Gutenberg's Press in a global context: Why a revolution happened in Europe and not elsewhere

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July 9th, 2018

ETEC-540: Text and Technology

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Gutenberg's printing press is widely regarded as one of the most important developments in history and in many ways the modern Western era begins with the printing revolution.

Technological components

When Gutenberg began developing his printing press in 1440, five technological ingredients necessary for the innovation were available in major European cities.

Ink was in use by both scribal and block-printing industries to produce their works. (Watson, 2006, p. 519)

Paper was in widespread use in Italy by the 1300s. (Watson, 2006, p. 519)

Printing itself already exited in the form of wood block technology. Books and playing cards were being produced in Europe by the 1300s. (Meggs, 2012, p. 69)

Screw turn presses had been used from pre-Roman times to produce wine and olive oil, (Man 2009, p. 135; Meggs 2012, p. 73) and were used to press paper and cheese in Gutenberg's time (Meggs, 2012, p. 73)

Lastly, writing— in alphabetical form—had been around since classical Greek and Roman times. (Watson, 2006, p.115-116)

To invent his press, Gutenberg had to invent metal movable type. His hand-mold based system allowed not only for reusable type, but also reusable matrix and punches, all of which made for a durable, reusable, and cost-effective system. (Man, 2009, p. 126-130; Meggs, 2012, p.73)

"Gutenberg also had to refine dozens of other sub-technologies—the business of storing type, composing it, setting it in multiple pages, getting it on to a suitable press, making the right paper, manufacturing the best sort of ink, and then ensuring quality control…" (Man, 2009, p. 134-135)

Understandably, it took ten years for Gutenberg to perfect his press, and the research and development involved required large sums of startup capital, which Gutenberg acquired from several investors. (Meggs, 2012, p. 75)

There was more going on than the technological ingredients we've just listed. This becomes obvious when we consider how these technological components were present in different areas of the world—in some cases 100s of years before they were available to Gutenberg.

China was confronted by the challenge of a writing system of 40,000 characters. As such, the benefits of movable type printing presses would be negligible, which is probably why the Chinese stuck to block printing, despite having experimented with movable type.(Evon, 2009, p. 1; Lupton, 2010, p. 13; Man, 2009, 109; Meggs, 2012, p. 72)

The Mongols and Koreans both had access to alphabetic systems and to the Korean movable metal type printing press, invented by 1200 AD. (Man, 2009, p.109-113; Sissingh, 2017, p. 9) However, the Mongols were mostly illiterate and the empire was administered by literate Chinese officials. No reader market and no administrative need for their alphabetic system, there was thus no reason for the Mongols to invest in movable type printing. (Elverskog, 2016, p.30-31; Man, 2009, p.113)

Meanwhile, the elites of Korea resisted the adoption of the Korean alphabet. Since commoners could easily learn the alphabet, its adoption would have led to the elite "losing Chinese, the badge of their elitism" (Man, 2009, p.115) and would have destabilized the Chinese-based educational foundations of the Korean state. (Evon, 2009, p.3) State and elite interests remained aligned on this point, and the state maintained a monopoly on printing technologies.(Hippe 2015, 28; Evon, 2009, p.17)

Muslims had an extensive literature and scribal culture based on their alphabet. However, the religious elite of Islam—the imams— actively resisted Gutenberg's printing press after its development. Their power was derived from disseminating information, so printing technology would have undercut their elite position in society. The Ottoman state, which controlled the vast majority of Muslim lands, was powerfully centralized. The state's power and alignment with the interests of the religious elites ensured that there was strict adherence to the banning of printing technology. (Hippe, 2015, p.15-16)

Despite having the technological requirements of Gutenberg's press, historical and cultural contexts in these areas blocked the invention of the printing press. We could summarize these contextual restraints as follows: the alignment of traditional elite interests with those of the state, the ability of the state to control print technology, and the lack of a market of alphabet-literate readers demanding books.

The context in Gutenberg's Europe was very different.

Europe was a smorgasbord of states, not only empires and kingdoms but city states, market towns, and merchant guilds. Competition between these states resulted often enough in armed violence but it also led to more peaceful competition, as with the patronage of artists, musicians, and—after Gutenberg—the publishing of printed books. (Man, 2009, p. 209)

In addition, the internal composition of these states was marked by a tension between traditional feudal elites and nouveau riche urban elites.(Rifkin 2009, 262) Over time, the nouveau riche were gaining ascendancy via new trade routes, as well as the labour-saving, cost reducing effects of milling technologies. (Rifkin, 2009, p. 263) The nouveau riche had the money to spend on books, and to invest in novel inventions such as the printing press.

