

## **Media Theory, Education, and the University: A Response to Kittler's History of the University as a Media System**

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### **Abstract**

Developments in media technologies occurring more recently than cave paintings, hieroglyphs, or the phonetic alphabet have prompted similar epochal pronouncements. The computer and the Internet, we have been told, will usher in a more civilized and advanced era. For enthusiastic proponents of a completely networked university, this means that tasks such as storing and retrieving books and taking notes in the lecture hall will soon be a distant memory. The computer, together with digital networks, will render these familiar elements of university education obsolete. For critics, the increasing computerization of the university signals the death of 500 years of print-based education. The future, they fear, is one in which Wikipedia entries and Google search results will surpass the utility and legitimacy of printed books and articles.

### **Introduction: The University, Education & Media Theory**

Media and education have long been closely linked. Speaking of collective human education, Rousseau claimed an “almost exact correspondence” between stages of social development and modes of writing:

three ways of writing correspond almost exactly to three different stages according to which one can consider men gathered into a nation. The depicting of objects is appropriate to a savage people; signs of words and of propositions, to a barbaric people; and the alphabet to civilized people. (1966, 17)

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The computer and the Internet, we have been told, will usher in a more civilized and advanced era. For enthusiastic proponents of a completely networked university, this means that tasks such as storing and retrieving books and taking notes in the lecture hall will soon be a distant memory. The computer, together with digital networks, will render these familiar elements of university education obsolete. For critics, the increasing computerization of the university signals the death of 500 years of print-based education. The future, they fear, is one in which Wikipedia entries and Google search results will surpass the utility and legitimacy of printed books and articles.

The strident positions of both the critics and enthusiasts in these debates ignore the historical imbrications of education and media. The history of the university – among the oldest continuously operating institutions, east or west – is impossible to consider without recognizing the intimate relationship that this institution has with changing media technologies for storing, producing and disseminating information. Attention to the role

of the codex, print and more recent media technologies show that the co-evolution of the university and media is certain to continue

According to this historical perspective, any presuppositions of the inherent universalism of the pursuit of knowledge are subject to what has become known as the mediatic *a priori*. What we know as knowledge, education, and the university, in other words, are contingent upon the contemporary system of media devices and technologies. It follows, then, that any changes within the media system result in changes in education and knowledge: how they are pursued, produced, stored, disseminated and reproduced within and among institutions. Changes in media, for example the invention of the printing press, the rise of a reading public, and later the emergence of telegraph, film, gramophone and typewriter, are accompanied by changes in the culture of education and also in the university and its practical and institutional configurations and functions.

This perspective on media and the university is familiar from media theory, an approach that prioritizes the *form* of media over its content. Media theory, as many North Americans understand it, is associated with the work of Canadians Harold Innis (1950; 1951) and Marshall McLuhan (1962; 1964) and complemented by American writers like Walter Ong, Elizabeth Eisenstein, Neil Postman and Joshua Meyorwitz. With its morphological and technological-historical emphasis, media theory has long had an uneasy relationship with more conventional, empirical studies of media in North America:

...[its] focus on technologies, media formats, and materialities of communication did not fit easily within an intellectual landscape shaped more by questions of media ownership, audience manipulation, and strategies for communicative emancipation (Winthrop-Young & Wutz 1999, p.xiv).

Despite this marginalized position in North America, forms of media theory –and the contributions of their Canadian founders-- have grown in importance in continental Europe. In France, for example, Jean Baudrillard and Paul Virilio are not far removed from the work of North American media theorists. But it is in German speaking Europe (Germany, Austria, Switzerland) that media theory has come into its own as a new interdisciplinary field, referred to as *Medienwissenschaften* (Media Sciences) –with McLuhan as its founder and Friedrich A. Kittler as its most prominent proponent.

The purpose of this paper is to examine the university as a media system, and in particular, to examine how education has been shaped by different media forms. In doing this, we take as our starting point an essay by Kittler on the university as a media system: “Universities: Wet, Hard, Soft, and Harder” (2004). We argue that there is something missing from Kittler’s history of the university as media system: the role of education, the pedagogical practices of teaching and learning. The link between media, what is being taught, and how is it being taught is generally not considered by Kittler. With this in mind, the purpose of this paper is to re-think Kittler’s history of the university as a media system by considering the ways in which media shape pedagogy.

As Kittler’s work is little known in North American media and communication studies, we feel it is important to review, and contextualize, his work alongside theorists who are more familiar to an English speaking audience. Thus, before dealing with Kittler’s media-centric theory of the university and our response to this theory, we will first present a brief overview of German media theory and Kittler’s work in particular.

### Friedrich Kittler & German Media Theory

In 1986, Friedrich Kittler pronounced that “media determine our situation,” and so doing, staked out ways of understanding media, and culture that have come to constitute the interdisciplinary field of *Medienwissenschaften*. W.J.T. Mitchell and Mark Hansen (2010) characterize Kittler’s pronouncement as follows:

Packed into Kittler’s statement is a crucial claim: that media form the infrastructural basis, the quasi-transcendental condition, for experience and understanding. Like the strata of the seeable and sayable that, in French philosopher Michel Foucault’s archaeology of knowledge, make knowledge possible in a given historical moment, media broker the giving of space and time within which concrete experience becomes possible. (vii)

According to this way of theorizing media, any presuppositions of the inherent universalism of the pursuit of knowledge are subject first to the “quasi-transcendental condition” presented by media. Knowledge, education, and the university are contingent upon the existant media system –or upon prevailing mediatic conditions or mediality (*Medialität*; Margreiter, 2006, 63-67)– such that any changes within this media system result in changes in education and knowledge: how they are pursued, produced, stored, disseminated and reproduced within and among institutions.

