Media and Education: Mythologies Old and New

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In his essay, Norm Friesen studies the different conceptualizations of speaking and writing in the rational and the romantic paradigm of language recognition and shows the importance of this norm setting in the face of a generation of digital natives.

Yes, and numbers, too, chiefest of sciences, I invented for them, and the combining of letters, creative mother of the Muses' arts, with which to hold all things in memory.

Aeschylus, Prometheus Unbound (459)

The origin of writing, as it has been mythologized in cultures around the world, typically appears as an invention or intervention. Although the specific details differ, it generally takes the form of a kind of intrusion on the part of a god or mythical entity into a pre-existing human order. In the case of Prometheus, this intervention is harshly and famously punished by the gods: Prometheus is chained to a rock, with an eagle sent to feed on the eternally regenerated flesh of his liver. In Egypt, the god Theuth,

scribe of the gods themselves, was said to have given writing to King Thamus, who was to disperse it to the people of Egypt. In China, the invention of writing is credited not to a deity but to a legendary four-eyed minister of the Yellow Emperor, Cangjie.[1]

Cangjie, mythical inventor of Chinese logograph, ssource: Wikimedia Commons;

His logographs (characters representing words or word-parts, rather than sounds) were seen as allowing communication between heaven and earth – although Cangjie allegedly also taught his system to the administrators of the empire (Yang, An & Turner 2008: 84–86). In the Old Testament, writing is first mentioned well after the naming of the animals and the

proliferation of diverse tongues in the story of the Tower of Babel. Its first prominent appearance is in the story of Moses ascending Mount Sinai to receive God's law. There, the Ten Commandments are said to have been "inscribed" on tablets of stone "by the finger of God" himself. As Muslims know, the first word revealed to the prophet Muhammad was "Iqra," Arabic for "read," a command which was later to be embodied institutionally in the first Islamic schools or Madrasahs (Totah 1926, 12). Whether Muslim, Christian or Jewish, Abrahamic monotheists see the written "word of God" as *the* primary instance of writing, and consequently as holy and inviolable: It is God's revelation of *His Truth* to mortals. Its words are inscribed and chanted inside mosques; they are studied and recited in churches; and they are retrieved from the arc and read as a form of prayer in synagogues.

Mythological accounts of *spoken* language, however, are strikingly different from descriptions of the origins of writing. Language or speech appears not as a divine intervention into human affairs. Instead, it is integrated in or appended to the original process of creation itself. In Norse mythology, the faculty of speech is a gift from the third son of Borr, who also gives hearing and sight to humans at the time of their creation. In the Bible, spoken language is part of the pre-lapsarian, edenic condition. Adam and God converse with a directness that is subsequently lost in communication between the human and divine in dominant monotheistic accounts. The presumed perfection and the possible return of this original, Adamic language has long been a matter of hope and speculation in monotheistic theologies and philosophies. Greek mythology on the other hand speaks of a language held in common by gods and mortals, and like the Bible, it also tells of the confusion and chaos as diversity is introduced into it. In this case, however, the multiplicity of tongues is not the work of the Old Testament god *Yahweh*, but of Hermes, the god of transitions and boundaries whose name is referenced in the modern day study of interpretation, hermeneutics.

Writing and speech, the most basic communication media, have thus long been understood as distinct in nature and origin: Speech is a part of the

condition of humanity, a precondition for human existence itself, and – in its original state – a means of direct communication with God or the gods. Writing, on the other hand, appears only afterwards, as an "invention" or a gift, as a remedial form of communication handed by God(s) to humans, just as Yahweh hands the tablets of the Law down to his servant Moses. Writing becomes an important, ritualized and even sacred means of communication only after spoken language has been rendered problematic. Learning to read, or to access this sacred communication becomes a priority in religious terms, either for a priestly class, or for believers generally. Unlike learning to speak, it seems that one has to be told or commanded to read or to write: For alphabetical scripts like the Arabic, Hebraic or the Phonetic, or for an advanced logographic writing, like Chinese, textual competency entails first a process of teaching and learning of letters or units of inscription which are in themselves meaningless and arbitrary. Moreover, it is with this religious imperative to "read" – particularly when interpreted as being issued *beyond* an elite priestly class – that schooling as a formal institution begins. An early and prominent example is the founding of schools during the Islamic golden age and in the wake of Allah's imperative to Mohammed (Totah 1926, 15[2]), and a later instance is the spread of schools in Europe following the reformation (Hamilton, 1989).

Speech and text, the most basic of media, are thus qualitatively different not only in their putative origins and cultural connotations, but also in their educational significance. Spoken language is given; writing on the other hand is hard-won and must be re-won by successive generations. Speech is autochthonous, indigenous or inherent to the human condition. However, speech also brings with it the characteristics of this condition, including its heterogeneity, ambiguity and other imperfections – characteristics constantly calling for interpretive or hermeneutic vigilance. Writing, reading and textuality, on the other hand, appear as an artificial or effortful intervention into this communicative state of affairs. This task of repeating this effort over generations, moreover, is a matter of obligation and cultivation – a matter, in other words, for education. In

other words, they have long been conceived as "non-neutral," as far as education and other aspects are concerned.

