

restricted to political and religious leaders. Such leaders represented the elite class, who either understood the language in which the scrolls or tablets were written or could afford to have the works translated into their native tongue. Things improved for the public in the West a little over five centuries ago, with the invention of movable type and the printing press. With the Renaissance and prosperity came a literate class and the practice of printing in the common tongue instead of in Latin.

In the world of commerce, the expertise of many professions continued to be passed on through apprenticeship, sometimes supplemented by books and other forms of collective memory. This concentration of knowledge limited actual manufacturing to relatively small shops in which skilled craftsmen toiled over piecework. Things changed with the introduction of the assembly line as a method of production. The industrial revolution was possible largely because rows of machines—not an oral or written tradition—provided the structural memory of the process involved in the production of guns, fabrics, machinery, and other goods whose design enabled mass production. No longer was a lengthy apprenticeship, or literacy, or even an understanding of the manufacturing process required for someone to quickly achieve acceptable performance at a task. Anyone, including women and children with no education, could learn to refill a bobbin with yarn, keep a parts bin filled, or operate a machine in a few hours—and keep at it for 12 hours at a time, seven days a week. For the first time, productivity could be measured, benchmarks or standards could be established, and processes could be optimized. As a result, productivity increased, goods became more plentiful, and they could be offered to the masses at an affordable price while maintaining a healthy profit margin for the company and its investors. However, knowledge of the overall process and how individual workers contributed to the whole was closely held by a handful of assembly-line designers and senior management.