Making Meaning With Technology:

A Critical Transactional Framework For Literacy in Computer Mediated Communication

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Abstract

Over the past twenty-five years, many theories and models have been proposed by the literacy studies community for teaching and assessing literacy practices involving computer mediated communication (CMC) technologies. More recently, CMC software has incorporated functions that influence interpretation and creation of texts, but do not support meaning-making by readers and authors. In this article, the author proposes an inquiry framework for literacy practices in computer-mediated contexts based on Rosenblatt's transactional model of reader response and drawing from Feenberg's critical theory of technology. This framework adopts a nondeterministic approach to digital literacy practices and encourages reconceptualizing and repurposing CMC technologies along democratic, rather than technocratic, lines.

Keywords: reader response, transactional reading, digital literacy, critical literacy, critical theory of technology, computer mediated communication

For twenty-five years, the literacy studies community has worked to develop theories and models of literacy practices in the context of computer mediated communication (CMC) technologies. Professional interest in the implications of CMC, as well as new priorities and methods, have yielded rich, complex, and occasionally contradictory models of digital literacy (Goodfellow, 2011; Jacobs, 2013, 2014; Coiro, 2021). Early CMC contexts were predominantly text-based, but evolving technologies have led to novel literacy practices that incorporate words, symbols, images, audio and video. In this environment, characterized by rapidly shifting CMC technologies, Leu, Kinzer, Coiro, Castek, and Henry (2013) have argued that literacy is now defined by ongoing technological change.

At the core of all literacy practices, however, are humans engaged in meaning-making. To study, teach and learn literacy practices in CMC contexts requires accounting for the evolving state of CMC technology while remaining focused on this core. This continued focus on human meaning-making is particularly relevant in light of recent developments in CMC software that intervene in readers' meaning-making processes (Hao, 2021; Lada, Wang, & Yan, 2021; Roose, Isaac, & Frenkel, 2020). These changes may limit, rather than support, human agency; they therefore need careful and critical examination.

In this article, I propose a framework for inquiry into the interventions computer mediated communication technologies make in human literacy practices. Reaching across disciplinary boundaries, this framework combines Louise Rosenblatt's transactional model of reading and composition with Andrew Feenberg's critical theory of technology. Rosenblatt's work is familiar to many literacy scholars, teachers and researchers; Feenberg's writings on the philosophy of technology perhaps less so. The advantage of a framework that combines the transactional model of reading and writing with the critical theory of technology is twofold. First,

Rosenblatt's transactional literacy model allows researchers to investigate when and where in readers' and authors' meaning-making processes CMC technologies are intervening. Second, Feenberg's critical theory of technology provides tools for identifying the social and technical assumptions underlying CMC technologies that are responsible for literacy interventions.

In this article, I will briefly describe each of the theories that comprise my proposed framework and discuss how they work together to support inquiry into literacy in CMC contexts. I will then provide some representative examples of the framework in use. In my conclusion, I will discuss the implications of these examples, consider the current limitations of the framework and suggest ways in which it can be expanded and combined with additional models of CMC literacy.

A Critical Transactional Framework for Literacy Practices in Computer Mediated Communication

Describing Meaning-Making in Literacy Practices

Louise Rosenblatt's transactional model of reading

Rosenblatt's (2005b) transactional reading model proposes that meaning does not reside only in the reader, nor in the text (a collection of linguistic symbols or sounds) by itself, but emerges from the transaction of the reader with the text. Rosenblatt refers to this as the "evocation" of the text, or the "poem" (Rosenblatt, 1978, p. 12, 2005a, pp. 14-15). The process of evoking meanings from texts happens at the level of the individual, but is constrained or extended by the textual object itself, and the reader's social context. The emergence of warrantable interpretations of a text is therefore social rather than idiosyncratic. For this reason, Rosenblatt (1978) emphasizes the importance of public discussion of texts, as well as private reading.

