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In writing studies research, automated writing evaluation technology is typically examined for a specific, often narrow purpose: to evaluate a particular writing improvement measure, to mine data for changes in writing performance, or to demonstrate the effectiveness of a single technology and accompanying validity arguments. This article adopts a broader perspective and offers a standpoint theory of action for formative automated writing evaluation (fAWE). Following presentation of the features of our standpoint theory of action, we describe our two study sites, and each instructor documents her experiences using the fAWE application (app), Writing Mentor® (WM). One instructor analyzes experiences using the app with nontraditional adult learners to provide career pathway access through a high school equivalency (HSE) credential awarded by successful completion of the GED® (General Educational Development Test) or of the HiSET® (High School Equivalency Test). A second instructor analyzes WM experiences working with a diverse population of

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two-year college students enrolled in first-year writing. These instructors' experiences are used to propose two theory-of-action frameworks based on the instructors' standpoints, with particular attention to fAWE components, pedagogies, and consequences. To explore the representativeness of these two case studies, we also analyze student feature use and self-reported self-efficacy data from a general sample ($N = 5{,}595$) collected through WM user engagement. We conclude by emphasizing the pedagogical potential of writing technologies, the advantages of instructionally situating these technologies, and the value of using standpoint theories of action as a way to anticipate local impact.

Keywords: action research, Assessment for Learning (A*f*L), formative automated writing evaluation, Natural Language Processing (NLP), response to writing, standpoint theory, theory of action, theory of transactional distance, Writing Mentor (WM), writing technologies

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In terms of responding to student writing, much of the research that leverages automated writing evaluation (AWE) frames a given technology for a specific purpose: to evaluate a specific writing improvement measure (e.g., error reduction in grammar and usage; see Wang et al., 2020); to data mine for changes in writing performance (e.g., analysis of a large-scale formative writing systems; see Foltz & Rosenstein, 2017); or to demonstrate the effectiveness of a specific technology and examine those arguments used to support its validity (e.g., classroom trials of software; see Cassidy et al., 2016; Chapelle et al., 2015; Ranalli, 2018). Recently, Burstein et al. (2019) used AWE to conduct *post hoc* writing analytics studies on writing samples from college students to examine relationships between writing features and broader outcomes, such as grade point average. Their findings suggest AWE can support an understanding of these relationships (see also Burstein et al., 2017; Burstein, McCaffrey, et al., 2020; and Ling et al., 2021). Because of these recent studies, we believe formative AWE (*f*AWE)—formative applications (apps) in which feedback, not scores, is given according to targeted linguistic features—offers promising directions in responding to student writing. Our awareness that AWE research can provide insights about writing proficiency and broader success outcomes was the key motivation for this study.

As an extension of AWE, we define *f*AWE as a writing technology featuring student-facing systems in which structured writing feature feedback is accompanied by pedagogical support. Our work is aimed at providing baseline knowledge about *f*AWE in classroom settings by using a theory of action framework—localized through standpoint—in which instructors identify instructional components, pedagogies, and consequences of automated feedback. Such a standpoint theory of action, we believe, can lend support to greater use of *f*AWE in the classroom and suggest how it might be situated in different classroom settings. It is therefore important to understand that this study is not a *f*AWE classroom trial; rather, it is a demonstration project in which classroom experiences of two highly skilled and experienced writing instructors generate an innovative theory of action framework. Such frameworks, we assert, can be extremely useful

in early stages of curricular development when new writing technologies are initially being considered for large-scale classroom use.

Following this brief introduction to the present study, we provide a literature review on four areas of scholarship that inform our study: responding to student writing, automated responses to student writing, theory of action, and standpoint theory. We then present the features of our model and its relevance in terms of components, pedagogical actions, and consequences. We introduce the two study sites, describe our process of theory development, and then use instructors' experiences to generate two proposed theory of action frameworks based on a unique form of *f*AWE, Writing Mentor® (WM). For comparative purposes, we present a descriptive data mining analysis of student event log data—files collected by the app that contain information about how a user has engaged with it, such as time spent, features selected, writing products, and revisions—from a general sample (N = 5,595) of WM users that includes self-reported self-efficacy data. We conclude with pedagogical inferences drawn from our study that emphasize the integrative pedagogical potential of writing technologies, the advantages of instructionally contextualizing these technologies, and the value of using standpoint theories of action for technological localization.

Literature Review

Before turning to research involving automated responses to student writing, we need to emphasize that *f*AWE as discussed in the present study is informed by, and integral to, research on feedback. While the literature is vast, feedback studies may be broadly categorized in terms of case studies, meta-analyses, and expert panel recommendations. Following the literature review on response, including automated response, we then turn to scholarship on theory of action and standpoint theory. The four-part extended literature review is needed if we are to demonstrate how the perspective we offer can be used to understand the value of *f*AWE pedagogical interventions.

Responding to Student Writing

To date, Cassidy et al. (2016) have conducted the largest case study of AWE technologies and their ability to provide actionable feedback to students. The study reported that feedback software played a moderate to major role in monitoring student progress over the course of an assignment, yielded information on multiple drafts, and provided support for scoring. Teachers who participated in the Cassidy et al. study reported that the most useful roles for writing software were helping students with their composing and their revising. Anson and Anson (2017) examined properties of instructor and peer response to student writing by evaluating a corpus of nearly 50,000 peer responses produced at a four-year public university. Using the results of a survey of experienced instructors that provided a lexically based index of high-quality responses, the researchers used automated content analysis to identify the responses as they had been digitally captured in the *My Reviewers* writing technology platform used to facilitate peer review and instructor review (Moxley, 2013). Researchers found that instructors adopted some of the field's lexical estimation of high-quality response and that student peer response reflected the early acquisition of these high-quality responses. To interpret the findings, Anson and Anson used threshold theory—defined as the identification of portals into communities of practice that provide integrative ways to understand key concepts (Adler-Kassner & Wardle, 2019)—to suggest that students internalize at least some of the principles of effective feedback through the modeling of their instructors' responses. Anson and Anson also suggested that faculty development workshops on responding to student writing with high-quality comments could increase institutional threshold capacity. Significantly, this suggestion is supported in an earlier study by Fogel and Ehri (2006), who used a cognitive view of self-regulated learning to introduce classroom teachers to the syntactic features of African American English (AAE). Fogel and Ehri found that the teachers who received the most training in AAE no longer turned solely to error-based corrections of student writing and that the training led to

student self-correction of miscues. Exemplar case studies involving feedback in digital environments such as the one we describe in this present study include Laflen (2019), who demonstrated that students are more likely to access instructor feedback on their drafts than on their final papers.

In a significant meta-analysis, Biber et al. (2011) investigated 23 published papers that studied the effectiveness of writing feedback for students who have learned English as a first language (L1), students who have learned English as a second language (L2), and students who have learned second languages other than English. Among the findings relevant to the present study are the following: While both L1-English and L2-English students make gains in writing development in response to feedback, students with lower proficiency levels make greater gains in writing development in response to feedback than students with higher proficiency levels; in addition, the greatest gains for L2 students are achieved in response to feedback, including feedback from other students and feedback from software programs.

Employing a standards-based approach, the Institute of Education Science has established procedures that allow expert panel rating of research evidence of published studies (U.S. Department of Education, Institute of Education Sciences, 2020a, 2020b). These standards have been used to offer a practice guide that presents evidence-based pedagogical recommendations for helping students in grades 9–12 develop effective writing skills. These best-practice guidelines include the following: explicit instruction targeting appropriate writing strategies using a model-practice-reflect instructional cycle, integration of writing and reading to emphasize key writing features, and assessments of student writing to inform instruction and feedback (Graham et al., 2016).

Research from case studies, meta-analyses, and standards allow us to position WM as informed by evidence-based findings. As the studies we have identified illustrate, best practice in responding to student writing may be identified under these pedagogical interventions: actional feedback, threshold conceptualization of response, capacity building, timing,

collaborative feedback, automated feedback, explicit instruction, language arts modeling, and assessment-based instruction. Each of these interventions is important when planning how a *f*AWE app such as WM might be used in a classroom setting.

Automated Responses to Student Writing

A comprehensive history of AWE has yet to be written. We can, however, identify three distinct generations of AWE. In the first generation, from the 1960s to the 1980s, Ellis Page (1966) created Project Essay Grade as a technology driven by efficiency. In the second generation, beginning in the 1980s and continuing through the present, Writer's Workbench (MacDonald et al., 1982) became the first system to respond to student writing in terms of features. Running on a UNIX™ Operating System, Writer's Workbench detected errors in conventions, but the program also focused on the identification of topic sentences and so became the first, historically, to target discourse structures. With increasingly sophisticated natural language processing (NLP) technologies, Pearson's *Intelligent Essay Assessor*™ and Educational Testing Service's (ETS's) *e-rater*® were developed in the 1990s to provide scores and feedback. Today, products such as *Grammarly*®, Turnitin®'s *Revision Assistant*, and ETS's *Criterion*® online essay evaluation service (powered by *e-rater*) use AWE capabilities.

