3 A Heuristic Approach to Selecting Technological Tools for Writing Instruction and Support

Chris M. Anson
North Carolina State University

As new digital tools for use in writing instruction continue to burgeon, it has become increasingly urgent to forestall the rushed and unconsidered adoption of tools that do little to enhance conventional methods or even work against them. Although some selection criteria exist, they are generalized and lack reference to principled instructional methods and current best practices. This chapter proposes a set of theory-based perspectives, or lenses, to determine the instructional effectiveness of digital writing and learning tools. These perspectives include the informational, intellectual or cognitive, social and interpersonal, and rhetorical potential of the tool, along with the extent to which it places the student in an active-learning role and the extent to which the use of the tool is fair and ethical. After describing this set of perspectives, the chapter then tests them on three relatively simple tools that encourage writing of different kinds and purposes: Padlet (a classroom tool that facilitates active thinking and discussion); Fakebook (a platform that, emulating Facebook, invites students to create profiles of characters or famous historical figures and populate them with interactive posts, exchanges with "friends," videos, and other media), and the use of screencasting to facilitate student peer review. The perspectives are admittedly incomplete, designed heuristically to foster consideration of and dialogue around principled choice of digital tools on a small scale, such as Padlet, or a broader and more complex scale, such as the choice of an LMS for a course of study or entire department or program.

In 1957, noted scientist and engineer Simon Ramo sketched a dramatic vision of the classroom of the future: a technologically advanced system that "makes possible more education for more people with fewer skilled teachers being wasted in the more routine tasks that a machine should do for them" (Ramo,

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1957, p. 22). For this system, Ramo imagined a cash-register-like "memory machine" that would give preprogrammed encouragement to students when they submitted correct answers. Incorrect answers would trigger a red light with a sign that, like the warning that comes from jiggling a pinball machine, said "TILT!" (Andrews, 2019).

Ramo's ideas were soon picked up in the popular press. Cartoonist Arthur Radebaugh, illustrator of the syndicated newspaper comic "Closer Than We Think" (Novak, 2012), drew a version of Ramo's classroom that depicted students sitting at pushbutton terminals (with tiny, embedded cameras), watching a video monitor of a lecturing teacher (see Figure 3.1).

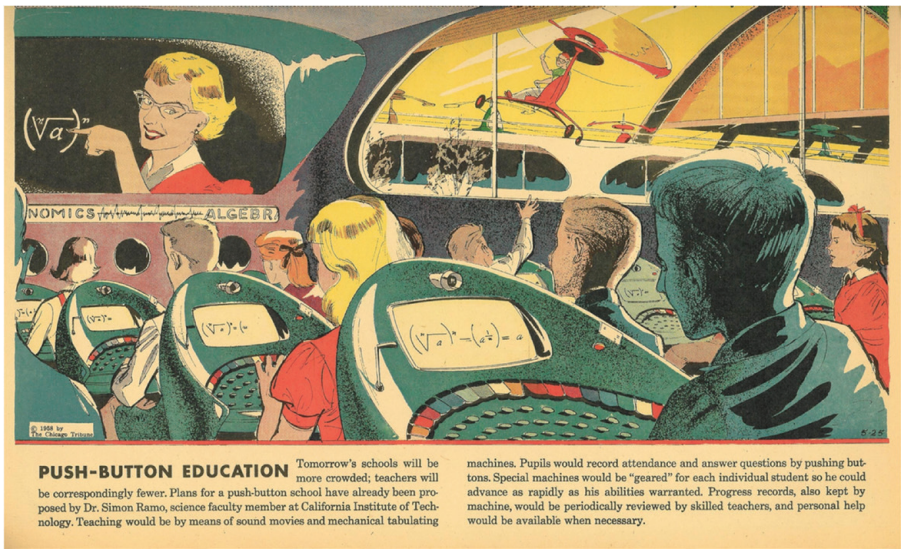

Figure 3.1. Push-button education (1958).

The description below the image reads, in part:

> Tomorrow's schools will be more crowded; teachers will be correspondingly fewer. Plans for a push-button school have already been proposed by Dr. Simon Ramo. . . . Teaching would be by means of sound movies and mechanical tabulating machines. Pupils would record attendance and answer questions by pushing buttons. . . . Progress records, also kept by machine, would be periodically reviewed by skilled teachers, and personal help would be available when necessary. (Novak, 2012)

Today, this Skinnerian vision of technology-assisted learning, driven by the psychology of operant conditioning, seems hopelessly uninformed.

But it represented an attractive fantasy at the time: in the US and elsewhere, post-war school enrollments were soaring and a baby boom predicted overcrowded classes and overburdened teachers. Automation had been implemented successfully in the factory; now it promised equal "efficiency" in the classroom.

As Ramo's and similar initiatives remind us, ideas for the mediation of technology in the classroom do not always guarantee that the technology will enact the principles of effective learning as these are informed by educational theory and research. Personal accounts abound of well-intentioned administrators finding that an adopted technology does little to improve learning, or ends up being unfair, or traps schools and universities in unreasonable contracts with for-profit companies. The annals of educational commentary are filled with stories about dozens of computers provided free to schools by companies hoping to create the next generation of consumers, only to have the devices sit in closets—even in their own shipping boxes—for lack of teacher expertise (or support) to integrate them into the classroom. Researchers Cuban et al. (2001) studied technological adoption in two U.S. high schools located in the epicenter of digital technology—Silicon Valley, California. Over a period of seven months, they conducted observations, interviews, surveys, and reviews of documents in the two schools, which had significantly above-average access to technology. Yet they found that most teachers were "occasional users or nonusers" (Cuban et al., 2001, p. 813) of the abundant technology, and when they did use it, they did not do so to enhance their teaching practices.