Alongside Norbert Bolz, Ludwig Pfeiffer and Hans Ulrich Gumbrecht, Friedrich Kittler represents what has become known as first generation German media theory. German media theory, though, is far from a coherent discipline. Geoffrey Winthrop-Young (2006), one of the principle interpreters of this movement, describes German media theory as a “motley crew of media-theoretical *paradigms* that pit incompatible basic approaches against each other...it resembles a patchwork of jealously guarded fiefdoms whose in-fighting prevents the establishment of a central authority” (p.89-90;

emphasis in the original). Despite this, in North America at least, it is often the case that the work of Kittler is taken to be representative of German media theory as a whole.

Kittler is best known through the English translations of *Discourse Networks, 1800/1900* (1990), *Gramophone, Film, Typewriter* (1999), *Optical Media: Berlin Lectures 1999* (2010), and a special edition of *Theory, Culture & Society* (2006) dedicated to interpretations of his work. As a media theorist, Kittler stands apart from those other European imports that have indelibly marked North American media studies – particularly those arriving from the centres of Birmingham and Frankfurt. In clear distinction from the brand of cultural studies associated with the Birmingham School, Kittler “is not interested in audiences or effects, resistance or hegemony, stars or genres; he spends no time on subculture, postcoloniality, gender, race, sexuality, ethnicity, or class” (*ibid.*, p.5). This strident apoliticism places Kittler in clear opposition to the Frankfurt School as well. Indeed Kittler sides with the German sociologist Niklas Luhmann in making the bold, anti-romantic gesture of rejecting the central category of the “human” in explaining social and cultural phenomena. For both, these phenomena are better explained by systems in which the “human” appears more as an epiphenomenal occurrence than as a conceptual cornerstone. Correspondingly, Kittler (also like Luhmann) explicitly rejects any sort of theorizing in terms of, say, technical system and organic lifeworld, or social processes of rational consensus-building. As John Durham Peters (2010) writes in his introduction to *Optical Media*,

Chief among many irritations is the notion of quantification as the disenchantment of the world. Kittler is a passionate friend of mathematics and an enemy of the notion that there is such a thing as “the two cultures” of science and humanities...the idea that numbers rob our soul or that humanities have nothing to do with counting or machines he finds outrageous...Kittler blames the Frankfurt School for a willed blindness to

our technical condition and a sentimentality about the humanities – and humans” (pp.2-3)

Kittler’s media theory emerged from an intellectual career that began by importing French post-structuralism to the study of literature in Germany. His study of media has been characterized as a “merger of Foucault, Lacan, and McLuhan” (Winthrop-Young & Wutz, p.xvi). For the sake of brevity we will contextualize Kittler’s work in comparison to McLuhan’s.

Kittler acknowledges his intellectual debt to McLuhan in detail in the chapter entitled “Theoretical Presuppositions” in *Optical Media* (2010, pp.29-35; see also Gane 2005). The similarities between the two are striking. Both come from a background in philology or literary criticism, both privilege *form* in their study of media over its content and, perhaps most striking, both are subject to critiques from those who question their legitimacy as scholars. Like McLuhan, Kittler distances himself stylistically from conventional scholarship – and sees the anecdote, the analogy, the metaphor as methods indispensable to their study. As such, the controversies and infamy that followed McLuhan echo in the reception of Kittler’s work. Some argue that this work presents only “a sloppy mosaic that runs roughshod over more nuanced, contextualized, and academically acceptable research” (Winthrop-Young & Wutz 1999, p.xxvi). However, what is true for McLuhan seems also true of Kittler. As Peters puts it: “If all you see are the mistakes and exaggerations, you risk missing something big if you are interested in understanding media as architectonically important to our life and times: (Peters 2010, p.10).

### The University as Media System

The history of the university as presented by Kittler is epochal, tracing four long periods of stability, and the disruptions that separate them. Kittler begins with medieval manuscript culture, progresses via the Renaissance through to 1800 (Enlightenment, Romanticism), finally, arriving at the period stretching from 1900 to the present (the epoch of “psychophysics” or physiological psychology). Kittler’s coverage of these four stages follows a broadly Hegelian narrative of an original systematic and disciplinary unity followed by an extended period of growing alienation and contradiction among these elements, ending with the promise of a reconstituted disciplinary unity. This unity, according to Kittler, is enabled by the “universality” of the computer and internet as devices for the generation, reproduction and dissemination of knowledge:

Universities have finally succeeded in forming once again a complete media system. Turing’s universal machine – *vulgo* the computer – processes, stores, and transmits whatever data it receives, whether textbooks, measurements, or algebras. Computers, therefore, have come full circle; from the mathematics departments where they once began, making their way through physics, chemistry, and medicine, they have finally arrived in the humanities. For the second time in its eight centuries, the university is technically uniform simply because all departments share one and the same hardware (*ibid.*, p.249-250).

From this, Kittler imagines a truly multi-disciplinary university wherein the study of culture and the humanities recognizes that there is nothing non-technical<sup>1</sup> about culture while science, math and engineering require study of the “cultural contexts of proofs, experiments and hypotheses” (p.251). The split between science and the humanities that characterized the university after the enlightenment can be corrected when we recognize that the basis of this split was media. “The future of the university depends on its faculty

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<sup>1</sup> “When the old humanities do not deal with man, their topics are cultural technologies such as writing, reading, counting, singing, dancing, drawing...for the humanities there is nothing nontechnical to teach and research” (p.251).

to unite the separated notation system of alphabets and mathematical symbols into a superset” (p.252). After centuries of contest between the faculties, and of a split between heterogeneous media germane to the pursuit of the sciences versus the humanities, the contemporary university occupies a moment of enormous promise.

In what follows, we adhere to Kittler’s epochal historiography, focusing on the particular periods of media change and stability in order to draw out the connections between media and education. There are two reasons for this. First, as noted previously, the relationship between media, education, and the university is underrepresented in media theory and we wish to remedy this by augmenting Kittler’s media history of the university with a parallel account of university pedagogies and educational forms. Second, Kittler’s diagnosis and prognosis of contemporary universities is particularly bold and topical, and we intend to review Kittler’s conclusions, in the light of our own media history of pedagogical methods, pointing out aspects of the educational process that Kittler overlooks, yet which are unavoidable when thinking about the university as a media system.

