36. Technology

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The root of the word *technology* is the Greek term *tekhne*, which Aristotle defined as an art or "reasoned habit of mind in making something" (1991, p. 320). In 17th-century post-classical Latin, the term *technologia* (Greek *tekhne* + Latin *logia*, the study of) was used to describe the systematic study of an art or practical craft (R. Williams, 1985, p. 315). By the 18th century, *technology* was not only a study of practical arts, but particularly of the mechanical arts and applied ***sciences*** (Oxford University Press, n.d.). By the mid-19th century, this term implied not only the study, but also the active application, of mechanical arts, especially in manufacturing and industry (Technology, 2020). By the 20th century, the use of the term had expanded to include the products of people applying mechanical arts in manufacturing and industry (Oxford University Press, n.d.). In this sense of the term, technology can mean both the ***knowledge*** to make a mechanical object, as well as the object itself, as in this sentence: "Technology is starting to behave in intelligent and unpredictable ways that even its creators don't understand" (Bridle, 2018, p. 1). This contemporary sense of the word *technology* blurs the boundary between the person who has the knowledge and ability to make an object and that human-made object itself. As Steven B. Katz (1992) argued, "Technology becomes both a means and an end in itself" (p. 266), thus creating ethical implications that technical communicators should consider as they work with and write about technologies.

In *Nicomachean Ethics,* Aristotle argued that a person could lead a good life by pursuing virtuous knowledge and carrying out virtuous acts. He discussed *tekhne* as an intellectual virtue comprising one element of a good life. If the person who had technical knowledge was virtuous, the product of that *tekhne* would result in civic good: "The first principle is in the maker but not in what is made" (as cited in Kennedy, 1991, p. 289). In this early sense, the product of *tekhne* was the result of human agency, and the product could be evaluated according to the nature of its human creator. Thus, the product of *tekhne*—or what we might today call "a technology"—reflected its human maker and was under human control. Written communication can be considered to be an early technology in this sense (e.g., Havelock, 1986; Ong, 1992; Postman, 1993).

As relationships between humans and technology have evolved, the question of who is in control of technology has become contested. For example, this definition of how a thermostat works gives agency to the device: "While a thermometer is a tool to read a room's temperature, a thermostat is able to control it" (Hometree, n.d.). This attribution of agency to a technology in technical

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communication discourse is so naturalized as to appear as common sense. Yet the implications of placing this device in the subject position of a sentence open the door to metaphorically considering a technology as having independent agency to carry out actions in the world. This metaphorical need to place a device in the subject position of an active verb points to a limitation in the English language inherent in defining a *technology* as both the human know-how and the object created by that know-how: It confuses subject and object in the text. Take, for example, this account of what happened when software engineers added a "Like" button to the Facebook interface: "The 'like' button, it turns out, transformed the social media experience" (Newport, 2020, p. 51). Cal Newport's attribution of agency to a ***social media*** feature aptly illustrates his exploration of technological determinism. This sentence attributes the transformation of users' experiences to a software feature, not to the people who programmed the feature. The "Like" button is the hero of this small story about technology and society. When people read text, they look for stories. Technical and professional communicators provide these stories about people and technologies, as well as determining the subjects taking actions in these stories.

A new technology can change the way that people view (im)possible relations between humans and machines. What seemed impossible in the past —that machines can learn and make independent decisions impacting people's lives—is now a relationship that seems natural. When intelligent machines can have linguistic agency in sentences, people are taught to consider machines as actors in the physical world. When intelligent machines then have actual agency in that physical world, distinctions between *technology* and *human* become blurred. As Langdon Winner (1992) observed, "the nature of man's own creations has now emerged as a source of genuine perplexity" (p. 5). He continued, technology is "the totality of rational methods . . . that stands at the center of modern culture. . . . Some of the most intriguing new technologies have to do with the alteration of psychological or spiritual states" (Winner, 1992, p. 9), especially when we consider intelligent systems that can learn and act autonomously. Machine learning has already been implemented to take on some commercial operations as described by technical writer Jennifer Kite-Powell (2017):

> Bots can already be trained to answer and respond to simple queries. Over time, Bots will be able to respond to more complex queries and their ability to solve complex problems will continue to increase, allowing them to interact in more meaningful ways with customers. (n.p.)