Beginning in 2016 as a "left turn" away from the score-based traditional feedback path of AWE, third-generation AWE includes guided activities automatically generated by NLP methods as a complement to relevant writing responses (Burstein, Beigman Klebanov, et al., 2016). Such guided feedback technology, as Knight and Shum (2017) observe, aims to increase individual "development and improvement over time," a key characteristic of formative automated assessment (p. 21). Intended as a vehicle to provide on-demand writing help to all students for use both in and outside of the classroom, the WM Google Docs add-on provides students with immediate writing support through guided activities. (See

the ETS WM website for more details: https://mentormywriting.org/.) As an app within Google Docs, WM becomes part of a free, digitally driven, collaborative environment that exists on the same platform as Google Sheets, Slides, Gmail, Calendars, Hangouts, and Sites. The G Suite for Education provides teachers and students with access to different tools, each serving different educational purposes that support student learning in online environments. The integration of WM into the G Suite allows significant gains for students. As Constantinou (2018) has demonstrated, students positively viewed the use of G Suite for Education tools in their English for Academic Purposes courses, both in terms of ease of use and efficiency in the learning and teaching process. It is in the third generation of integrated educational support that we find *f*AWE in general and the WM app in particular.

As a third-generation form of AWE, WM has additional distinguishing features beyond those afforded by G Suite integration. Development of WM features was informed by previous research with university faculty (Burstein, Beigman Klebanov, et al., 2016); the development of *Language Muse*®, which automatically generates language activities targeting English learners (Madnani et al., 2016); and collaborations with writing research experts and classroom practitioners (Burstein et al., 2018). WM provides users with actionable feedback related to the writing that is convincing (e.g., claims and sources), well developed (e.g., topic development), coherent (e.g., flow of ideas), and well edited (e.g., knowledge of English conventions). WM feedback is presented by a nonbinary persona named "Sam." The app generates a report illustrating the amount of time a user spends viewing specific feedback categories. The report can be saved as a PDF document that can be shared with instructors (e.g., for use in a one-on-one instructor–student writing conference), other students (e.g., for collaborative review), and family members (e.g., in adult learning contexts where everyone might benefit). While there are now English and Spanish versions of WM, during the time when the studies reported in this paper

occurred, only the English version was available. "Dani" is the name of the nonbinary persona in the Spanish version. (For the ETS Spanish version of WM, La aplicación Writing Mentor®, see https://mentormywriting.org/es.html.)

Through a three-question, optional entry survey, the app collects information about the intrapersonal factor of self-efficacy: users' confidence about their writing skill. When responding to the survey, users indicate whether they feel they are a "not very confident writer," a "pretty confident writer," or a "very confident writer." Studies by MacArthur et al. (2016), McCaffrey et al. (2018), and Ling et al. (2021) have shown relationships among writing attitudes, student writing, and indicators of academic success. In light of these findings, the survey questions provide important information. In addition to capturing information about students' actual writing and revision, the inclusion of self-efficacy as part of the writing construct allows us to consider how intrapersonal factor data might be meaningfully interpreted.

Because our study is aimed at demonstrating the relevance of a standpoint theory of action for writing technologies, we now turn to scholarship that provides WM contextualization. The development of a theory of action allows teacher-researchers to identify, in a principled and transparent way, the components, pedagogies, and consequences of a given pedagogical intervention. The development of standpoint theory, in turn, allows teacher-researchers to understand individual, local perspectives, with special attention to the material conditions of historically underrepresented students living in conditions that impact educational opportunity.

Theory of Action

Kurt Lewin is viewed as the founder of action research—an approach that advances reflection, collaboration, and action through its attention to individual experiences (Adelman, 1993). In examining the views of key informants, Lewin believed researchers could better understand phenomena

of interest through stakeholder discussion. In the tradition of Lewin, Argyris (1997) focused on teaching and learning activities framed through an action perspective. Argyris advocated a theory-in-use model in which the educational effectiveness of an innovation can be best understood by identifying governing variables (individual aims), action strategies (behaviors that accompany these aims), and impact (consequences of those strategies). We argue that a theory of action should be developed during the initial stages of educational research so that fundamental knowledge of an educational innovation—in this case, a formative application of AWE in WM—will include identification of, and relationships among, situated instructional components, pedagogies, and consequences.

It is especially important to establish the need for theories of action for formative assessments. As Andrade et al. (2019) have noted, while the concept of formative assessment has a long history, it is used in very different ways and, hence, it is likely to be confused with other forms of assessment. As a "form of information gathering about students that is conducted primarily for the purposes of making judgments about the status of individual learners or determinations about the effectiveness of educational programs or systems" (Andrade et al., 2019, p. 4), formative assessment is oriented toward understanding learning processes and deriving inferences from information about those processes. Formative assessment, then, is distinct from summative assessment or the use of inferences about individuals or groups made at the end of a program of learning (American Educational Research Association et al., 2014). We will return to formative assessment at the conclusion of this study to further explore the advantages of reimagining assessment *of*, *for*, and *as* learning.

A theory of action developed for using WM in the classroom has demonstrable gains. Because theories of action allow key stakeholders to identify components and pedagogies while anticipating intermediate and long-term consequences—as we demonstrate here—a theory of action for WM holds the potential to allow stakeholders to progress beyond the

"indefinite controversy" surrounding automated response to student writing (Hammond, 2019, p. 64).

Standpoint Theory

Georg Lukács (1923/1971) is viewed as the founder of standpoint theory, a form of critical realism that emphasizes group and individual perspectives as formed by material conditions. Specifically, standpoint theory often focuses on feminist (Intemann, 2010), indigenous (Nakata, 2007), and social realist (Young, 2007) perspectives. Edwards (2014) noted this focus in her analysis of educational applications of the theory. Standpoint theory, she wrote, "developed out of a concern to *defend* objectivity in human enquiry against the challenges posed by attacks on positivism on one hand and radical skepticism on the other" (p. 171). With a focus on those who are historically underrepresented, standpoint theory holds the potential to provide what Harding (1995) has termed "strong objectivity" that can "function more effectively for knowledge projects faced with the problem of sciences that have been constituted by the values and interest of the most powerful social groups" (p. 346).

Brought to bear on theory of action scholarship, standpoint theory invites us to contextualize generalities. Too often, the components, pedagogies, and consequences that serve to build a theory of action framework are not tied to a specific time and place. Standpoint theory corrects such generalities by demanding that we focus on unique interactions. Further, conceptualizing the entire theory of action framework in terms of those who are historically underrepresented—in this study, nontraditional adult learners and two-year college students, whom we have kept firmly in mind while developing WM—allows important perspectives, informed by material student circumstances, to be developed at the earliest stages of planned pedagogies. As we will demonstrate, standpoint perspectives used to design theory of action frameworks yield fine-grained information that can help stakeholders better understand the situated nature of the pedagogical innovation at hand—in this case *f*AWE, as it is evidenced in WM.

A Standpoint Theory of Action

Informed by research on feedback, AWE, theory of action, and standpoint theory, we have designed a standpoint theory of action model that can be used for responding to student writing when an instructional technology accompanies classroom pedagogy. We now present the features of the model and identify its proposed usefulness.

Our theory of action model is based on twelve features: (1) components of the pedagogy at hand (in this case, WM); (2) identification of stakeholders (from the point of view of the instructor); (3) demonstrated pedagogical actions (observed by the instructors in students' first-time WM use); and (4) hypothesized pedagogical actions (anticipation of WM use). These first four features are intended to encourage identification of key instructional components, important stakeholders, and observed as well as anticipated classroom use. The next eight features are intended to encourage reflection about positive and negative consequences: (5) intended positive intermediate consequences (midway desired gains associated with WM); (6) unintended positive intermediate consequences (midway unexpected gains associated with WM); (7) intended positive long-term consequences (enduring gains associated with WM); (8) unintended positive long-term consequences (enduring unexpected gains associated with WM); (9) intended negative intermediate consequences (midway expected challenges associated with WM); (10) unintended negative intermediate consequences (midway unexpected challenges associated with WM); (11) intended negative long-term consequences (long-term expected challenges associated with WM); and (12) unintended negative long-term consequences (long-term unexpected challenges associated with WM). Accompanying these features are holistic, thematic phases intended to capture the essence of each of the 12 features.

In terms of pedagogical interventions—in this case, WM use—the standpoint theory of action is intended to support teacher researchers in five ways: (1) understanding pedagogical interventions through analysis of stakeholder perspectives; (2) facilitating theory-in-action techniques that result in productive, anticipatory reasoning at the beginning stages of

research; (3) reimagining assessment as a formative research activity; (4) undertaking principled research, leading to transparency, that is focused on the components, pedagogies, and consequences of a given pedagogical intervention; and (5) focusing on those who have been disenfranchised by values and interests of the most powerful social groups so that the deprived may benefit by justice and fairness. As we turn to the two study sites and examine WM use through standpoint theories of action developed for each site, the potential for achieving these support goals will become apparent.

Two Study Sites

We turn now to the two settings in which WM was used: District 1199C Training & Upgrading Fund in Pennsylvania and Prairie State College in Illinois. In the present study, WM was used in two forms: a paragraph writing model (shown in Figure 1 used in the first study site) and an extended writing model (shown in Figure 2 used in the second).