### **The Manuscript Era: 1100-1500**

Upon its appearance in Europe in the 12<sup>th</sup> century, the university as an independent institution represented a complete media system in the sense that oral and written means of circulating and maintaining information were all of a kind, and proper to the university itself. The basis of the medieval university was its library of Latin manuscripts which were inherited from monasteries and cathedral schools. Wider circulation of this information, according to Kittler, was accomplished via an informal “postal” system linking universities. Here as elsewhere in his analyses, Kittler works

backwards from categories derived from contemporary computer and systems science, and thus describes the early incarnation of the university in terms of three cardinal functions that mirror those carried out by today's networked computers: processing, storage and transmission:

the data-processing lecture, the data-storing university library, and the data-transmitting mail enabled a cumulative and recursive production of knowledge for almost three centuries...before Gutenberg's invention of the printing press (*ibid.*, 245-246).

Education or instruction is endogenous to this self-contained academic mediatic system. This is not only discussed explicitly by Kittler, but is registered clearly in Marshall McLuhan's comments in *The Gutenberg Galaxy* (1962) concerning writing in the medieval university. The teaching of writing, McLuhan explains, was accomplished through dictation and transcription, an educational method that was directly related to the production and consumption of manuscripts themselves:

There can be no doubt that one of the essential reasons for the custom of dictation finds its explanation in the fact that, before the era of printing, schools and scholars had no adequate supply of texts. A manuscript book cost too much; the simplest way of getting them was for the teacher to dictate the texts to his pupil. (*ibid.*, p.95-96)

A necessary complement to Kittler's discussion of the medieval university, then, is an understanding of its central pedagogical process as simultaneously a form of recording, processing and of mediatic production. Or as McLuhan puts it, "the rise of the universities brought masters and students into the field of book production in class time, and these books found their way back to the monastic libraries when students returned after completing their studies" (*ibid.*, p.134). McLuhan goes on to explain that what was being dictated was hardly uniform, as in many cases instructors "stroved to give to the

matter taught a new form suited to its own assumptions...[The instructor] mostly dictated to his students the results of these personal insights” (*ibid.*, p.97). Instruction thus involved a form of processing –in terms of the “new form” provided by the instructor– in addition to processes of data “backup” or reproduction articulated in the act of dictation. The integration and interdependence of pedagogy and the media system here is total: the entire media system is contained within the university. The division that exists today between media (re)production, consumption and storage on the one hand, and education and instruction on the other, as we shall show, has a long history. But this history begins only *after* the transformation of the university through the introduction of the printing press.

### **1500-1800: The Printed Book & the Ramist “Method”**

Elizabeth Eisenstein’s (1979, 2005) history of the printing press can be used to augment Kittler’s characterizations. She shows, for example, that developments following upon the invention of the printing press put the legitimacy of the teacher, lecturer or reader as a kind of processor and reproducer of information into question. In a world in which books were becoming relatively cheap and plentiful, the professor was no longer an unrivaled source and master of information and learning:

Gifted students no longer needed to sit at the feet of a given master in order to learn a language or academic skill. Instead, they could swiftly achieve mastery on their own, even by sneaking books past their tutors – as did the young would-be astronomer, Tycho Brahe. (Eisenstein 2005, p.38)

The academy as a unified media system was also undermined by the emergence of scientific and technical disciplines that operated in relative autonomy from the medieval *trivium*. This development, too, finds its origin in the appearance of new media forms and technologies, specifically the precise and readily-reproducible combination of

text, graphics and specialized forms of notation enabled by the printing press. Kittler (2004) notes that the “combination... of type and woodcut or copperplate enabled scientific visualization at a level of precision unheard of by Greeks and monks” (p. 248).

Elizabeth Eisenstein (2005) reinforces Kittler’s point:

The fact that identical images, maps, and diagrams could be viewed simultaneously by scattered readers constituted a kind of communications revolution in itself...For scholars concerned with scientific change, what happened to numbers and equations is surely as significant as what happened to either images or words (pp.14, 26).

The pictorial “communications revolution” was important not only for scientific progress, but for developments in education as well. Looking to the work of Walter Ong and others, it is possible to assert that among the most important of these are developments closely associated with the educational reforms of Peter Ramus (1515-1572).

As Ong explains, Ramus was an educator and educational reformer who devised what became known as the “Ramist method” of instruction (Ong 1958). Formulated in opposition to classical authorities (above all Aristotle and Cicero), this method was widely seen as providing a single efficient means of representation and organization through which a student could literally learn all that there is to know. In making this contribution, Ramus prefigured or originated a range of pedagogical notions that are today taken for granted, such as the importance of a “lesson,” the structure of a “curriculum” and, of course, the necessity of a pedagogical “method.” His educational reforms “dominated the teaching practices of European schoolmasters... [d]uring the late sixteenth and seventeenth centuries” and were particularly influential in New England. (Triche & McKnight 2004, p.41). Speaking even more broadly, Ong points out that before Ramus’s pedagogical innovation, “there was no word in ordinary usage which

clearly expressed what we mean today by ‘method,’ a series of orderly steps gone through to produce with certain efficiency a desired effect” (Ong 1958, p.225).

Ramus’s method can be thought of as a particularly mechanistic type of “literary empiricism” (Ong 1971, p.171) in which texts and their arguments are broken down into isolated terms and concepts which are then placed visually into interrelationship according to rules of precedence and antecedence. “The literary text becomes for a Ramist a kind of uninspired collection of miscellaneous details...” to be analyzed and taxonomized (Triche and McKnight, 40). Quoting a 1992 study of Ramus’s attack on Cicero, the same authors go on to explain:

Ramus proposed that unclear and confused arguments could be understood only by organizing all parts into an orderly progression moving from antecedent to consequence. Ramus’s method of arrangement accomplished this by organizing an argument so that “the chief matter is placed at the beginning, is arranged according to whether it is simple or complex, and then is argued and brought to a conclusion” (*ibid.*, p.40)

Ramus achieved this order and organization by leveraging possibilities for diagrammatic processing and transmission that had not been available to the likes of Cicero and Aristotle –or more recently, the teachers and students of pre-Gutenberg Europe. Terms and concepts extracted from texts were arranged and presented in a spatialized, diagrammatic form, in a figure known as “Ramist” or “binary tree.” (Figure 1 shows a Ramist dialectic of Philosophy that diagrams the interrelationship of the various arts; also, the computational connotations of the term “binary” are not entirely accidental, as we shall see.)