In the context of present and future pandemics that force tens of millions of teachers and students to work online rather than risk viral transmission in physical classrooms and other spaces, choices of educational technology are no longer optional. The development of new perspectives for such choices has become increasingly urgent. After most primary and secondary schools and universities worldwide transitioned to distance learning during the COVID-19 pandemic, it was no longer a choice of *whether* to use synchronous or asynchronous communication technologies to "supplement" face-to-face instruction, but which ones to use for all interaction. As many teachers lacking experience with online instruction adapted to its necessity and became familiar with online conferencing systems such as Zoom, Skype, and MS Teams, additional tools presented opportunities to do more than lecture into a screen full of unresponsive faces.

What principles, then, should guide the adoption of new digital tools for writing instruction, beyond simple trial and (frequent) error? What kinds of analysis can forestall the eager but unconsidered attraction to tools that end

up failing to improve student learning or enhance instruction? How can we forestall the adoption of tools that are not "subject to critical interrogation" (Borrowman, 2012, p. ix)?[1]

The purpose of this chapter is first to propose a set of perspectives, based on educational theory, research, and best practices in teaching and learning, to analyze digital tools for their potential adoption or adaptation in support of writing. Then the perspectives will be applied heuristically to three simple digital tools that can be used to enhance classroom interaction and writing instruction.

Current Perspectives for Digital Tool Choice

Across the landscape of education, the most common guiding principle for the adoption of digital tools focuses on the learning goal(s), or "defined educational rationales" (Wyatt, 2017, Step 2, para. 1) that the tool will support. Hughes (2004) suggests turning teachers into "technology integrationists" by encouraging them to "choose to use technologies *only* when they uniquely enhance the curriculum, instruction, and students' learning" (para. 3). In its position statement on technology integration, the (U.S.-based) National Council of Teachers of English (2018) proposes that "new technologies should be considered only when it is clear how they can enhance, expand, and/or deepen engaging and sound practices related to literacy instruction" (para. 11). An article in the *Chronicle for Higher Education* points out that "in choosing technology, people naturally gravitate toward tools that seem fun or easy, even if they're not the most useful," and suggests instead that teachers ask the "magic wand question" (what one skill, misconception, or task is most in need of attention?) and then choose a tool that will address it (Miller, 2019, para. 4). And Harris and Hofer (2009) recommend an approach to digital tool choice that "focuses on students' standards-based learning needs rather than the specific features of particular tech tools and resources" (p. 23).

A more extensive focus on goal-driven adoption appears in a model proposed by literacy scholars Hutchison and Woodard (2013), as shown in Figure 3.2.

1 In this chapter, the term "tool" will refer not to generalized technologies such as computers, which are widely available to students in spite of a persistent digital divide (see Croft & Moore, 2019, for the U.S. and Chen & Wellman, 2004, for the world), but to all specific technologically-mediated programs, apps, and platforms—anything designed or used to facilitate instruction with, for purposes of this volume, a focus on written communication. However, because other authors often use "technology" to refer to specific digital tools, "technology" may appear when referring to these authors' works and ideas.

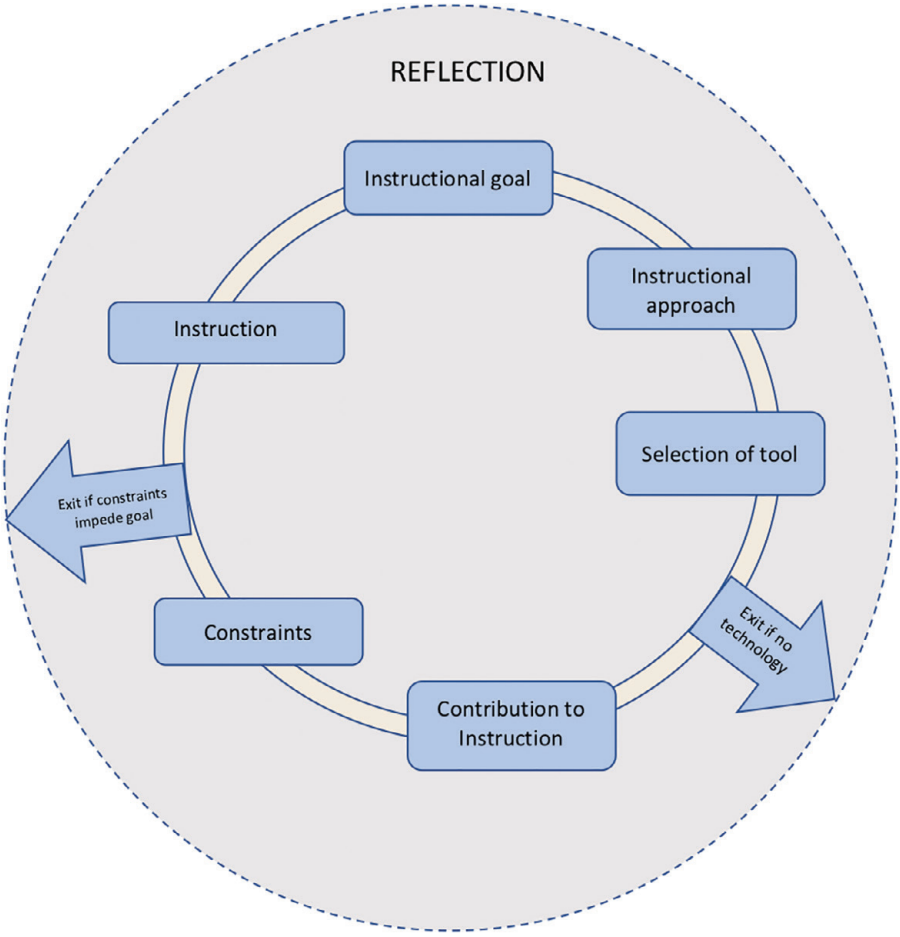

Figure 3.2. One model of technological adoption (Hutchison & Woodward, 2013).