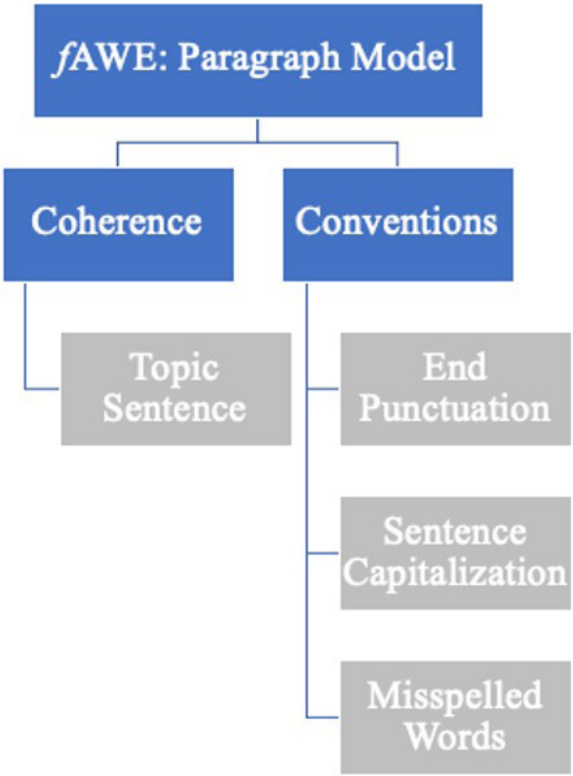
As we explain below, the WM paragraph format provided the best fit for nontraditional adult learners who need to successfully complete the GED® (General Educational Development Test) or the *HiSET*® (High School Equivalency Test) for career pathways. The extended WM model provided the best fit for an instructor working with a diverse population of two-year college students.

WM in a Nontraditional Adult Learning Environment

District 1199C Training & Upgrading Fund (Training Fund) provided the site of the first study, conducted by Lynette Hazelton. A unique labor-management partnership, the Training Fund was created in 1974 by the collective bargaining agreements between District 1199C of the National Union of Hospital and Health Care Employees; the American Federation of State, County, and Municipal Employees; and 11 Philadelphia hospitals. The Training Fund now includes more than 50 hospitals, long-term care and behavioral health facilities, and homecare agencies as employee partners. During the past 46 years, the Training Fund has served over 100,000 students.

Figure 1

Formative Automated Writing Evaluation: Writing Mentor Paragraph Writing Model

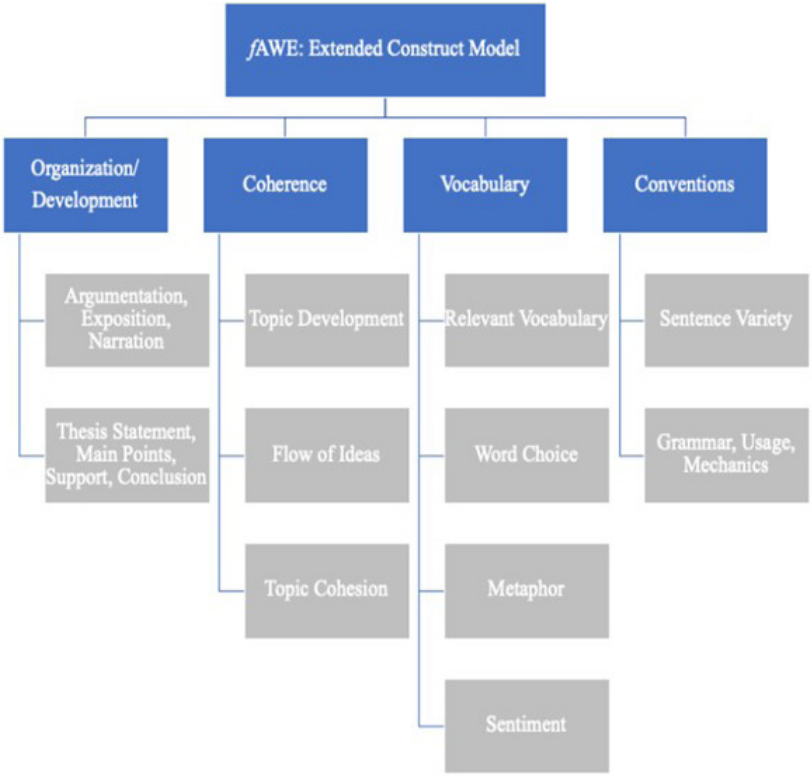


Student demographics reported for the 2017–2018 academic year indicate the population is 75% female and 25% male, 77% African-American, 10% White, 10% Hispanic and Latino, 2% Asian American, and < 1% American Indian and Hawaiian/Pacific Islander.

In this study, we apply the descriptors provided by the U.S. Department of Education to define "nontraditional": such students are considered "independent" when they apply for financial aid; they often have one or more dependents; they are often single caregivers; they do not have a traditional

Figure 2

Formative Automated Writing Evaluation: Writing Mentor® Extended Writing Model



high school diploma; and they have typically delayed postsecondary enrollment while attending school part time and being employed full time. Students with these material characteristics can be vulnerable to challenges that can impact their well-being, levels of stress, satisfaction, and likelihood of persistence leading to a degree (Radford et al., 2015). In 2013—the most recent available data from the National Center for Education Statistics—there were 816,213 total test takers applying for high school equivalency (HSE) credit (Snyder et al., 2019, Table 219.60, p. 205).

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The instructor used WM in two Fall 2019 Training Fund course sessions of a writing class designed to support students preparing to earn an HSE credential. In general terms, her course was framed by the College and Career Readiness (CCR) Standards for Adult Education (Pimentel, 2013). Pedagogically, the course generally followed the best practice guidelines described above, in which the instructor used a model-practice-reflect instructional cycle, integrated reading and writing, and incorporated assessments of student writing to inform instruction and feedback. Situated in a curriculum that followed the CCR, students used the app during class once a week for approximately one hour at the site's computer lab. The instructor asked the students to use the paragraph writing practice module and to compose paragraphs during the in-class instruction session. After providing students with some training to gain familiarity and comfort using WM's paragraph writing practice module, the instructor required students to use WM for paragraph writing during class time. At the beginning of the course session, students were required to write one paragraph in one hour during class. As the semester progressed and students demonstrated proficiency at accessing the app without assistance, they were asked to write three paragraphs in an hour. The instructor's expectations of each paragraph were that it should have a clear topic sentence and that supporting sentences were to be clearly related to the topic sentence. Each sentence was to begin with a capital letter, and each sentence was to end with a punctuation mark.

WM in a Two-Year College Learning Environment

Prairie State College, the site for the second study, conducted by Jessica Nastal, is a mid-sized, two-year community college located in the south suburbs of Chicago, historically home to manufacturing facilities. The Higher Learning Commission (2019) has acknowledged Prairie State's district as one of the most geographically, socioeconomically, and racially diverse of all Illinois community colleges. The median family income in

Chicago Heights is $46,463, and 21.3% of families live below the poverty line. Prairie State College is a Predominantly Black Institution and an Emerging Hispanic-Serving Institution.

Students at the instructor's study site experienced challenges that are similar to those faced by community college students across the United States. In a large-scale study of community college students (n = 50,097), Porter and Umbach (2019) found community college students are challenged by balancing work and school, paying expenses, meeting demands of family and friends, and dealing with health- and disability-related issues. In terms of academic experiences, students reported challenges related to success in online classes. While some reported challenges may appear either trivial or routine, they demonstrate authentic barriers to success, such as scarce campus parking, time spent on developmental courses, unclear instructor demands, fear of working at a post-secondary level, and timely course registration. In Fall 2018, the 10.9 million students at two-year institutions, such as Prairie State, constituted 65% of total U.S. undergraduate enrollment. During this same period, 35% (5.7 million students) were enrolled in two-year institutions (Hussar et al., 2020).

During Spring 2018, 38 students enrolled in a first-semester writing course at Prairie State Community College used WM under the instructor's direction. These students held a high school diploma, had an HSE credential, or were participating in an Early College Initiative program as high school juniors and seniors. In general terms, the course design was informed by the WPA Outcomes Statement (Council of Writing Program Administrators [CWPA], 2014) and *Framework for Success in Postsecondary Writing* (CWPA et al., 2011). Pedagogically, the course generally followed the standards-based approach of the Institute of Education Science (Graham et al., 2016)—practices instantiated in the design of WM (see Burstein et al., 2019, Table 5, p. 309, and Table 1 of the present study). WM was thus situated into this curriculum. Students installed and used the app to review their writing assignments. As part

of an instructional unit in which students learned about AWE, students used WM to review and revise one of the writing assignments completed and graded earlier in the semester. Students also incorporated their experience and reflection about WM use into an essay they wrote on the topic of AWE that was required as part of the unit.

Process of Theory Development

Developing theory of action frameworks for both sites proceeded in two key phases. In the first phase, both instructors integrated WM into their existing courses during the time periods identified above while reflecting on the ways that students reacted to WM. In the second phase, the instructors (the first two authors) and the third author used the 12 features of the standpoint theory of action described above to develop Figure 3 and Figure 5, discussed in the following section. This process included completion of a preliminary table that included each of the categories shown in these figures. The process was iterative, as the team deliberated on each component and finally adopted the language used in the two figures. Important to this second phase was the development of holistic, thematic phases intended to capture the essence of each of the 12 standpoint theory features identified above. These are illustrated in Figures 3 and 5. As these illustrations show, we have interpreted the *f*AWE components of WM as an instance of technological mediation of the writing construct. Katz and Elliot (2016) have suggested that constructs are mediated by the environments in which they are enacted. In cases in which constructs are delivered in digital environments, special care must be taken to identify the components of the construct that are technologically mediated. In the case of WM, it is therefore important to identify the language feedback targets. The models shown in Figure 1 (the subfeatures associated with coherence and conventions of the paragraph writing model) and Figure 2 (the subfeatures associated with organization/development, coherence, vocabulary, and conventions of the extended writing model) consequently are especially useful in specifying

the feedback targets. Figures 3 and 5 illustrate the pedagogies described in the present study (Vehicle 1) and hypothesized pedagogies for near-term instruction (Vehicle 2).