In this example, an intelligent technology is acting in the physical world, as well as being represented linguistically as an agent acting in a sentence. Once a technology can take actions that impact people in a physical world, ethical questions arise, especially regarding technological systems that have the potential for lethal outcomes. When a technology can act independently and potentially take

an action that can kill a human, who is responsible for that action? Winner (1992) argued that "Autonomous technology is ultimately nothing more or less than the question of human autonomy held up to a different light" (p. 43). Technical and professional communicators are necessarily implicated in these ethical relationships when we write about technologies.

If an intelligent technology can take independent action similar to a person, can the consequences of that action be judged by the same ethical principles whether it is taken by a machine or a person? In considering human actions, Keith Abney (2012) distinguished between actions taken through instinct and those taken after deliberation. He concluded that machines are not subject to ethical judgement because their actions are programmed and therefore instinctual, not deliberative (Abney, 2012, p. 46). The question remains unanswered, though: "Who is responsible for an action taken by an intelligent technology?" The ***designer***? The programmer? The operator? The technical communicator who enables the operator to use the machine? This question comes into sharp focus when we consider intelligent military systems known as "lethal autonomous weapons" that are designed to fight, defend, and kill. This lethal defense technology is undoubtedly embedded in a complex network of people who design, produce, and implement the system, as well as people who are targets of the system. As Winner (1992) argued, such autonomous technological systems seem out of the control of any one person or group of people. More than a question of direct implementation, the question of responsibility becomes more about underlying values than direct action. When the technological system is so complex as to be beyond the control of any one human organization, the implication is that the values embodied in the technology are social values.

Technical and professional communicators participate in systems of social values when we give voice to technological knowledge. What is our responsibility in this knowledge/power system? Although technical communication has historically been viewed as functional and instrumental, more recent cultural studies conclude that technique and correctness in themselves do not represent the influence that technical communicators exert on people's understanding of their (im)possible relations with technologies (e.g., Jones, 2016; Jones et al., 2016; Longo, 1998, 2000; Slack et al., 1993). Because technical and professional writers work within institutions, such as businesses, governmental agencies, and academia, our practices "serve to (de)stabilize important rational and scientific knowledge/power structures in our culture" (Longo, 2006, p. 22). We work at the intersection of institutions and publics; whose interests do we serve? "Only when technical communicators accept responsibility as authors within our cultural context can we begin to understand and control our practices and the technologies in which we are complicit" (Longo, 2006, p. 22). Only when we look for the interests of people whose experiences have traditionally been marginalized because they threatened to destabilize the dominant knowledge/power system—such as the half of the world's population who are currently not connected to the internet or people who

live with very low incomes that do not allow them full online access to opportunities and services—can technical communicators add ***social justice*** concerns to our professional values and our "reasoned habit of mind in making something" (Aristotle, 1991, p. 320).

Technology as a means and an end becomes in itself a rationale for action, since it shapes a society's values while it is, in turn, shaped by those values. Neil Postman (1993) argued that "every culture must negotiate with technology" (p. 5) because "radical technologies create new definitions of old terms . . . that have deep-rooted meanings" (p. 8), such as *human* and *technology*. Postman further argued that a technology "creates the 'conditions of intercourse' by which we relate to each" (p. 14). In examining one documentary example of how society shapes and is shaped by technological values, Katz (1992) asked how some people in the Third Reich could come to view other people as subhuman objects for extermination. He determined that their rationale was "grounded not in the arrogance of a personal belief in one's superiority, but rather in a cultural and ethical norm of technology . . . the ethic of technological expediency" (Katz, 1992, p. 265). On a textual scale, this case illustrated the importance of word choice and syntax in reflecting cultural values. On a societal scale, it illustrated an ethical system in which humans and technologies were intertwined in institutional systems with far-reaching consequences for people's lives.

As long as the word *technology* obscures human and machine agency, the use of this term contains the possibility of ethical ambiguity. This term can also reveal societal values that place convenience and practicality over the messiness of human nature (e.g., Dilger, 2006). As technical and professional communicators are increasingly called upon to consider questions of social justice as well as institutional stability (e.g., Haas & Elbe, 2018; Walton et al., 2019; Williams & Pimentel, 2012), we should use the word *technology* with caution because adopting a machine-based ethic has important, life-and-death implications for other people and the world we perpetuate. We should use what Natasha N. Jones and Miriam F. Williams (2020) call the "just use of imagination" to safeguard the humanity of all people and counteract oppressive practices that could be contained in relationships between humans and machines.