Interpretation is further shaped by the reader's intent to seek information or experiential association from a text. Rosenblatt (2005a) defines "stance" as the reader's position on a continuum that extends from predominantly seeking information (the denotative, or public aspects of sense) which she names "the efferent stance", to predominantly seeking the experiences constructed by transacting with the text (the emotional, artistic, or private aspects of sense) which she names the "aesthetic stance" (pp. 11-12). A text may have an indefinite number of potential evocations. Warrantable interpretations of a text, however, must take the public aspects of meaning into account. Because humans cannot adopt a purely aesthetic or purely efferent stance with respect to a text, private and public meaning are always to some extent in play (Rosenblatt, 1978, 2005a).

Transactional composition and authorial reading

Rosenblatt (1989) argues composition is also transactional, because it incorporates the author's store of experience and knowledge into what is, at first, a potential text. The author selects which elements from this store will be realized as an actual text. The actualized text, as it emerges, is then shaped by the double transaction of "authorial reading" which the author performs during composition (p.166).

Authorial reading, in its first sense, involves selecting the appropriate semiotic elements to inscribe the author's experience and knowledge in textual form. This "inner oriented" reading helps the author to realize a personal conception of the text and is deeply tied to the author's purpose in composing it. According to Rosenblatt, this sense of authorial reading may continue throughout the composition process (ibid, p. 167).

The second sense of authorial reading involves authors reading their own emerging texts to shape them in anticipation of future readers' evocations of meaning. This reader-oriented

sense of authorial reading requires authors to consider what cues to provide in order to assist readers in selecting their position on the esthetic-efferent continuum. This process also requires authors to cultivate a sense of what their readers' social and personal stores of meaning are most likely to be (ibid, p. 170).

Accounting for Technology in CMC Transactions

Andrew Feenberg's critical theory of technology

Feenberg (2002) developed the critical theory of technology as a response to previous theories of the social role of technology. Specifically, critical theory of technology rejects the assertion that technologies are politically neutral and decontextualized from human concerns (instrumental theory of technology). It also rejects the position that technologies determine social change (substantive theory of technology). Instead, drawing from Post-Marxist philosophers like Marcuse, Feenberg proposes a third position: technologies are "a scene of struggle" between groups with varying social positions and access to power (ibid., p. 12).

Critical theory of technology starts with the observation that for any real-world need, multiple technological solutions are possible. Feenberg refers to the decontextualized association of a technological solution with a need as primary instrumentalization. There is always, however, more than one potential solution, and each solution proposed may have different areas of usefulness and efficiency.

The social decisions that converge on selecting a technological solution are what Feenberg refers to as secondary instrumentalization. Secondary instrumentalizations are then manifested as one or more technical codes. Technical codes serve to define how the technology is perceived, how it functions, and to rationalize that technology in its current form (Feenberg, 2002, 2010).

Contributions to the decision-making process, however, are often restricted. Owners or controllers of technologies make decisions to maximize their efficiency and utility for the owners' benefit. Because other social groups and perspectives have been left out, the result prejudicially excludes them. This is what Feenberg calls the formal bias of technical codes (Ibid).

When users resist or critique the formal bias of technical codes, they open up space for reconceptualizing technologies. As technologies are brought into use, technology users may accept technological limitations, develop ways to work around these limitations, or invent entirely new uses for technologies. Ultimately many of these workarounds or alternative uses may be designed back into a given technology. Feenberg names this phenomenon by borrowing the term concretization from Gilbert Simondon (Feenberg, 2010, p. 78). Concretization, in its ultimate form, is an active repurposing of technology involving democratic stakeholders who use their influence to rewrite previously biased technical codes.

The technical codes of CMC technologies

The technological context in which discussions about CMC literacy practices are set is half-a-century old. From a literacy studies standpoint, one outcome of this long history is that it partly obscures the decisions that shaped and continue to shape the technical codes of CMC technology. As academic and military researchers developed the early Internet, it was used mostly with text files, because text terminals were the primary human-facing interface for computers through the early 1990's (Krol, 1992). Word processors—now ubiquitous composition tools—took on new characteristics required to serve business needs (Haigh, 2006). The practices of tech-savvy academics and computer hobbyists also contributed to the design and use of CMC software (Gilster, 1997).

