CityU of Seattle

DISRUPTING THE NORM: Addressing the Dominant Discourse of Science

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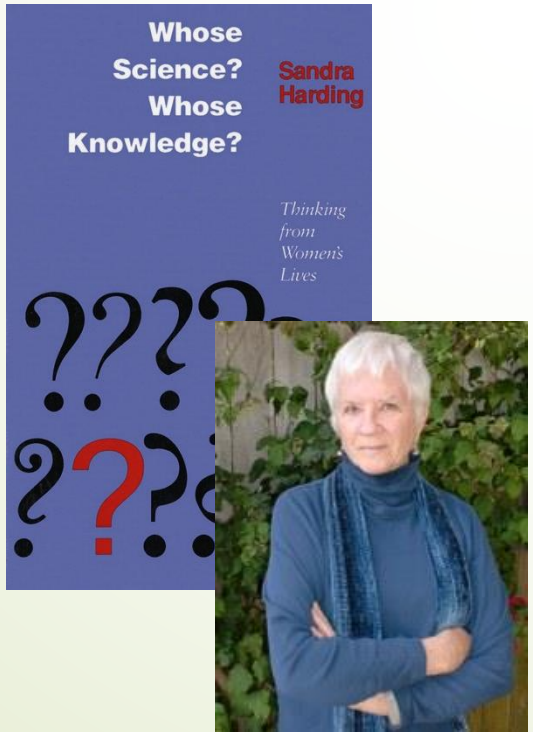
T190: Making Sense of Methodologies and Theoretical Frameworks in GER

Problem

- Geology is the **least** diverse of all sciences!
- How does gender bias play a role in the creation of science?



Bernard, 2018

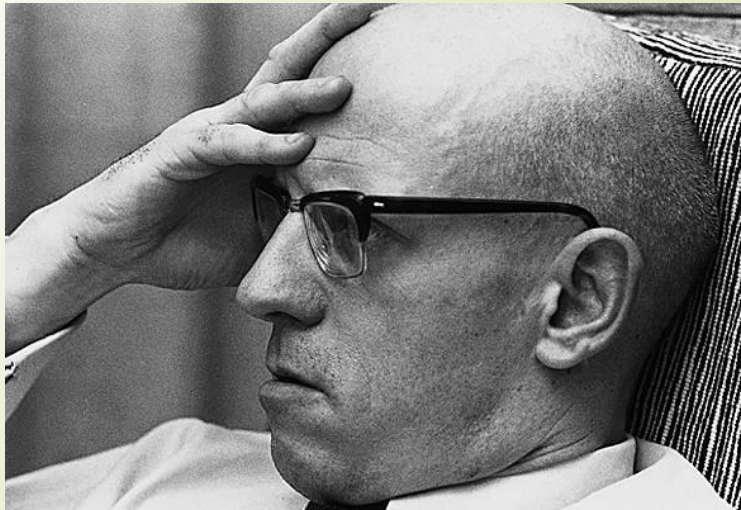
Social construction of knowledge

- Knowledge is socially constructed in science.
- Primary focus is on how we develop meaning of scientific concepts through social interaction.
- How do discursive practices shape other's perceptions of science?

Akkus, Gunel, & Hand, 2007; Kilbourn, 2006

What is dominant discourse?

- Discourse-"a dynamic constellation of words and images that legitimate and produce a given reality"
- **Dominant** discourse
  - takes center stage and becomes "truth" above all other discourses.
  - Operate like common sense and are shaped by those in power or of privilege.
  - "Tectonics is a difficulty field of inquiry."



Poststructural Feminism

Eliminating sexist bias in biology and the social sciences may require redefining our scientific method, objectivity, and rationality.

—*Sandra Harding, 1991*

- Discourse and how it shapes people's subjectivity.
  - Language does not reflect reality, but language can be used to construct reality.
- How discourse shapes women's identities and their ontologies.
- Argues the need to question the apparently objective scientific standards for producing knowledge.

Belsey, 2002

Research question?

- What evidence suggests that daily dominant discourse patterns associated with the nature of scientific inquiry have contributed to women's negative perceptions of science?

How can this framework be applied in GER? (Methods)

- Phenomenological study-data is collected from persons who experienced the phenomenon and develop a composite description of the essence of the experience
  - 2 phases of data collection
    - 12 classroom observations (4 from 3 different classrooms of introductory geology at 3 institutions)
    - Interviews (21 interviews from students in these classrooms)

Classroom Observations

- 12 classroom observations from 3 large lecture introductory geology classes
- Classes averaged between 75-125 students each
- Instructors were male with 10+ years of teaching experience.

- Sample size in qualitative research depends on what the researcher wants to know, what will be useful, who has credibility, and who is available (Patton, 2002).
- We don't generalize in qualitative research!! ☺

Interviews

- Selection criteria included women who were taking their first undergraduate science course.
- 21 interviews transcribed and coded.
- Emergent themes were analyzed.