All intended and unintended consequences were categorized according to their potential to afford pedagogical agency and their potential to contribute to pedagogical disjuncture. With regard to agency, meaningful response to student writing is understood as contributing to agency and engagement (Shvidko, 2015; Sommers, 2013) and has been described by Hyland and Hyland (2006) as "co-constructed" by the stakeholders identified in Figures 3 and 5 (p. 220). With regard to disjuncture, anticipation of negative consequences was framed under Merton's (1938, 1996) Social Structure and Anomie Theory. Specifically, opportunity structures must be equally available to all if we are to avoid the unstable environment of anomie, in which opportunities are advertised as achievable while, in reality, they are not. Through this lens, adverse consequences can be anticipated in the detail we have shown in Figures 3 and 5 and, with effort, addressed by careful planning. (See Slomp's [2016] integrated design and appraisal framework, which has considerably influenced our work on identifying consequences in the earliest stages of research on technical and pedagogical innovations.)

As noted above, we believe our standpoint theory of action may be relevant to any educational technology or pedagogy. We want to emphasize, however, that Figures 3 and 5 are best understood in the context of the present study. Interpretative significance is lost if the information in the figures is taken as stand-alone expressions of all forms of *f*AWE research in general or all studies of WM in particular. In terms of context, we were very conscious of our small sample sizes and unique classroom experiences. We offer our standpoint theory as a conceptual starting point for those considering *f*AWE as part of writing pedagogies and who will, in turn, make their own generalizations as they design and implement their own classroom-based practices.

Standpoint Theory of Action: Experiences for Nontraditional Adult Learning Stakeholders

We now turn to detailed analyses of the standpoint theories, applied to WM, at both study sites. We identify experiences among WM system components, pedagogies, and consequences, as well as the holistic, thematic phases describing each of the 12 standpoint theory features.

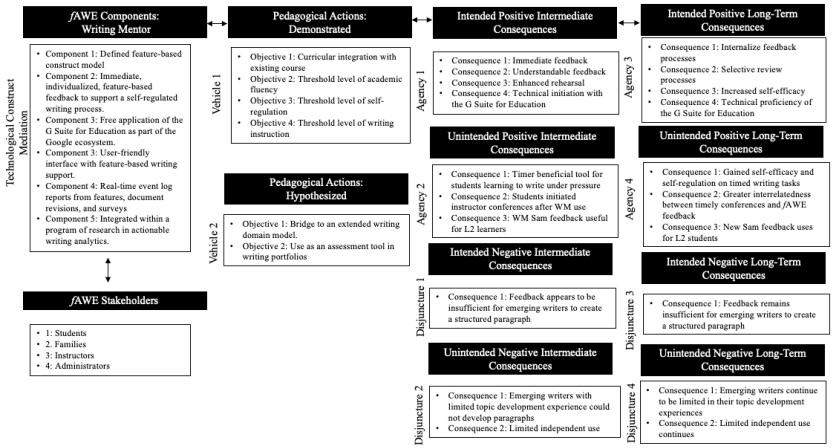
Because WM is the technology under examination and has been designed to be distributed across educational settings, Figure 3 and Figure 5 have identical components. Depending on instructional site, however, stakeholders, pedagogical actions, and consequences are expected to vary. Variation is an appropriate feature of formative assessment, one that allows a granular understanding of how WM can be used in different settings. The two standpoint theories are explained in terms of key instructor stakeholders in this study.

WM Experiences of Nontraditional Adult Students

We begin with a theory of action for a Nontraditional Adult Learning Community as developed by Lynette. The theory developed from WM use in her instructional setting is illustrated in Figure 3. When students at the Training Fund use WM, it is important to realize they may have extremely low levels of academic writing ability and a weak knowledge of conventions, especially grammar, usage, and mechanics. To this end, the paragraph writing model shown in Figure 1 was informed by the instructor with the idea that it could serve as a bridge to the extended model shown in Figure 2. In terms of pedagogy, students engaged the five WM components as they composed responses to the prompts available in WM. In the present study, the instructor directed students to WM's 50 argumentative writing tasks to help them prepare for a high school equivalency credential assessment. The app is designed so that users can cycle through five prompts at a time.

Figure 3

Formative Automated Writing Evaluation: A Standpoint Theory of Action for Nontraditional Adult Learning Community Use of Writing Mentor®

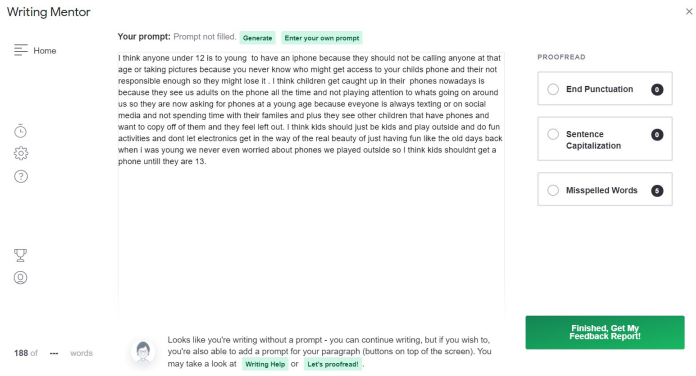


Users must pick from those five in order to get a new set of five prompts. This idea was operationalized in WM based on the instructor's advice (as a stakeholder consultant). The instructor had hoped students' comfort level with writing about unfamiliar topics would increase over time and this would benefit them when they took their HSE assessment. This phasing of the prompts is therefore important for effective WM use with students—a fact long known in writing assessment research (Ruth & Murphy, 1988) that has important implications for *f*AWE. The students quickly realized the connection between their degree of background knowledge on the topic and their ability to elaborate on it. An example of the relationship between student background knowledge and task phasing is shown in Figure 4.

Figure 4 contains a screenshot of a student's earliest writing on a topic. The student had a great deal of background knowledge as well as a strong opinion, both of which account for the length of the sample. As the example illustrates, the components of WM are readily contextualized into the course

Figure 4

Visualization of Adult Learner Writing Sample in Writing Mentor®



in terms of the selected task and student responses to it. As WM was used, the instructor was able to observe threshold levels of student writing fluency and self-regulation, and she was able to prepare an instructional response in real time. More generally, instructors can more clearly understand learners' initial experiences with threshold writing concepts that are critical to written communication in academic settings (Adler-Kassner & Wardle, 2019; Meyer & Land, 2006). Just as the paragraph model may become a bridge to an extended writing model, so, too, can the writing experiences with WM be collected over time as part of another writing experience that can, for example, be displayed in a writing portfolio.

As Figure 3 illustrates, this pedagogical orientation yields immediate, understandable feedback. In terms of learning to write in digital environments, WM affords facility by its connection with the Google ecosystem. The technological nature of WM—one in which features to support instruction can be added when needed—is important as a way to enhance pedagogy. The instructor observed that one feature, the timer in WM, became more beneficial than anticipated. The timer allows to students to gain additional experience writing timed essays, such as those required as

part of the 120-minute Language Arts–Writing section of *HiSET*®. In addition, "Sam" was especially useful as a way to scaffold paragraph structure for L2 learners in the classroom. In terms of long-term intended positive consequences, students' behavior suggested student agency may increase as feedback processes become internalized, reviewed processes become more selective, self-efficacy is increased, and technical proficiency becomes greater. Student gains in agency may continue as they become increasingly confident and efficacious in timed writing situations, feel more comfortable in instructor writing conferences, and extend their use of "Sam" to scaffold paragraph structure. These agency gains must be balanced against the limits of paragraph-centered feedback. In the paragraph writing practice mode, feedback is limited to a single form of coherence (topic sentences) and three areas of conventions (sentence capitalization, end punctuation, and misspelling). Independent use of the WM paragraph model may subsequently become limited as students explore longer, more developed writing genres and encounter unfamiliar, more complex feedback types. In such cases, an instructor intervention that supports students as they move to the extended writing model of the app would expand their ability to work with a broader set of automated responses that may, in turn, lead to their writing improvement.

WM Experiences of Families of Nontraditional Adult Students

In the present study, adult students from nontraditional backgrounds were similar to those identified by Radford et al. (2015, Table 2) as independent, over 24 years old, with family and work responsibilities. As noted above, adult literacy programs are challenged by poor retention, limited persistence, and low levels of goal achievement. In the instructor's experience, students enrolled in such programs require a high degree of social involvement. That social involvement is often manifested within families in which adult learners see themselves as role models for their children. To foster this learning community model in which family is critical, the instructor

acknowledged that many of the adults have children as part of their lives and tried to make learning as social as possible. Such inclusion fosters a more successful experience for learners in terms of retention, especially as courses moved online in Spring 2020 in response to the global COVID-19 pandemic. During this time, a teenage child of one of the instructor's students was listening in on the class and participating in the discussion—much to the mother's delight. While we cannot say whether such family support and participation increase retention, we can say that the immediate impact can be important to adult students, who, in the instructor's experience, often feel isolated and alone.

Depending on experiences in written communication, families of adult learners may view the paragraph model shown in Figure 1 as either beneficial (as a helpful way to generate brief writing samples) or constrained (as lacking support for longer writing samples). For other learners at home, WM may be a form of instruction, such as a traditional class handout, in which writing practice for a working mother, for instance, may be brought home to children, who will then also benefit. In this case, the demonstrated and hypothesized instructional gains and related intermediate and long-term consequences may impact an entire family. Conversely, as illustrated in Figure 3, the family may find WM does not fully meet learning-to-write needs if a new genre extends beyond paragraph writing. Possible negative consequences shown in Figure 3 therefore include the fact that feedback in the paragraph model is limited. Additionally, independent use outside of the classroom may be limited without the presence of a qualified instructor.