Prior CMC users, CMC developers and owners of CMC platforms all contribute to the technical codes of CMC software. In turn, these technical codes define and rationalize the software's interventions in literacy transactions. Coiro (2021) summarized twenty years of research that points to readers modifying their literacy practices in CMC contexts. In light of this, it is not unreasonable to assume that the technical codes of CMC software have some effect on every reading and authoring transaction that uses CMC technology.

A Critical Transactional Framework

Combining Rosenblatt's insights into literacy transactions with Feenberg's critical theory of technology yields both a process for inquiry into literacy transactions in CMC contexts and a process for critical analysis of CMC technologies themselves. Figure 1 presents the linkage between the two within a critical transactional framework.

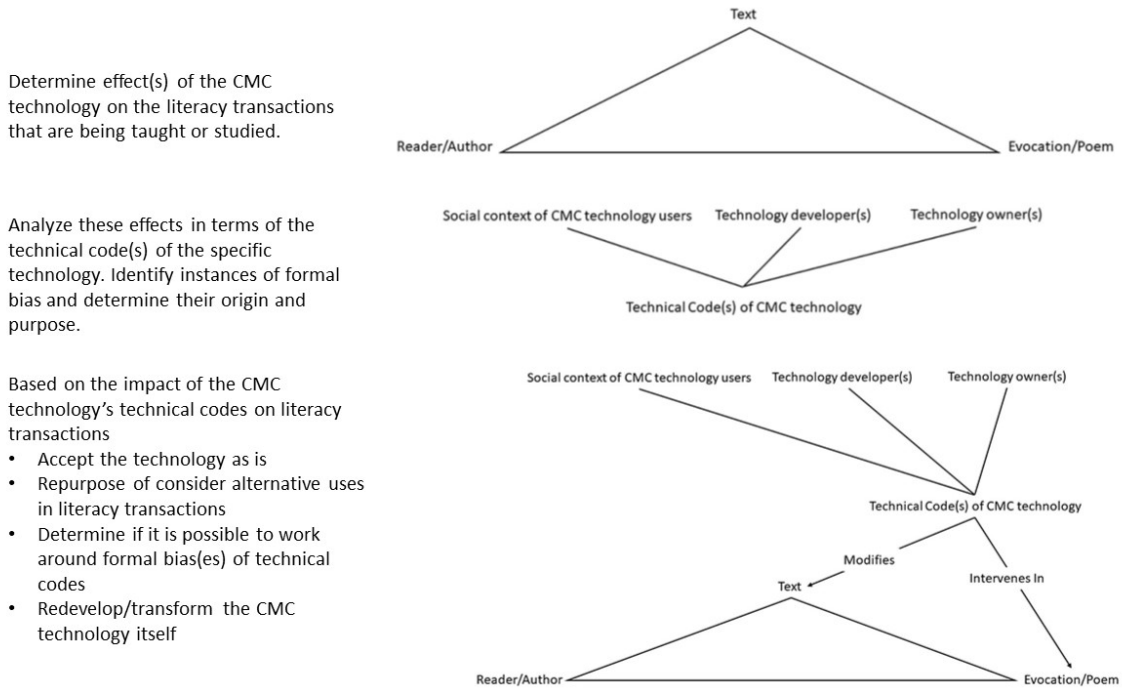


Figure 1. Process of inquiry and critical analysis within a critical transactional framework for literacy transactions in CMC contexts.

The inquiry process begins by examining the literacy transaction and determining any effects that stem from the CMC context in which it occurs. Of particular interest are: the size of any intervention, what is the component (or are the components) in the meaning-making transactional flow in which the intervention occurs, does the intervention affect the evocation of private or public meaning and, finally, does the intervention support the transactional process, interfere with it, or not have much effect.

The second phase of the inquiry process is based on knowledge gained during the first phase. This phase is a critical analysis the technical codes of the CMC technology. Based on the kind and magnitude of the CMC technology's effects on literacy transactions, scholars may want to examine the social, technological and historical factors that contribute to these effects. If evidence for formal biases emerge, determining their scale, origin and impact will assist with the decisions to be made in Phase 3.

