learning

Learning is a term used in contemporary educational theory to describe the ability to build up and add to a foundation of concepts, beliefs, and applicable skills. Techniques of argumentation and other means of communication are seen as a relevant part of these skills, but so too are motor skills that help control the use of the body and its parts, including the senses and brain. The faculty of learning applies to animals, humans, and some artificial technologies; but we will focus here on human learning, which has been scrutinized and discussed for the longest time. Information, or messages to which the receiver attends, plays a crucial role in the acquisition and development of knowledge and mental habits, but it can also disturb and disorganize them.

Memory has long been and still is an integral part of the learning process by allowing for both storage and retrieval in the mind and in external media of many kinds—from cave walls and notched stones to electronic devices. Natural memory depends on the physiology of the human brain but also on the training specific to cultural habits of child rearing and education. In many, perhaps most cultures before the recent reliance on finding aids and electronic devices, a strong memory was considered one of the greatest intellectual and moral virtues. One of the principal goals of education was to develop natural memory; as a result, we have records of feats of memory that seem nearly impossible today. In short, human mnemonic capacities have varied over time, as have the various forms and media of external memory.

Individual learning depends on interactions with the world and with others. This article will examine the recent theory of connected learning and show how kinds of connected learning operated in practice in historical contexts, in particular in the community of sixteenth-century Zurich. It will then consider the possibility of self-learning (or autodidacticism), in particular

through the example of the self-taught Cambridge PhD Tara Westover and her memoir *Educated*, published in 2018.

Connected Learning Theory

Modern theories of information tend to overwrite the traditional concept of knowledge with a more flexible concept of information as bits of knowledge, associated with a technology of storage and transmission. As "information" is transferred, the means of its transfer are important—they codefine (and thus manipulate or on a positive note help formulate) any message or observation.

Connected learning theory is a recent ideal of learning that encourages learners to make decisions and respond quickly as new information is continually acquired. Connected learning theory values the ability to create connections amid a diversity of inputs, to distinguish important from unimportant information, and to recognize whether newly gathered information should alter decisions already made. The capacity to acquire new knowledge is therefore more critical than the amount of knowledge that has been acquired; and maintaining and augmenting connections to sources of learning are crucial techniques to facilitate continual learning. The theorists of connected learning aim to integrate machine learning with human learning. They thus stray from the field of psychology, in which modern theories of learning developed, notably in the wake of seminal work of Jean Piaget (1896–1980) on cognitive development. Instead these theorists strive toward practices of collecting as the basis for connected learning. This theory focuses on learners as collectors of information and on their process of gathering objects and information as just as constitutive of learning as the knowledge that is collected.

Although the theory is new, the practice of connected learning is anything but. Good examples include *encyclopedic practices in many cultures that gathered information from many

sources, the various “republics of letters” formed by personal and remote interactions among scholars from different backgrounds with shared intellectual interests (including European Renaissance and Enlightenment), and the participation in a burgeoning public sphere. Other entries in this volume give overviews on those topics. Instead I will use as an example of premodern connected learning communities a midsized city, sixteenth-century Zurich, with about five thousand inhabitants, which served as the economic and cultural capital of its region. Connected learning operated through the civic community, but the records that survive about oral and other nontextual learning habits are very sparse. Most of the developments that we can reconstruct today were recorded by learned scholars working with texts. They thus present modern researchers with a scholarly technology rather than, say, a public response to news and information.

Connected Learning: A Sixteenth-Century Case

Sixteenth-century Zurich was not a democracy, but neither was it a completely authoritarian society. A culture of diversity was fostered through its status as a free imperial city and its late-medieval organization into twelve guilds, with the aristocratic land-owners (and other citizens not belonging to another guild) being one of them; other guilds included occupations such as merchants, apothecaries, or shoemakers. Together, the guilds' representatives governed the city. Vertical and horizontal social mobility allowed sons and daughters to follow different career paths from their elders. Litigation courts managed diversity of opinion, in particular when opinion clashed with town laws. These courts heard and pondered each side of the argument and imposed penalties in order to maintain internal peace. As long as the laws of state or church were not at issue, people discussed opinions openly on the street.