This range of connotations and valuations remains an important, implicit influence indispensable in the way that the normative value of writing and speech has been understood in education and psychology. Indeed, this paper argues that the echoes of these religious and understandings can be detected in a great deal of theory and debate today concerning educational media and technology. This paper highlights both consistencies and inconsistencies in these ways of understanding the educational value and meaning of speech and writing, identifying two trends or traditions in particular: A "rationalist" tradition which sees writing as an authoritative codification, and which emphasizes (as does writing itself) questions of structure, rules and grammar; on the other hand, there is a broadly "romantic" tradition which sees spoken words as both original and ultimate, and which valorizes nature and expression. The relationship of speech and writing as configured in the latter, romantic tradition has been the topic of ingenious analyses by philosophers Jacques Derrida and Friedrich Kittler – and their illuminating positions are briefly summarized (and also briefly critiqued) in this paper. The assumptions inherent in both the romantic and rationalist positions subsequently and repeatedly appear in the discourse of those advocating the use of various technologies and media in education, and those wishing to set specific priorities for school, teaching and learning. By discussing the historical and cultural construction of these positions, this paper hopes to show that valuations and assumptions regarding these basic forms are ultimately contradictory and irreconcilable.

The Rationalist Tradition: The "Absolute Privilege of Writing"

Although rationalist and romantic views of writing and speech are prefigured in earlier times, this account begins with the 17th century. This is a time still energized by the invention of the printing press, and also reverberating with the aftershocks of the reformation and religious wars. The early 17th century in particular, as Michel Foucault explains, is part of

an era marked by the "absolute privilege of writing." It is a time, he explains, in which

"it is the primal nature of language to be written. The sounds made by voices provide no more than a transitory and precarious translation of it. What God introduced into the world was written words; Adam, when he imposed their first names upon the animals, did no more than read those visible and silent marks; the Law was entrusted to the Tablets, not to men's memories; and it is in a book that the true Word must be found again. ... For it was very possible that before Babel, before the Flood, there had already existed a form of writing composed of the marks of nature itself, with the result that its characters would have had the power to act upon things directly, to attract them or repel them, to represent their properties, their virtues, and their secrets." (1970, 37)

The recovery of this magical, universal, original and above all *written* language was a central goal for many thinkers and educators in the early 17th century. At this time, the reach of the printed word was starting to stretch well beyond the "republic of letters" populated by those who could read and correspond in the *lingua franca* of Latin. Political and religious creeds and broadsheets in "vulgar" and still-unstandardized native tongues like German, French, English circulated widely. This happened at the same time as the enormously destructive Thirty Year's war was fought on the continent and as England was embroiled in its own civil war. Bacon, Hobbes and others saw linguistic ambiguity and multiplicity as a key underlying problem: Words did not unambiguously designate the basic things in the world, nor did their grammar reflect the true nature of the interrelationships of these things. The invention or recovery of a universal language, often envisioned as a literal return to the language of Adam, reflecting God's created order in its original state, was a central inspiration for example, for the central-European educator and polymath Johann Amos Comenius. Quoting Comenius' own words, Stillman explains:

"Faced with the ruin of his 'country, her churches and her schools' in a conflict 'threatening the Christian world with disaster and desolation'... Comenius...

recommended as the cure for civilization's ills the creation of a universal language, 'a language absolutely new, absolutely easy, absolutely rational, in brief a Pansophic language, the universal carrier of light.'" (1995, 29)

For Comenius, the first step to a pansophic language – one reflecting knowledge of all things by all people – was to elevate God's rationally-ordered creation above existing human languages. In his *Didactica Magna*, for example, Comenius states that "things are essential, words only accidental; things the body, words the garment; things… the kernel, words the shell and the husk" (1896, 267). The implications for educational media are clear: If only people could learn first through the visible world, and from there, acquire language, this language would reflect this visible order, and would be that much closer to the original, ordered language shared by God and Adam. Indeed, as one historian explains, Comenius envisioned that this "artificial language [was] to take the same shape as the basic Latin presented in [his own] textbooks" (Slaughter 1982, 114). The most famous of Comenius' textbooks is the *Orbis pictus* (1658), and in the introduction to this text, Comenius insists that teaching itself must

"be clear, and by that, firm and solid, if whatever is taught and learned, be not obscure, or confused, but apparent, distinct, and articulate, as the fingers on the hands. The ground of this business, is that sensual objects may be rightly presented to the senses, for fear they may not be received. I say, and say it again aloud, that this last is the foundation of all the rest: because we can neither act nor speak wisely, unless we first rightly understand all the things which are to be done, and whereof we are to speak." (Comenius 1777: 2)

The way that Comenius ordered words, concepts and the things of the world is by connecting schematic illustrations of such things (pictured on one page) to their common and Latin names and descriptions (often on the facing page).

The Heaven, 1.
hath Fire, and Stars.
The Clouds, 2.
hang in the Air.
Birds, 3.
fly under the Clouds.
Fishes, 4.
swim in the Water.
The Earth hath Hills, 5.
Woods, 6. Fields, 7.
Beasts, 8. and Men, 9.

Cælum, 1,
habet *Ignem & Stellas.*
Nubes, 2.
pendent in *Aere.*
Aves, 3.
volant sub nubibus.
Pisces, 4.
natant in *Aqua.*
Terra habet *Montes,* 5.
Sylvas, 6. *Campos,* 7.
Animalia, 8. *Homines,* 9.
Thus

Things of 'The World,' from *Orbis Pictus*, with labels in English and Latin, source: public domain/Google book

These were grouped together in 150 topics or themes, each containing many numbered items and their corresponding meanings. Together, these allowed Comenius to "rightly present" "sensual objects… to the senses," with each numbered object linked to text showing the reader "whereof we are to speak." As an early English translator of *Orbis Pictus* points out, the approach of this text seems best suited to a "child's

capacity of six or seven years of age (seeing we have now such commonly brought to our Grammar-schools to learn the Latin Tongue)" (Hoole 1777, 13). In terms of educational media, Comenius' project is powerful but paradoxical – as is the case with many later efforts to mediate speech and writing in education. To recover universal transparency in language, Comenius resorts to the newest and most artificial of media of the time: numbered schematic engravings, and with their corresponding names printed next to them.