The third phase of the inquiry process requires an evaluation of the CMC technology's technical codes in light of the effect the technology has on literacy transactions. Based on this evaluation, a number of options are available. One may accept the CMC technology as it is, and modify one's literacy practices; one may consider alternative uses for the CMC technology, or uses that work around its impact on literacy transactions; finally, one may decide a CMC technology is not useful for literacy transactions, and work to influence its technical codes by redeveloping or transforming the technology.

The following examples take the inquiry process through the end of Phase 2. They are not a full sample of possible inquiries. Instead, they are a preliminary exploration of common situations scholars, teachers and students may encounter.

Technical Codes and CMC Interventions in Literacy Transactions: Examples of the Framework

CMC as Context: Readers' Experiences of Stable Texts

According to Rosenblatt (2005), the situational context of the reader and the text affects both readers' attention to the text and the stance with which they approach reading transactions. Research by Evans and Po, (2007), Singer Trakhman and Alexander (2016), and Turner, Hicks, and Zucker(2020) support the assertion that different CMC platforms affect readers' approach to, and understanding of, texts. Figure 2 displays the relationship between the technical codes of CMC platforms and the influence of situational contexts on readers.

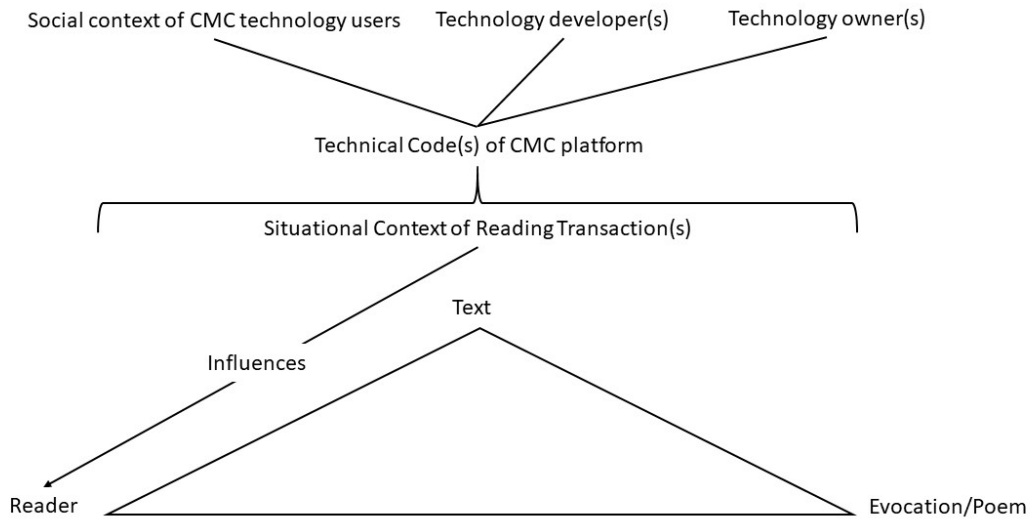


Figure 2. Diagram of the relationship between technical codes, situational contexts, and readers

In this diagram, the textual object itself is assumed to be stable, i.e., the platform software does not modify the contents of the text. Differences in evocations are largely caused by the reader's stance as it is influenced by the reading context the platform provides. Warrantable interpretations are supported, insofar as different readers are able to refer to a common text, albeit one that may be presented differently on different CMC platforms.

Alphanumeric/illustrated texts in CMC contexts

This relationship is illustrated in Figures 3 and 4, below. Both figures display the same text from the World Wide Web. Figure 3 is a screen capture from a desktop web browser, and Figure 4 is the same screen displayed on a mobile phone.