References

Abney, K. (2012). Robotics, ethical theory, and metaethics: A guide for the perplexed. In P. Lin, K. Abney, & G. A. Bekey (Eds.), *Robot ethics: The ethical and social implications of robotics* (pp. 35-52). The MIT Press.

Aristotle. (1991). *On rhetoric: A theory of civic discourse* (G. A. Kennedy, Trans.). Oxford University Press.

Bridle, J. (2018, June 15). Rise of the machines: Has technology evolved beyond our control? *The Guardian*. https://www.theguardian.com/books/2018/jun/15/rise-of-the-machines-has-technology-evolved-beyond-our-control-

Dilger, B. (2006). Extreme usability and technical communication. In J. B. Scott, B. Longo, & K. V. Wills. (Eds.), *Critical power tools: Technical communication and cultural studies* (pp. 47-70). State University of New York Press.

Haas, A. M., & Eble, M. F. (Eds.). (2018). *Key theoretical frameworks: Teaching technical communication in the twenty-first century*. Utah State University Press.

Havelock, E. A. (1986). *The muse learns to write: Reflections on orality and literacy from antiquity to the present*. Yale University Press.

Hometree. (n.d.). *How does a thermostat work?* https://www.hometree.co.uk/energy-advice/central-heating/how-does-a-thermostat-work.html

Jones, N. N. (2016). The technical communicator as advocate: Integrating a social justice approach in technical communication. *Journal of Technical Writing and Communication*, *46*(3), 342-361. https://doi.org/10.1177/0047281616639472

Jones, N. N., Moore, K. R., & Walton, R. (2016). Disrupting the past to disrupt the future: An antenarrative of technical communication. *Technical Communication Quarterly*, *25*(4), 211-229. https://doi.org/10.1080/10572252.2016.1224655

Jones, N. N., & Williams, M. F. (2020). *The just use of imagination: A call to action*. ATTW. https://attw.org/blog/the-just-use-of-imagination-a-call-to-action/

Katz, S. B. (1992). The ethic of expediency: Classical rhetoric, technology and the Holocaust. *College English*, *54*(3), 255-275. https://doi.org/10.2307/378062

Kite-Powell, J. (2017, December 29). The next technology shift: The internet of actions. *Forbes*. https://www.forbes.com/sites/jenniferhicks/2017/12/29/the-next-technology-shift-the-internet-of-actions/?sh=27adcde32270

Longo, B. (1998). An approach for applying cultural study theory to technical writing research. *Technical Communication Quarterly*, *7*(1), 53-73. https://doi.org/10.1080/10572259809364617

Longo, B. (2000). *Spurious coin: A history of science, management, and technical writing*. State University of New York Press.

Longo, B. (2006). Theory. In J. B. Scott, B. Longo, & K. V. Wills. (Eds.), *Critical power tools: Technical communication and cultural studies* (pp. 21-24). State University of New York Press.

Newport, C. (2020, May). When technology goes awry. *Communications of the ACM*, *63*(05), 49-52. https://doi.org/10.1145/3391975

Ong, W. J. (1992). Writing is a technology that restructures thought. In P. Downing, S. Lima, & M. Noonan. (Eds.), *The linguistics of literacy* (pp. 293-319). J. Benjamins. https://doi.org/10.1075/tsl.21.220ng

Oxford University Press. (n.d.). Technology. In *Oxford English Dictionary*. Retrieved March 11, 2011, from https://www.oed.com

Postman, N. (1993). *Technopoly: The surrender of culture to technology*. Vintage Books.

Slack, J. D., Miller, D. J., & Doak, J. (1993). The technical communicator as author: Meaning, power, authority. *Journal of Business and Technical Communication*, *7*(1), 12-36. https://doi.org/10.1177/1050651993007001002

Walton, R., Moore, K., & Jones, N. (2019). *Technical communication after the social justice turn: Building coalitions for action*. Routledge Press. https://doi.org/10.4324/9780429198748

Williams, M. F., & Pimentel, O. (2012). Introduction: Race, ethnicity, and technical communication. *Journal of Business and Technical Communication*, *26*(3), 271-276. https://doi.org/10.1177/1050651912439535

Williams, R. (1985). *Keywords: A vocabulary of culture and society* (Rev. ed.). Oxford University Press.
Winner, L. (1978). *Autonomous technology: Technics-out-of-control as a theme in political thought*. The MIT Press.