TABVLA ARTIVM, QVAS IN  
hoc Volumine coniunximus.

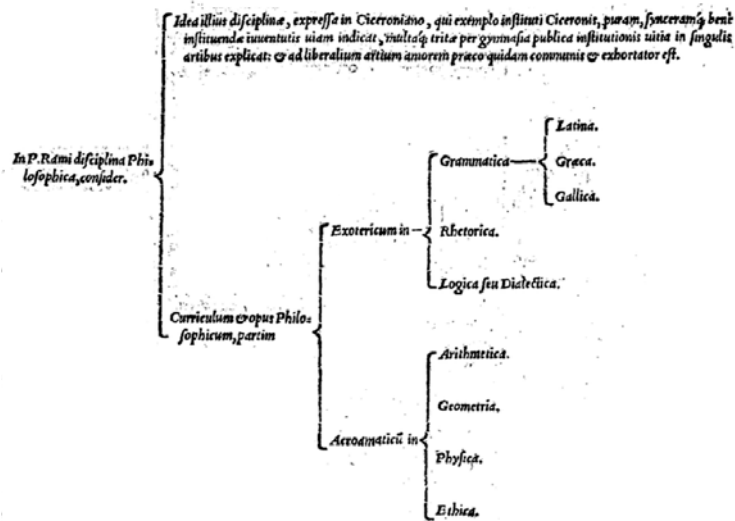


Figure 1: Table of the Arts (from: Thomas Freigius'

*Professio Regia*, Basel 1567)

Quoting yet another recent study of Ramus's work and influence, Triche and McKnight explain:

As a diagram of dichotomized concepts, Ramus's method could be used to present any subject as a visually represented structure that reduced knowledge to the bifurcated 'spatial patterns' of a branching taxonomy... by 'setting out the whole subject on a single side of paper', a student would be able 'to see the subject as a [single] whole'. This visual and graphic process certainly gave the teacher greater control over what subject matter would be handled and mastered (*ibid.*, p.47-48).

The reduction of a text, in all of its ambiguity and complexity, to one of these branching trees was itself constitutive of Ramist method. To subject a text to such a reductive analysis, to "process" it in this way, was to effectively "methodize" it. As Ong (1971) puts it, "words which admit of neat diagrammatic or semidiagrammatic presentation are those which are methodized properly" (p.185). And the significance of such methodization, indeed of a more general methodized and spatialized epistemology

in general could, as Ong explains, only be realized in the context of new typographical print technologies:

In principle, every subject properly treated by a Ramist admitted of being diagrammed on bracketed, dichotomized outlines...[But] while such outlines are not unknown in the pretypographical manuscript tradition, in this tradition they do not admit of the ready multiplication which printing makes possible. In manuscripts, diagrams are much more laborious productions than straight text, for manuscript copying only with great difficulty controls the position of material on the page. Typographical reproduction controls it automatically and inevitably. Ramist method is... of a piece with typographical reproduction (*ibid.*, p.168-169).

It is important that Ramus's method points to the conceptualization of pedagogy itself as a question of technique, as a matter of optimized efficiency, that has flourished from 1900 to the present day.<sup>2</sup> This is not to say, however, that present forms and systems follow directly or unproblematically from Ramus' method. It is distinctly premodern in its claims to disciplinary universality (being applicable to "any subject") and admits of none of textual ambiguity that, as shown below, was constitutive of the culturally self-aware "hermeneutic man" of 1800 –and of his "natural" grounding in maternal orality.

### **The Mother's Mouth and the Hermeneutic Man**

The late eighteenth century marks the coincidence of a number of developments significant enough to warrant the label of "pedagogical century" for the period as a whole (Gudjons, 2008, p.81). Pedagogy came into its own at this time not as a universal diagrammatic method, but much more specifically as a *Geisteswissenschaft*, literally as a "science of the spirit" –implying, of course, its full separation from the natural and

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<sup>2</sup> "It also provided the dialectical (logical) preconditions underlying the subsequent refinements to method propagated by both Francis Bacon and Renee Descartes (among others), whom curriculum theorists believed to have supplied the foundational scientific and philosophical concepts of method appropriated by modern pedagogues and curricularists." (Triche and McKnight, 41)

technical sciences. According to Kittler (2004), this ascendancy of pedagogy as a “humanities” subject coincided with strengthened interest on the part of the state in the development of specialized training for bureaucrats, civil servants, and other governmental employees –particularly teachers and professors. Both Napoleon and Frederick the Great, Kittler explains, redefined the pedagogical and political role of higher education in France and Prussia by connecting it very explicitly to the functions of the state:

In France...new Écoles Normales, by teaching future teachers, enabled Napoleon to procure a new elite of bureaucrats. In Prussia, the king made academic professors and high school teachers civil servants [*Beamte*], so that a dramatically modernized philosophical faculty could invent - by dialogic seminars and hermeneutic lectures - the so-called unity of *Forschung und Lehre* (teaching and research) that then fed back from universities to the gymnasia, from philosophy to literary studies. (p.248)

As is the case with many assertions in Kittler’s *Universities: Wet, Hard, Soft, and Harder*, these two sentences can be readily expanded into a paragraph, passage, or indeed, an entire chapter. In fact, Kittler provides precisely this kind of expansion and explication in the first chapter of his *Discourse Networks 1800/1900* (1990) and this will be used to explore the pedagogical implications of his assertions here.

