

Introduction: Meeting the Challenges of Workplace English Communication in the 21st Century

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1.0 Introduction

This article introduces the first special issue of *The Journal of Writing Analytics*. Documenting a program of research in nine papers and an afterword, colleagues deliberate on a single, pervasive theme: “Meeting the Challenges of Workplace English Communication in the 21st Century.”



From their diverse disciplinary perspectives, authors focus on innovative ways to improve assessments of communication constructs, elucidate the various considerations that must be attended to when developing and using data from prototypes, and discuss the importance of consequences when these assessments are used to support teaching and learning. Contributors specifically focus on foundational design issues and illustrate the types of complexities, challenges, and opportunities arising in the development and use of data from digitally-delivered assessments involving communication constructs. Colleagues worked together from March of 2019 through March of 2021—through the emergence of the COVID-19 global pandemic—to provide foundational research on an underexamined area of investigation.

In describing the theme itself, questions immediately arise regarding assessment genres, construct definitions, research settings, and impact. Questions also arise regarding the contributions of writing analytics to the theme under examination. In introducing the special issue, we believe that one useful way to answer pressing questions is through the use of threshold concepts. Defined as doorways into communities of practice, threshold concepts provide integrative ways to understand key concepts for structuring participation in a given discipline (Adler-Kassner & Wardle, 2019; Meyer & Land, 2006). We here extended this concept to principles involving multidisciplinary research practices enacted on a common theme. The special issue is best understood through a common lens provided by three threshold concepts.

- *Threshold Concept 1: Assessment for Learning (AfL) is a research genre.* Pellegrino et al. (2001) categorized assessments into three genres: assessments to assist learning (formative assessments), assessments of individual student achievement (summative assessments), and assessments to judge program effectiveness (evaluative assessments). Extending that common thread of assessment aim, the United Kingdom’s Assessment Reform Group (1999) offered an alternative framework: assessment *of* learning (a summative action), assessment *for* learning (a formative process), and assessment *as* learning (a metacognitive process). In the United States, these three concepts have become known under the shorthand AfL (Bennett, 2011; Heritage & Wyley, 2018). As the special issue illustrates, we are just beginning to understand the constitutive force of AfL as a research genre in terms of its role among other assessment genres, its ability to help educators understand stakeholder need, its usefulness as a window into complex constructs, and its role as a form of social action.
- *Threshold Concept 2: Construct modeling is a limiting act.* Cronbach and Meehl (1955) famously defined a construct as “some postulated attribute of people” (p. 238). This definition, and variations of it, are used to identify attributes as they are modeled—a process that sets the defined attribute into play in a particular context. As Mislevy (2018) has noted of this process, “It is not simply the content of models that matters, but the thinking and the activities they organize, and how peoples’ interactions revolve around them” (p. 9). Key to understanding the

concept of communication as studied in this special issue is the idea that constructs are drawn down—that is, both narrowed and limited by use and context—in a particular study for a particular reason (Mislevy & Elliot, 2020). As such, while it is possible to speak of robust construct representation (researcher use, for example, of an email to better understand knowledge of student sensitivity to organizational hierarchy), it is nevertheless important to remember that communication itself is a complex construct. Indeed, we wonder if it is the case that all constructs, understood in their full span, are complex. If that is the case, then the more robust a construct is represented in a given assessment, the harder it is to evaluate. In the case of communication, construct span is vast (White et al., 2015). And so, while each of our authors establishes ways that the construct under examination is represented in acts of writing, reading, listening, and speaking (that is, a language arts model), it is inaccurate to imagine that there is one universal construct of communication—or that any assessment can do any more than to capture the drawn down construct. Seen in this way, construct underrepresentation is inevitable, and we must do our best to understand the impact of any episodic draw down (Elliot, 2016). Key, then, is for the readers of this special issue to attend to the construct as limited and defined in each article.

- *Threshold Concept 3: Twenty-first century communication abilities are needed across organizational settings.* In an issue of *Assessing Writing* published just before this special issue, Macqueen et al. (2020) noted the significance of communication in nonacademic settings: “In a hospital context, an inaccurate written handover poses a risk to patient safety. In a business context, an inappropriate tone in an email poses a risk to the client relationship and their future dealings” (p. 1). In cases when these abilities are taught and assessed, it is worth asking if the drawn-down construct results in risk—to organizational applicants who do not have sufficient capabilities and to organizational stakeholders who rely on them. While great effort has been spent to assess written communication (as isolated from reading, listening, and speaking) in academic settings, far less effort has been undertaken to assess organizational communication in its professional and technical forms (Hundleby & Allen, 2010). Additionally, first-year writing in U.S. post-secondary settings is commonly focused on academic genres in which the instructor is the sole audience and knowledge of conventions is the pedagogical target (Isaacs, 2018). In this restrictive environment, it therefore becomes imperative to understand the overwhelming need to shift traditional writing pedagogies to ones that embrace a comprehensive view of communication in organizational settings and to design curricula in which transfer capacity is a focal goal.



