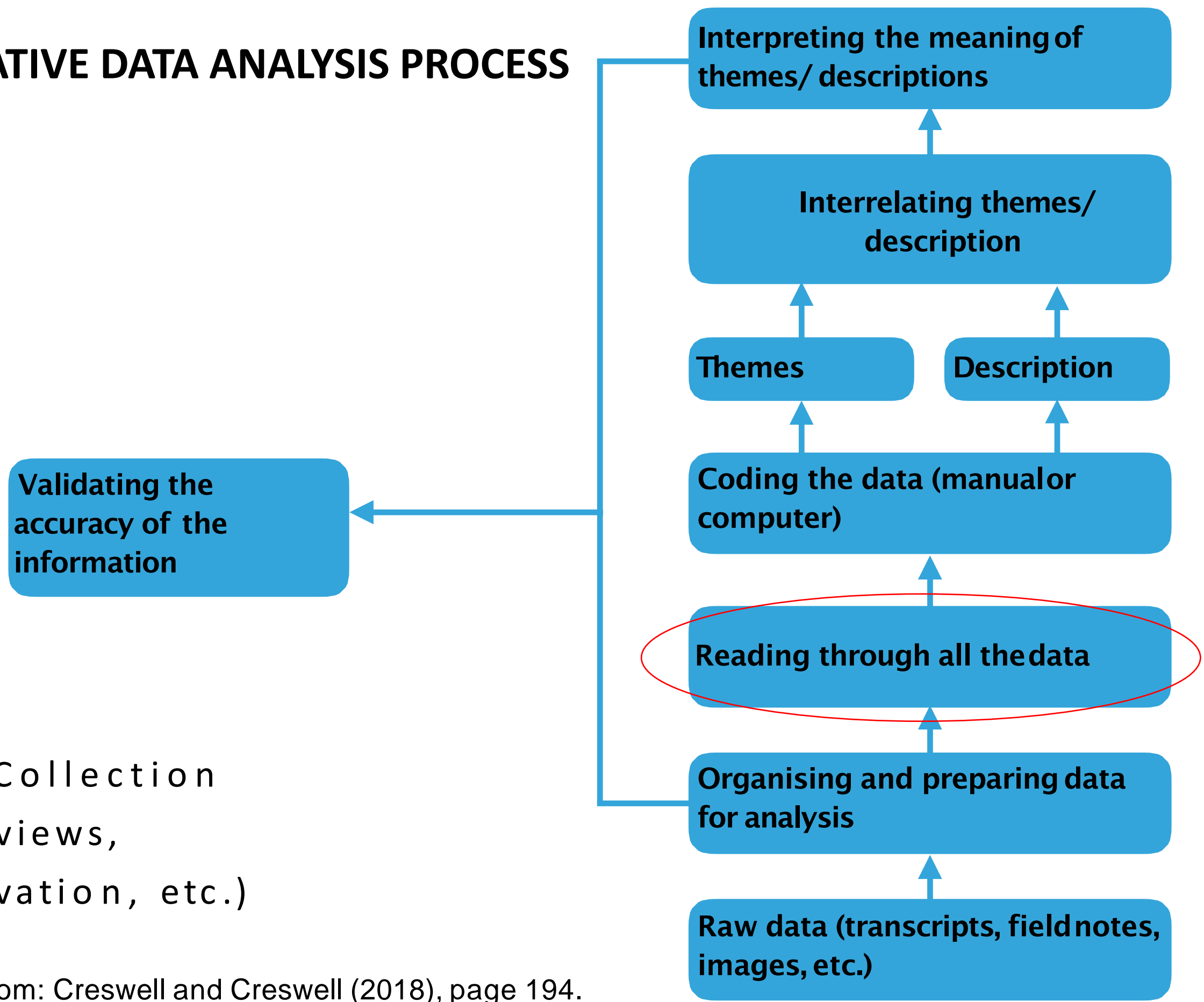
Data Collection
(interviews,
observation, etc.)