In this first chapter “The Mother’s Mouth,” Kittler describes the development of a new class of educated “universal bureaucrat” as part of a new model of the state. In France, this bureaucratic class developed in the context of Napoleonic reforms and consolidation; and in the northern regions of German-speaking Europe, it was situated in the emergence of the Prussian *Kulturstaat*. The latter was a state in which “cultural production was seen...as the major cohesive factor in the face of political fragmentation” (Winthrop-Young 2006, p.90). Correspondingly, members of this educated civil servant

class were seen as advocates and agents of national cultural achievement and unity, rather than as mere cogs in an impersonal administrative apparatus. These cultural and pedagogical servants were described at the time as “instructors of mankind” or “education officers” (*Erziehungsbeamte*), and were charged with nothing less than “improving the inner condition of man” (Kittler 1990, p.59).<sup>3</sup>

In 1800, these state-sponsored agents of inner improvement and cultural unification were seen as the end product of a careful process of educational formation or *Bildung*. This education, as Kittler indicates, is one involving “dialog and hermeneutics,” and it is achieved through the unification of “teaching and research” on an institutional level (2004, p. 248). Kittler here is referring to two significant developments in the German university (and later on an internationally): the “hermeneutic seminar” (e.g., Clark 1989) on the one hand, and the “Humboldt model” of the university (e.g., Albritton 2006) on the other. Referencing sources outside of Kittler’s text, we consider each of these developments in turn.

Wilhelm von Humboldt, working as Prussian Minister of Education, was called upon “to strengthen and elevate the nation by removing the burdens weighing on it and also through education” (Diesterweg, as quoted in Hohendorf 2001, p.5). Humboldt combined the humanistic pedagogy of the Swiss educator Johann Heinrich Pestalozzi (who worked with poor children and mothers) together with the principle of the unity of teaching and research, and added to these an emphatic affirmation of university’s institutional autonomy. Theorizing along idealist-Hegelian lines, Humboldt saw the potential for the discovery of the inner subjective life and the outer objective world as

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<sup>3</sup> To the present day, university professors and upper-level school teachers work in Germany as direct employees of the state.

being infinite. He envisioned the university as reflecting this unending process of discovery:

In the organization of institutions of higher education everything depends upon retaining the principle that knowledge must be considered as something not yet wholly discovered and never entirely discoverable, and that it must incessantly be sought as such. (Humboldt, as quoted in Albritton 2006, p.3)

This incessant, institutionally-grounded seeking and discovery continues to have its objective manifestation, for example, in university laboratories. However, Humboldt was equally serious about directing such inquiry inwards, and spoke of the need to explore the “unknown world” of the subject, of “the inner powers [that] define the true essence of the individual” (Humboldt, as quoted in Lüth 1997, p. 50). Such exploration would have its institutional correlative not in the laboratory, but in the “dialogic seminars and hermeneutic lectures” – the lecture hall and secular seminary (or graduate school)– indicated in Kittler’s second point, above. Particularly the emergence of specialized sites of secular post-graduate instruction have been portrayed by other historians of education as part of “a genuine epistemic shift” – one tantamount to the emergence of a “new pedagogic arena,” and ultimately the “father[ing of a] ‘new man’” (Hoskin 1993, pp.280, 284).

Such developments occurred through the combination of a number of new genres and mediatic forms and processes, including the student essay or research paper, and the replacement of “recitation and disputation” (vestiges of the medieval dictation and oral performance) with “dialogue and individual interpretation” (Hoskin 1993, p. 282). As the art of interpretation, the “authority” of a text is configured in hermeneutics in ways that are rather different from the anonymous and timeless authorization of the medieval manuscript, or the renaissance valorization of the printed world. The terms of

hermeneutic authorization are subjective, concerning the intentionality of the author, and are at the same time objective, concerning the work as a whole and its historical context. Hermeneutics is generally conceived of as a cyclical process –objective to subjective, part to whole– carried out through a figurative “dialogue” with the text, its time, and its underlying authorial intentions.

Also important are the text’s implications in terms of “philosophical anthropology” –as a study of its “human” characteristics that remains important in Germany to the present day. Such an anthropological hermeneutics, Kittler stresses, ultimately provided “the interpretive techniques [to] refer interwoven words to a single and universal ‘man’” (Kittler 1990, p.159). In a paper entitled “Education and the Genesis of Disciplinarity” (1993), Hoskin goes even further, characterizing this hermeneutic education as being tantamount to a “transform[ation of] the kind of knowledge... [that students] produced, as they internalized a new hermeneutic approach to the critical reading of texts” (p.283):

...the reflexively aware practitioner of hermeneutics, who reads writing as trace and the "objective" as the problematic production of subjectivity, and who thus discovers a meaning that constantly recedes... [He] eventually finds that the truth thus written leads always back toward one's own self and the hermeneutics of the world within (*ibid.*, p.276).

This type of individual, capable of engaging in an unflinching exploration of the subjectivity of “a single and universal ‘man,’” was apparently needed not only in Germany, but also in North America, where the Humboldt institutional model was emulated by a number of prominent universities, including the University of California at Berkeley, Johns Hopkins University, the University of Chicago – and through the last of these, also the University of Toronto.

It is important to note that diagrammatic and visual components are of little epistemological value in charting this inner hermeneutic world. “Letters, ciphers, and diagrams in their threefold combination,” Kittler (2004) explains, “proved too alien for humanists” (p.248). The “world within,” unsurprisingly, is best sounded out through the multivocality of poetic words, rather than inerrantly mapped with cartographic visuals. While further underscoring the separation between natural sciences and the *Geisteswissenschaften* (including pedagogy), it is significant that the visual was not completely devalued in humanistic pursuits. It still had an important aesthetic, expressive role to play, specifically when it comes to matters sublime, where language and hermeneutics reach their limits.

The significance of graphical illustration can be demonstrated in terms of a critical component of the discourse network of textually-based, hermeneutically-focused pedagogy. This component is that of the feminine, or more specifically, the mother (Figure 2). Again inspired by the pedagogy of Pestalozzi, the period around 1800 in Germany (and around 1880 in America) witnessed the publication of numerous instructional books for mothers, offering nursery rhymes or *Koselieder* (literally “caressing songs”) to be sung to children, to strengthen their verbal ability, their knowledge of the alphabet and ultimately their literacy skills.

