Definition and usage

Science

Definition and usage The invention of the printing press made it possible for scientists and politicians to communicate their ideas with ease, leading to the Age of Enlightenment; an example of technology as a cultural force. The use of the term technology has changed significantly over the last 200 years. Before the 20th century, the term was uncommon in English, and usually referred to the description or study of the useful arts.[1] The term was often connected to technical education, as in the Massachusetts Institute of Technology (chartered in 1861).[2] " Technology" rose to prominence in the 20th century in connection with the Second Industrial Revolution. The meanings of technology changed in the early 20th century when American social scientists, beginning with Thorstein Veblen, translated ideas from the German concept of Technik into " technology." In German and other European languages, a distinction exists between Technik and Technologie that is absent in English, as both terms are usually translated as " technology." By the 1930s, " technology" referred not to the study of the industrial arts, but to the industrial arts themselves.[3] In 1937, the American sociologist Read Bain wrote that " technology includes all tools, machines, utensils, weapons, instruments, housing, clothing, communicating and transporting devices and the skills by which we produce and use them."[4] Bain's definition remains common among scholars today, especially social scientists. But equally prominent is the definition of technology as applied science, especially among scientists and engineers, although most social scientists who study technology reject this definition.[5] More recently, scholars have borrowed from European philosophers of " technique" to extend the meaning of technology to various forms of instrumental reason, as in Foucault's work on technologies of the self ("

techniques de soi"). Dictionaries and scholars have offered a variety of definitions. The Merriam-Webster dictionary offers a definition of the term: " the practical application of knowledge especially in a particular area" and " a capability given by the practical application of knowledge".[6] Ursula Franklin, in her 1989 " Real World of Technology" lecture, gave another definition of the concept; it is " practice, the way we do things around here". [7] The term is often used to imply a specific field of technology, or to refer to high technology or just consumer electronics, rather than technology as a whole.[8] Bernard Stiegler, in Technics and Time, 1, defines technology in two ways: as " the pursuit of life by means other than life", and as " organized inorganic matter."[9] Technology can be most broadly defined as the entities, both material and immaterial, created by the application of mental and physical effort in order to achieve some value. In this usage, technology refers to tools and machines that may be used to solve real-world problems. It is a far-reaching term that may include simple tools, such as a crowbar or wooden spoon, or more complex machines, such as a space station or particle accelerator. Tools and machines need not be material; virtual technology, such as computer software and business methods, fall under this definition of technology.[10] The word " technology" can also be used to refer to a collection of techniques. In this context, it is the current state of humanity's knowledge of how to combine resources to produce desired products, to solve problems, fulfill needs, or satisfy wants; it includes technical methods, skills, processes, techniques, tools and raw materials. When combined with another term, such as " medical technology" or " space technology", it refers to the state of the respective field's knowledge and tools. " State-of-the-art technology" refers to the high technology available to

humanity in any field. Technology can be viewed as an activity that forms or changes culture.[11] Additionally, technology is the application of math, science, and the arts for the benefit of life as it is known. A modern example is the rise of communication technology, which has lessened barriers to human interaction and, as a result, has helped spawn new subcultures; the rise of cyberculture has, at its basis, the development of the Internet and the computer.[12] Not all technology enhances culture in a creative way; technology can also help facilitate political oppression and war via tools such as guns. As a cultural activity, technology predates both science and engineering, each of which formalize some aspects of technological endeavor. Science, engineering and technology The distinction between science, engineering and technology is not always clear. Science is the reasoned investigation or study of phenomena, aimed at discovering enduring principles among elements of the phenomenal world by employing formal techniques such as the scientific method.[13] Technologies are not usually exclusively products of science, because they have to satisfy requirements such as utility, usability and safety. Engineering is the goal-oriented process of designing and making tools and systems to exploit natural phenomena for practical human means, often (but not always) using results and techniques from science. The development of technology may draw upon many fields of knowledge, including scientific, engineering, mathematical, linguistic, and historical knowledge, to achieve some practical result. Technology is often a consequence of science and engineering – although technology as a human activity precedes the two fields. For example, science might study the flow of electrons in electrical conductors, by using already-existing tools and knowledge. This new-found knowledge

may then be used by engineers to create new tools and machines, such as semiconductors, computers, and other forms of advanced technology. In this sense, scientists and engineers may both be considered technologists; the three fields are often considered as one for the purposes of research and reference.[14] The exact relations between science and technology in particular have been debated by scientists, historians, and policymakers in the late 20th century, in part because the debate can inform the funding of basic and applied science. In the immediate wake of World War II, for example, in the United States it was widely considered that technology was simply " applied science" and that to fund basic science was to reap technological results in due time. An articulation of this philosophy could be found explicitly in Vannevar Bush's treatise on postwar science policy, Science–The Endless Frontier: " New products, new industries, and more jobs require continuous additions to knowledge of the laws of nature... This essential new knowledge can be obtained only through basic scientific research." In the late-1960s, however, this view came under direct attack, leading towards initiatives to fund science for specific tasks (initiatives resisted by the scientific community). The issue remains contentious–though most analysts resist the model that technology simply is a result of scientific research