QUALITATIVE DATA ANALYSIS PROCESS

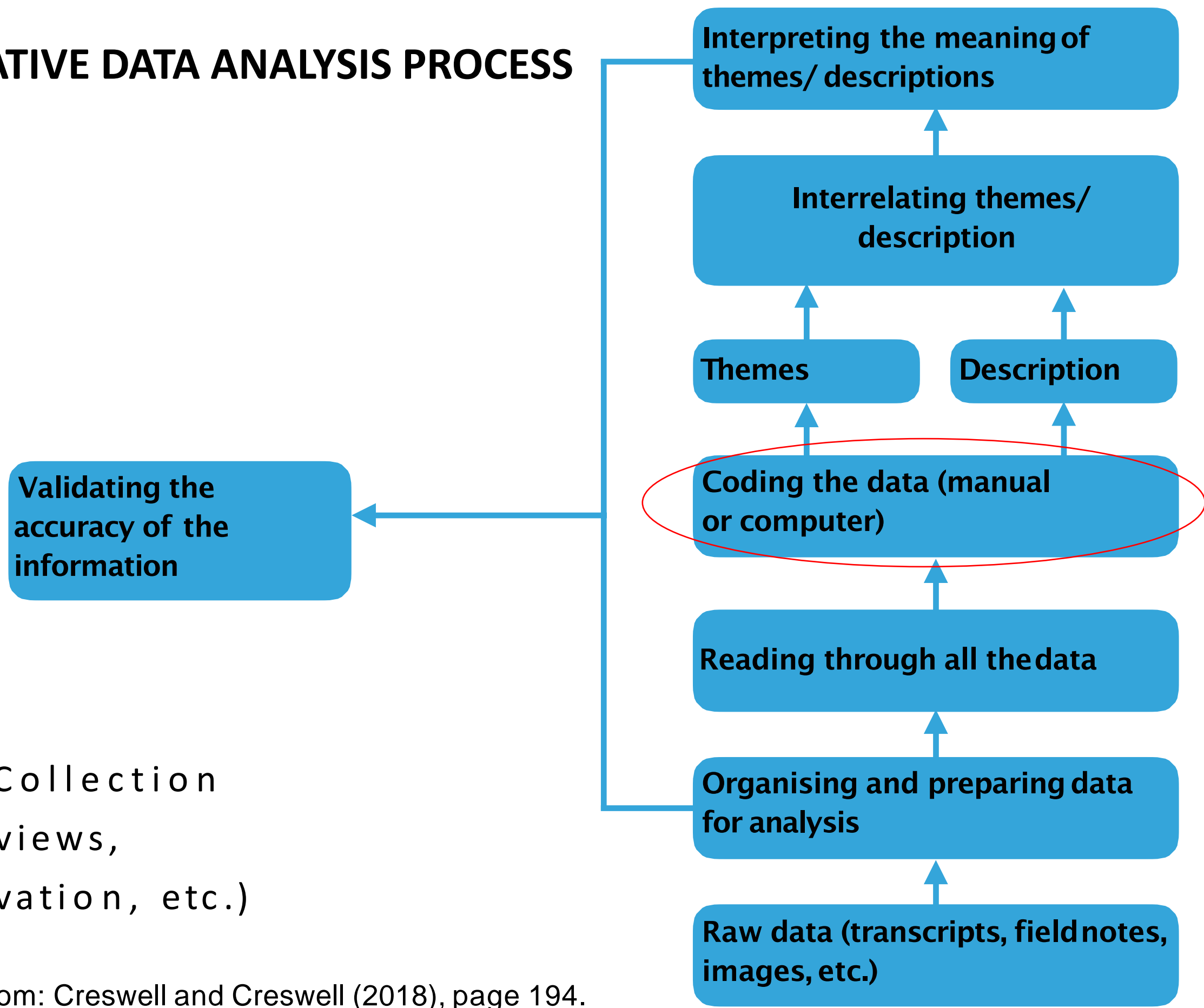


QUALITATIVE DATA ANALYSIS PROCESS



Data Collection
(interviews,
observation, etc.)

