## Class Discussion Exercises

These exercises are for class discussion, perhaps with short presentations prepared in advance by small groups of students.

9.28 In developed countries and some less developed countries, computers and Internet access are available in schools. Is the "digital divide" likely to last more than one generation? What form will it take 25 years from now? How does it differ from social divisions that occurred when other information and communication technologies were introduced?

9.29 What are some skills, traditions, and/or social conventions that have been, or might soon be, lost because of computers? Include at least one that you think will be a real loss (i.e., a negative result of computers), and include at least one where you think the loss is not a problem. Give reasons.

9.30 Hold a debate in class on one variant of the following question: Does computer technology, overall, have a negative impact on
   a) most people in the world?
   b) poor people in a developed country (e.g., the U.S.)?
   c) the middle class in a developed country (e.g., the U.S.)?

9.31 When information appeared on computer screens only as text, deaf people could read it, and programmers developed speech-synthesis programs to read the screens to blind people. The multimedia, point-and-click interfaces of the Web pose problems for disabled people. Should all business and government Web sites be required to provide full access for disabled people? Discuss arguments for both sides. Which side do you think is stronger? Why? The National Federation of the Blind sued America Online in 1999 because AOL's software was not compatible with screen-access software used by blind people. Which side do you think should win the suit? Why?[72]

9.32 Three-dimensional "printers" create a 3D structure, layer by layer, using glues and resins, under direction of a computer file. What are some likely uses for these devices? (Try to think of both good and bad uses.) Do they fill any real needs? What disadvantages do they have?

9.33 At the beginning of the 21st century, a large protest movement against "globalization" developed. Compare globalization caused by computer and telecommunications technologies to globalizations caused by significant earlier technologies. Present and evaluate some of the arguments of the current anti-globalization movement.

# NOTES

[1] Michael Rothschild, "Beyond Repair: The Politics of the Machine Age Are Hopelessly Obsolete," *The New Democrat*, July/Aug. 1995, pp. 8–11.

[2] Hightower is a radio commentator, quoted in Robert Fox, "Newstrack," *Communications of the ACM*, Aug. 1995, 38:8, pp. 11–12.

[3] Quoted in Jerry Mander, *In the Absence of the Sacred: The Failure of Technology and the Survival of the Indian Nations*, Sierra Club Books, 1991, p. 62.

[4] "Net surfing mom charged with ignoring kids," CNN Interactive, June 16, 1997, www6.cnn.com/US/9706/16/briefs.pm/internet.neglect/; viewed Oct. 29, 2001.

[5] Alexandra Eyle, "No Time Like the Co-Present" (interview with Neil Postman), *NetGuide*, July 1995, pp. 121–122. Chet Bowers, another critic, also complains that computers contribute to the view of the individual as the basic social unit. Richard Sclove and Jeffrey Scheuer, "On the Road Again: If Information Highways Are Anything Like Interstate Highways—Watch Out!" in Rob Kling, ed., *Computerization and Controversy: Value Conflict and Social Choices*, 2nd ed., Academic Press, 1996, pp 606–612.

[6] Robert D. Putnam, *Making Democracy Work*, Princeton University Press, 1993. I thank Phil Agre for bringing Putnam's work and some of the ideas in this paragraph

to my attention in his talk "Networking in the Community" at the San Diego ACM chapter meeting, Jan. 24, 1996.

7   Alexis de Tocqueville, *Democracy in America*, Alfred A. Knopf, 1945, translated by Henry Reeves.

8   "Technology in the American Household," Times Mirror Center for the People and the Press, May 1994, pp. 5–7. Jon Katz, "The Digital Citizen," *Wired*, Dec. 1997, pp. 68–82, 274–275. Lisa Guernsey, "Cyberspace Isn't So Lonely After All," *New York Times*, July 26, 2001, pp. D1, D5. James E. Katz and Philip Aspden, "A Nation of Strangers?" *Communications of the ACM*, December 1997, 40:12, pp. 81–86. Pew Research Center, Nov. 2000.

9   From a study by sociologist Claude Fisher, reported in Charles Paul Freund, "The Geography of Somewhere," *Reason*, May 2001, p. 12.

10  This is a condensed version of my article "Impacts on Community," *Computers & Society*, v. 27, n. 4, December 1997, pp. 15–17.

11  In Rob Kling, ed., *Computerization and Controversy: Value Conflict and Social Choices*, 2nd ed., Academic Press, 1996, pp. 606–612.

12  Office of Technology Assessment, "The Technological Reshaping of Metropolitan America," 1995.

13  See Joel Kotkin's book in the references for an extensive discussion of the impact of computers on towns and cities.

14  Robert Fox, "News Track: Disorderly Conduct," *Communications of the ACM*, July 1998, p. 9.

15  CPSR, "Serving the Community: A Public Interest Vision of the National Information Infrastructure," pp. 15–16.

16  CPSR, "Serving the Community," p. 21.

17  National Information Infrastructure Advisory Committee, "A Nation of Opportunity: Realizing the Promise of the Information Superhighway," reported in *Telecom-Post*, Oct. 26, 1995. Robert H. Anderson, Tora K. Bikson, Sally Ann Law, Bridger M. Mitchell, *Universal Access to E-mail: Feasibility and Societal Implications*, Center for Information Revolution Analysis, RAND, 1995. Laurent Belsie, "'Universal Service' Is No Longer So Simple," *Christian Science Monitor*, Apr. 7, 1994.