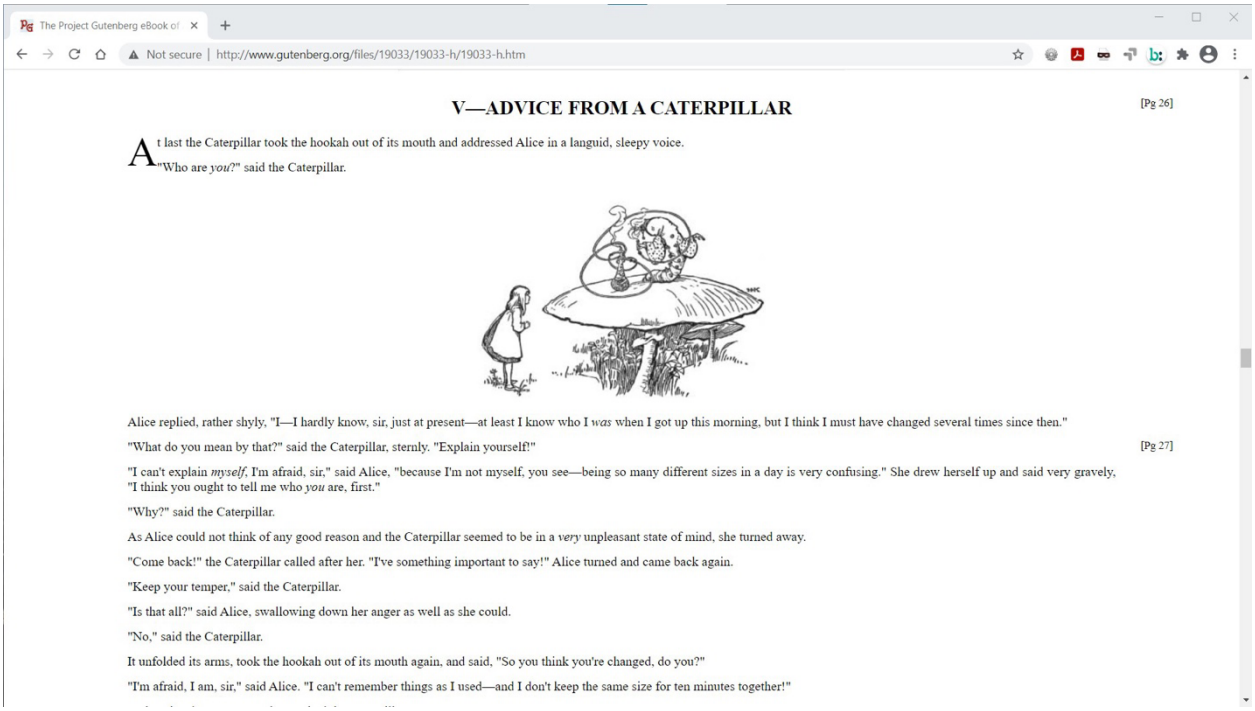


Figure 3. Screen capture of an illustrated children's book retrieved from Project Gutenberg http://www.gutenberg.org/files/28885/28885-h/28885-h.htm

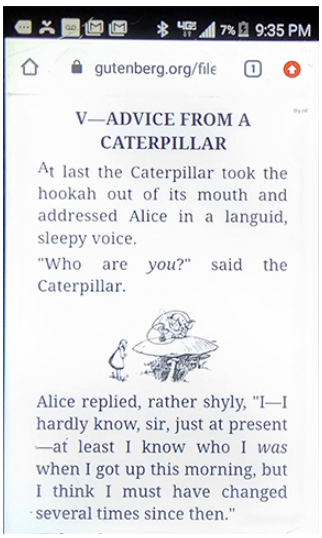


Figure 4. Screen capture of the same book as displayed on a mobile phone

The text and illustration are identical, and the warrantable public meanings that can be evoked from them should be close, if not identical in each case. But the individual reader's experience of the text, and hence the reader's stance, is likely to be different. The display and user control interfaces for each platform incorporate very different technical codes: Web browsers are optimized to share documents (Berners-Lee & Fischetti, 1999); whereas mobile phones are optimized for portability and short text messaging (Agar, 2013).

Stable CMC-specific texts

Some categories of texts are unique to computer mediated communication. The dialogue shown in Figure 5 is composed largely of emoji, a system of glyphs that emerged from mobile phone and computer chat exchanges (Danesi, 2017; Stark & Crawford, 2015).



Figure 5. Conversation on a social media post using emoji

We can adduce that N. is going to see family for Thanksgiving. One of N's friends inspires a joke about emoji and the APA Manual of Style. N.'s next response could be something like "Don't blow the top of your head off!" but this would be unwarrantable given the public meaning of expression emoji in IM conversations. The explosion in the "mind blown" emoji is understood by all parties to be metaphorical.