WM Experiences of Instructors of Nontraditional Adult Students

In the present study, WM was embedded in a strategy-based workshop environment in which writing is discussed and shared. As noted above, this pedagogical approach has been proven effective (Graham & Perin, 2007). In the instructor's classroom, the first strategic question she asks when a student submits a completed piece of writing is about that student's own

opinion on the quality of the writing. Aligned with the recommendations of Graham et al. (2016), this explicit strategy of reflection allows students to sharpen their skills of inquiry. Key here is developing the student's sense of responsibility to produce coherent, interesting prose through a drafting process. Because students rarely think they have produced a good piece of writing, follow-up questions invite students to identify, in the sample at hand, what they consider weaknesses. Beyond error correction, this process requires students to assess their own writing. In this process, students focus on topic sentences, relationship of sentences to that topic, and conclusions drawn from it; technically, students focus on conventions in terms of capitalization, punctuation, and spelling. The goal in this review process is to encourage self-efficacy and self-regulation, as students become more confident and able to plan a revision process before submission.

Embedded in this environment, WM becomes integrated into the workshop pedagogy. The instructor found that WM focused feedback fosters small, well-planned, discrete steps. During individualized writer workshops, students can review one or two elements of their writing, each time using a strengths-based approach combined with an abundance of opportunity to practice on the computer. While the instructor saw students twice weekly for three hours per day, she devoted one hour per week for students to visit the computer lab as a class and work on WM. Additionally, the instructor spent one to two weeks helping students navigate Gmail—an important skill they needed to use to access directions regarding WM use. Over time, the goal for these students was for them to progress from the paragraph writing feature to the extended writing feature of WM shown in Figure 2.

In the classroom, instructors working with nontraditional adult students can judge the value of intended and unintended intermediate and long-term positive consequences and make subsequent curricular adjustments. Of special interest, as illustrated in Figure 3, is the hope that WM will allow students to develop review processes for their writing that focus on selected writing features. In developing the paragraph model construct, the instructor had also identified intermediate and long-term negative consequences, intended and unintended, accompanied by plans to lessen

the impact of limited automated feedback and to promote autonomous use through instructor intervention. Over time, students may learn to view WM and related digital tools as resources that, with the support of informed human feedback, will lead to improved self-regulated learning and strengthened writing performance.

WM Experiences of Administrators of Nontraditional Adult Students

Adult literacy programs are embedded in a network of other agencies, including welfare, probation, and health. As noted above, the Training Fund is a unique labor-management partnership with many clients to serve and many stakeholder collaborations to maintain. As Schmidt and Biniecki (2016) observed in their guide for the management of adult education programs, "program administration is typically done on a level that can be far removed from instructors and learners" (p. 2). In this environment, based on instructor views, administrators are unlikely to see the specific components of any unique technology; rather, if the instructor is positive, administrators are more likely to approach *f*AWE in general, and WM in particular, as a positive experience for students.

To help administrators consider the consequences of WM for students, it will be important for instructors—those who will know most about the app—to present the technology in terms of budgeting, technological support, licensing, data security, marketing, human resources, strategic planning, and program evaluation. As part of the G Suite, for example, an instructor may want to explain to the program administrator that WM can be used to leverage student EPortfolios within Google Docs. As the instructor realized in her use of WM, students can display their drafts and final work, as well as reflective statements, in an EPortfolio created in Google Sites that could, in turn, be used as part of program evaluation. Examples of student writing, including drafts and revisions in WM, could be used in an EPortfolio to demonstrate student capability on the adult education writing standards (Pimentel, 2013). As Pimentel noted generally of the CCR, "classroom activities, assignments, and a range of formative and summative assessments all help determine whether or not students are absorbing the essential skills

and knowledge included in the standards" (p. 2). EPortfolios can be used to leverage such work. As Cassidy et al. (2016) concluded from their large-scale classroom trial, writing software used to create EPortfolios of each student's writing—along with associated performance assessments over time—can be used to illustrate individual student progress and identify areas for further work. Such practices can be invaluable to administrators who must demonstrate program effectiveness to a wide range of stakeholders, from advisory boards to accreditation agencies. Adopting the perspective of an administrator can be key to the instructional success of a program, and the proposed theory of action can be used to identify specific administrative areas that must be engaged if *f*AWE and tools such as WM are to become more familiar to administrators.

Standpoint Theory of Action: Experiences for Two-Year College Stakeholders

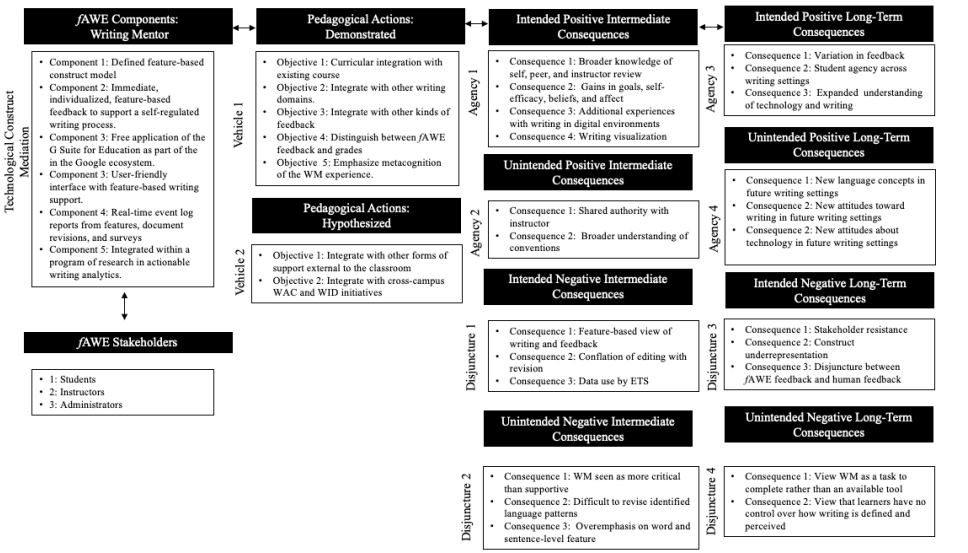
This section presents Jessica's analysis of components, pedagogies, and consequences as they would likely be understood by key stakeholders of Prairie State College. While there are similarities between stakeholders at the Training Fund and at Prairie State College, there are also distinct differences. Figure 5 illustrates the theory as developed for two-year college use.

WM Experiences of Students at Two-Year Colleges

When the two-year college students in the second case study were first exposed to WM, the instructor invited them to understand how the five components in Figure 5 were aligned with their existing coursework. In her class, she focused on analysis, not argumentation. Because composition students often have extensive high school experience writing argumentative essays, there is frequently cynicism in their attitudes toward writing persuasively: They know well how to glean the most striking pieces of information and argue why their position is right without close reading or deep interaction with the texts. They have become skeptical about this

Figure 5

Formative Automated Writing Evaluation: A Standpoint Theory of Action for a Two-Year College Community Use of Writing Mentor®



discourse mode, and the introduction of analysis—exposition for its own sake—it a good way to move beyond routinization (Aull & Ross, 2020).

To give students additional writing experiences—and to help them rethink their cynicism about academic writing—work with students in this case study focused on collaboration through textual analysis as students were encouraged to ask questions in class that would help them explicate the course readings. WM thus served as a bridge to analyze the course readings and as a way to help students understand writing as a recursive process, one that would enable them to think critically about their literacy experiences now and in the future. As one student wrote,

> At first I was kinda like, What? How you gonna suggest a small error like not double spacing my paragraphs? (which I only single spaced at first). Then I realized every

> teacher or employer is going to want their paperwork in a specific way, so instead of objecting I decided to get with the program. . . . I implemented all the advice that was given to me by Sam . . . because . . . I wanted to become a better writer. In my future career [as a prison guard] I have to know how to make perfect sentences. One little error and I could get into trouble. This is why I took all the advice in.

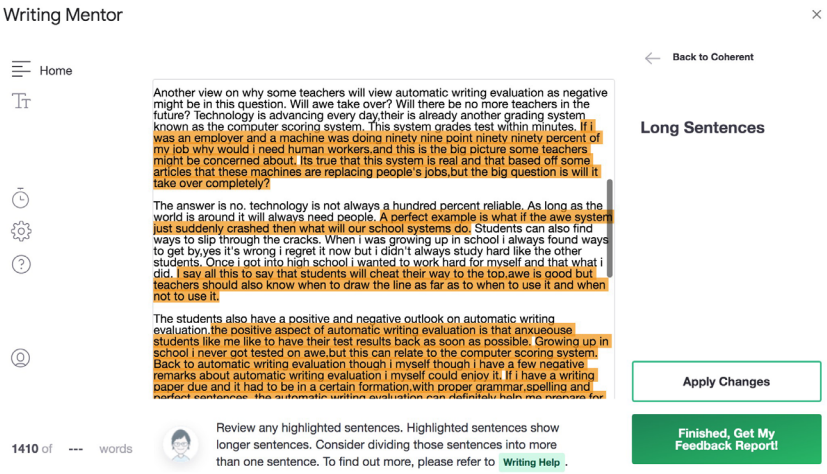
Because the student was introduced to new experiences, his cynicism towards writing appears to have diminished. In that process, the student seems to have become more open to textual experiences and found a desire to become a better writer. At the level of the sentence, the student expressed a desire to be in control of language—an important part of his future in law enforcement. As Brannon and Knoblauch (1982) observed in their study of teacher response, "By responding, a teacher creates incentive in the writer to make meaningful changes. By negotiating those changes rather than dictating them, the teacher returns control of the writing to the student" (p. 166). Openness to textual experiences, a form of student agency, thus becomes part of identity formation. The student's professional identity is beginning to be formed through effective language use.