18  "Technology in the American Household," Times Mirror Center for the People and the Press, May 1994, p. 8.

19  Most data from W. Michael Cox and Richard Alm, *Myths of Rich and Poor: Why We're Better off Than We Think*, Basic Books, 1999, pp. 161–162. Theodore Caplow, Louis Hicks, and Ben J. Wattenberg, *The First Measured Century: An Illustrated Guide to Trends in America*, AEI Press, 2001, p. 276.

20  Most of the data in this paragraph comes from polls and studies by Pew Research Center, Forrester Research, Luntz Research Companies, Ipsos-Reid Corporation, Nielsen//NetRatings, the U.S. Commerce Department, and others, reported in various news media.

21  Several studies mention similar figures; see, for example, Jon Katz, "The Digital Citizen."

22  Richard Shim, "Thanks for the memory: 30GB hard drive on a platter," *ZDNet News*, Jan. 23, 2001, www.zdnet.com/zdnn/stories/news; viewed Mar. 23, 2001.

23  www.eudora.com/products/eudora/download

24  The term "have-lates," as a substitute for "have-nots," was first used by Marvin Minsky, to the best of my knowledge; I prefer to use "have-laters" rather than "have-lates."

25  Ford provided computers to about 166,000 employees, then canceled the program because of financial pressures due in part to tire problems on Ford Explorers.

26  Les Shu, "All You Can E," *Wired*, Mar. 2001, p. 76.

27  *Collected Poems 1901–1962*, Harcourt, Brace & World, 1963, p. 147.

28  This line appears on many Web sites that quote the two lines from Eliot's poem. The earliest source I found is Neville Fletcher (Australian Academy of Science), "A Distributed National Collection? A Science Viewpoint," July 21, 1997 (www.anu.edu.au/caul/nscf/fletcher.htm).

29  Parts of this poem have circulated on computer networks and appeared in newspapers. The full version (36 lines), slightly different from the one I used, appeared in the *Journal of Irreproducible Results*, Jan./Feb. 1994, 39:1, p. 13. Zar attributes the title to Pamela Brown and the opening lines to Mark Eckman.

30  Barry Bearak, "Pakistani Tale of a Drug Addict's Blasphemy," *New York Times*, Feb. 19, 2001, pp. A1, A4. Michael Lesk, "Going Digital," *Scientific American*, Mar. 1997, pp. 58–60.

31  See, for example, Neil Postman, *Technopoly: The Surrender of Culture to Technology*, Alfred A. Knopf, 1992, pp. 3–8.

32  *New York Times*, Feb. 1, 2001. Walter J. Ong, *Interfaces of the Word: Studies in the Evolution of Consciousness and Culture*, Cornell University Press, 1977. Americans spent $26 billion on more than two billion books in 1997 (Caplow *et al.*, *The First Measured Century*, p. 266).

33  From Microsoft's explanation of its policy, quoted in Mark Goldblatt, "Bowdlerized by Microsoft," *New York Times*, Oct. 23, 2001, p. A23.

34  Stephen Moore, "The Coming Age of Abundance," in Ronald Bailey, ed., *The True State of the Planet*, Free Press, 1995, p. 113.

35  "Interview With the Luddite," *Wired*, June 1995, pp. 166–168, 211–216 (see pp. 213–214).

36  Kirkpatrick Sale, *Rebels Against the Future: The Luddites and Their War Against the Industrial Revolution: Lessons for the Computer Age*, Addison–Wesley, 1995, p. 257.

37  Mander, *In the Absence of the Sacred*, p. 61.

38  Postman, *Technopoly*, p. 119.

39  Eyle, "No Time Like the Co-Present."

40  Harvey Blume, "Digital Refusnik" (interview with Sven Birkerts), *Wired*, May 1995, pp. 178–179. "Interview With the Luddite."

41  Postman, *Technopoly*, p. 15.

42  See Jane Jacob's classic *The Economy of Cities*, Random House, 1969.

43  Postman, *Technopoly*, p. 6. The Freud quote is from *Civilization and Its Discontent* (e.g., the edition edited and translated by James Strachey, W. W. Norton, 1961, p. 35).

44  John Davis, quoted in Sale, *Rebels Against the Future*, p. 256.

45  Sale, *Rebels Against the Future*, p. 257.

46  The quotes are from "Interview With the Luddite," p. 214 and p. 213. Sale expresses this point of view also in *Rebels Against the Future*, p. 213.

47  Sale, *Rebels Against the Future*, p. 256.

48  This dichotomy has always struck me as strange, because it almost suggests that humans are alien creatures who arrived on earth from somewhere else. We evolved here. We are part of nature. A human's house is as natural as a bird's nest, though, unlike birds, we have the capacity to build both ugly and beautiful things.