QUALITATIVE DATA ANALYSIS PROCESS

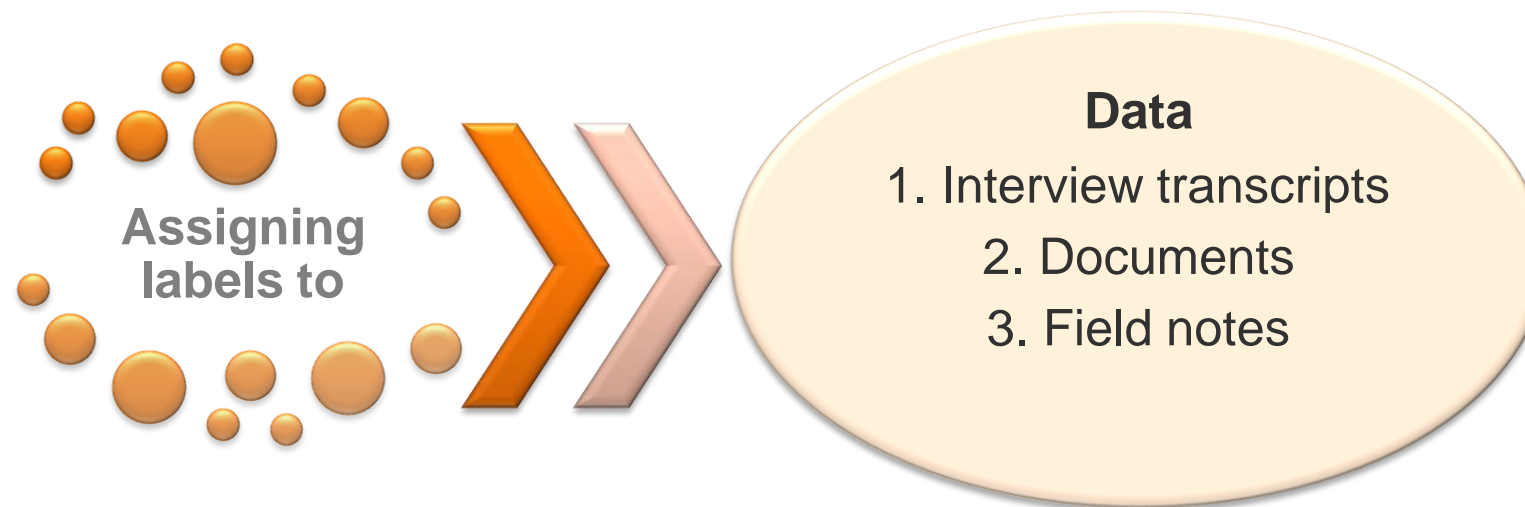




Break (10 min)

WHAT IS CODING?

- ▶ Coding is a data condensation task, that enables you to retrieve the most meaningful material, to assemble chunks of data that go together and to further condense the bulk into readily analyzable units.



A code is a word, phrase, or sentence that represents aspect(s) of a data or captures the essence or feature(s) of a data

WHAT CAN YOU CODE? (ROBSON, 2011)

- ▶ Specific behaviours
- ▶ Events
- ▶ Activities
- ▶ Practices or tactics
- ▶ States or situation or condition
- ▶ Concepts used by participants
- ▶ Interaction
- ▶ Consequences
- ▶ Constraints

CODING CYCLES

- ▶ First cycle coding:
 - ▶ Happens in the beginning of coding.
 - ▶ Easy and straight forward.
 - ▶ There are different methods for first cycle coding: in vivo coding, descriptive coding, attribute coding, emotion coding, etc.
 - ▶ You can use more than one.

EXAMPLE (IN VIVO CODING)

- ▶ Also known as literal coding - “the terms used by [participants] themselves” (Strauss, 1987, p. 33).

I ¹ hated school last year. ² Freshman year, it was awful, I hated it. And ³ this year's a lot better actually. Um. I ⁴ don't know why. I guess, over the summer I kind of ⁵ stopped caring about what other people thought and cared more about, just, I don't know. It's ⁶ hard to explain. I ⁷ found stuff out about myself, and so I went back, and all of a sudden

¹ “HATED SCHOOL”

² “FRESHMAN YEAR AWFUL”

³ “THIS YEAR'S BETTER”

⁴ “DON'T KNOW WHY”

⁵ “STOPPED CARING”

⁶ “HARD TO EXPLAIN”

⁷ “FOUND STUFF OUT”

EXAMPLE (DESCRIPTIVE CODING)

- ▶ Known as topic coding - summarise qualitative data into a single word as the basic topic.

Driving west along the highway's access road and up Main St. to Wildpass Rd. there were ¹ abandoned warehouse buildings in disrepair, ² spray painted gang graffiti on walls of several occupied and unoccupied buildings. I passed a ³ Salvation Army Thrift Store, Napa Auto Parts store, a tire manufacturing plant, old houses in-between industrial sites, an auto glass store, Market/Liquors, Budget Tire, a check cashing service. ⁴ More spray paint was on the walls.

¹ BUILDINGS

² GRAFFITI

³ BUSINESSES

⁴ GRAFFITI

SECOND CYCLE CODING

- ▶ “To develop a sense of categorical, thematic, conceptual, and/or theoretical organization from your array of First Cycle codes. (Saldaña, 2009).