In this model, the adoption of a digital tool is not the first consideration; rather, the process begins with the articulation of learning goals. The goals lead to the development of an instructional approach, which refers to "the method used to meet the objectives laid out in the instructional goal" (Hutchison & Woodard, 2013, p. 460). Several decision points inform the approach, including how teacher- or student-centered it is and whether the approach involves individual or group learning. These considerations inform the selection of a tool, with an analysis of the prior experiences students have with the tool, how the tool contributes to instruction, and what constraints might push against the realization of the goals. Because pencil and paper are

not "technologies" (but see Baron, 1999), choosing them makes the rest of the model irrelevant because it focuses only on digital tools. Among the considerations involved in tool choice are whether the students will learn both digital and nondigital literacy skills and get practice in multimodal production (Hutchison & Woodard, 2013, p. 461). If the constraints in adopting the tool subvert the goal or are too challenging to overcome, the tool is rejected; if not, then the teacher reflects further on the use of the tool, envisioning issues such as classroom space and student work time.

One strength of this model is its advocacy of what Schön (1983) and other scholars call "reflective practice"—the systematic inquiry into the effectiveness of instruction. Tying the adoption of digital tools to specific instructional goals represents an attractive and principled method—a significant improvement over the tendency to reach for any new tool just because it looks new or fun. But in spite of helpful accompanying examples, the model is largely theory-neutral, without reference to how the goal or the tool are grounded in scholarship on literacy. Instead, it relies on Mishra and Koehler's (2006) "TPACK" framework, which assumes that teachers can "simultaneously draw on their technological, pedagogical, and content knowledge" to make principled decisions about the use of technological tools (Hutchison & Woodward, 2013, p. 457).

Acknowledging its limitations, the authors present the model as a procedural way of integrating digital tools into classroom instruction. But as a result, a teacher could begin with a problematic instructional goal and approach, such as eradicating the nonstandard grammatical features of students who speak a dialect by showing people's negative reactions to speakers' use of those features. The goal and approach could then lead to the development or selection of a discriminatory digital tool, such as an online interactive "quiz" requiring students to watch cartoon versions of people using standard or nonstandard dialect features and then selecting "correct" or "incorrect" options, with corresponding animations of booing or applauding audiences. Missing from the model is a finer-grained set of considerations based on educational principles—in this case, anti-racist approaches to language in the classroom (see Young, 2011) brought to bear on tool selection and integration.

Also missing from the model are the broader processes of tool development, which precede its adoption. If tool developers do not have access to current scholarship on literacy development, their tool's design may reflect outmoded or discredited pedagogical practices or, as Selfe and Selfe (1994) showed in an analysis of computer desktops, particular ideologies of "work" or "school." For this reason, the heuristic approach described in this chapter could be helpful beyond the educational community as technology companies continue to develop and/or market digital tools for use in classroom instruction.

Perspectives for Determining Choice

Choice of digital tools is often driven by cognitive goals that, as Vossoughi and Gutiérrez (2016) have argued, dominate our thinking about education. For example, a web-based grammar puzzle might attract a teacher as a learning tool, but lack consideration of the tool's rhetorical, social, interpersonal, or affective value. From the perspective of activity theory, written communication involves multiple social, contextual, and affective dimensions in addition to purely cognitive ones. As Russell (1995) puts it, "one acquires the genres (typified semiotic means) used by some activity field, as one interacts with people involved in the activity field and the material objects and signs those people use (including those marks on a surface that we call writing)" (p. 56). This social theory of communication reorients literacy as always involving interaction among human beings in context (Kress et al., 2001; Street, 2013). But this orientation has not been sufficiently used to analyze the adoption of digital tools for teaching and learning (see Zylka et al., 2015). A more appropriate focus for our purposes brings together the cognitive, informational, social and interpersonal, and rhetorical dimensions of literate work, as well as the extent to which the tool involves active participation and the extent to which it is ethical. As a heuristic for analyzing available tools and making informed choices, this model prompts us to ask the following operative questions (see Figure 3.3):

- What is the tool's informational potential?
- What is the tool's intellectual/cognitive potential?
- What is the tool's rhetorical potential?
- What is the tool's social/interpersonal potential?
- How *active* is the student in the learning process?
- How *fair and ethical* is the tool?

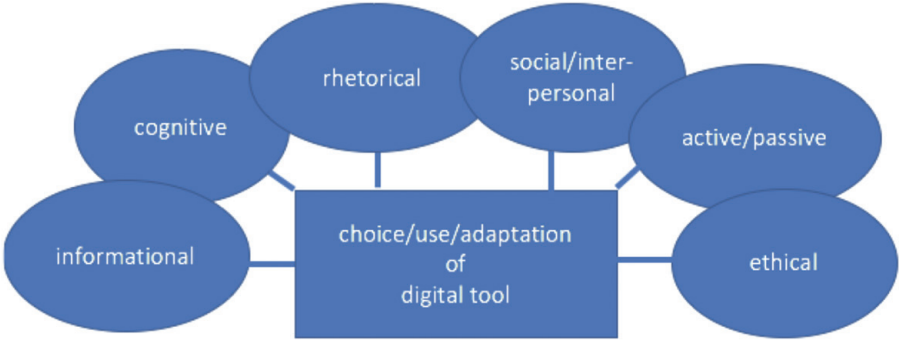

Figure 3.3. Dimensions of choice in the selection of digital tools.

In the analysis of any educational content, the informational perspective would normally refer to the nature and sophistication of the material and intertextual connections to other information (Bazerman, 2004); demands on the learner's information processing (e.g., Torrance & Galbraith, 2006); and the relationship of the information to the goals and outcomes of the course. This perspective is highly contingent on the quality and nature of the material itself because many digital tools simply provide an interface between content matter and the learner. However, some considerations remain and take us into the domain of universal design (see Rose et al., 2006; Rose & Meyer, 2002). The tool could render the information difficult to process, or provide no alternative access for those who need it, an issue we will return to in the context of the ethical perspective. When presented multimodally, the information also could be affected by the relationship between the modalities. For example, using eye-tracking equipment, Slykhuis et al. (2005) found that learners pay more attention to accompanying visuals onscreen when the visuals are "complimentary"—most highly integrated with the text. When included, audio narration of the text assists in students' processing of complimentary material but becomes superfluous when students are considering material not well integrated with the text. Other research has shown that students read certain kinds of texts more thoroughly and with better recall in print than onscreen (Clinton, 2019). For these reasons, informational potential will refer to the *informational interface* of the tool—how the tool presents the information—rather than to the quality of the information itself, which requires a separate analysis.