As readers of our special issue frame the work presented in terms of these three threshold concepts, we believe that the useful role of writing analytics will become clear. Lang, Aull, and Marcellino (2019) have demonstrated how writing analytics provides a functional taxonomy that includes principled attention to educational measurement (to encourage multidisciplinary collaboration), massive data analysis (to identify the advantages and limits of big data), digital learning ecologies (to emphasize situated views of language), and philosophical perspectives (to include theory-building and ethical practice). Thus, writing analytics, itself a research genre, provides a principled way to understand communication in terms of history, theorization, implementation paradigms, data, digital instantiation, analytic processes and uses, assessment, ethical considerations, and ongoing challenges. Readers will find elements of the writing analytics taxonomy in play throughout this special issue.

With these threshold concepts in mind, we now turn to a more detailed introduction to this special issue. We begin with a history of the origin and development of the special issue (§2.0), as well as a detailed description of workplace English communication (WEC) scenario-based tasks (§3.0). We then turn to questions that guided us in the design, development, and review processes that we believe will be helpful to readers (§4.0). We offer our own conceptual model of the special issue that will help readers understand that the challenges we face in assessing twenty-first century communication abilities are, in fact, facets of the more general challenges that educational assessment faces today (§5.0). We also identify technical and instructional considerations that are important to consider in understanding, teaching, and assessing WEC communication abilities in digital environments (§6.0). We present an overview of each article and the afterword (§7.0) and conclude with acknowledgements to those who made the special issue possible (§8.0).

2.0 Origin and Development of the Special Issue

Systematic, principled review of the special issue theme began in 2013. María Elena Oliveri, the principal investigator of the program of research reported in this special issue, began work with the Texas Workforce Commission on a project led by Karl Haigler. During that period, she worked with the Occupational Network database (O*NET)—developed by the U.S. Department of Labor as a free online resource for employers and educators to benchmark job requirements against data derived from job analysis—to align it with the competencies needed for instruction and employability as outlined in the Texas Adult Education and Literacy Content Standards (Texas Workforce Commission, 2019; see also Haigler, 2021, in this special issue.) That work was continued by Oliveri through a joint collaboration of Educational Testing Service (ETS) with support from the Institute of Education Sciences (Carmona, 2016-2019) and ETS (2017-2020). During that period, the program of research expanded as Oliveri and her colleagues worked on the following: defining WEC construct elements, examining the validity of WEC test scores and consequences of score use, and creating digital training modules for instruction and assessment of workplace communication abilities. Publications associated with this work include

the following: Acereda et al. (2018); Oliveri et al. (2017); Oliveri and Markle (2017); Oliveri and McCulla (2019); Oliveri and Mislevy (2019); Oliveri, Mislevy, and Elliot (2020a); Oliveri and Tannenbaum (2017, 2019); and Schmidgall et al. (2019). Papers were also presented at the 7th and 9th International Conferences on Writing Analytics (Oliveri, 2019; Oliveri, Rupp, & Slomp, 2020c).

In designing the project, researchers relied on a sociocognitive framework (Oliveri et al., 2021a, this issue) and employed anticipatory, principled frameworks such as Evidence-Centered Design, expanded Evidence-Centered Design (e-ECD), Theory of Action (ToA; Oliveri et al., 2021a, this issue), and an Integrated Design and Appraisal Framework (IDAF; Oliveri et al., 2021b, this issue). Validity considerations were examined to determine the benefits of complex and digital performance tasks (Tannenbaum & Katz, 2021, this issue). Tasks were mapped onto a defined construct model (Corrigan & Slomp, 2021, this issue), and linguistic analyses were conducted using corpus methods to propose overarching principles for assessing English-language workplace email communication (Aull & Aull, 2021, this issue). Prospective score reports were developed for teachers and students to emphasize reporting students' skill progress to classroom instructors (Zapata-Rivera et al., 2021, this issue).

By 2019, the project—now named Kitchen Design (KD)—had developed into a simulation involving complex tasks. As Chernikova et al. (2020) noted in their meta-analysis of simulations in post-secondary education—and as the development team realized—approximations of practice offer a wide range of opportunities to develop complex skills through scaffolding. Using a scenario-based approach, the modules present opportunities for students to learn WEC by working in a fictitious company that specializes in designing and overseeing the construction of commercial and private kitchens. Characters in the module included a supervisor (named Volk), an internal consultant (Shirley), a construction manager (Amy), a purchasing agent (Dmitri), and a designer (Victor). Figure 1 illustrates the scenario-based frame.

Figure 1

Scenario-Based Framing for Workplace English Communication (WEC)



Organization Chart

Volk Ullmann
Supervisor

Shirley
Virtual Guide

Amy Cheong
Model Construction

Dmitri Sokolov
Finance Manager

Victor Jones
Senior Designer

YOU
Project Manager

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The specific roles shown in Figure 1 allowed narrative elements to be integrated into the scenario (Chute, 2008) and, as such, support student engagement prerequisite to completing complex tasks. For examples and illustrations of the scenarios involved in the KD simulation, see Oliveri, Mislevy, & Slomp, 2021, this issue. We turn to a detailed description in the following section.