Although much of this exchange is expressed in emoji (glyphs) rather than words, the linguistic conventions that have grown up around emoji permits warrantable interpretations. Changing any of the emoji would change the meanings evoked by all participants. At the level of private evocation, however, different CMC platforms have adopted slightly different renderings of each emoji. In this exchange, each reader may have read the conversation in the graphical equivalent of a different typeface ("Emojipedia Home of Emoji Meanings," n.d.; Ricker, 2017).

Hypertexts

Hypertext documents are most often experienced online in the form of webpages. The process of evoking meaning from each component of a hypertext document is similar to evoking meaning from a fixed text. The overall textual object of a hypertext document, however, is co-created by readers based on the links they choose to follow and the order in which they follow them. Hypertexts documents are, therefore, mutable in the sense that a single document may contain many evocable texts (in addition to many potential evocations for each).

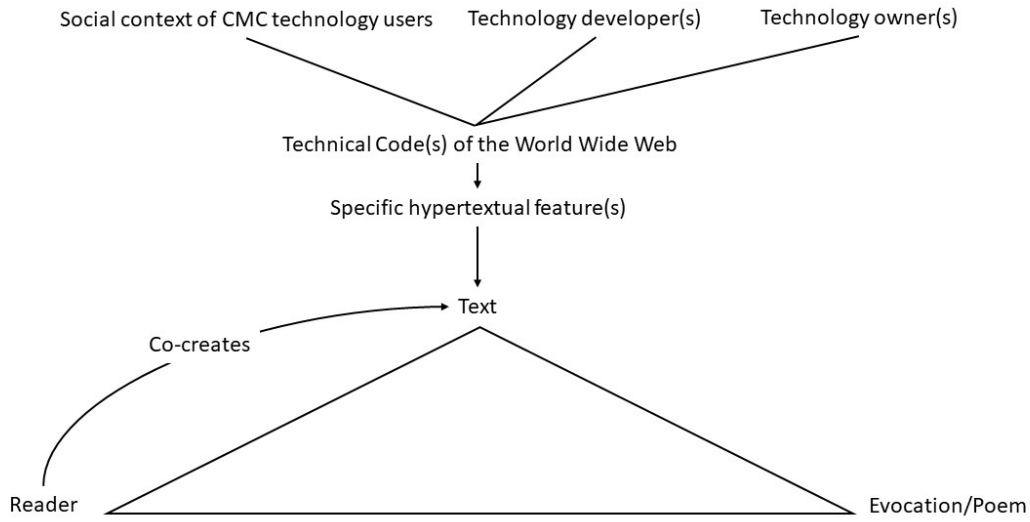


Figure 6. Diagram of the relationship between technical codes, hypertext documents, and readers

Warrantable assertions about any text require collective agreement on the content and boundaries of the text. The technical codes of the World Wide Web in theory permit nearly infinite linking within and across documents (Berners-Lee & Fischetti, 1999; World Wide Web Consortium, 2021), which would seem to preclude this. In fact, however, there are a number of areas in which readers may arrive at agreement:

- Whether or not a text is a hypertext document
- What stance(s) readers have adopted for reading a hypertext document
- Which public evocations of meaning are associated with which hyperlink "paths"
- If readers have been following the same, or related, hyperlinks while reading the document

The published body of research on hypertexts that includes Rosenblatt's transactional reading model is small. McEneaney, Li, Allen, and Guzniczak (2009) found that reading prompts influenced reader stance as they navigated through hypertext documents. Evans and Po's 2007

study also found that readers resisted the concept of unstructured hypertexts designed to frustrate interpretation. On this limited basis, it appears that hypertextuality complicates, but does not confound the process of transactional reading. Readers desire to evoke both private and public meanings for hypertexts, and modify their reading stances accordingly.

Interventions by CMC Software

A more recent development in computer mediated communication technology is software that intervenes directly in both the texts available to readers and in authors' creation of texts. Figure 7 illustrates the relationship of this type of CMC software with authors and readers.