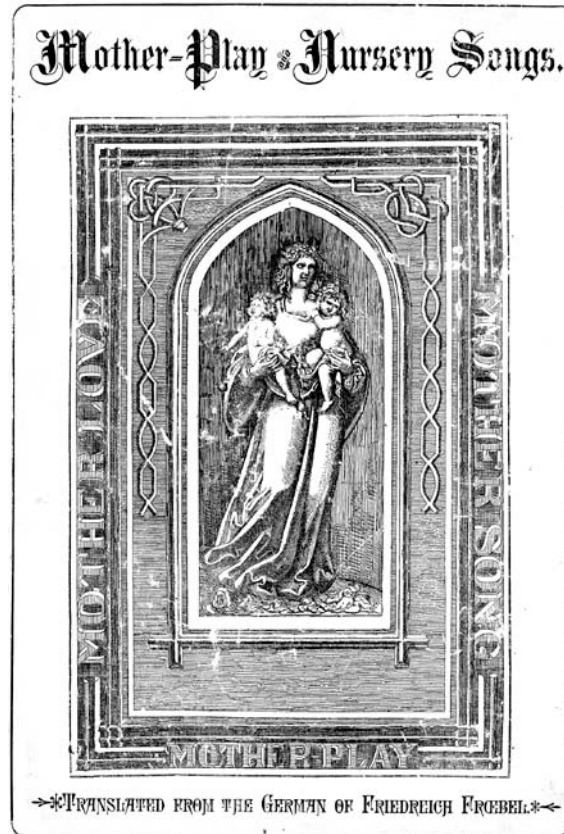


Figure 2: “Mother Love, Mother Play & Mother Song;” cover illustration from instructional book for mothers by Friedrich Fröbel, published in Boston in 1896.

By providing oral instruction that ultimately leads to textual competency, the mother plays an indispensable role in an inscriptive network that now extends far beyond the university or even the printing shop, to include the nursery and the maternal embrace. Through her oral instruction, the mother can be said to effectively complete the circuit constitutive of the discourse network of 1800. Kittler (1990) explains how this works. He describes maternal instruction as presenting the means by which *nature* “accomplish[es] a production of discourses” through a kind of dissimulated “primary orality” (p.25). The

mother would read about the education of children via songs, games and other techniques. Through her “elementary and oral dispensation,” she would then lead the child “from natural sounds to language,” and from there to the alphabet (*ibid.*, p.31). This would then complete the illusion that the child received his linguistic and literary ability from the wellsprings of a natural orality. The discourse network of 1800, despite its thoroughly typographical components, could then be seen as grounded in an emphatically natural source:

A simple and direct shortcircuit characterized pedagogical discourse. Educational tracts and primers written explicitly for mothers obliterated their own textuality for the sake of their addressees. Books disappeared in a Mother’s Mouth whose original self-exploratory experience had been instituted by those very books. (*ibid.*, p.53)

The result of this elaborate disappearing act, as Kittler describes, is a “male brotherhood of educational bureaucrats” (*ibid.*, p.170) formed through the instructional deeds of the mother. And such a fully-formed (*gebildet*) new bureaucratic man is capable of “invok[ing] the feminine producer of discourse” not as a tangible reality, but only as a “thoroughly constructed ideal” (*ibid.*, pp.171, 170), as evoked in the conclusion to Goethe’s *Faust II*: “*Das Unbeschreibliche, Hier ist's getan; Das Ewig-Weibliche zieht uns hinan*” (1832).<sup>4</sup>

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<sup>4</sup> “The indescribable, here it is done / The Eternal Feminine draws us on.” The last lines from Goethe’s *Faust Part II*, Walter Arndt’s translation of *Faust*, ed. Cyrus Hamlin (New York: W. W. Norton & Co., 1976), p. 308.

### Education 1900: Pedagogy as Psychophysical Technique

Education was changing decisively by the end of the 19<sup>th</sup> century, and perhaps nowhere more decisively than in America. Approaches referred to as “physiological psychology” and “psychophysics” appeared simultaneously in Europe and America at this time. However, whereas the influence of these new psychologies on pedagogy in Germany has been limited, in America it has been irrevocable. In Germany, *Bildung* as the construction of subjectivity remains a matter of practical interest, whereas in America, comprehensive attempts to cast education as a natural “science” continue to this day. Kittler (1990) explains what is at stake in the sudden, simultaneous developments of 1900:

The victory of psychophysics is a paradigm shift. Instead of the classical question of what people would be capable of if they were adequately and affectionately “cultivated” [*gebildet*] one asks what people have always been capable of when autonomic functions are singly and thoroughly tested... The discourse network of 1900 was the first to establish a treasury of the signifiers [for such testing] whose rules were entirely based on randomness and combinatorics... (pp. 214, 210).

Kittler provides compelling evidence for this by recounting the studies of the autonomic memory function carried out by the German psychologist Hermann Ebbinghaus. Ebbinghaus’ research work focused on the measurement of his own memory capacity, studied “singly and thoroughly” as an isolated, physiological function. Inspired by earlier studies of the *Elements of Psychophysics* by Gustav Fechner, Ebbinghaus began his tests of his own memory capacity by first memorizing the text of Byron’s *Don Juan* (Hoffman et al. 1986, p.72). However, he became concerned at the lack of “homogeneity” in this text. Ebbinghaus wanted to ensure that the associative power of a

text's meanings and the mnemonic strength of its cadences would not limit the validity of his findings (*ibid.*, p.59). Consequently, he turned to nonsensical sequences of terms – words like “fud,” “lof,” or “zof” – he combined carefully to avoid any semblance of meaning and metre. It is from studies based on these terms that Ebbinghaus developed his finding of the “forgetting curve,” an exponential line tracing the decline of memory over time. The integrity of a nonsense sequence committed to memory, in short, decreases by half over regular intervals (days or weeks).

