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Office Hours
M 10 – noon and 2 – 3 PM
T 11 – noon and 2 – 4 Pm
W 9-10, 11-noon and 2 – 3 PM
R 11 – noon
Other times by appointment

IDS 3200 SCIENCE AND CULTURE

SCIENCE AND CULTURE is a course designed to give IDS majors in a variety of concentrations an opportunity to explore and compare two ways of knowing and their embedding in and impact on culture. The course uses a case study approach to explore scientific and narrative knowing.

SCIENTIFIC KNOWING

This section presents a perspective on the nature of science and its embedding in culture. It draws on philosophy, sociology of scientific knowledge and the history of science. Student's own assumptions about science are surveyed. Conventional views about science are presented and discussed by considering High School science texts. A Kuhnian perspective on science is then introduced and post-Kuhnian perspectives from philosophy and sociology of scientific knowledge are considered. Reasons why interdisciplinary students should have an understanding of the approaches and nature of scientific knowing are explored. The course then considers four case studies from science which allow students to apply the preceding material to actual scientific developments.

The first considers the recent controversy about the possibility of life on mars.

The second case study describes the discovery by John Snow of the mode of transmission of cholera in nineteenth-century London. It illustrates how a controlled experiment is done, and how it can make an overwhelming case for a theory.

The third case study is from the history of physics and concerns the conflict between the theory that heat is a substance and the theory that it is the motion of the atoms of matter. This study demonstrates the value of replacing qualitative impressions with quantitative measurements. It also is an example of where for a time the wrong theory could explain things better than the correct one.

The fourth case study deals with mental disorders. It follows the development of ideas of madness where behavioral and social science both play roles. This case study focuses on the role of classification in science and its dynamic interaction with theory.

Following the case studies and drawing on them, some general feature of the scientific process are considered. Science is presented as a search for understanding which is

achieved by means of statements of general laws or principles. These laws and principles can be tested experimentally. The importance of measurement in science is considered with the attendant issues of reliability, validity, precision and accuracy. How hypotheses emerge and how the commitments of scientists are involved in how they work are illustrated.

NARRATIVE KNOWING

This section explores the recent resurgence of interest in narrative in the human sciences. General features of narrative knowing are considered. The issue of whether experience assumes narrative form or is imposed post hoc is considered. Stein and Policastro's empirical work on what constitutes a narrative and a prototypical story is presented as is the Gergens' views on elements and form of narrative. The range and importance of narrative for personal and cultural identity is explored.

Following this general introduction specific case studies in the use of narrative in the human sciences are presented. The narrative approach in psychology is illustrated by the work of Bruner and the Gergens' analysis of developmental theories. Mishler's work on research interviewing illustrates a narrative approach in the social sciences. McCloskey's narrative approach in economics is presented. Narrative issues are considered in paleoanthropology.

The final in the course requires the students to compare and contrast scientific ways of knowing with narrative ways of knowing and reflect on the strengths, limitations and domains of applicability of each way of knowing.

REQUIRED READING (In order of use)

1. Readings in three High School science texts on the nature of science and the methods of science.
2. Chapter Three from L. W. Trowbridge and R. W. Bybee, *Becoming A Secondary School Science Teacher* (Columbus, Ohio: Merrill, 1986).
3. P. B. Medawar, "Is The Scientific Paper Fraudulent?" *Saturday Review*, August 1, 1964, pgs. 42-43.
4. Excerpts from Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: The University of Chicago Press, 1962, 1970).
5. Martin Goldstein and Inge F. Goldstein, *How We Know: An Exploration of the Scientific Paradigm* (New York: Plenum. 1978).
6. Sarah Boxer, "The Parable Of The Cheek-Turners And The Cheek-Smiters", *Discover*, August 1987, pgs. 80-83.
7. Melvin Konner, "The Many Faces of Madness", *The Sciences*, July/Aug. 1987, pgs. 6-
8. Robert Bartholomew, "Boderlands", *Skeptic*, vol. 8, #3, 2000, pgs. 36-40.
9. Frederika Randall, "Why Scholars Become Storytellers", *New York Times*, v133 Section 7, p1, Jan. 29, 1984.