The cognitive/intellectual perspective refers to the nature of the reasoning required to use or interact with the tool (e.g., Applebee, 1984); the extent to which the tool activates critical thinking and evaluation (e.g., Bean, 2011; Condon & Kelly-Riley, 2004; Pearlman & Carillo, 2018), and, especially in the context of this collection, the relationship between the writing activity, as assigned, and the kinds of cognitive or intellectual processes, or "structure of activity," that students must engage in (Anson, 2017, p. 23; see also Melzer, 2014). Certain tools or digital media are better suited to the engagement of cognitive activity than others. For example, as Hewett and DePew (2015) point out, asynchronous digital tools and platforms support stronger cognitive engagement while synchronous media provide interpersonal advantages because of higher levels of social engagement.

The rhetorical perspective refers to the potential of the tool to help students develop discursive abilities such as using persuasive strategies (e.g., Selzer, 2004); decentering, identifying with audiences, and conceding to alternate perspectives (e.g., Flower, 1979; Kroll, 1978); and building awareness of

rhetorical genres, in both their forms and structures and in their relationship to social and communicative contexts (e.g., Bawarshi & Reiff, 2010). McKorkle (2012), for example, analyzed the relationship of emerging technologies to the classical rhetorical concept of *delivery,* arguing that "delivery's scope can be widened to accommodate the practices of graphic design, digital editing, or the manipulation of formal elements within a medium (p. 3; see also Delagrange, 2011, and Rice, 2012, for further analyses of the relationships between digital tools and rhetorical understanding).

The social and interpersonal perspective refers to the way that the tool encourages interaction through language and the development of skills of collaboration and exchange, and how people negotiate their social positions, especially in situations that involve evaluation. It includes how sophisticated the tool is for supporting relational aspects of learning and performance (e.g., Kerssen-Griep et al., 2008; Kluger & DeNisi, 1996); the demands the tool places on negotiating "face work" (e.g., Goffman, 1955; Lim & Bowers, 1991); how effectively the tool fosters social awareness (e.g., Bazerman, 2017; Portanova et al., 2017); how fully it helps students to develop skills of teamwork (e.g., Wolfe, 2010); and the extent to which it encourages the development of "passionate affinity spaces"—"loosely organized social and cultural settings in which the work of teaching tends to be shared by many people, in many locations, who are connected by a shared interest or passion" (Gee, 2018, p. 8; see also Gee, 2005; 2007).

In addition to these perspectives, the active/passive continuum is a broader dimension of learning that draws from scholarship on the need for novice writers to be engaged in the processes of writing and the active construction and reconstruction of knowledge and understanding, rather than being passive recipients of information (Biggs & Tang, 2007). A synchronous chat places the learner in an active role that involves social and interpersonal interaction, compared, for example, to pure lecture. But while a self-guided online tutorial may appear to place students in an active role by virtue of their interaction with the screen, keyboard, and mouse, a more careful analysis will show that "activity" depends on and varies with a number of factors, such as how much work a program is doing *for* the user.

Finally—and perhaps most importantly—the ethical perspective refers to the fairness of the tool. Does the tool place anyone at a disadvantage on the basis of access, accessibility, prior experience, cost, or certain processing concerns (such as strongly favoring oral over visual information)? Is it discriminatory? Does it rely on prior knowledge or experience in ways that exclude some from full engagement? Do all learners have equal access to the tool, or is access new to some and not others? Who bears the cost of the tool? For example, a course

that requires students to download an application that levies a substantial monthly subscription fee may unfairly place some at a financial disadvantage (see Anderson & Perrin, 2018). And, of importance to contexts in which the tool is created or programmed for the use of one language (such as English) but the users are L2 speakers of that language, does the tool place learners at a linguistic disadvantage or require accommodations to use effectively?

Of course, the tool itself may not fail the fairness criterion, but how it is used. This concern takes us beyond tool selection and into a complex world of instructional ideology and preparation, assumptions about learners and their experiences, and the presence of curricular mandates or guidelines that teachers must follow. Selfe and Selfe (1994), for example, consider the ways that computer interfaces—neutral when taken by themselves—are spaces that enact ideological and material legacies. Citing previous scholars, they point out that minority schools often use software for decontextualized drill and practice (driven by unfair assessments imposed from without) while schools populated by mainstream students may use the software to foster higher-order literacies.

It is also beyond the scope of this chapter, but essential in the analysis of digital tools for instruction, to consider deeper questions of usability, universal design, and fairness, as previously mentioned. Instructors rarely have the time and resources to fully test a tool to determine whether it poses challenges to particular students or groups of students. Concerns include physical differences (is the tool more difficult to use for students with limited hand function, for example); visual differences; hearing differences; learning differences; attention differences; and communication differences (see Burgstahler, 2008). For example, when students choose—or, such as during a pandemic, are compelled—to take courses online, it may be necessary to offer asynchronous options to accommodate differences in the pace at which students can learn. At the same time, advantages may also accrue from digital tool use, such as the ability for a distance learner to watch a video lecture multiple times, or stop and replay sections of it, which would be impossible in a face-to-face situation. But even in less thorough analyses of a tool for possible adoption, considerations of fairness are essential.

Together, these perspectives make up important theoretical orientations for the choice of digital tools in support of writing development. Each can be used to evaluate the possible affordances of the tool. Of course, a number of concessions are called for. First, the perspectives are not meant to provide answers automatically, because so much depends. For example, the ethical perspective has led many writing programs to reject Turnitin, the plagiarism detection tool, because it takes ownership of students' work to grow its database, because it invokes a distrust of students before a course begins and

implies that they are guilty until proven innocent, and because it creates false positives and also misses legitimate cases of plagiarism (see Morris & Stommel, 2017; Schorn, 2015). Educators who believe students own the copyright to their academic work will find Turnitin to be problematic; those who believe the institution (or, when subscribed, Turnitin) owns students' work may find it less ethically questionable. Like the other perspectives, the ethical is contingent; its application is designed to create discussion and critical analysis, not to auto-generate decisions.