A related but different affirmation of privilege or primacy of the visible and written word is evident in the work of a contemporary only six years younger than Comenius, René Descartes. Descartes' specific understanding of the sign – embodied paradigmatically in logical and mathematical operators – is one, as Foucault says, that is central to the classical self-understanding world view or episteme of the 17th century. This leads away from Comenius' hope to recover a pre-lapsarian language, and points towards a more explicitly rationalistic project. In writing "I think therefore I am," for example, Descartes is not only confirming the power of signs to identify things clearly and distinctly in the world (including thought and self), he is also underscoring the power of conjunctions of logical operators (e.g., "therefore") to help establish the nature of their interrelationship. Foucault explains the epochal significance of such a view of written language:

"there exists a single, necessary arrangement running through the whole of the Classical episteme: the association of a universal calculus and a search for the elementary within a system that is artificial and is, for that very reason, able to make nature visible from its primary elements right to the simultaneity of all their possible combinations. In the Classical age... the task of knowledge... is to fabricate a language, and to fabricate it well – so that, as an instrument of analysis and combination, it will really be the language of calculation." (1970, 61)

Such a fabricated language of calculation is indispensable in connecting the rationalist tradition of the 17th century to more recent developments. And such a connection is provided by the self-described "Cartesian"

linguistics of Noam Chomsky – someone whose work has done much to re-establish the dominance of the rationalist approaches to educational media. But before this paper turns to Chomsky, it looks to the opposed, romantic position or tradition of media prescription and privileging in education.

The Romantic Tradition: "Accents, Cries, Complaints"

Among the intervening developments of importance to media in education is the emergence of romanticism in the 18th Century – in part as a reaction against the rationalism of Descartes and others like him. Jean-Jacques Rousseau, famous both as an early romantic and an educationist, did much to establish the foundational elements. Rousseau starts his *Essay on the Origin of Languages* (written in the 1750's) with the assertion that language "did not begin by reasoning but by feeling,"

"...in order to move a young heart, to repulse an unjust aggressor, nature dictates accents, cries, complaints. The most ancient words are invented in this way, and this is why the first languages were tuneful and passionate before being... methodical and reasoned." (1998, 294)

Language is not exemplified in logical operators or the rational order of nature; it is instead an extension of an expression or cry of emotion. Language does not reduce to grammar, rules and logic – whether it reflects the order of creation or that of human calculation – but to expression and feeling. Through the introduction of writing, and even more forcefully through the printed word, language, Rousseau explains, is alienated from this original and natural condition. It is deprived of its original energy, passion and musicality, and becomes abstract.

"The more voices become monotone, the more consonants multiply, and that as accents are eliminated and quantities are equalized, they are replaced by grammatical combinations and new articulations... Writing, which seems as if it should fix language, is precisely what alters it; it changes not its words but its genius; it substitutes precision for expressiveness. Feelings are conveyed when one speaks and ideas when one writes. In writing, one is forced to take

all the words according to common acceptation… it is not possible for a language one writes to keep for long the liveliness of one that is only spoken… The means taken up to compensate for this quality [work to] diffuse, [and] elongate written language and, passing from books into discourse, enervate speech itself." (1998, 300)

Writing for Rousseau is hardly a gift from the gods, a divine means through which holy truths are transmitted to the world of mortals – and that we are then expected to "read." Instead, it is an enervation of originally tuneful and passionate expressions of feeling, or of accents or cries of joy or sorrow. Grammar and rules of "common acceptation" – as well as a general "methodical and reasoned" quality – become dominant in language only when it falls under the influence of writing and abstract ideas, and when it loses its ties to feeling and expression with which it began.

Rousseau, like Comenius, can be seen to have developed his views as an educationist in a manner quite consistent with his understandings of writing and language. In *Emile*, his famous novel of education, Rousseau recommends that the eponymous protagonist *not* be exposed to books, or otherwise be given "lessons" until well into his adolescence. Rousseau sees programmatic instruction and any concerted effort to teach reading and writing as harmful and unnecessary, and as something to be postponed for as long as possible:

"When I thus get rid of children's lessons, I get rid of the chief cause of their [children's] sorrows, namely their books. Reading is the curse of childhood, yet it is almost the only occupation you can find for children. Emile, at twelve years old, will hardly know what a book is. But, you say, he must at least know how to read. I agree; he must know how to read when reading becomes useful to him. But until then it is only a way of boring him." (1950, 80)

Until reading and writing can no longer be avoided, the only mediatic exposure and practice that the child should undergo is with *spoken* language. Consistent with his remarks in the *Essay on the Origin of Languages,* Rousseau also specifies how *Emile* is to be instructed in speech and diction. This instruction is to be largely (but not completely) devoid of

the characteristics that Rousseau sees as introduced into speech through writing. Rousseau recommends that instead the child be encouraged to speak with the musicality and expressivity of the unwritten dialects of the provinces. But at the same time, it is important to note that Rousseau supplements this with further recommendations:

"Brought up in all the rustic simplicity of the country, your children will gain a more sonorous voice; they will not acquire the hesitating stammer of town children, neither will they acquire the expressions nor the tone of the villagers, or if they do they will easily lose them; their master being with them from their earliest years, and more and more in their society the older they grow, will be able to prevent or efface by speaking correctly himself the impression of the peasants' talk. Emile will speak the purest French I know, but he will speak it more distinctly and with a better articulation than myself." (1950, 32)

Rousseau envisions a naturalness of verbal expression commensurate with the "rustic simplicity of the country," but at the same time, he also sees Emile's speech as avoiding the less desirable characteristics of this unspoiled dialect. Through the intervention of "a master" who is with Emile from his "earliest years," the child's speech will incorporate "neither…the expressions nor the tone of the villagers." In other words, Rousseau imagines a natural sonority accompanied at the same time by a distinctness and articulation that is proper only to the "purest French." This simultaneous affirmation of and distantiation from originary, natural speech or orality is mirrored in Rousseau's explicit recommendations concerning writing. For despite having already stated that "Emile, at twelve years old, will hardly know what a book is" Rousseau admits the following elsewhere in his novel:

"I am pretty sure Emile will learn to read and write before he is ten, just because I care very little whether he can do so before he is fifteen; but I would rather he never learnt to read at all, than that this art should be acquired at the price of all that makes reading useful." (1950, 179)

Just as Emile will embody the sonority of the country while possessing none of its coarseness, he will also learn to read and write without lessons, and indeed, while "hardly knowing what a book is." Paradoxically,

Emile will learn to read precisely because of general *indifference* towards reading and writing: "because I care very little whether he can do so."

Rousseau's fundamental ambivalence regarding the "naturalness" of speech and the artificiality of writing has been famously dissected in Derrida's analysis the "supplement" in *Of Grammatology*. As Derrida explains,

"The speech that Rousseau raise[s] above writing is speech as it should be or rather as it should have been... He valorizes and disqualifies writing at the same time. At the same time; that is to say, in one divided but coherent movement. We must try not to lose sight of its strange unity. Rousseau condemns writing as destruction of presence and as disease of speech. He rehabilitates it to the extent that it promises the reappropriation of that of which speech allowed itself to be dispossessed." (1974, 141–142)

Rousseau, in other words, valorizes original speech as an ideal form that is natural and complete in itself. But at the same time as he condemns writing as the "curse of childhood," he relies on the distinctness and articulation of writing in describing ideal speech. "Writing" in this sense, as Derrida explains, "is the supplement par excellence:" It is "an inessential extra added to something [already, allegedly] complete in itself" (1974, 281). Textuality, to generalize further, is acceptable in the romantic tradition only insofar as it is like speech, and can be assimilated to and support naturalized speech. There are various ways through which this can be accomplished. Rousseau sees it as taking place by avoiding as much as possible any direct exposure to writing and printed books, and by having any characteristics associated with these forms introduced only indirectly into spoken language, through a cultivated master.

Johann Heinrich Pestalozzi, a Romantic educational theorist who shared Rousseau's valorization of original orality, points to another method for the supplementation of speech by writing. This is to be found in Pestalozzi's advice to mothers, particularly concerning how they might teach their children to read and write. Like Rousseau, Pestalozzi uses a fictional account to make his points, and he also begins by denouncing

premature lessons in reading and writing. Describing "Gertrude and her [seven] children," Pestalozzi explains:

"Although Gertrude thus exerted herself to develop very early the manual dexterity of her children, she was in no haste for them to learn to read and write. But she took pains to teach them early how to speak; for, as she said, 'of what use is it for a person to be able to read and write, if he cannot speak? – since reading and writing are only artificial sort of speech.' To this end she used to make the children pronounce syllables after her in regular succession, taking them from an old A-B-C book she had. This exercise in correct and distinct articulation was, however, only a subordinate object in her whole scheme of education, which embraced a true comprehension of life itself." (1889, 130)

Since reading and writing are only an "artificial sort of speech," Gertrude covertly prepares the children to reading and writing through her own version of this "artificial speech." This consists, in Pestalozzi's words, of "mak[ing] the children pronounce syllables after her in regular succession, taking them from an old A-B-C book." Such a book is then used to structure "exercise[s] in correct and distinct articulation." This pattern of using not only reading and writing, but also the medium print, to sustain an orality allegedly primary to and freed from the contamination of print, is common in Romantic pedagogies – or in those that are today considered "progressive." It is to be found not in Rousseau and Pestalozzi, but as Friedrich Kittler points out, it is also endemic in instruction manuals for mothers that proliferated in the 18th century. In a chapter called "The Mother's Mouth" in his book on *Discourse Networks* (*Aufschreibesysteme*, 1985), Kittler explains:

"A simple and direct shortcircuit characterized [this] 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... The phonetic method... substituted for the textuality of the book and alphabet a Voice [sic] that neither read aloud nor imitated, but instead spontaneously created the pure sounds of the high idiom or mother

tongue... For the sake of the Mother, a book would forget being a book. Pestalozzi made this shortcircuit explicit in his joyful exclamation, "The book is not yet there, and already I see it disappearing again through its effects!"[3] (1992, 53)

The romantic tradition, in other words, produces a contradiction concerning writing and speech that inverts the one produced by Comenius and the rationalist tradition: Comenius sees written language as primary, and advocates a return to an original, universal, and transparent writing. Speech for him and other "rationalists" is only a derivation of writing, and pedagogical and educational efforts are evaluated in this tradition in terms of their ability to connect with the primal written nature of communication or of thought itself.