10. Bill Buford, "The Seductions of Storytelling", *The New Yorker*, June 24 and July 1, 1996, pgs. 11-12.
11. Langdon Gilkey, "The Structure of Academic Revolutions", from Owen Gringerich, ed. *The Nature of Scientific Discovery* (Washington, D.C.: Smithsonian).
12. John Robinson and Linda Hawpe, "Narrative Thinking as a Heuristic Process", from T. R. Sarbin, *Narrative Psychology* (New York: Praeger, 1986, pgs.111-125).
13. D. N. Michael and W. T. Anderson, "Now That "Progress" No Longer Unites Us", in *New Options*, #31. Nov. 24, 1986, pgs. 1-2.
14. "Women's Stories, Women's Quest, in Carol P. Christ, *Diving Deep and Surfacing* (Boston: Beacon Press, 1975).
15. Excerpts from E. G. Mishler *Research Interviewing* (Cambridge, Mass: Harvard Press, 1986, pgs. 145-161).
16. Jerome Bruner, "Life as Narrative", *Social Research*, Vol. 54, No.1, Spring 1987, pgs.11-32.
17. Laurel Richardson, "Narrative and Sociology", in *Journal of Contemporary Ethnography*, vol. 19, #1, 1990.
18. K. J. Gergen and M. M. Gergen, "Narrative Form and the Construction of Psychological Science", from T. R. Sarbin, *Narrative Psychology* (New York: Praeger, 1986, pgs.22-44).
19. Introduction, Chapter 1 and 2 of Donald N. McCloskey, *If You're So Smart: The Narrative of Economic Expertise* (Chicago: The University of Chicago Press, 1990, pgs.1-39).
21. "The Storytellers" from Roger Lewin, *Bones of Contention* (New York: Simon and Schuster, 1987, pgs. 30-46).

RECOMMENDED READING

1. Donald E. Polkinghorne, *Narrative Knowing and the Human Sciences* (Albany, N.Y.: State University of New York Press, 1988).
2. Donald M. McCloskey, *If You're So Smart: The Narrative of Economic Expertise* (Chicago: The University of Chicago Press, 1990).

CALENDAR AND SCHEDULE

8/26 Introduction to course; pass out "Assumptions About The Scientific Enterprise"; form collaborative groups; discuss students reaction to "Assumptions".
 Assignment: This is a task for each collaborative group. Go to IMC in library and find High School Science texts in three areas of science. Find out what these texts say about what science is, and what process or method science uses. Write up a consensus of your groups conclusions.

8/28 Present and discuss groups' findings from High School science text exercise.
 Assignment: Read Chapter 3 "Understanding Science" from Trowbridge and Bybee *Becoming A Secondary School Science Teacher* and P. B. Medawar, "Is The Scientific Paper Fraudulent?".

9/2 Discuss the view of science presented by Trowbridge and Bybee and the view of research presented by Haas in this reading. Compare to views in High School texts. Also lecture on the two worlds of science: actual research and research paper.

Assignment: Look up definitions of positivism, empiricism, foundationalism, realism, dualism, relativism and constructivism. Read Selection on Kuhn from *The Structure of Scientific Revolutions*.

9/4 Lecture on Kuhn's view of science. Discuss "isms".

Assignment: Preface and Chap. 1 and 2 from *How We Know*; Examine the "Assumptions About the Scientific Enterprise" and reading in *How We Know* in terms of "isms" and Kuhn's view of science.

9/9 Discuss facts in science, "facts are theory laden", institutions of science, knowledge filter, warranted knowledge, frontier science; Assignment: Handout readings on "Life on Mars".

9/11 Discuss "Life on Mars" in terms of knowledge filter, frontier science, and warranted knowledge.

Assignment: Read Chapter 3, pages 25-51 of *How We Know*, case study of Snow on Cholera.

9/16 Discuss readings in *How We Know*.

Assignment: Read remainder of Chapter 3, pages 51-62.

9/18 Complete discussion of case study.

Assignment: Prepare for exam on course material covered so far.

9/23 First Exam.

Assignment: Read Chapter 4, pages 63-91 of *How We Know*, case study on conflict between caloric and kinetic theories of heat.

9/25 Lecture on temperature, caloric and kinetic theories, quantification in science, heat capacities, Black's work.

Assignment: Chapter 4, pgs 92-113.

9/30 Lecture on Rumford's experiments; what happens when theories compete; why the caloric theory survived; commitment and subjectivity in science.