Second, although Figure 3.3 implies that all the perspectives should operate simultaneously when the tool is chosen, for various instructional reasons it may be desirable to consider them selectively. Sometimes watching online videos can provide learners with valuable information even though they are relatively passive. An analysis of the tool by itself will fail the active/passive test and rate low from the social/interpersonal perspective. But considering the model in the larger context of a course could lead to enhancements in students' learning. For example, students could watch a video passively, then engage in an asynchronous forum with other students to respond to teacher-generated prompts, or subsequently work in small groups to discuss specific aspects of the video after writing informally about their reactions. The tool must therefore be seen in the full context of *activity*.

Application: Three Cases

An analysis of the potential adoption of several digital tools can help us to determine the heuristic value of the perspectives in Figure 3.3 for writing instruction or support. The first case applies to the domain of classroom interaction using writing; the second to a writing assignment; and the third to a method of facilitating peer response to writing in progress.

The first case is a simple cloud-based app, called Padlet, that facilitates classroom discussion of content. After creating an account, the instructor designs a page using the provided templates. When the blank page is finished, the instructor gives a URL to students so that they can access the page on their devices. Each student can double-click on the page, which opens a text box. As they write in these boxes, their brief comments populate the page (which can also be projected in the classroom). Comments can then generate further written responses. After a period of time, the instructor can ask students to reflect on and discuss what everyone has written. Padlet is often used in physical classrooms, but it can also be used during synchronous online sessions. Several similar apps are also readily available, such as Poll Anywhere, Popplet, and iBrainstorm.

Figure 3.4 shows a sample Padlet screen from an undergraduate course in the US for prospective teachers focusing on literacy theory and instruction. Students have read a brief scenario describing an isolated farming community that has been highly successful for generations, passing on its farming techniques to its children, but it has no written literacy. Students have also read opposing articles about the cognitive consequences of literacy and literacy as a socially determined practice. They are asked to reflect on whether literacy would be useful to the farming community. Notice that in some cases, the students have responded to each other's posts.

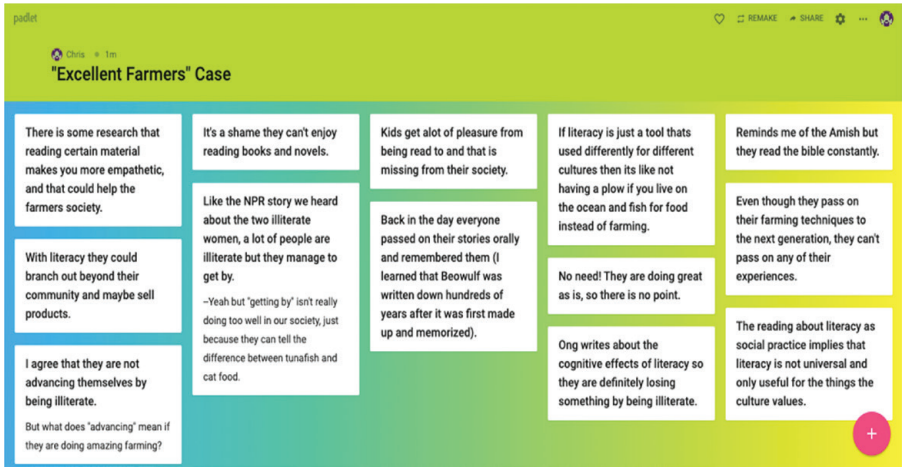

Figure 3.4. Sample Padlet screen from a college course in the US on literacy.

As shown in the analysis in Table 3.1, the informational interface is mostly positive (a simple display of text with colorful background options), limited only because the screen can become crowded, forcing students to scroll up and down to read the posts and making it difficult to project all the posts at once in the classroom. The cognitive potential of the app depends on the nature and quality of the material, and therefore cannot be judged apart from a specific use. In this case, however, it is strongly realized: students must apply their interpretation of the readings to a specific context and consider the implications, at the same time negotiating their reasoning with the reasoning of others. The app offers some rhetorical potential because students frame responses in the context of other responses, creating mini-arguments that can be expanded during discussion or more extensive written reflection. The app facilitates some degree of social interaction by making thinking visible and allowing students to read and compare their responses, and also respond to each other's posts. It places students in a highly active role, and its addi-

tional affordances include the possibility for anonymity, which can draw out students who otherwise might not contribute to a discussion. The app is generally fair because it is free and easy to use, gives students time to formulate ideas before posting them (and helps those who need more time to process the others' ideas and formulate their own), and provides instructional controls such as filters on profanity. However, it can also disadvantage the visually impaired, depending on whether proximity is a concern (students can see the Padlet on their own devices; if a blind student has a text-to-speech system, the posts can be read).

Table 3.1. Analysis of the Potential Adoption of Padlet

Perspective	Much	Some	Little/No	Depends
Informational Interface		✔		
Cognitive				✔
Rhetorical		✔		
Ethical		✔		
Social/Interpersonal		✔		
Active	✔			
Additional Affordances	✔*			

** Potential for anonymity; visible thought; increased participation*

The second case is an educational tool, Fakebook (https://www.classtools.net/FB/home-page), that can be used to create assignments with the goal of researching and writing about a historical figure or literary character, or practicing other languages through multilingual exchanges. Fakebook closely mirrors Facebook in its design and basic functionalities. As students research their chosen figure, they create a profile based on historical information, or background material if the person is a character in a literary text. They then add "friends" who interact with the figure, and populate the site with video clips, photos, and other material.

Figure 3.5 shows the first page of a Fakebook project on James Baldwin. At the top of the screen are photos of Baldwin and to the left is a bullet list of biographical details and a list (with photos) of "friends" that include singer-songwriter Nina Simone, Malcolm X, and Richard Wright. The most recent post by Baldwin is a statement about injustice, dated August 28, 1963, to which Martin Luther King, Jr., responds in agreement. Earlier "posts" contain images of Baldwin's books, a link to a song by Bessie Smith, and interactions with a number of people in a mix of formal, vernacular, and social-media-style writing, as well as "likes" by many others.