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      S and ask, How do you say that?   Answer, S
then O       „       „        „       now?    „      SO
  „   L       „       „        „         „       „      SOL
  „   D       „       „        „         „       „      SOLD
  „   A       „       „        „         „       „      SOLDA
  „   T       „       „        „         „       „      SOLDAT
  „   E       „       „        „         „       „      SOLDATE
  „   N       „       „        „         „       „      SOLDATEN
  „  ST       „       „        „         „       „      SOLDATENST.
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Frequent repetition of building up the same word is absolutely necessary to make the formation and pronunciation perfectly fluent to the child.

Exercises for pronunciation from Pestalozzi's *How Gertrude Teaches her Children*,
source: public domain

Educational theorists and practitioners labeled as "romantic" are diametrically opposed. They attempt to reduce text and symbols to the supposed "naturalness" of speech. "Reading and writing," as Pestalozzi's Gertrude says, "are only an artificial sort of speech." But Rousseau and Pestalozzi, and by implication, others in this tradition, go a significant step further: They also advocate a return to speech in its natural and originary state through specific methods and techniques – procedures which at the

same time rely explicitly on the intervention writing itself. For Pestalozzi, as Kittler point out, this is embodied in the function of the A-B-C book that Gertrude uses for "exercise[s] in correct and distinct articulation" with her children. For Rousseau, a similar effect is achieved in Emile's education through the intervention of a cultivated master who will "prevent or efface… the impression of the peasants talk… by speaking correctly himself."

A similar "simple and direct shortcircuit" can be said to characterize pedagogical prescriptions of later figures with broadly "romantic" and "progressive" sympathies. John Dewey, the father of American progressive education, labels the belief that children should learn reading and writing in the early grades as "false educational god." Referring in 1898 to recent rise of "magazines, libraries, art-galleries and all the daily play of intellectual intercourse," Dewey remarks that the "methods of the discovery and communication of truth… [now] have become direct and independent, instead of remote and tied to the intervention of teacher or book" (1940, pp. 18, 19, 22). Although he asserts knowledge and the truth itself is to be found in magazines and libraries, Dewey – like Rousseau and Pestalozzi before him – keeps this "dangerous supplement" (Rousseau, as cited in Derrida 1974, 141) at arm's length from any explicit educational efforts. Textual ability is then learned by children not through any adult efforts, but precisely in spite of these. It is to occur as Dewey describes, through "the teacher[s] …power to transmute symbols and contents into their working psychical equivalents" (1900, 105) or simply though the spontaneous event of "children teach[ing] themselves… to read:"

"Reading is not to them an isolated exercise; it is a means of acquiring a much-desired object. Like climbing the pantry shelves, its difficulties and dangers are lost sight of in the absorbing desire to satisfy the mental appetite." (Dewey & Dewey 1915, 22)

The difference between Dewey and his romantic predecessors, perhaps strangely, is that Dewey does not suggest a "ruse" or "trick" such as the cultivated master or the A-B-C books of Rousseau or Pestalozzi. Instead, he seems to see a natural, textual fluency being ushered in through the

ubiquitous circulation of knowledge itself, swirling around the pupil, and leading him or her to engage with it through spontaneous desire or via a sort of "transmutation."

Chomsky's Syntatic Structures and Media Neutrality

To return briefly to the rationalists, the theory of universal grammar or syntax of Noam Chomsky is one which in many ways inaugurated cognitive revolution of the 1960's and 1970's. Cognitivism, in turn, is arguably still the dominant account of mind and communication in the Anglo-American world. Like Comenius' dream of his own universal linguistic order and Descartes' contributions to a purely rational language of calculation, Chomsky's universal, generative or transformative syntax, has done much to popularize the rationalist privileging of writing, and conceptions of the primal nature of language as writing, in educational thinking. Like Comenius, Chomsky sees language, specifically rules of syntax and grammar, as embodying an order and logic that is universal. There are a few important differences, however, that separate Chomsky's "Cartesian linguistics" from earlier dreams of a perfect and universal language: Chomsky's universal language is not one that has been lost or that needs to be invented. Instead, it is believed to precede any and all language, of necessity undergirding all forms of linguistic expression, whether living or dead. At the same time, though, it is not directly accessible through any one existing tongue or dialect. It is locked away from direct access, and is manifest only very indirectly through syntactic commonalities shared between the actual human languages that it generates. As Chomsky explains in his *Syntactic Structures*, this language is not an expressive sonority, but possible combinations or sequences of discrete elements:

"...I will consider a language to be a set (finite or infinite) of sentences, each finite in length and constructed out of a finite set of elements... or symbols... All natural languages in their spoken or written form are languages in this sense.... The fundamental aim in the linguistic analysis of a language ...is to separate the grammatical sequences which are the sentences... [in this

language] from the ungrammatical sequences which are not sentences… and to study the structure of the grammatical sequences." (2002, pp. 13, 21)

What is most important for Chomsky, in other words, is the structure of (both correct and incorrect) grammatical sequences that may be assembled from any language or finite set of elements or symbols. Chomsky's concern here is principally on the *complexity* of the grammatical rules that govern these combinations or constructions. He sees these as determined by the universal "deep structures" common to all languages, structures that undergo logical "transformations" to form the specific rules of any given language.