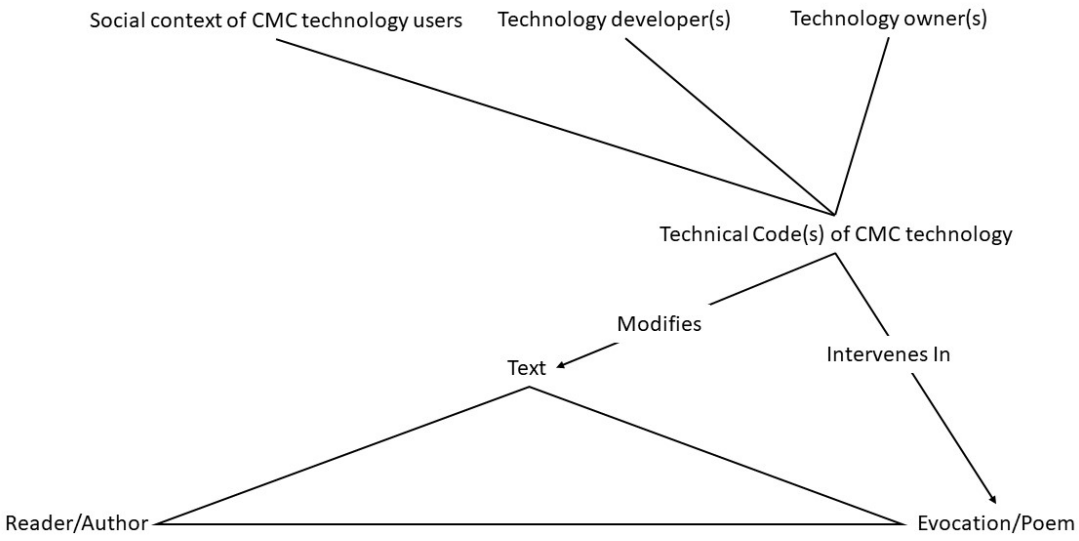


Figure 7. Diagram of the relationship between technical codes, actively intervening CMC software, readers and authors

Generated social media pages: interventions in reading transactions

Content personalization algorithms are increasingly being used by social media sites. These algorithms generate CMC texts intended to be viewed by specific readers. This is accomplished by combining text components based on pages readers have previously viewed, or content that the algorithms recognize as related. As readers transact with these generated CMC

texts, the software continues to collect information about them. This information is then used to transform future versions of the text. In addition to being targeted to specific readers, these generated pages are ever-changing. Refreshing one's browser can produce a completely different version of a given page.

Discussing generated CMC texts with other readers is difficult. Both readers need to be looking at the same screen at the same time, or the text must be captured as a screenshot and distributed in that form. Generated CMC texts may have public as well as private evocations of meaning. But background intervention by CMC platform software sharply limits readers' ability to share these texts.

This is a direct outcome of the software's technical codes. The purpose of Facebook's personalization algorithms is not to assist readers in constructing meaning from their transactions with pages on the site. It is explicitly to maximize advertising sales for the Facebook platform. Readers' interests in social interaction or discovering meaningful texts are merely input data for the algorithms (Hao, 2021; Lada et al., 2021). This has consequences that reach beyond literacy practices: during the 2020 election cycle, the Facebook corporation viewed the spread of politically divisive content by its platform as an embarrassment. At the same time, the company was concerned with the financial impact of curtailing it (Roose et al., 2020).

Interventions in composition transactions

Software interventions have also become more prominent in composing texts using CMC tools. Spell check, grammar check, and various predictive or corrective algorithms push authors towards specific assumptions during the process of authorial reading. In extreme cases, interventionist software can transform the entire meaning of a text without input from the author.

Figure 8, for example, is a screen-capture from a popular email program.