One central activity in the community of Zurich was a process of connected learning, one

that involved a diversity of contributions. In the early years of the Reformation in Zurich, one endeavor of the learned church elite was to engage in a public discussion of how to translate the Bible, the most important basis for wisdom and moral instruction. Four designated scholars used the daily mass in the Grossmünster Church to come together to discuss in front of an audience of citizens, men and women of all social ranks, the best way of translating the Holy Book, sentence by sentence. In their collective deliberations, they compared the Bible transmitted in the learned languages (Hebrew and Aramaic, Greek, and Latin) and translated passages into German to make them accessible to the public. In their open dispute, the scholars detailed and compared differences in each version. The Greek and Hebrew specialist Theodor Bibliander (ca. 1506–64) was one of them, and he was especially interested in the comparison of different versions. He understood the philosophical approach of comparing languages for a true understanding of the Bible, which he believed would lead in the end to world peace.

Alongside such events attended by a wide range of community members, the scholars of Zurich (as in many other cities of early modern Europe) were concerned to store and transmit the information they accumulated. Drawing on models from antiquity and the inheritance from medieval institutions, sixteenth-century Zurich had a significant cathedral library, a growing city archive, and a number of compiling projects carried out by individuals. These can be considered nonhuman memory appliances, equivalent to our various electronic media today. In the sixteenth century these collections increased significantly for a number of reasons, including the growth of official record keeping and the production of printed books, the circulation and trade in specimens and objects within Europe and beyond, and most fundamentally a genuine enthusiasm for the accumulation of information in many forms. This growth of information posed problems of organization and retrieval and motivated new experiments in the methods of managing books,

archives, and information of many kinds.

Thus the catalog of the Grossmünster library, with its unusual taxonomy that offered lists organized by author, title, and topic, may have inspired the famous Zurich encyclopedist Conrad Gessner to compile a reference book that sorted all known books by the topics they treated (the *Pandectae* [pandects] of 1548, sorting the contents of his *Bibliotheca universalis* [universal library] of 1545). At the same time, Gessner also tapped a pan-European network of correspondents and readers whose contributions of information about animals and plants made possible the large *encyclopedias of natural history that he published. As he thanked contributors in print for sending him specimens or images of text extracts, he encouraged further contributions from existing but also new contacts. Through his letter writing and his explicit thanks to informants in his publications Gessner nurtured and maintained the connections needed to facilitate continual learning.

Sixteenth-century Zurich offers just one example of the kinds of connected learning that occurred in a myriad of places in the early modern world, in Europe and elsewhere. In applying the notion, our learning today indicates that we all are (largely unconsciously) using premodern academic techniques that rely on textual sources rather than experiences, and that store our information in organized external memory. Scholars developed these techniques before the sciences and the *humanities separated, and before the term “research” was used to characterize their work.

Autodidacticism

Learning was closely associated with teaching in the long tradition of European pedagogy in all European languages: a learning person, according to the philologists Jacob and Wilhelm Grimm’s *Wörterbuch* (dictionary, 1854), was synonymous with a pupil, student, or apprentice,

and this person would always have a master as interlocutor. The intellectual circles of late seventeenth- to nineteenth-century Europe however, integrated a certain type of student, who earlier had a rather marginal role and negative connotation. These came to be called "autodidacts," named after the Greek, those who self-learned or were self-taught. This term was applied both to people who published and taught in university disciplines such as astrophysics or economics, even though they had not received a formal school or university education, and to those who from a humble and illiterate background had taught themselves how to read and write. Compared with the sixteenth century, where many scholars were self-taught but did not broadly discuss the topic, the frequent usage of the term in the later scholarly discussions shows that formal education was now the norm for reaching professional excellence in the disciplines, and for being able to read and write.