Chomsky uses this hypothesis to explain the kind of natural, early language learning, the pure and innocent orality so privileged by Rousseau and Pestalozzi. If the language that every infant learns with such apparent ease is governed by computationally complex rules and transformations, then the infant must be born with what Chomsky refers to as a "machine:" a computational language organ that is closely coupled with sensory inputs, and that has "data-handling or 'hypothesis-formulating' ability of unknown character and complexity." (1957, 57)

Chomsky's theory of language offers a way of understanding a range of media, including writing, speech, and more recent media forms or technologies. A specific language or form of communication or even instruction can be seen as simply a function of an underlying set of rules and computations. It is just one of many potential systems of symbols that can be generated through transformations of underlying universal structures, and that can be efficiently processed through human cognitive machinery. As indicated above, Chomsky's particular configuration of the questions of language, universality and rationality has laid the groundwork for a wide range of theories and studies of learning and of educational media. The question for each of these becomes one of constructing other media or "symbol systems" so that they engage with this encoding as efficiently as possible. The issue, in other words, is to use technologies and that which is most artificial in order to connect with that which is most deeply human and natural.

One example of this way of evaluating the potential of media systems is provided by a well-known piece that initiated a decades-long debate about the neutrality of media for instruction. This is Richard E. Clarks' "Reconsidering Research on Learning from Media" appearing in 1983. From a North-American perspective, this debate serves as a central reference point in discussions regarding the neutrality of media in education. Clark begins by affirming the basic premise that different media, such as television, computers or books, represent different "symbol systems" or "symbolic 'elements' of instruction," and that these are in turn subject to specific "processing" and "transformations" by a human data processing machine or cognitive apparatus:

"All instructional messages [are] coded in some symbolic representational system… and symbols vary in the cognitive transformation they allow us to perform on the information we select from our environment." (Clark 1983, 74)

Clark's most significant point, however, is that a given medium and a specific symbol system are *not* exactly the same. He reminds his readers, for example, that it is possible to present the symbol system of "text" using the medium or hardware of a book or of a computer screen. As a corollary, Clark also maintains that no medium can be seen as a *necessary* causal factor in learning. Media instead can only be very broadly correlated with changes in learning performance. Although symbol systems vary (and may even vary in their suitability for the human cognitive processing) no one medium has exclusive claim to any one symbol system, and thus to a possible direct and causal influence on learning – or in other words, to even a minimal, functionalist normative significance.

Clark further points to 70 years of research, starting with the behaviourist use of pictures as instructional media in 1912. He notes that it has generally failed to support the medium of instruction as a statistically significant factor in learning performance. Clark ends his article by concluding: "It seems reasonable to recommend, therefore, that researchers refrain from producing additional studies exploring the

relationship between media and learning unless novel theory is suggested" (1983, 90).

Romantic Rationalism: France, Mathland, Natives and Immigrants

As indicated above, no new or truly "novel" theory that would radically reconfigure media and learning has emerged since Clark's pronouncement. Instead, the conceptual vocabulary of cognitive theory has been only gradually adapted and augmented by constructivist and other influences. In the terms of this paper's analyses, these adaptations and augmentations can be said to integrate aspects of both romantic and rational traditions in their prescriptions concerning media and education. A first and fundamental move in this synthesis is to affirm the cognitivist notion that the efficiency of oral language learning is something that can be readily transferred to other "symbol systems" and media forms. These include anything from film to radio and television to video games and touch-screen interfaces. Such technologies, like spoken languages, share the characteristic that familiarity with their use can be acquired at a young age, and without formal teaching or structured effort. At the same time, this "romantic rationalism" engages in a notable downplaying of the specifics of any transformational cognitive machine that might underlie the acquisition of a linguistic or technical skill.

One of the earliest advocates of computer media or technology to develop arguments on this basis is Seymour Papert, who combined the constructivism of Jean Piaget with the computational cognitivism of the MIT (*Massachusetts Institute of Technology*) milieu that he shared with Chomsky in the 60's and 70's. Papert begins his account (taken from his 1980 book, *Mindstorms: Children, Computers, and Powerful Ideas*) beings identifying "the model of successful learning" as being "the way a child learns to talk, a process that takes place without deliberate and organized teaching." Saying that "Piaget is at the center of the concerns of this book," Papert goes on to label this type of learning – one occurring without teaching – as "Piagetian learning." He then asserts that such

natural and effortless learning is also in the foreground when children have the opportunity to program computers:

"Programming a computer means nothing more or less than communicating to it in a language that it and the human user can both "understand." And learning languages is one of the things children do best. Every normal child learns to talk. Why then should a child not learn to "talk" to a computer? ...it is possible to design computers so that learning to communicate with them can be a natural process, more like learning French by living in France... than like trying to learn it through the unnatural process of American foreign-language instruction in classrooms." (1980, 5–6)
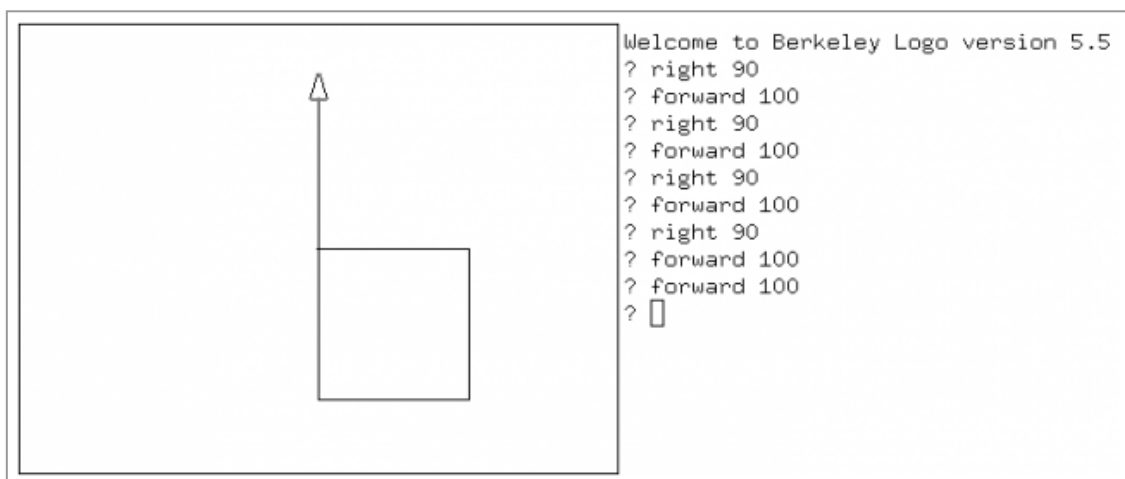
Papert here begins with a variation of a gesture that is common to many rationalists: the elimination of fundamental differences between speech and writing. Like Chomsky, Papert is asserting (albeit tacitly) that "All natural languages in their spoken or written form are ...constructed out of a finite set of elements... or symbols." But it is soon after this point that Papert and Chomsky part company. Papert not only goes further than Chomsky in considering artificial *computer* languages also as effectively the same as their "natural" spoken counterparts, but in ignoring the notion of any underlying, rational code. For Papert, all manifestations of writing and speech are the same in that they are at heart a manifestation the "natural" orality of early childhood, exemplifying "Piagetian learning."

Papert goes on to argue that computers present to children not only a language, but also a "living" linguistic environment or culture. In the case of the computer, this language is not so much about learning to say " *Bonne nuit*" or "*je m'appelle John*" but about learning to speak the language of a living environment of math and geometry:

"The computer can be a mathematics-speaking and an alphabetic-speaking entity... When this communication occurs, children learn mathematics as a living language. Moreover, mathematical communication and alphabetic communication are thereby both transformed from the alien and therefore difficult things they are for most children into natural and therefore easy ones. The idea of "talking mathematics" to a computer can be generalized to a view

of learning mathematics in "Mathland;" that is to say, in a context which is to learning mathematics what living in France is to learning French." (1980, 6)

Of course, there are no names, times of day or even other people in the place called Mathland; in their place, there is a textual interface, allowing the student to compose lines of code, instructing the computer to can draw lines and shapes in this imaginary land. The computer "replies" in this "conversation" by displaying executed operations, or presenting error messages.

```
Welcome to Berkeley Logo version 5.5
? right 90
? forward 100
? right 90
? forward 100
? right 90
? forward 100
? right 90
? forward 100
? forward 100
? []
```

An example of commands and drawing from Papert's Logo Programming Language,
an early precursor to Mathland, source: Wikimedia Commons

Neither the differences between writing and speech – nor those separating the variety of everyday language from the terse commands of programming – have stopped others from repeating very similar extended analogies regarding early language learning and more advanced tasks in computer environments. In fact, intervening developments in computer hardware and software seen to have made such comparisons even more popular and tempting.

For example, in his recent book *Teaching Minds: How Cognitive Science Can Save Our Scho*ols (2006a), Roger Schank links early language learning with "learning by doing" – and sees the latter as exemplified in learning to walk

and talk. He invokes cognitive theory of rational, goal-directed action to make the argument that

"Everything we do as human beings is goal-directed. We pursue goals as soon as we are born. We try hard to learn to walk, talk... If school related to the goals that children actually had... [it] would seem like a natural and helpful experience. Students wouldn't stress about satisfying their teachers any more than they stressed about satisfying their parents when they were learning to walk and talk."(8)

Here and elsewhere, Schank envisions a kind of naturally-occurring "experiential" learning as being realized in the context of "online, learning-by-doing, experience based, learning environment[s, in which] teaching occurs on an as-needed basis" (2006b, 590). In other words: we learn complex things like walking and our first language(s) "naturally;" therefore, we should emulate this learning-by-doing, and we can do so most effectively through computers.

Finally, a slightly different but enormously popular variation on discourses connecting early language learning with new media and technology has been provided by Marc Prensky and his notion of young "digital natives" and older "digital immigrants." Like many before him, Prensky begins his argument with a broad comparison of linguistic fluency with fluency in the use of computers and similar technologies. Unlike Papert (or Schank), however, Prensky does not see early language learning as "the model of successful learning" for just any age or subject. Instead, Prensky's position is that this type of learning is the exclusive possession of the young, and that the best that any older generation can do is learn – either figuratively or literally – with an immigrant's accent.