Culturally, Europe's elite were influenced by the Renaissance, a cultural movement which emphasized humanism; secularism; anti-traditionalism; and knowledge through experimentation and logic. (Eisenstein, 1980, p.101)

"…the Catholic Church actively demanded printed books from private printers once the printing press was invented. Thus it represented a large and potentially reliable customer for businessmen."(Hippe, 2015, p. 28)

Even if the Church had wanted to prevent the spread of the press—as Muslim and Korean elites had—it wouldn't have been able to. The Church's power was diminished by internal divisions. (Eisenstein 1980, p. 102; Watson, 2006, p. 622) and states increasingly resisted the power of the Church.(Watson, 2006, p. 490)

"Between the early fourteenth century and 1500 the number of universities grew….Most of the fifteenth century universities were founded as secular institutions, by municipalities, and were only confirmed by the papacy."

The reason for the growth of universities was an interest in literacy in secular subjects, such as medicine, accounting, and law. Any male (females were excluded) of at least 12 years of age, showing a propensity to learn Latin (the language of instruction) was allowed to enroll. The growth of universities led to increased demand for paper for books and increases in literacy. (Watson, 2006, p. 510-511)

University teachers taught through dictation, as books were scarce. The aim was to help students memorize texts, and to produce manuscripts. Manuscripts were either kept by students for employment-related purposes, or sold to a market hungry for books. However, even before the press, the oral component of learning was decreasing in importance, and silent reading was becoming more prevalent as literacy spread.(McLuhan, 2011, p. 108)

The influence of the press on literacy and education

It is this context which allowed Gutenberg to successfully develop his press. By 1500, about 1000 printing presses were employing ten to twenty thousand people (Man, 2009, p. 221) and had churned out about 20 million books. (Man, 2009, p. 210; Watson, 2006, p. 523). This had noticeable impacts on literacy and education:

"Although to begin with the market was chiefly among universities and other academically minded souls, books soon reached out to the general public." Religious, grammar, chivalric romances, scientific, mathematical, astrology, and travel books all became popular. In this way "The arrival of printing…did not so much change the shape of the culture as make it far more readily available to many more people." And, as publishers competed to make ever more perfect books, through proofreading, kl pagination and indexes, reading became easier. (Watson, 2006, p. 523-524)

Printing helped increase literacy, texts were increasingly printed in the vernacular rather than Latin, (Moodie, 2014, p. 7-8) and ideas requiring accurate and precise visual representations—mathematical equations, charts, and maps—were disseminated in earnest. This not only helped the spread of trade networks—as with maps—but also contributed to the increased specialization of education—as with mathematics and the sciences. (Moodie, 2014, p. 12 and 19)

Beyond education and literacy, the context that had enabled the creation of the printing press—the mosaic of competing state entities, a not-all-powerful Catholic church, the tensions between traditional and nouveau riche elites, the cultural drives of the Renaissance—were all in turn impacted by print, which then changed the dynamic relationships between these contextual factors.

For instance, the printing press was used by Martin Luther to disseminate his ideas, which sparked The Reform and split Christendom into Catholicism and Protestantism. One of Luther's key concepts was that Christians should directly read the Bible. With the proliferation of cheap vernacular Bibles and literacy-spreading universities, this ideal became attainable, and also contributed to increases in literacy. (Eisenstein, 1980, p. 102-3)

The Reform also sparked religious turmoil, which had consequences for state dynamics, dynamics implicated in the cataclysms of the 30 Year War, and the emergence of the modern nation state. (Nexon, 2009, p. 265-273)

Increases in literacy and the large numbers of books contributed to the growth of vernacular texts and the spread of secularism (Watson, 2006, p. 523-524) In turn this influenced what was taught in universities. (Moodie, 2014, p. 9)

It's interesting that literacy increased in part due to religious concerns, but that this then fed into further secularization, which is somewhat antithetical to the aims of the Protestant movement.

You can probably see how difficult it is to separate out the influence of print on education from the shifting context in Europe. Not only is education being influenced by print technology, but also by other contextual factors, themselves dynamically related to one another.

Because of these dynamic relationships, Gutenberg's press has been implicated as a necessary precursor to the industrial revolution, nationalism, and modern science (McLuhan, 2011, p. 142-143; Meggs, 2012, p. 81) and all of these phenomena have influenced the evolution of education, and have given us the education system we have today.


To summarize:

"The effects of printing seem to have been exerted always unevenly but always continuously and cumulatively from the late fifteenth century on. There appears to be no point at which they began

to diminish. Much evidence suggests that they have persisted with ever-augmented force right down to the present."(Eisenstein, 1980, p. 106)

Thanks for watching, and Gutenberg be with you.

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