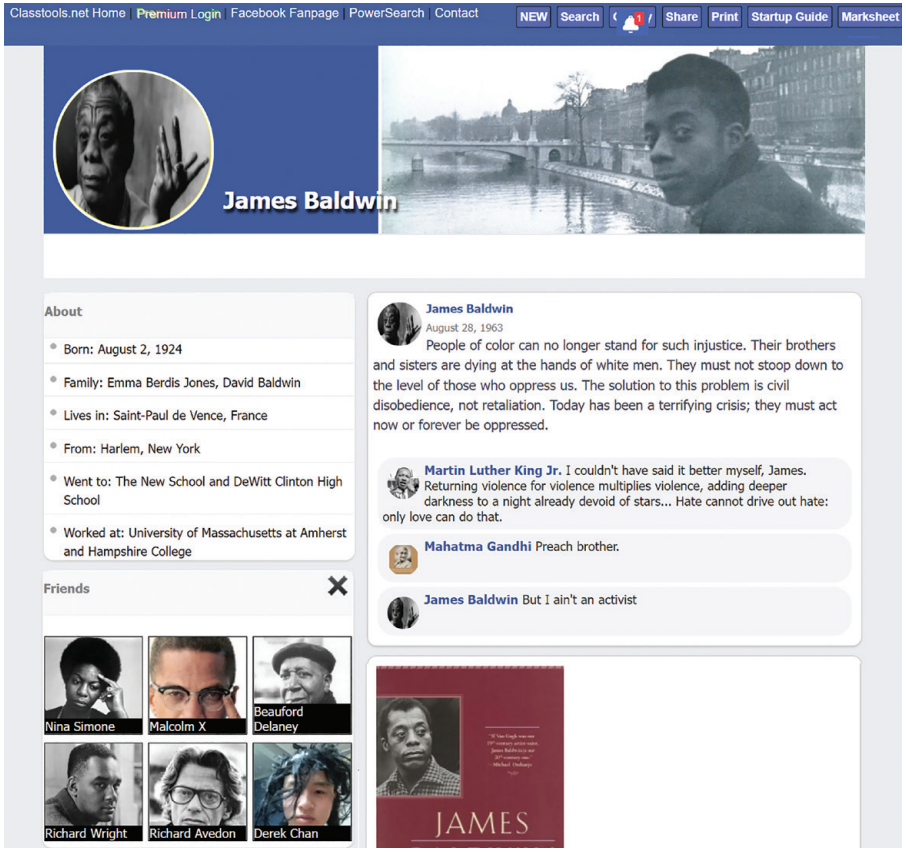

Figure 3.5. Screenshot of a Fakebook profile.

As shown in Table 3.2, this tool realizes multiple cognitive and rhetorical goals related to writing and information literacy. Students must find information and judge its accuracy, then translate it rhetorically to conform to the usual style and other features of Facebook discourse. They must create realistic written interactions with interlocutors (who take the role of "friends"), framing their remarks in ways that tap into and enhance their understanding of written interaction. The social and interpersonal perspective is realized through those invented interactions, but even more so if students visit each other's sites and share their responses. Students are highly active in their productions, the site is easy to use, free, and multimodal, and the emulation of social media motivates and engages students. The informational interface is attractive because of its familiarity, but also suffers from the inclusion of ads that intrude on and in some cases interrupt the other material. Like Padlet, visually impaired students may have difficulty obtaining all the information

in a Fakebook page even with a text-to-speech program unless every image is described according to universal design principles. If audio clips are included, some deaf or hard-of-hearing students may also be disadvantaged. Students with limited computer skills may need additional coaching, although the basic functions are relatively intuitive.

Table 3.2. Analysis of the Potential Adoption of Fakebook

Perspective	Much	Some	Little/No	Depends
Informational Interface		✔		
Cognitive	✔			
Rhetorical	✔			
Ethical		✔		
Social/Interpersonal	✔			
Active	✔			
Additional Affordances	✔*			

** Dynamic character roles; emulation of social media*

The third example focuses on a widely available tool, screencasting, that can be used to facilitate student peer review. The goal for this use of the tool is to help students provide response to their peers' drafts to encourage revision, but also to facilitate the responder's own learning as they identify rhetorical, linguistic, and content-related issues. The screencasting program allows the peer reviewer to create a video as they work through and discuss their peer's draft, which the writer can then play (and re-play) as they continue to revise and shape their draft. Of course, one-way peer responses are generally not as effective as face-to-face group discussions of drafts, which allow for a conversation and real-time negotiation of ideas for revision instead of a monologue. But screencasting can still be a useful tool for peer review, especially in online courses, or in situations when it is problematic to devote entire class sessions to revision workshops (as in content-focused courses in the disciplines), or during pandemics or other emergencies when campuses must close. The screencast program considered here is Jing (produced by TechSmith), which provides a maximum of five minutes of audio-visual response. The student reads and optionally annotates a draft, activates the program, and then talks through it, scrolling and highlighting words, sentences, or broader textual units. The video is then saved and uploaded so the writer can play it.

Figure 3.6 shows one moment of a screencast peer review. The writer has begun her paper too generally, "writing her way in," as is the practice

of many novice writers, with some statements that readers already know. Notice that the peer reviewer has utilized the more conventional tool in Word that enables marginal annotations to be inserted at various points in the paper. Now, as the student scrolls through the paper, she is able to discuss and elaborate on those responses orally, which serve as placeholders for elements of the paper that struck her as she read through it the first time. In addition, the running commentary can be useful for discussing the use of graphics or other visuals, as well as broader structural matters that are difficult to write about with comments inserted only at specific locations. At this point in the video, the peer reviewer is calling attention to the overly general introduction, moving her cursor around to show the area of the paper she is referring to.