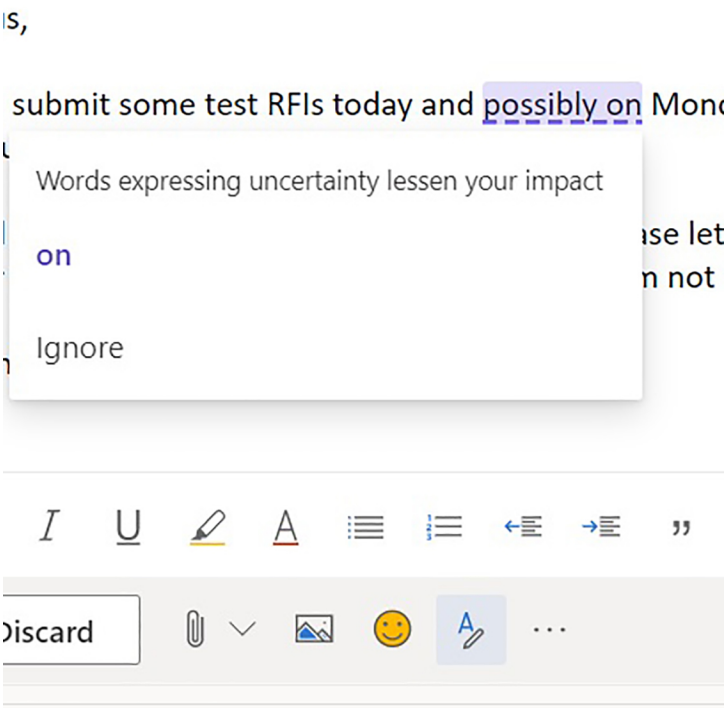


Figure 8. Screen capture of an email composition screen showing style recommendation

In addition to spelling and grammar correction, this software provides recommendations on writing style, couched in value-laden terms. The recommendation is presented as a decontextualized truth about public meaning, regardless of the author's intent. Authors have the option to ignore this advice, but the software will continue to mark the passage as if it is an error.

Once again, this is an instance of formal bias in the software's technical codes. The digital protocols underlying electronic mail have existed in their present form since 1973 (Bhusan, Pogran, Tomlinson, & White, 1973; Left, 2002). Originally tools for academics, computer scientists and the military, email clients were adopted by businesses. Nearly 50 years of software development have optimized at least a subset of email software to support the values and concerns of business correspondence (Haigh, 2006; Lewis-Krauss, 2014). Whether this supports writers in their processes of authorial reading is a secondary consideration.

Implications, Limitations and Directions for Future Study

The preceding examples demonstrate a small set of the possible effects of CMC technologies on literacy transactions and show how these effects are linked to the technical codes that shape the social use of CMC technologies. Two points are important to keep in mind: first technical codes are themselves the outcomes of a social process. Second, while CMC technologies will continue to change over time, the outcome of their evolution is not predetermined. Greater critical awareness of what different CMC technologies offer or withhold as contexts for literacy transactions may, in fact contribute to the process of technological development.

That said, not all current CMC technologies and contexts support literacy transactions equally. In some cases, CMC software designed and optimized with goals other than literacy in mind are occurring in contexts where literacy transactions are socially expected. It may be preferable, for example, to view some social media platforms as contexts in which literacy is contested, rather than contexts in which literacy can be studied or taught. Exploring new instrumentalizations of these platforms that resist or bypass the formal biases of their technical codes may provide a better understanding of human learning and meaning-making than trying to invent new literacy practices to fit them.

I have demonstrated the critical transactional framework proposed in this article is an effective tool for examining and critically analyzing the effects of computer mediated communication technologies on literacy transactions. It is, however, incomplete. Researching the history and social factors that led to the adoption of some technical codes may stray outside the realm of literacy studies entirely. Research from additional fields such as cultural studies, media studies and critical discourse analysis may be needed to gauge the effects of some CMC

technologies on literacy transactions. As a pragmatic offering, I intend this framework to be adaptable to support more sophisticated theoretical tools when needed.

The most important argument, however, for a critical transactional framework for literacy in computer mediated communications is that it asserts literacy as a purpose for technological innovation rather than technology as a reason to transform literacy practices. In the best case, features supporting new and more transparent literacy contexts will become part of the future of computer mediated communication. At a minimum it will help us arrive at greater critical awareness of what different CMC technologies offer or withhold as contexts for human literacy transactions.

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