Intended intermediate positive consequences of this pedagogy are associated with a broader knowledge of forms of review, gains in self-efficacy, additional experiences with writing in digital environments, and independent visualization of their writing effectiveness. This visualization is key to the student experience, as shown in Figure 6.

Here, the student is able to see lengthy sentences highlighted for a single feature—and to have the opportunity to revise and apply changes, a process promoted by "Sam," before continuing the review process. This kind of focused revision supports goal-based review, as well as increased confidence when writing in digital environments. By visually highlighting lengthy sentences and providing advice from "Sam" to divide them into individual sentences, WM communicates to the student what Christensen (1963) long ago observed: "The best grammar is the grammar that best displays the layers of structure of the English sentence" (p. 157). While it

Figure 6

Visualization of a Two-Year College Writing Sample in Writing Mentor®



takes a skilled instructor to help a student understand the exact nature of those structures, WM begins by asking students to question their control of language at the sentence level. That is an excellent place to begin to build self-efficacy in terms of an automated response that is both directive (what a student should do) and facilitative (how a study might reflect on writing practices) (Straub, 1996).

While she did not anticipate student challenges to her disciplinary expertise, the instructor began to realize that classroom authority was shared with WM feedback. While unexpected, such exchanges were welcome: The more the instructor explained her knowledge of writing, the more granular discussions became, which appeared to increase student self-efficacy. Because of the targeted nature of WM feedback—and accompanying classroom discussions of the construct model in Figure 2—students developed a broader understanding of their knowledge of conventions and writing structures. In terms of long-term intended positive consequences, student agency may increase as learners experience varied forms of automated and

human feedback; transfer their knowledge, skills, and attitudes about writing across settings; and expand their understanding of technology and writing. Student gains in agency may continue as students learn new language concepts related to linguistic, cultural, and substantive patterns (Mislevy, 2018). These gains may be accompanied by new attitudes about writing and the ways it is supported—and shaped—by technology. These gains in agency must be balanced against the limits of a restricted, feature-based view of the writing construct and conflation of feature-based editing with other targets of revision, such as audience analysis.

Students may also question the use of information gathered through the app, although their identity is not collected and their data is used only for research purposes. For some students, WM may also be seen as more critical than supportive, and it may become clear that there is disjuncture between automated and human feedback. This may be especially true in terms of distinctions between feature-based editing targets (which machines are very good at identifying) and conceptual reasoning (which humans are much better at sensing) (Deane, 2013). If the app is not combined with human feedback, it may well be that WM is seen as a way to complete an isolated task—with little individual agency—rather than as a tool that supports writing instruction.

Do these challenges outweigh the benefits for students? A standpoint theory of action—such as the one the instructor has developed—is obligated to identify possible adverse consequences. Once possible adverse consequences have been identified, it is then possible to provide additional information that will, in the case of WM, identify gains that may outweigh costs. In Figure 3, for example, the instructor identified ETS's use of data collected in WM as a potential negative consequence. Data, however, can be used in many ways, and Figure 7, discussed below, demonstrates the positive value of large-scale information on student WM use. There we see information on student self-efficacy that tells us that writers who describe themselves as pretty confident or lacking confidence make more use of the feedback features than do writers who identify as very confident. Thus,

it appears that WM supports opportunities to learn for students who are emerging writers in terms of their self-confidence. This kind of reporting, in this case, on 5,595 students shown in Figure 7, allows an individual teacher to examine overall feature usage patterns—and then to compare that overall use to individual classroom use, as shown in Figure 9. Such comparisons are just one way that stakeholders can make use of information collected in WM.

WM Experiences of Instructors at Two-Year Colleges

As is the case with adult learners in the Training Fund described earlier, instructors at two-year colleges are often key to helping students understand the role of technology in writing instruction. And, as is the case with the adult learners, a workshop approach focused on teaching students explicit strategies for planning, writing, and editing was used throughout the instructor's course. To augment the workshop approach, the instructor adopted a hospitality approach (Haswell & Haswell, 2015) in which students are considered centers of knowledge who bring valuable experiences into the classroom. To emphasize perspective, the instructor's pedagogy was also informed by feminist standpoint theory (Intemann, 2010), which places special emphasis on the lived experiences of marginalized groups as a place to begin formal inquiry into situated language use and power relations surrounding it.

In the instructor's class, students read research on AWE (e.g., Elliot et al., 2013) as well as related articles from the field of writing studies (e.g., Alvarez, 2017). Students focus on research gaps and whose perspective is omitted—each of which is a key line of questioning that can be developed under a feminist standpoint lens. In the instructor's pedagogical practice, this gap analysis helps students find their way into complex discussions of genre use and knowledge of conventions. Because the class integrates reading and writing instruction, students will often begin by reading as if a given perspective is factual, only to find that it is not. Because composition students often become unsettled when the positions they present in their

writing are challenged, they might stop reading or participating in class at that point. In such cases, the instructor again identifies this as a teachable moment. Specifically, this is a moment in which an instructor can help a student to understand the reality that all writing is socially situated. Students can then think about how adding different perspectives or writing for different audiences would change the text. Students work to thoughtfully consider how they want to interact with their audiences and what purposes they want to achieve in their writing.

Embedded in this classroom environment, WM becomes important to the course emphasis on analysis and reflection. In a course organized according to units, students focus on responses to writing with consideration of communities of readers, reading experiences, and technological feedback applications. As students compose, draft, and revise in WM, their texts are examined by automated feature analysis and revision is invited by "Sam." Here is an excellent opportunity to raise questions such as these: How do the apps such as WM define good writing? How do they offer feedback? How is WM targeted feedback related to broader classroom discussions of feedback? How does WM motivate student writing improvement? Who benefits by WM use? How do the automated responses to human activities such as writing make us feel? Why? Without WM, it would be difficult to raise such issues and encourage detailed discussion that could, for example, focus on automated and human feedback associated with the extended writing model shown in Figure 2.

In the classroom, instructors can judge the intended and unintended intermediate and long-term positive consequences. Especially notable here is the possibility of a broader knowledge of response processes, new attitudes toward language use in future settings, and equally new attitudes toward writing itself. In such cases, Figure 2 may serve as a bridge to expanded construct models focusing on cognitive, interpersonal, intrapersonal, and neurological domains of writing (White et al., 2015).

WM Experiences of Administrators of Two-Year College Students

While adult learning programs such as the Training Fund are situated in a network of federal, state, and local agencies, two-year college English courses are administered across diverse units. Distinct from management approaches incorporating welfare, probation, and health services, writing program administration in community colleges has no common location. The writing program may therefore exist independently of the very student support services that are so integral to nontraditional adult learners. It is useful to consider Figure 5 from a uniquely two-year college writing program administration perspective. As Taylor (2009) found in his survey of two-year colleges, "there is no predictable pattern of where 'English' tends to be housed" (p. 127). Survey findings indicated that administrative locations ranged across English department chairs, deans, committees, and *ad hoc* appointments. In these settings, the duties of a writing program administrator (WPA)—those scholar-administrators who manage instructional and assessment activities, human resources, budgetary demands, and public accountability of a curricular unit—are so dissimilar that an edited collection has been devoted to critical issues involving such work (Ostman, 2013).

This absence of a clear administrator entry point poses substantial challenges for the adoption of writing technologies: If the WPA believes in helping students use technology to improve writing, then that administrator will see *f*AWE as one of many additional student experiences with writing in digital environments. Conversely, if the WPA opposes computer-driven responses to student writing in any form, then administrators will resist the particular instance of WM. Key to the administrative understanding of WM may be app training that would ensure that WPA stakeholders are informed in terms of the design, uses, limits, and affordances of the technology. Additionally, it may be important for WPAs at two-year colleges to develop their own standpoint theory of action, based strictly on local administrative processes, so they can better understand the issues and consequences of *f*AWE use.

Study Sites Compared to General Population

As shown in Figure 3 and Figure 5, WM is an *f*AWE component embedded within a program of actionable writing analytics. As noted earlier, WM contains an optional entry survey asking users how they identify as writers: "not very confident," "pretty confident," and "very confident." Having this information about an intrapersonal factor, such as self-efficacy, allows us to perform writing analytics analyses. For example, we can examine relationships between self-efficacy and use of the app. To that end, Figures 7, 8, and 9 illustrate three user groups—the general population of WM users, adult learners from our study, and two-year college students from our study—in terms of the preferred features given self-reported self-efficacy. Note that the preferred features are those with which users spent the most time.