PATTERN CODING

- Examining initial codes
- Identifying trends, patterns, relationships
- Assigning labels (they could be categories or themes)

EXAMPLE

- EMOTIONS (ANXIETY, NERVOUSNESS, "HURT SOMEONE BAD," RESTLESSNESS, "FELT LIKE CRYING," ANGRY)

Display 4.3
Smoking Cessation Patterns at Months 1 and 6

Initiating Smoking Cessation Patterns	Month 1	Month 6
NEGATIVE EMOTIONS	Anxious, nervous, angry, aggressive	Occasionally anxious
PHYSICAL CHANGES	Gained 5 pounds, felt "burning" sensation in throat and lungs	On weight loss program after gaining 20 pounds, heightened sense of smell
RESTLESS JOURNEY	Wandering and habitual movements	Habitual movements
REGRETFUL LOSS	"Felt like crying," hyper-conscious of cessation	Nostalgic for smoking, "hangs around" smokers

FOCUSED CODING

- ▶ Identifying “the most frequent or significant initial codes
- ▶ To find categories from the data based on conceptual similarity.
- ▶ Can be further analysed using axial coding or theoretical coding.

Example:

First Cycle codes: (MATERIALS, COMPUTERS, TEXTBOOKS)

FOCUSED CODING:

RESOURCES:

MATERIALS

COMPUTERS

TEXTBOOKS

AXIAL CODING

- ▶ An extension to focused coding.
- ▶ You must focus on the properties of each category.
 - ▶ explore how Category and sub-category relate to each other.

Teacher Skills (Main Category)

Instruction Skills (Subcategory 1)

Pedagogical (code)

Socio-economic (code)

Style/Personal expression (code)

Technical (code)

Management Skills (Subcategory 2)

Behaviourist techniques (code)

Group management (code)

AXIAL CODING: EXAMPLE

Basit's (2003) study of the aspirations of teenage British Muslim girls, analysis of interview data with the girls, their parents, and their teachers

IDENTITY (Main Category 1)

Ethnicity (Subcategory 1)

Language (Subcategory 2)

Religion (Subcategory 3)

CAREER ASPIRATIONS (Main Category 2)

Career Choices (Subcategory 1)

Unrealistic Aspirations (Subcategory 2)

Career Advice (Subcategory 3)

THEORETICAL CODING

- ▶ Could be done as a follow up of focused or axial coding.
- ▶ Specify the relationship between categories/themes to create a storyline

QUALITATIVE DATA ANALYSIS

EXAMPLE

COLUMN 1 Code or Theme	COLUMN 2 Datum Supporting the Code or Theme	COLUMN 3 Researcher's Interpretive Summary
RESISTANCE	"And I thought, 'OK, if that's the way you're going to treat me, I'm not budging one inch on this'."	Employee RESISTANCE will be linked to ENTITLEMENT, based on his or her SENIORITY in the company.

QUALITATIVE CODING TOOLS

- ▶ Spreadsheet
- ▶ NVivo (SDU has a license).