49  Martin V. Melosi, *Garbage in the Cities: Refuse, Reform, and the Environment: 1880–1980*, Texas A&M University Press, 1981, p. 24–25.

50  In "George Gilder and His Critics," *Forbes ASAP*, Oct. 9, 1995, pp. 165–181.

51  Optical fiber: Ronald Bailey, ed., *Earth Report 2000: Revisiting the True State of the Planet*, McGraw Hill, 2000, p. 51. Moore, "The Coming Age of Abundance," p. 119. Nicholas Eberstadt, "Population, Food, and Income: Global Trends in the Twentieth Century," p. 34, in Bailey, *The True State of the Planet*. Family income spent on food: Stephen Moore and Julian L. Simon, *It's Getting Better All the Time: The 100 Greatest Trends of the 20th Century*, Cato Institute, 2000, p. 53. Ronald Bailey, "Billions Served" (interview with Norman Borlaug), *Reason*, Apr. 2000, pp. 30–37. Julian L. Simon, "The State of Humanity: Steadily Improving," *Cato Policy Report*, Sept./Oct. 1995, 17:5, pp. 1, 10–11, 14–15. Nonvehicular accidental deaths declined from 72 per 100,000 people in 1900 to 19 per 100,000 people in 1997 (Caplow *et al.*, *The First Measured Century*, p. 149).

52  Ian Hacking, *The Emergence of Probability*, Cambridge University Press, 1975, p. 108. Snow, *The Two Cultures*, pp. 82–83. The population data, some from the United Nations, are reported in Eberstadt, "Population, Food, and Income," p. 21, p. 23, and in Caplow *et al.*, *The First Measured Century*, pp. 4–5.

53  Mander, *In the Absence of the Sacred*, pp. 67–68.

54  Mander, *In the Absence of the Sacred*, p. 57. Comments at the Computers, Freedom, and Privacy Conference, San Francisco, 1995; Panel: "Against Computers: A Systemic Critique."

55  Cox and Alm, *Myths of Rich and Poor*, p. 15.

56  United Nations, "E-Commerce and Development Report 2001," quoted in Frances Williams, "International Economy & the Americas: Unctad spells out benefit of internet commerce," *Financial Times*, Nov. 21, 2001.

57  Eyle, "No Time Like the Co-Present." Postman, *Technopoly*, p. 10.

58  Julian L. Simon, "The State of Humanity: Steadily Improving," *Cato Policy Report*, Sept./Oct. 1995, 17:5, pp. 1, 10–11, 14–15. See the books by Cox & Alm and Moore & Simon in the references.

59  Sale, *Rebels Against the Future*, p. 210.

60  Postman, *Technopoly*, p. 7.

61  Peter J. Denning, "The Internet After 30 Years," in Dorothy E. Denning & Peter J. Denning, eds., *The Internet Besieged*, Addison–Wesley, 1998, p. 20.

62  Bill Richards, "Doctors Can Diagnose Illnesses Long Distance, To the Dismay of Some," *Wall Street Journal*, Jan. 17, 1996, pp. A1, A10.

63  Richards, "Doctors Can Diagnose Illnesses Long Distance."

64  Donald A. Norman, *Things That Make Us Smart: Defending Human Attribute In the Age of the Machine*, Addison–Wesley, 1993, p. 190.

65  "Interview with the Luddite."

66  See Jacobs, *The Economy of Cities* for a discussion of how wealth develops.

67  Telephone: Norman, *Things That Make Us Smart*, p. 191. Edison and Watson: Chris Morgan and David Langford, *Facts and Fallacies: A Book of Definitive Mistakes and Misguided Predictions*, St. Martin's Press, 1981 (Watson: p. 44). *Popular Mechanics* (March 1949, p. 258) and Olson: Christopher Cerf and Victor Navasky, *The Definitive Compendium of Authoritative Misinformation*, Pantheon Books, 1984, p. 208, 209. Olson's comment made at a convention of the World Future Society. Thomas Petzinger Jr., "Meanwhile, from the Journal's Archives," *Wall Street Journal*, Jan. 1, 2000, p. R5.

68  Joseph Weizenbaum, *Computer Power and Human Reason: From Judgment To Calculation*, W. H. Freeman and Company, 1976, pp. 270–272.

69  Simson L. Garfinkel, "Enter the Dragon," *Technology Review*, Sept./Oct. 1998, pp. 58–64.

70  This quote has been attributed to Neils Bohr and Albert Einstein; I could not find a reliable source for either.

71  Jefferson: www.princeton.edu/~tjpapers/; Voltaire: Voltaire Foundation, www.voltaire.ox.ac.uk

72  Federal rules released in December 2000 mandate that virtually all government Web sites be made fully accessible to disabled people. Some legal experts expect the rules to be applied to private commercial sites as well. Michelle Delio, "Fed Opens Web to Disabled," *WIRED News*, Dec. 21, 2000.

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- Frederick Bennett, *Computers As Tutors: Solving the Crisis in Education*, Faben, 1999. Proposals for productive ways to use computers in education.

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