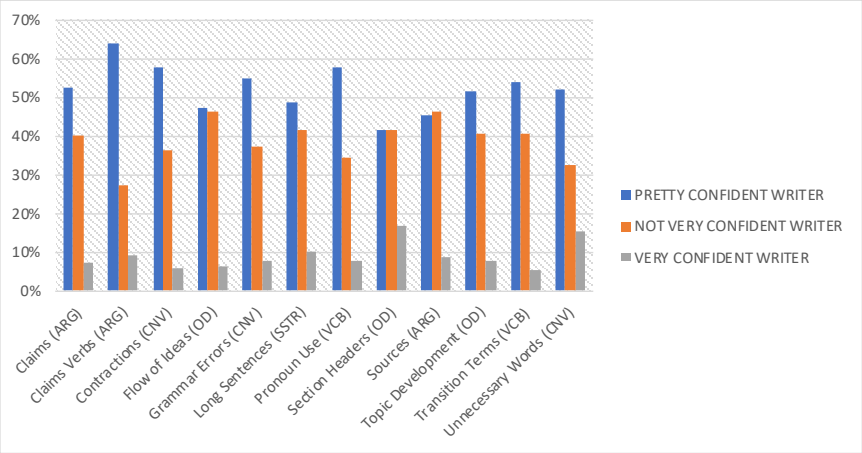
Figure 7 reports features that are representative of those in the extended writing model shown in Figure 2. Self-efficacy was reported as noted above: "not a very confident writer" ($n = 2237$), "pretty confident writer" ($n = 2981$), or "very confident writer" ($n = 440$). The sample size in Figure 7 is large, and patterns of use are revealing when categorized by reported self-efficacy. Few writers reported that they were "very confident," and those writers made little use—under 10%—of the features, with the exception of section headers (a feature of organization and development) and unnecessary words (a feature of conventions). Writers who identified as "pretty confident," conversely, made use of each of the features, as did writers who identified as "not very confident." Writers who were "pretty confident" concentrated more on features of argument, organization and development, vocabulary, and conventions. Both groups concentrated nearly equally on flow of ideas, section headers, and use of sources.

Figure 8 presents the preferred features used by the 19 nontraditional adult students who responded to the self-efficacy survey. These features are based on the paragraph model shown in Figure 1. The sample size is very small; nevertheless, patterns of use are congruent with a long tradition of

research suggesting that inexperienced writers overwhelmingly focus on knowledge of conventions during the writing process (Guo et al., 2018;

Figure 7

*Total Writing Mentor® Users Responding to the Self-Efficacy Survey (Mid-November 2017 to Mid-April 2019): Preferred Feature by Self-Efficacy (*N *= 5,595)*

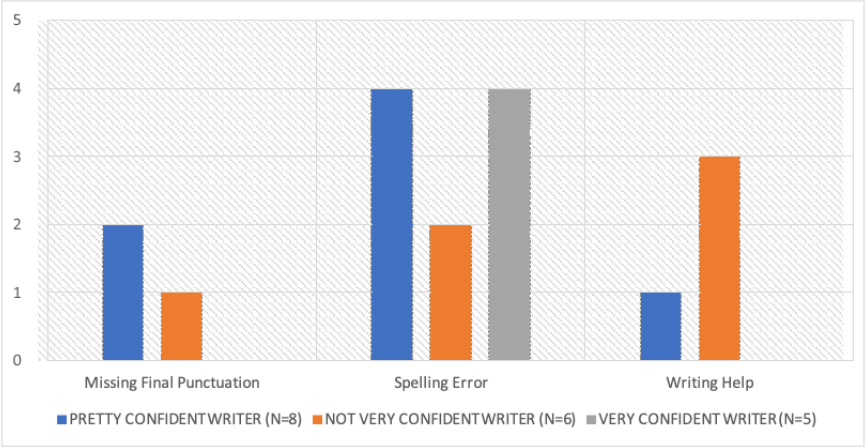


Perl, 1979). The spelling error type was a preferred feature type across all groups. Writers who identified as "not very confident" used the Writing Help feature more than any others. Missing final punctuation was preferred by one "not very confident writer" and two "pretty confident writers."

Figure 9 presents preferred features used by the 38 two-year college students who responded to the self-efficacy survey. These features are based on the extended writing model shown in Figure 2. It is interesting to note that while there were again few "very confident writers," students who identified with this category used features related to claim verbs and topic development at comparatively higher rates than did the same group of writers reported in Figure 7. Of the traits used by all three groups, "pretty confident writers" used claims, contractions, grammar errors, and topic development at a higher rate than the other two groups did.

Figure 8

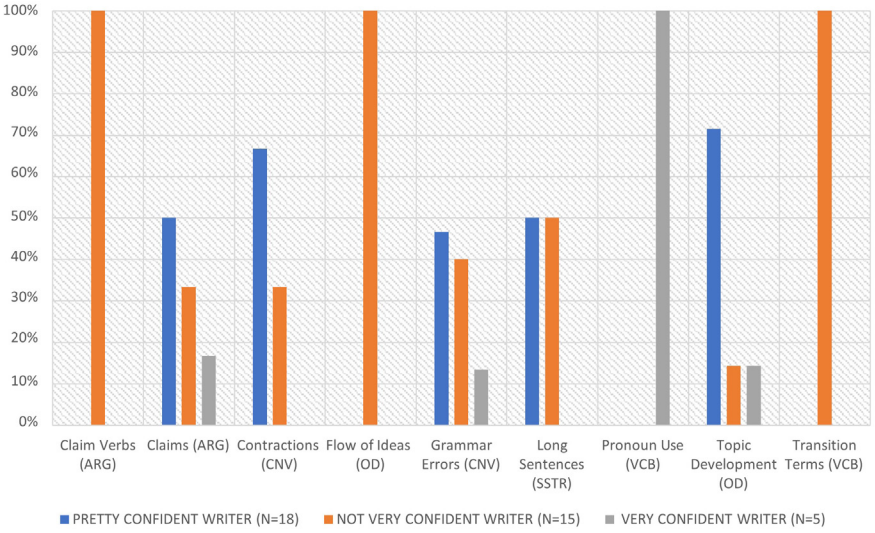
Nontraditional Adult Student: Preferred Writing Mentor® Feature by Self-Efficacy (N =*19)*



Taken collectively, Figures 7, 8, and 9 demonstrate the need for evidence-based standpoint theories of action to accompany *f*AWE. As use cases from both instructors' experiences have demonstrated, a standpoint theory of action thought experiment is very valuable to accompany any technological innovation to be used in educational settings. In the case of descriptive data mining analysis using comparative data as that shown here, the use of evidence is clearly useful both in documenting use patterns and in raising further questions. While, in general, the patterns of use follow observed practices of nontraditional adult and two-year college students, we must return to the fact that much more can be learned about *f*AWE in general and WM in particular. Returning to Figure 7, for example, we might wonder whether a writer profile might be created based on feature use. Why do "pretty confident writers" use more features than "not very confident writers" do, and why do "very confident writers" use so few features? For the adult learners shown in Figure 8, how could such a profile help instructors

Figure 9

Two-Year College: Preferred Writing Mentor® Feature by Self-Efficacy (N = *38)*



to encourage student advancement beyond knowledge of conventions? For the two-year college students shown in Figure 9, why do so many of these students identify as "not very confident," and how can engagement with *f*AWE features support increased self-efficacy?

While these studies are still exploratory, observations from them suggest that a promising research direction would be to model student writing profiles informed by automated feature analysis (see Allen et al., 2014; Burstein et al., 2017; Burstein et al., 2019; Burstein, Riordan, & McCaffrey, 2020; Martinez, 2014). As we demonstrate in this study, responding to student writing involves complex domains of performance and self-efficacy. To map out such complexity in terms of pedagogy and impact, it appears that a standpoint theory of action offers a practical, principled way to approach new technologies and pedagogies before they become deeply embedded in the lives of students.

Pedagogical Implications

In her critical study of ways to integrate AWE into classroom writing instruction, Stevenson (2016) observes that "considerable controversy has surrounded AWE, particularly its use in high stakes testing situations" (p. 2). From the perspective of writing instructors, such controversy is most relevant in terms of possible misalignment between evidence of AWE construct validity in particular technologies (Condon, 2013) and construct validity as understood more broadly across the profession (CWPA, 2014; CWPA et al., 2011). Third-generation AWE, with its distinguishing features and emphasis on formative assessment, signals a new beginning. Under *f*AWE frameworks such as WM, examined for classroom use under standpoint theories of action, the sense of indefinite controversy described by Hammond (2019) as it existed in the past need not extend to the future.

Among the important lessons learned from first-generation controversies over AWE is that not all writing technologies are the same and that hegemonic claims regarding validity are of little use if we are to understand the multifaceted dimensions of assessment: *of* learning (a summative action), *for* learning (a formative process), and *as* learning (a metacognitive process). As Heritage and Wylie (2018) have noted in conceptualizing Assessment for Learning (A*f*L), sole attention to scores in assessment *of* learning—and the summative judgments attached to them—diminishes as we view assessment as a way to advance students' achievement, foster individual identity, and achieve equity for diverse student groups.

Another important lesson learned from first-generation controversies over AWE is that programs of research are needed if we are to understand, in meaningful ways, the impact of such pedagogies on students. Haswell and Elliot (2019) have proposed a category of evidence model as a way to extend replicable, aggregable, data-supported research. The model classifies forms of evidence as foundational research (gaining basic knowledge such as that which is presented in our study), developmental research (determining a knowledge span through initial field testing), efficacy research (determining knowledge under ideal conditions), effectiveness research (using

knowledge under typical conditions), scale-up research (using knowledge in large-scale conditions), and monitoring research (refining knowledge over time). Through this kind of extended, evidence-based programmatic approach applied to writing technologies, we can better understand the complex relationships between human and machine feedback as they occur in varied settings, both face to face and asynchronous, and more clearly anticipate the consequences of our innovations.

With these lessons in mind, we can reflect on gains realized in the present study. What pedagogies, one might justifiably ask, can be inferred from the case study presented here? Table 1 presents one way of structuring pedagogical opportunities for WM use with nontraditional adult learners and two-year college students.