"Today's students – K through college – represent the first generations to grow up with this new technology. They have spent their entire lives surrounded by and using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age. What should we call these "new" students of today? Some refer to them as the N-(for Net)-gen or D-(for digital)-gen. But the most useful designation I have found for them is

Digital Natives. Our students today are all "native speakers" of the digital language of computers, video games and the Internet." (2001, 1)

This argument, which has been repeated and reinterpreted in a wide range of presentations and publications (e.g., Stoerger 2009; Prensky 2010),[4] valorizes natural spoken language learning and applies it also to technology. By way of contrast, it the awkward foreignness of adults, particularly teachers, who lack fluency in this language, and the educational priorities and institutions with which they are often associated:

"...the single biggest problem facing education today is that our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language. This is obvious to the Digital Natives – school often feels pretty much as if we've brought in a population of heavily accented, unintelligible foreigners to lecture them. They often can't understand what the Immigrants are saying. What does "dial" a number mean, anyway?" (emphasis in original; 2001, 1)

Prensky can be seen to be repeating the pattern of valorizing naturally-learned skills and abilities –those modeled in natural oral language learning – and as suppressing the textual as the "dangerous supplement." He engages, in other words, in the "simple and direct shortcircuit" that Kittler attributes to Pestalozzi's Gertrude. But unlike Gertrude, Prensky is not simply suppressing or shortcircuiting the text that is used to teach "correct and distinct articulation;" he is instead omitting the role of writing as described at the outset of this paper: as an inter-generational undertaking or obligation that is the *raison d'être* of school and education. The foreignness of the school and of educational processes to those raised with cell phones and video cams (and earlier, TVs) is not an incidental characteristic of education or schooling; it is instead arguably expressive of its very essence. In addition, the skills and abilities cultivated in this outdated and unintelligible place are not only the pre-requisite to the construction and maintenance of the world of computers and other toys and tools of the digital age, but are indispensable for the realization

of their power and potential. As Umberto Eco has noted, digital technologies are highly textual in nature: "the computer returns us to Gutenberg's galaxy; from now on, everyone has to read" (2011, 4)

Prensky's compelling metaphors of digital natives and immigrants appear much more problematic when the repressed supplement or factor of writing is brought into the picture. Reading, writing, programming or mathematics, for starters, are communicative activities that are not done with an accent. For many people (particularly outside of the English speaking world), being able to engage in complex textual activities like reading or writing in a foreign language does not depend on the linguistic or technical milieu into which one was born. Instead, what matters are the skills and abilities one acquires through emphatically "unnatural," artificial effort and difficulty, often long after one has mastered one or more spoken languages with the ease and efficiency of Piagetian learning or learning-by-doing.

Conclusion: Dispelling Media Myths

In both the rationalist and the romantic pedagogical traditions, orality and textuality are reduced one to the other. In the rationalist tradition, all language is considered ultimately to be a code: a finite set of elements… or symbols governed by rational structures and rules; in the romantic tradition, all communication ultimately reduces to oral expression, and its fundamental "accents, cries, complaints." With Derrida's notion of the "supplement" and Kittler's observation of the "shortcircuit in pedagogical discourse," both identify a significant issue that arises in the way that textuality and orality are configured in what I have called the "romantic" tradition. However, there is much evidence to suggest that both Derrida and Kittler display an affinity with what I have called the rationalist position, particularly insofar as they affirm that "it is the primal nature of language to be written" (Foucault 1974, 37). For Derrida, this affirmation occurs via the notion of arche-writing and its self-deconstructing *différance* that governs not only speech but also any other imaginable expressive forms, for example, cinema or choreography (e.g., Derrida

1976, 9). For Kittler, this affirmation is particularly clear in his late celebration of the expressive and recursive power of the written phonetic alphabet (particularly as it is instantiated in computing machines). As Kittler himself has proclaimed, "[w]hat *is*, is alphabetic. This, only this, metaphysics forgets" (Kittler, as cited in Heilmann, in press).

The analyses presented in this paper can be seen as illustrations of the problems presented by such reductions, specifically as they apply to educational theory and practice. Writing and speech, at least insofar as educational theorizing is concerned, should be seen as heterogeneous and mutually irreducible. Writing is not artificial speech, nor is speech simply or ultimately reducible to symbols and encodings. In focusing on the one and suppressing the other, each tradition creates significant distortions – ones that perhaps become clearer by recalling some of the valorizations and significances in the mythical accounts with which this paper began. In these, writing is explicitly acquired and taught; it is an artifice that is learned with difficulty, as if in a response to a command or obligation. Speech, on the other hand, is something that is "naturally" or always-already a part of the human condition.

This heterogeneity and mutual irreducibility is central to pedagogical or didactic method, which frequently involves the invocation or simulation of one medium through the other. Comenius wanted to bring people to a natural Adamic conversation with God through the artificiality of books and writing; Cartesian and other forms of cognitivism begin with codifications and associated computational "machinery" to then imagine how speech – and from there, other media – might interface with it. Rousseau, Pestalozzi and Dewey – and after them, Papert and other theorists and advocates – go in the other direction: starting with expressive orality, they see a kind of natural "learning by doing" as paving the path all the way from spontaneously learning to speak through to an equally spontaneous mastery of text. These biases and valuations can be said to represent a kind of "new mythology" of media education, a set of narratives and configurations that might benefit from being brought

further into careful and conscious alignment with older myths and understandings.

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[1] "Cangjie" is now used to designate a computer input method for entering Chinese characters (i.e. those allegedly invited by Cangjie) using a standard keyboard.

[2] As Totah (1926) states: "When Charlemagne was learning to read his letters with the sons of his nobles in the palace school, al-Ma'mūn was studying and discussing philosophy in Baghdad and at a time when most European children had no schools to attend, their Arab contemporaries were enjoying the full benefits of education" (15).

[3] Although Pestalozzi is writing here in his book on Gertrude and her children, he is referring to an unwritten book specifically titled "The Mother's Book."

[4] Google Scholar indicates that Prensky's original article has been cited well over 5,500 times.