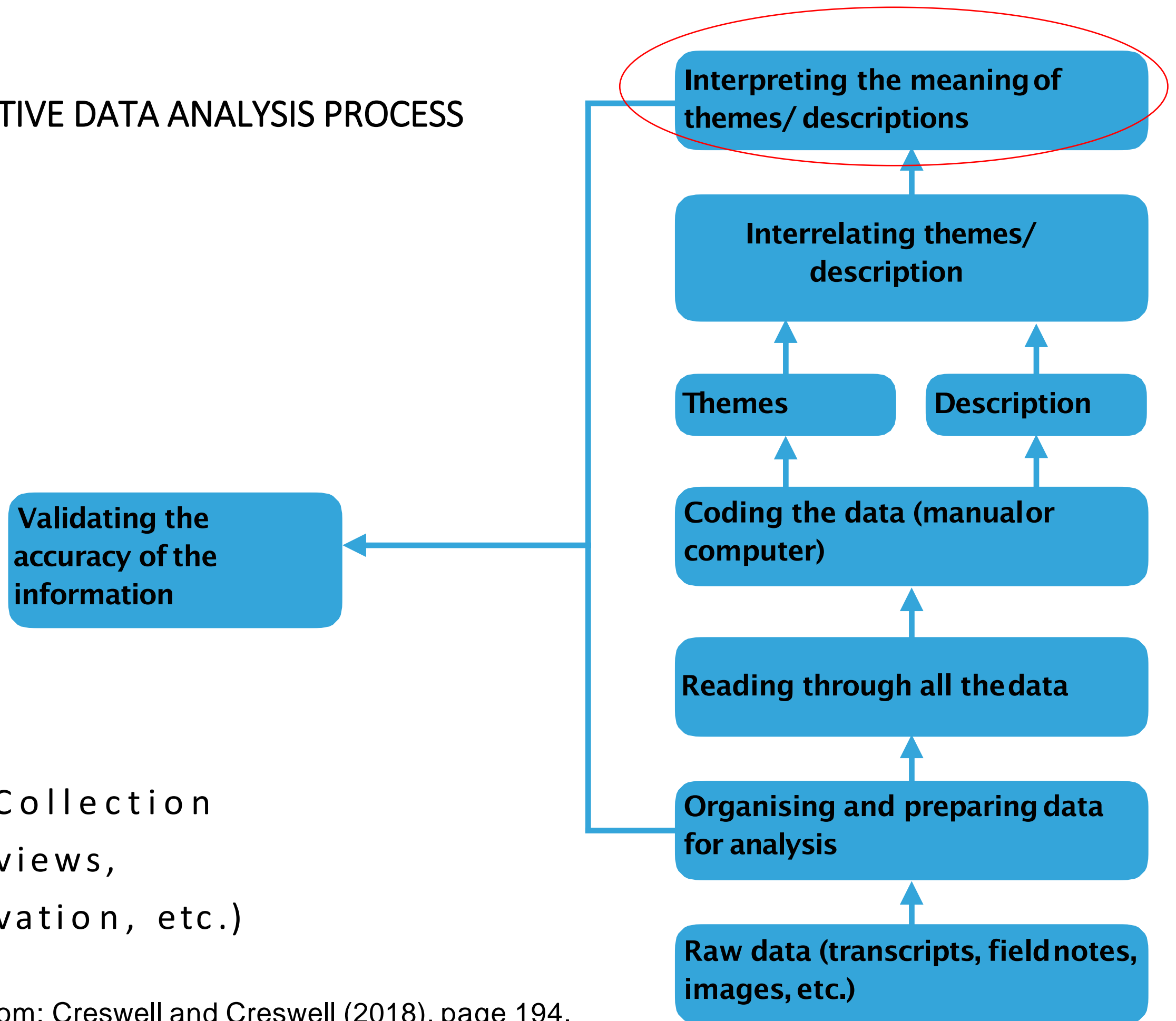
MEMOING

- ▶ Essential in qualitative research.
- ▶ Keep a memo when you are coding.
- ▶ Document your thinking process behind the codes that you assigned to the categories.
 - ▶ Why you assigned certain codes to certain passage.
 - ▶ Why you put different code together under certain categories.
- ▶ It could be a source for your codes and categories.

QUALITATIVE DATA ANALYSIS PROCESS

- ▶ Simultaneous procedure
 - ▶ Qualitative data analysis usually done iteratively and hand-in-hand with data collection and writing-up.
- ▶ Data reduction (winnowing).
 - ▶ Some or most part of the data is probably not used.
 - ▶ Aggregate data into small number of themes.