The table is based on recent calls for the use of evidence-based models in education on the federal level (U.S. Department of Education, Institute of Education Sciences, 2020b), as well as from the educational measurement community (Mislevy et al., 2017) and the writing studies community (Haswell & Elliot, 2019). We believe that these significant recent calls will lead to important evidence-based practices. In addition, writing instruction is also informed by other sources of evidence related to classroom use, diverse student populations, ecological modeling, and pedagogical consequences. This research is often informed by consensus statements from leaders in the field (CWPA, 2014; CWPA et al., 2011). There is no reason to see these two research traditions as binary; understood in resonance, both yield valuable information for all educational stakeholders.

Table 1 is an example of such resonance. In terms of new technologies such as WM, we believe a sound way to explore evidence-based teaching practices is to begin with Institute of Education Science standards-based recommendations (Column 1) and end with potential pedagogical strategies based on case study experiences (Column 7). We also believe that useful questions based on four evidence-based pedagogies—explicit strategies, process-based instruction, language arts integration, and formative assessment (Graham et al., 2016)—may be asked. Reading Table 1 from left

Table 1

Writing Mentor Pedagogical Strategies: An Evidence-Based Model

IES recommendation (Graham et al., 2016)	**Research on writing response** (Anson & Anson, 2017; Cassidy et al., 2016; Fogel & Ehri, 2006; Laflen, 2019)	**Classroom trials with software** (Cassidy et al., 2016)	**Consensus statements** (CWPA, 2014; CWPA et al., 2011)	**Writing Mentor® component feedback**	**Writing Mentor® case study experiences**	**Writing Mentor® potential pedagogical strategies**
			Explicit strategies			
Engage students in explicit instruction targeting appropriate writing strategies	Explore threshold concept theory to understand student writing concepts and peer review capability and to strengthen instructor review practices	Use software to identify common writing weaknesses that can be addressed in teacher-led lessons before students continue work	Provide intentional instruction focusing on the use and implications of writing and reading using electronic technologies	Incorporate a defined feature-based construct model to support students as they develop writing that is convincing, well-developed, coherent, and well-edited	Provide in-class WM practice with the following explicit strategies: increase student software familiarity and comfort, provide feature-based response, scaffold increasing organizational complexity, facilitate collaboration and reflective practice, and increase self-regulation	Consider threshold concept theory to honor student agency, to advance targeted language use strategies, and to increase self-regulation and collaboration
			Process instruction			
Use a model-practice-reflect instructional cycle	Monitor student progress over the course of an assignment and provide information on multiple drafts	Model informative feedback so that students can determine what to look for and how to provide actionable peer feedback	Encourage multiple strategies to writing and research through process-based frameworks	Provide feature-based feedback to support a self-regulated writing process	Use workshop process pedagogy to achieve the following with WM: encourage focused review and language control, encourage collaborative peer review, increase out-of-class independent WM practice, and encourage combined use of automated and human feedback	Consider exploring writing process models as they are mediated by WM technology

IES recommendation (Graham et al., 2016)	**Research on writing response** (Anson & Anson, 2017; Cassidy et al., 2016; Fogel & Ehri, 2006; Laflen, 2019)	**Classroom trials with software** (Cassidy et al., 2016)	**Consensus statements** (CWPA, 2014; CWPA et al., 2011)	**Writing Mentor® component feedback**	**Writing Mentor® case study experiences**	**Writing Mentor® potential pedagogical strategies**
			Language arts integration			
Combine writing and reading to emphasize key writing features	Expose teachers to both a cognitive view of self-regulated learning and to the syntactic features of African American English to decrease error-based comments on reading and writing	Have students complete a reading, engage in group discussion of the reading, and write in response to a prompt related to the reading using the software	Leverage student experiences with writing, reading, and critical analysis so they gain experience reading and composing across multiple genres	Integrate reading and writing activities as students respond to prompts, compose, receive feedback by "Sam," use WM tutorials, and finalize writing products	Adopt a language arts framework to achieve the following with WM: use feedback by "Sam" to encourage reading for actionable information and use reading selections relevant to electronic technologies to encourage experiential and reflective writing	Consider using WM in a language rich, diverse classroom of writing, reading, speaking, and listening
			Formative Assessment			
Provide regular assessment of student writing to inform instruction and feedback	Recognize feedback on drafts is more effective than feedback on final submissions; for L2 students, recognize greatest gains are achieved in response to feedback from other students and from software programs	Use masked peer feedback and invite students to exchange their writing and score others' work	Adopt assessment tools that emphasize genuine purposes and audiences in order to foster flexibility and rhetorical versatility	Provide immediate, individualized, feature-based feedback as well as real-time event log reports on feature use, document revisions, and surveys	Adopt a formative assessment framework to achieve the following with WM: emphasis on targeted feedback based on targeted features, not scores; increase student capability of using combined automated and human feedback; and use information about writing process as related to broader success outcomes	Consider using WM to support formative assessment to strengthen both writing performance and writing motivation

to right allows teacher-researchers to examine existing evidence from a variety of research traditions and to subsequently consider instructional approaches incorporating WM. While the content of Table 1 is self-evident, three observations are worth emphasizing in terms of pedagogy.

First, *writing technologies have integrative pedagogical potential*. In research related to asynchronous learning, Moore (2019) proposed that a transactional distance may occur when a technology is introduced in a learning context and subsequently results in gaps between teacher and student understanding. Strobl et al. (2019) noted in their systematic analysis of digital support for academic writing that writing tools can reduce this transactional distance. In efforts to reduce such distance, pedagogical alignment can be achieved by providing meaningful student and teacher technological interactions that lead to both improved student-to-student interactions and improved student-to-instructor interactions. Table 1 identifies those technological interactions with WM in the component feedback features (Column 5) that, in turn, provide structure and facilitate dialogue—two key variables in reducing transactional distance. In turn, student-to-student and student-to-instructor benefits are identified in the case study experiences and the potential strategies (Columns 6 and 7). While a full application of transactional distance theory is beyond the scope of this study, it is important to recognize that writing technologies, depending on design and use, hold the potential to serve as an integrative force for teachers and students by reducing transactional distance between teachers and students through structured, dialogic interactions.

Second, *writing technologies work best for students when they are pedagogically situated within evidence-based practice frameworks*. In classroom settings such as the ones described in the present study, technologies such as WM are not drop-from-the-sky tools. As the two instructors worked through their two applications of standpoint theories of action shown in Figures 3 and 5, it became clear that the components, pedagogies, and consequences were deeply embedded in existing pedagogical practices

that included explicit, process-based instruction in a language arts environment featuring formative assessment (Graham et al., 2016). Implicitly, both teachers were mindful of Sommers's keen observations on writing feedback: As a means for helping students, comments are "disembodied remarks—one absent writer responding to another absent writer. The key to successful commenting is to have what is said in the comments and what is done in the classroom mutually reinforce and enrich each other" (Sommers, 1982, p. 155). Far from being a slogan, A*f*L is operationalized in WM in the feature analysis shown in Figures 1 and 2. WM thus becomes a vehicle for A*f*L practice used to advance student achievement, foster identity, and achieve equity. Similarly, a focus on features allows students access to threshold concepts in two ways: developing writing that is convincing, well developed, coherent, and well edited; and developing student self-efficacy. In this way, we are able to add to the benefits of viewing WM as an opportunity to advance threshold concepts related to writing patterns and self-efficacy. In that identification of effective writing patterns and encouragement of self-efficacy remain key portals into communities of practice, WM used in a classroom setting holds the potential to advance both. In discussion with their instructor, students can explore varied forms of writing patterns within and beyond the assignment at hand, and students can begin to understand the role of self-confidence as related to measures of student academic achievement. In integrating both the cognitive and intrapersonal domains, WM appears to be well positioned to be used within existing evidence-based practice frameworks.

Third, *application of a standpoint theory of action provides a principled way to anticipate the ways writing technologies may be used in specific sites*. As Strobl et al. (2019) noted, a given digital tool must be the subject of an iterative design and evaluation cycle if is to remain responsive to its context of use. New tools and new theoretical perspectives could require additional features or refinement of existing parameters. If it is true that WM and related technologies appear to have integrative pedagogical potential

and are most beneficial for students when pedagogically situated within evidence-based frameworks, then it is equally true that principled methods must be used to understand how the technology will be used within specific institutional sites. Here, then, is a valuable place for applications of a standpoint theory of action. A brief review of the *Standards Handbook* demonstrates that educational innovations such as WM are unlikely, in the near future, to be examined through studies using randomized control trials (U.S. Department of Education, Institute of Education Sciences, 2020b). Indeed, even the large-scale study by Cassidy et al. (2016) used convenience sampling because of the challenges of randomization when new technologies are being examined. When evidence-based practice is desired, there are alternative research traditions available to classroom teachers beyond those described in the *Standards Handbook*. Part of traditions that focus on classrooms, diversity, natural environments, and impact, action research has long proven to be a viable way for teachers to focus on the very stakeholders who would most likely feel the consequences of any action involving them (Slomp & Elliot, 2021). As this paper has demonstrated, principled analysis of WM in terms of its components, pedagogies, and consequences has led to a transparent way for others to evaluate how a given technology may be used in responding to student writing at a specific site. It may well be that a pedagogical future for *f*AWE may best be charted by standpoint theory of action for one basic reason: the focus is always on our students, the very stakeholders who experience the consequences of our actions.

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