During 1900 in America, a similar exponential curve was discovered to characterize findings of a set of experiments rather reminiscent of those of Ebbinghaus. This curve was described not as one of forgetting but of *practice*, and was produced in the research of educational psychologist Edward L. Thorndike.<sup>5</sup> Although Thorndike is not mentioned by Kittler, Thorndike's synthesis of physiological psychology with educational concerns makes him an indispensable point of reference in this paper. The manner in which Thorndike reduced questions of education to individual autonomic functions to produce his curve of practice is in some ways more radical than Ebbinghaus. Instead of eliminating subjective associations of meaning and cadence, Thorndike removes the human subject itself –replacing it with autonomic functions as these can be studied first of all in *animals*. In the inaugural edition of the journal *Educational Psychology*, Thorndike (1910) declares that “Psychology is the science of the intellects, characters and behavior of animals...” –adding as if an afterthought “...including man” (p.5). In his groundbreaking dissertation research on animal intelligence, Thorndike confined cats, dogs and other animals to “puzzle boxes,” timing their repeated attempts to

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<sup>5</sup> Ebbinghaus is credited as the first to describe the exponential relationship between learning and time that was later referred to as the “learning curve;” Thorndike made it one of the foundations of a psychology of education from his 1898 dissertation onwards.

access food by pressing on a lever or pulling on a rope. From this, he established the first of a number of “laws of learning” (Thorndike, 1911, 244-245). This first law states that “[responses] accompanied or closely followed by satisfaction to [an] animal will, other things being equal, be more firmly connected with the situation, so that, when it recurs, they will be more likely to recur” (*ibid.*, p.244).

Human and animal are of course subject to this same law, and recurrence is key. Thorndike used the animal’s confinement as a recurring situation, defining it as a function or variable directly related to the rapidity of response. These variables of repetition and rapidity were seen to apply to more complex tasks carried out by human animals as well. In *Education: A First Book* (1912) Thorndike refers to studies of “practice at typewriting by the ‘sight’ method” and “reading and tapping out the telegraphic language” (pp.106, 107) to illustrate how the same exponential relation holds for the rather differently defined recurrence and rapidity of response (figure 3). Recurrence in this case takes the form of hours or weeks of practice, and rapidity of response corresponds to letters or strokes per minute.

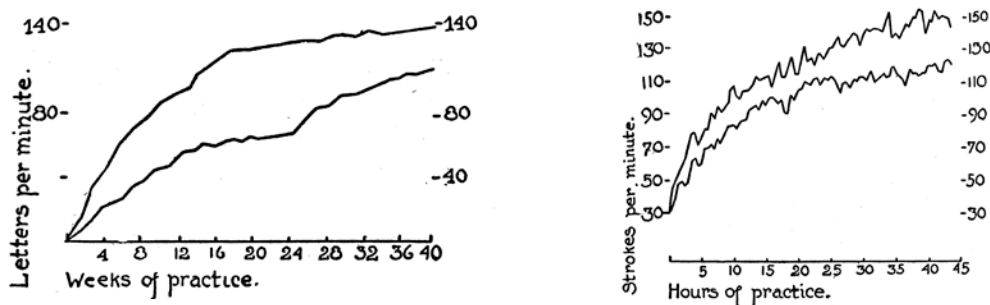


Figure 3: “Curves of practice” for sending and receiving telegraphic messages (left) and for two individuals “in typewriting by the sight method” (right).

A number of important elements of the configuration of education and mediation in 1900 –and many remaining relevant in the present– coincide in these “curves of practice.” First, as measures, these curves are based on capabilities (typing, and sending and receiving telegraphic messages) that are clearly secondary or tertiary to competencies central in conventional education (e.g. reading, writing, mathematics). But because “letters per minute” and “strokes per minute” can be accurately quantified at specific points in time, these performances serve as a measure for education or “learning” in a much more general sense. In the age of psychophysics, as Kittler (1990) observes, a “subordinate mental function becomes the most fundamental [simply] because it is quantifiable” (p.208).

Second, there is the conspicuous role of the typewriter and telegraph in these measures. These contemporaneously “new media” are used by Thorndike in a manner similar to Ebbinghaus’s use of nonsense sequences. Both allow for an objective, repeatable quantification of performance in terms of elements that are purely combinatorial and/or aleatory, and through the deliberate exclusion of questions of meaning and association. As Kittler points out, both telegraph and typewriter have the ultimate effect of marginalizing or eliminating semantic elements constitutive of the subject and its inwardness –specifically as the writing hand and the feeling body. These paradigmatically human elements are then replaced with components as arbitrary as “the spaces between elements in a system” (Kittler 1999, p.15). These include, of course, the spaces separating letters on a keyboard, or silences between ciphers transmitted along a telegraph line. And both are conspicuously devoid of intrinsic meaning and the bodily presence that is associated with both oral and handwritten communication

Thirdly, Thorndike's "curves of practice" (and also Ebbinghaus' curves of forgetting) illustrate the function of graphical and visual representations in the era of psychophysics—a function very different from their role in the discourse network of 1800. Images no longer accompany a text to provide aesthetic illumination, to intimate that which lies beyond verbal description. Instead, Thorndike's diagrams delimit—in a manner deliberately eschewing decoration and ambiguity—the simple but universal "truth" of his first law of learning: that performance increases as a logarithmic function of time.

Finally, these curves of practice and forgetting are illustrative of education configured in ways that anticipate Kittler's (2004) vision of the mediatic reunification of the faculties and functions of the university. Understood in terms of the relationship between two (or more) experimental variables, education is no longer separate from natural science. Psychology as "the science of the intellects, characters and behavior of animals, including man" provides the basis—in the form of a series of indubitable laws—for the deployment of pedagogy as pure technique. Education, as Thorndike himself argues, becomes the handmaiden of experimental psychology: "To an understanding of the material of education," Thorndike states, "psychology is the chief contributor" (Thorndike 1910, p.6). Education is constructed as the scientific task of creating conditions that are causally related to desired results:

Any problem of education may be put in the form: 'Given a certain desired change in a man, what situation shall we create to produce it, either directly or by the response which it provokes from him?'" (Thorndike 1912, p.55-56).