An influential source for the idea of the autodidact as not only being self-taught, but also having learned to reason without outside help, was Ibn Tufail's *Philosophus Autodidactus*, a book originally written in the twelfth century that Edward Pocock translated in 1671 from Arabic into Latin. The book tells of a child who grew up on a desert island without any human contact. By the sole use of his own reason and experience, the young man not only learned the rules necessary for living but also penetrated into the most hidden secrets of the sciences. When he was accidentally discovered, it turned out that by his natural judgment he had far surpassed all ordinary philosophers. The book was influential in the eighteenth century on presentations of castaway narratives, not least the learning theory that Jean-Jacques Rousseau (1712–78) presented in his book *Emile*, where the teacher arranged learning scenarios to stimulate the boy Emile to learn by experience and through his own rationalizations and conclusions. Crucial for the success of this didactic method was the exclusion of Emile from human society, so that his

tender mind would not be spoiled or corrupted.

Already at the end of the seventeenth century scholars and pedagogues debated whether the self-learners could read or understand the disciplines they studied without a teacher's guidance. The fear was that they would misunderstand their readings and give bad advice to those whom they served professionally. This fear diminished during the eighteenth century, and innovative pedagogical approaches were encouraged, especially in the sciences and economics, where agricultural progress was based on a creative reading of new and old sources together with an open mind for new experiments and calculations. The Royal Society, which awarded membership to the most innovative scientists of its day, had many autodidacts among its members, including artists who became published science illustrators and mining engineers. Examples include the famous German mathematician Gottfried Wilhelm Leibniz (1646–1716) and the astronomer John Hellins (1749–1827). To integrate autodidacts meant to accept (and prefer) a diversity of opinions and to be open to judgments that deviated from the standard protocol or canon.

Today, in spite of the rigorous formal training that modern educational systems typically involve, we are self-taught in many of our daily practices. Once we have mastered the basics of reading and writing, methods of thinking, and gained familiarity with the computer and internet, then we can teach ourselves through our networks, our reading, or how-to videos. In her memoir *Educated* (2018), Tara Westover describes growing up without a formal education or access to the networks of information in modern society. She was deprived of both because her father, a radical Mormon survivalist, prepared his family for the last judgment, which he considered imminent. Largely self-taught, using books and materials supplied by her elder siblings, she made her way into college and finished with a PhD in history at Cambridge University. She

finally thought of herself as educated when she had developed an independent voice to formulate opinions and beliefs of her own, which she based on her experiences, readings, research, and rationalizations. To be self-taught helped her to be passionate about her learning but was also an obstacle because she lacked basic historical knowledge (she had never heard of the Holocaust or the civil rights movement), and had little sense of how problems might admit of more than one interpretation.

The facts and stories that she learned were less important for her than the process of self-finding. When asked how she would conceptualize education, she answered that she would be in favor of open-ended learning materials, so as to offer the full breadth of possibilities.

Once admitted into college, Westover had a few understanding teachers who helped her. But even in her formal-learning phase, she did most of her learning via self-motivated reading of textbooks. Her doctoral thesis was an account of coming to terms with her past. She analyzed her religious background of Mormonism and put her early readings of the Book of Mormon and other religious literature into a historical and philosophical context. By historicizing her religious reading, she was able to make sense of it as useful and important, and she found a voice as a historian thinking and making sense of her past experiences. Westover represents a new form of autodidacticism that is based on connected learning: Her learning rests in diversity of opinion; she connects specialized nodes or information sources; she values the capacity to know more as more important than what is currently known; she maintains connections needed to learn; and she ties together different fields and ideas, linking her religious upbringing to her methodic study of history. Connected learning enabled Westover to free herself and obtain an education.

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See also ALGORITHMS; APPRAISING; ART OF MEMORY; DIAGRAMS; DIGITIZATION;

EXCERPTING/COMMONPLACING; GLOBALIZATION; KNOWLEDGE; MANUALS; MEDIA; PROFESSORS; REFERENCE BOOKS; STORAGE AND SEARCH; TEACHING

Further Reading

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