> So here, I wrote that it feels like you're starting out really general, I mean, "computer use is increasing," and like we're affected by technology and stuff. I don't think you need to say this because your readers, like, already know it and want to know what you're going to talk about specifically. I really like the wiki Hawai'i thing so maybe you could start with that for your introduction and then say more about the wiki before saying what the paper will do.

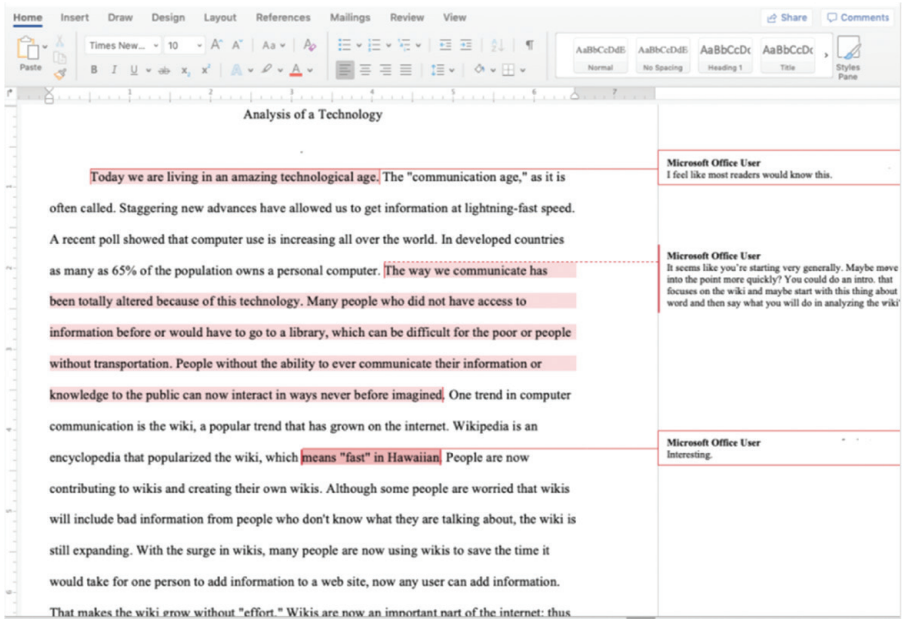

Figure 3.6. One moment of a Screencast peer review video.

As shown in Table 3.3, creating a screencast places the student in a highly active role. The app facilitates the processes of discursive evaluation and critique and is highly interpersonal, enabling the practice of diplomatic and helpful response provided vocally. Fairness may depend on the security of the screencast program; how challenging it is to record, save, and upload the file; and how students process oral vs. written information. Additional affordances are mixed: face to face interaction is preferable for negotiation, but the screencasts can also be replayed multiple times.

Table 3.3. Analysis of the Potential Adoption of Screencasting for Peer Review

Perspective	Much	Some	Little/No	Depends
Informational Interface	✔			
Cognitive	✔			
Rhetorical	✔			
Ethical				✔
Social/Interpersonal	✔			
Active	✔			
Additional Affordances		✔*		

** Can be replayed; supports more extensive response*

Applying the perspectives in Figure 3.3 to these three technologies shows that each can realize multiple goals related to support for students' writing development. In each case, the tool's affordances enhance an assignment or activity that would ordinarily use conventional teaching tools and methods. In the case of Padlet, the non-digital alternative is a classroom discussion, but without additional intervention, some students can remain passive, there may be no opportunity for the display of students' thoughts, it is challenging to remember all the points raised or to respond to them outside the flow of conversation, some students may be reluctant to speak, and they get no practice articulating their ideas in writing. In the case of Fakebook, the non-digital alternative is a print version of a biographical research paper; but without carefully scripted allowances for genre manipulation, the paper loses its social-media style (and the associated motivation) and creates difficulties to show the figure's historical or imagined interaction with others. In the case of screencasting, the non-digital asynchronous alternative is monologic written responses swapped in class or exchanged online, but these clearly lack the social dynamism of vocal commentary and the much more specific references to parts of the

text and live explanations thereof. Research has also shown that in five minutes, screencast response usually provides seven to eight times more text (when transcribed) than conventional written response (Anson et al., 2016); however, as noted, a 15-minute face-to-face conversation in a standard in-class peer review session would far exceed the volume of response compared with a 5-minute screencast.

Enhancing the Selection Model

Ideally, the selection heuristic in Figure 3.3 needs to be placed in the context of the goal-based model developed by Hutchison and Woodward. With some small modifications to the model, the test of relevant dimensions is placed after the articulation of instructional goals and approach as part of the process of digital tool selection. If the tool fails one or more of the desired perspectives, there may be possibilities for its adaptation (cf. Figure 3.7). An apt example is the use of Turnitin, which has been heavily critiqued as a gatekeeping plagiarism-detection tool. However, Turnitin might be used formatively to good effect: students submit a draft of a writing project to the system, receive an analysis, and then study their draft against the results. If the system produces a false positive, the student can explore the reasons for the flag and then justify the use of correctly cited material (or some common phrases or boilerplate that do not require attribution) while they continue to work on their use of sources. Parallel reflections on their processes can provide instructors with useful information about students' learning. Note, however, that if a teacher considers Turnitin's archiving and ownership of student drafts to be unethical, then the tool could be rejected out of hand without the possibility of adaptation.

The enhanced model has the advantage of a strong focus on teacher reflection, goal-setting, planning, implementing, and assessing, but adds significant tests, based on scholarship on writing, learning, and literacy development, of the valuable developmental and performance-based perspectives in Figure 3.3. Two further points, however, are important in the context of how this model can be used effectively.

The Need for Faculty Development and Research

The enhanced model in Figure 3.7 can be used by individual instructors or administrators as they select digital tools for student learning. For example, instructors could use the model to think through the use of a specific tool in their instruction, or to develop a proposal for the adoption of a particular tool

(especially one that may require funding). However, ideally the model should be used collaboratively. For example, in a centralized writing program such as those administered under the banner of "first-year composition" at U.S. universities, or several offerings of a single writing-focused course common in many other countries, a group of teachers and/or program directors could work through the model when deciding whether to adopt a particular digital tool. Applied heuristically, the model generates the kind of thoughtful discussion and negotiation that can provide a strong rationale for accepting or rejecting particular tools or finding ways to supplement or adapt them so that they become educationally useful and enhance instruction. The model can also be used in instructional development programs or in graduate courses to give teachers and students practice in the thoughtful integration of digital tools into instruction.