Education no longer has any relation to subjectivity and interiority; as Kittler (1990) says, there is "no universal norm (inwardness, creative imagination...)

transcending the particular [physiological] functions” (p.214). Instead, there are only particular functions or performances –whether mnemonic, telegraphic, or typewritten– which are to be maximized through education as a type of “practice.” There is no thinking self, moreover, to be formed through education, and there are no more subjective depths to be explored through endless research. There are only specific physiological performances to be trained and reinforced through repetition and practice. Writing in *Film, Gramophone, Typewriter* (1999), Kittler explains:

The "I think," which since Kant was supposed to accompany all of one's representations... became obsolete as soon as body and soul advanced to become objects of scientific experiments. The unity of apperception disintegrated into a large number of subroutines, which, as such, physiologists could localize in different centers of the brain and engineers could reconstruct in multiple machines. (p.16)

Machines, however, provide more than an occasion for reconstructing apperceptive subroutines and autonomic functions. Machines, as Thorndike's examples of typewriter and telegraph amply illustrate, serve also as means of modeling or training these routines and functions. Education, finally, becomes not only a thoroughly instrumental set of pedagogical techniques for maximal performance; at its most efficient, it also becomes a machinic or mechanical means through which these functions are constructed, trained and maximized.

### **Conclusion: The University made Whole?**

Kittler's paradigm shift represented by the victory of psychophysics on both sides of the Atlantic has the effect of setting the university back on the path to integration on the disciplinary level –a path that it is arguably still following today. Far from being a *Geisteswissenschaft*, education has been redefined as a “learning science:” as the study of “the internal mechanisms that govern learning across ages and settings” (Bransford et al. 2000, p.212). Education is reunified with natural science, and a similar reunification is evident on the mediatic level as well. This is illustrated (again) in the use of typographic and telegraphic “machines” in Thorndike's examples of curves of practice.

If the typewriter, as McLuhan (1964) writes, “fuses composition and publication” (p.260) then the telegraph can similarly be said to combine dissemination with mediatic encoding and decoding functions. In the case of both telegraph and typewriter, the pedagogical process (i.e. the exercise of techniques of practice to increase performance) is not just rendered mechanical; it is also reinscribed into a discourse network of composition, encoding, decoding and dissemination. The student, in other words, is re-installed as a producer and transmitter in a media system, rather than having this production confined, as in 1800, to the genre of the student paper or the academic “arena” of the seminar. The student is reintegrated into a position similar to the one he occupied in the pre-Gutenberg university. He is again placed into the field of book and information “production in class time” (McLuhan 1962, p.134). But instead of functioning as a mere “copying machine at almost no cost” (Kittler 2004, p.252), the present-day student is

reinstalled –particularly with newer Web technologies—as a generator and processor of content, writing public blog postings or contributing to the open source knowledge repositories such as *Wikipedia*.

If the medieval student’s work as a kind of no-cost “copying machine” placed him in a cloistered scriptorium, then current mediatic conditions necessitate a comparable confinement for the contemporary student. If education is a question, as Thorndike says, of techniques that would produce desired changes in either human or animal, the student is then best situated where these techniques can be most carefully controlled. Although Thorndike (unlike B.F. Skinner) stopped short of adapting his animal “puzzle boxes” for human use, he presciently understood the potential of media technology for creating effective environments for training and practice. For example, writing in *Education: a first Book* (1912), Thorndike speculates:

If, by a miracle of mechanical ingenuity, a book could be so arranged that only to him who had done what was directed on page one would page two become visible, and so on, much that now requires personal instruction could be managed by print. (p.165)

This miracle of mechanical ingenuity –one that would closely control a student’s progress based on their performance– was realized first in Sydney Pressey’s machine for “drill and practice” (Petrina 2004) and later in B.F. Skinner’s “teaching machine” (Skinner, 1968). In each case, the student is effectively interned in front of a machine – an instrument sometimes compared to a typewriter– arranged on the desk before him or her. The student would scroll through and answer questions, with each answer being recorded, and serving as a basis for controlling the student’s subsequent interaction with the machine. Still later, digital technologies allowed even more elaborate means of controlling the “situation” of the student –often by means of sophisticated branching

structures effectively representing “executable” Ramist trees composed for computers. In these scenarios, the computer (or other device) consistently presents a means for carefully restricting student action, and controlling conditions presented to him or her as surely as any cage or puzzle box.

The mediatic reintegration of the university –and a kind of return to the mechanics of the Ramist method– is also presaged in Thorndike and Ebbinghaus’s use of visual and diagrammatic representation in the form of “curves” of practice and forgetting. Like the student whose learning is installed in digital networks of transmission, reproduction and generation, new media for charting learning are able to generate and transmit visual representations of student performance endogeneously within the system. Updatable in real time, instantaneous visual feedback loops have the potential to be transmitted directly to the student, allowing student responses to be adjusted accordingly. Writing on Internet technology and school reform in *Educational Psychology* almost one hundred years after Thorndike’s inaugural contribution, one researcher invokes the following scenario:

Data generated as learners use [specialized networked software] ...can be analyzed, aggregated within and across episodes and learners, and reported back to all parties engaged in school reform with a very short delay. In the same way as my stock portfolio can be updated every 20 min[utes], learners, teachers, and researchers can have data upon which to make on-the-spot adaptations. (Winne 2006, p.14)

Computers and their multimedia capabilities allow the student to not only see how their practice may be improving over time, but also to adjust their responses accordingly, closing the performatively-defined inscriptive network in a relentless feedback loop. The university as a media system has indeed come full circle: it is now progressing towards a kind of reintegration and reconciliation, on a disciplinary and technological

level, having passed through intervening historical moments of alienation and contradiction. In doing so it is following not the necessity of spirit, but the situation as it is determined by media. The question, of course, is whether the resulting whole is the truth, or whether, with Adorno (1983), we may wonder whether “the whole is the untrue” (p.57).

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