QUALITATIVE DATA ANALYSIS PROCESS

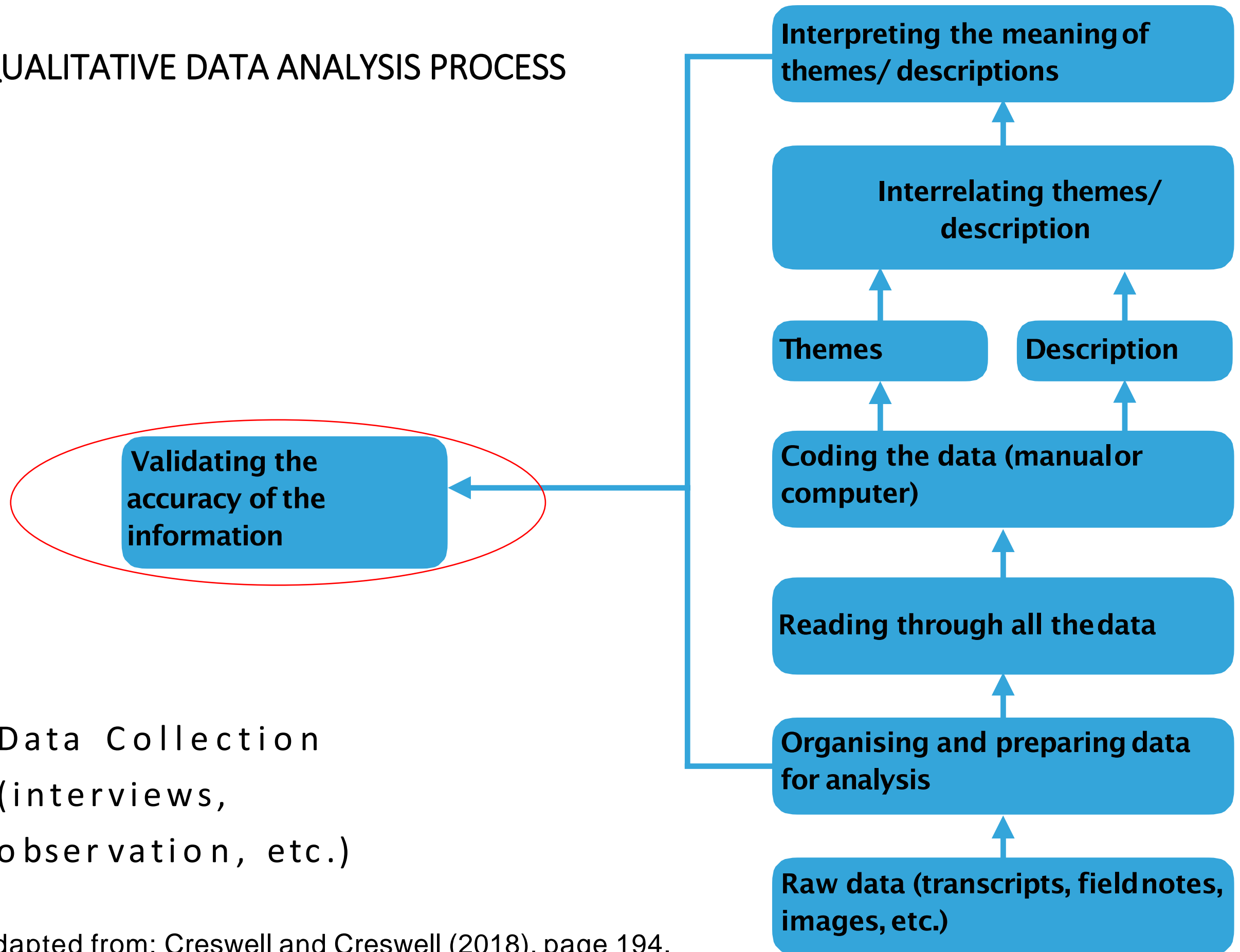


EXAMPLE: Analysis of a survey that focused on factors of affordability in housing in the city of Ibadan, Nigeria (Akinyode, 2017).

Table 2: Generating Organizing Themes from Basic Themes

New No	Old No	Step 3: The Basic Themes	Step 4: The Organising Themes
1	18	Increase in birth rate and youth migration increase users' population who are seeking for house	O1 Housing shortage is not dealt sensibly by government, leading rents of desirable houses to go beyond affordable limit of low income earners
2	15	Population increase in urban centre that increases land and housing demand has influence on housing quality	
3	16	Conversion of residential house to commercial use leads to housing shortage	
4	17	Low housing supply resulted from road extension and conversion of residential house to commercial use	
5	6	Low wages of users prevent many from having their own personal house	

QUALITATIVE DATA ANALYSIS PROCESS



QUALITATIVE CODING GUIDE

- “The Coding Manual for Qualitative Researchers”, Johnny Saldaña, SAGE publishing
- “Constructing Grounded Theory”, Kathy Charmaz, SAGE publishing

Mini Quiz 😊

1. Interviewing participants multiple times, rather than just once, is an example of triangulation in qualitative research.

☐ True

☐ False

2. What is another name for validity in qualitative research?

☐ objectivity

☐ bias

☐ trustworthiness

☐ reliability

3. What is the optimal number of questions for an interview protocol?

☐ 1-5

☐ 5-10

☐ 10-15

☐ 15-20

Mini Quiz 😊

5. For a study exploring how kids engage in play at Montessori elementary school, which would be the most appropriate data collection method?

☐ Observation

☐ interviews

☐ documents

☐ Audio visual digital materials