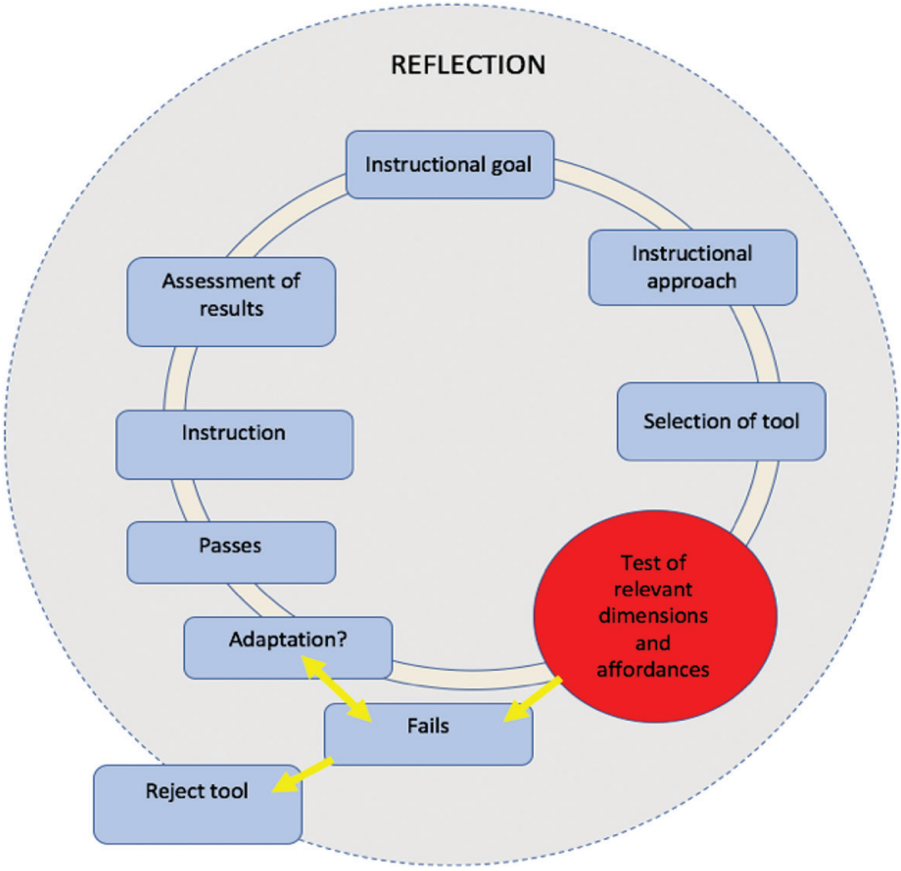

Figure 3.7. Enhanced goal-based selection model.

Finally, the generally positive results of the three case examples are based on projected uses of the tools in typical writing-enhanced classrooms, as seen through the lenses of the perspectives in Figure 3.3. Importantly, the enhanced model ends with implementation and assessment, which takes us into the realm of reflective practice (Schön, 1983) or, on a larger scale, program assessment. Reflective practitioners constantly measure the results of instructional interventions and practices against their learning goals, which makes them researchers of their own classrooms. Program directors constantly assess the effects of an intervention on the quality of instructional delivery and student success. In this way, a digital tool adopted because it meets the criteria of the perspectives in Figure 3.3 might present unanticipated problems or complexities in actual use, which leads to further modifications of the tool or even its eventual rejection. For example, when I first used screencasting to respond to students' writing projects, I administered student surveys across several courses over a period of two years to gauge their effectiveness and tap into students' opinions. The highly positive results eventually led me (alone and with colleagues) to conduct formal research on screencast response in first-year writing courses and courses across the disciplines, and then eventually as a method for student peer review (see Anson, 2021). However, a very small number of students shared difficulties processing the oral responses (compared with more extensive written marginal and end comments), which provided evidence that not every student is advantaged by the tool. I now show 30 seconds of a fabricated screencast response and offer students the option to request conventional written response.

Although it is beyond the scope of this chapter, it would also be desirable to apply the heuristic to more complex digital tools, such as an entire learning management system (LMS). A team of teachers and/or directors in a department or academic program could work through all the functionalities and affordances of the LMS and consider each in turn. For example, many popular LMSs like Blackboard and Moodle include tools such as group forums for discussion, chats, screencasting or voice recording apps, and wikis, and can have links to (or include) associated tools such as Google Groups, Zoom, Wordpress, and Turnitin. Programs can make informed decisions about which of these should or should not be accessible to or used by instructors. Instructors themselves, either individually or through teacher-development programs, can also decide which ones to use and for what reasons.

The perspectives also drive questions for more formal inquiry, including classroom-based research (Taber, 2013), action research (Mertler, 2020), and full-scale formal studies using a range of methods. What actually happens when students use the tool? How do they feel about it? Is there evidence

of learning? How effectively does the tool work in L2 contexts? Anwar et al. (2019), for example, found that students in a functional linguistics course were generally positive about the use of Padlet and felt that it enhanced their learning. But Chuah (2015) found more mixed impressions: students counterbalanced their generally positive feelings about Padlet with concerns about the delay of feedback as others reflected on their comments. Similarly, based on studies of screencasting for teacher commentary (Anson, 2018; Anson et al., 2016), Walker (2017) found "compelling evidence" for screencast-mediated peer review. However, Anson (2021) found that the nature and quality of student peer review using screencast technology varies as a function of instructional ideology and the genre of the writing task.

As further research explores the complexities of digital tool adoption across multiple contexts and populations, the perspectives in the expanded model can become more fully informed, helping teachers to make critical decisions about what to bring into their instruction and how best to utilize it.

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