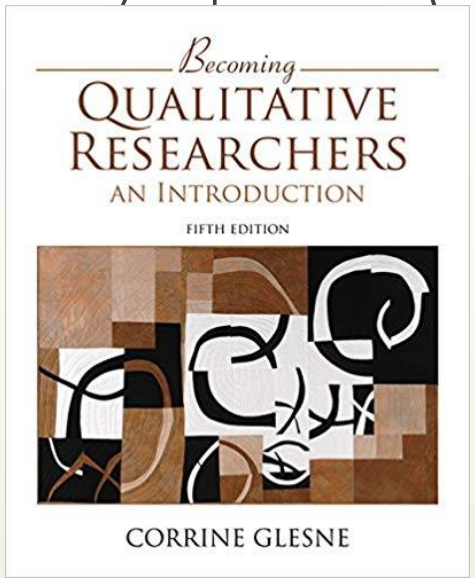
1. Tell me about the earliest experience that you remember in a science course.
2. What did this early experience teach you about what science is?
3. Could you elaborate a little more or tell me a bit more about how this experience made you think of science differently?
4. Tell me about the different types of work that you were required to do in your last course.
5. Think about (insert example from Question 4) that student gave and ask how this type of work made them perceive their own role in the scientific community.

Positionality

- Personal experiences and subjective ontological views influence how we analyze our data (Denzin & Lincoln, 2011).
- Researcher should acknowledge his or her subjectivity, while also thinking about how one's lived experiences shape and have influence on the results of the research (Laine, 2000).
  - My own lived experiences:
    - Grandfather who did not believe in education for women.
    - Personal friends who are dissuaded from being scientists.

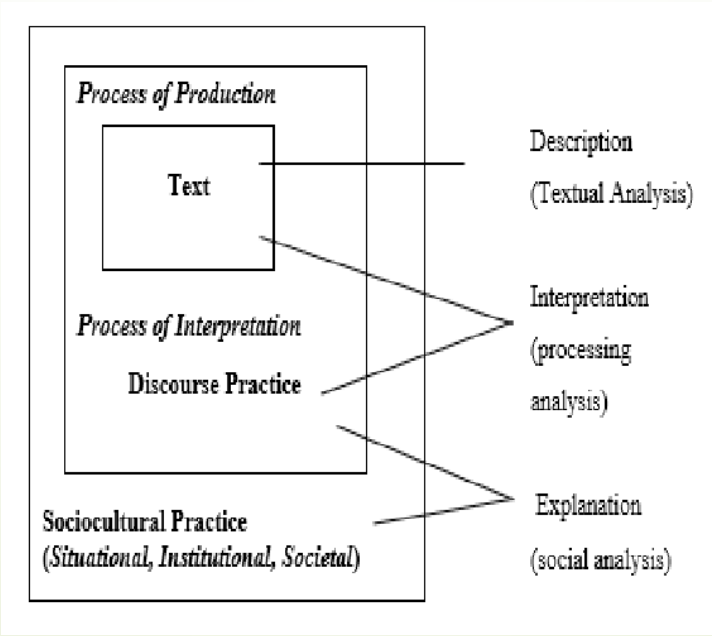
Credibility and Trustworthiness

- Qualitative researchers have adopted standards for evaluating reliability and validity (Guba & Lincoln, 1985).
- Check interview transcripts in order to ensure that they do not contain mistakes from transcription and ensure that the meaning of my codes that were developed do not change meaning throughout the analysis process (Creswell, 2009).



Data Analysis

- Thick description (Geertz, 1973)
- Critical Discourse Analysis-dialogue and social interactions shape reality (Johnson, 2011)
- What students say is as equally important as what they don't say!



Conclusions

- Poststructural feminism offers an alternative focus on exploring the construction of human subjects through various cultural discourses.
- Dominant discourse patterns shape our perceptions of gender and science.
  - The everyday discursive practices that we engage in with our students can shape their perceptions of science.

Selected References

- Belsey, C. (2002). *Poststructuralism: A very short introduction.* New York, NY: Oxford University Press.
- Denzin, N. K., & Lincoln, Y. S. (2011). Introduction: The discipline and practice of qualitative research. In N. K. Denzin, & Y. S. Lincoln (Eds.), *The sage handbook of qualitative research* (4th ed.). Thousand Oaks: Sage.
- Glesne, C. (2015). *Becoming qualitative researchers: An introduction. (Fifth Edition).* Boston, MA: Pearson.
- Harding, S.G. (1991). *Whose science? Whose knowledge? Thinking from women's lives.* Ithaca, NY: Cornell University.
- Johnson, D.C. (2011). Critical discourse analysis and the ethnography of language policy. Critical Discourse Studies, 8(4), 267-279. Retrieved June 13, 2018, from htt://dx.doi.org/10.1080/17405904.2011.601636.
- Kilbourn, B. (2006). The qualitative doctoral dissertation proposal. *Teachers College Record*, *108*(4), 529.

Support

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