Assignment: Read Chapt. 5, pgs 114-135.

10/2 Further discussion on theories of heat. A modern view of heat.

Assignment: Read Chap. 5, pgs. 136-162.

10/7 Lecture on historical views of and treatment of mental illness; classification in science, classification of mental illness.

Assignment: Prepare for exam on Chapter 4.

10/9 Exam on Chapter 4

Assignment: Read Chapter 5, pgs. 162-186.

10/14 Lecture/Discussion on views of schizophrenia, institutional neurosis, cross cultural studies on schizophrenia, genetic studies, biological versus psychological causes.

Assignment: "The Many Faces of Madness", "Borderlands", and Chapters 6, 7, and 8.

Hand out essay exam.

10/16 Discuss how "The Many Faces of Madness" compares to the Goldsteins. Discuss creativity in science and comparison to creativity in other areas, the goal of generality in science and the role of experimental test in science.

Assignment: Finish out-of-class essay-exam using :The Parable of Cheek-Turners and the Cheek Smiters. Essay due 10/21.

10/21 Essay-exam due. Discussion of issues raised by this case study.

Assignment: Chapters 9, 10, 11, and 12.

10/23 Fall Break

10/28 Discussion of problems of experimentation, double blind experiments, measurement and its pitfalls, accuracy and precision; where hypotheses come from; subjectivity and objectivity in science.

Assignment: Essay due Tuesday Nov. 4. How have your views of science been changed and confirmed by this course and why? Review "Assumptions About The Scientific Enterprise". This counts 10% of your class participation grade. If this is a serious and honest effort and lets me know what your views were before this course and now, then it will receive an A.

Assignment: Read "Why Scholars Become Storytellers" and "The Seductions of Storytelling" and "The Structure of Academic Revolutions".

10/30 What is a queen discipline, what are the assumptions of a queen discipline, introduction to narrative.

Assignment: Continue work on essay.

11/4 Essays due. Discussion of the role of storytelling in societies; the return of narrative; narrative in the human sciences.

Assignment: Read: "Narrative Thinking As A Heuristic Process".

11/6 Discussion of "Narrative Thinking As A Heuristic Process"; Is experience narrative? Stein and Policastro's work on what counts as a story and prototypical story.

Assignment: Read "Now That Progress No Longer Unites Us" and "Women's Stories, Women's Quest".

11/11 Discuss "Now That Progress No Longer Unites Us" and "Women's Stories, Women's Quest".

Assignment: Read excerpts from Research Interviewing

11/13 Discussion of the standard research interview, uses of research interviewing and polling, Mishler's criticisms.

Assignment: Read "Life as Narrative"

11/18 Discussion of "Life as Narrative"

Assignment: Read "Narrative and Sociology"

11/20 Discussion of the use of narrative in the social sciences.

Assignment: "Narrative Form and The Construction of Psychological Science".

11/25 Lecture on applying Gergen's analysis to a fairy tale and narrative structures in developmental theories.

Assignment: Read the Introduction, Chapters 1 and 2 in McCloskey If You're So Smart: The Narrative of Economic Expertise.

11/27 Thanksgiving Break

11/2 Discussion of narrative in economics.

Assignment: "The Storytellers" in Lewin's Bones of Contention

11/4 Discussion of narrative and science in anthropology. Review for final.

FINAL EXAMS: Monday, 12/15/03 9:00-11:30 AM.

The course Final will cover the readings on narrative knowing and ask you to compare scientific and narrative knowing.

COURSE POLICIES

METHODS OF TEACHING: The class will be primarily lecture, discussion and use of collaborative groups for student discussion.

REQUIREMENTS: The student must read all assigned material and be prepared to discuss it on the day for which it is assigned. Assigned projects, exercises, class presentations and written assignments must be completed on the days indicated.

ATTENDANCE: Attendance is expected and required at each class. Absences will be taken into account in the class participation part of the grade. Absences beyond two will forfeit the class participation (10 %) grade.

EVALUATION:

20% Class participation:

10% attendance, on time for class and active contribution to class discussion and collaborative group.

10% Essay on how your views of science have been confirmed and changed and why.

40% Two in class, written, hour exams.

20% Take home essay-quiz.

20% Final Exam comparing scientific and narrative knowing.