By 2020, a prototype had been developed and field tested at a number of U.S. sites (Haigler, 2021, this special issue). Colleagues from Carnegie Mellon University were also consulted for their expertise in curriculum design emphasizing workplace writing and their use of DocuScope Classroom in analyzing student texts across writing tasks (Wetzel et al., 2021, this issue). We turn to the cost of developing the prototype in §6.0, the afterword (Slomp et al., 2021, this issue).

Following the global COVID-19 pandemic of 2020, ETS leaders faced difficult decisions as they re-examined resources and foci in a changed world. Among those decisions was to bring research on Kitchen Design (KD) to a close. The WEC program of research begun by Oliveri continued, and the special issue records the effort as of the spring of 2021.

3.0. Overview and Description of Scenario-Based WEC Tasks

In the KD scenario, learners play the role of a new project manager in a company that designs kitchens for business and private clients. Learners are responsible for coordinating with a team of colleagues to prepare a bid on a contract. The tasks were designed to ensure that specialized knowledge of kitchens, designs, or the proposal process was not needed for success. The scenario unfolds largely through emails from the learner's supervisor and colleagues. Learners are asked to complete tasks that are a mix of selected response items, email writing tasks, and brief written reflections on their work.

In the fully developed prototype, there were six parts to the story: getting to know the team, prioritizing an inbox, sharing basic information, getting started on a proposal, preparing a cover letter, and scheduling a client call. The scenario and its embedded tasks were designed based on a sociocognitive model of writing used to capture student ability across seven domains of knowledge as described by Corrigan and Slomp (2021, this issue). These include metacognitive knowledge, critical discourse knowledge, discourse community knowledge, rhetorical aim knowledge, genre knowledge, substantive knowledge, and communications task process knowledge.

The scenario begins on the learners' first day in an entry-level project manager position. The learners are provided with an overview of their responsibilities, an organizational chart that shows their position within the management structure, and an introduction to the key members of the organization they will be interacting with. In this introductory segment of the scenario, the learners are tested on critical discourse knowledge—in particular reflection on tone and formality appropriate for emails to each member of the organizational hierarchy.

The next set of tasks involves sorting through an inbox. Learners are told they have only a short time before their next meeting to review their inbox. They are then asked, based on sender and subject lines, to determine in what order they would read the emails. After making these



decisions, they are asked to explain their choices. Learners are then given an opportunity to read the emails in their inbox and to reflect on the effectiveness of their choices.

The next set of tasks requires the learners to respond to these emails. After composing each email, learners are asked to reflect on what considerations shaped the emails they composed. Reflection questions are a blend of short written explanations and selected response items. The questions are designed to measure reflective considerations across each of the construct domains.

As the scenario progresses, a member of the learners' team forwards to the team a call for proposals for the design of a commercial kitchen. As team leader, the learners are tasked with emailing their supervisor to request approval for the team to pursue this bid. After completing the request email, the learners are again asked to reflect on the considerations that shaped the composition of that email. The supervisor approves the request. He suggests that the team members begin their work on this proposal by updating their resumes—a key component to the bid package they will be submitting. The learners are tasked to work with a human relations consultant on the team's resumes. Rather than have the learners compose the email to the consultant, they are provided with several sample emails that could fulfill this task and are asked to select the sample that would be most effective. The learners are then asked to reflect on their choice. (Note that resume revision tasks were part of a future set of modules, and were not a focus of the current scenario.)

The learners next receive an email from their supervisor providing them with a sample cover letter for a bid proposal. The sample is part of a previously successful proposal and is intended to serve as a model for the cover letter the learners' team is required to compose. The learners are then provided with a set of sample emails to their team, informing them of next steps in the process of developing their bid. The learners are asked to select the email they think would be most effective, and then are asked to explain their choice. To conclude this phase of the scenario, a member of the learners' team sends an email highlighting what she and a colleague believe should be key messages in the cover letter they are drafting. Drawing on these recommended messages, the learners are asked to write an email to the team's supervisor in which the draft cover letter is forwarded to him. After completing the email, learners are asked to reflect on the considerations they used to compose the email.

In the final section of the scenario, the learners are informed that the team's bid was successful. They are then asked to schedule a meeting between the client and the design team. Several drafts of an introductory email are then presented to the learners to choose from. After choosing an email to send to the client, the learners are asked to reflect on why they choose that email option. The client's response provides his availability in the coming weeks. The learners are then instructed to look at the office calendar to determine the optimal time to schedule the meeting. After making a decision, the learners then receive an email from a member of the team, informing them that his schedule was out of date. As team leaders, the learners' first order of business is to address the issue of the out-of-date calendar. The learners are again presented with a set of email options to select from and asked to reflect on their choice before drafting a revised

email that better addresses the situation. The scenario concludes with a request for the learners to review the emails they completed during this scenario—and then to reflect on those emails to explain what they had learned about email writing through their completion of this scenario.

When designing the scenarios and tasks, we attempted to seek a balance across item types. Half of the items were constructed response (CR; 25% short CR and 25% email) and half were selected response, or multiple choice (MC; 35% two-choice MC and 15% multiple-selection MC). Similarly, we attempted to find a relative balance in who the email recipients were across the 39 tasks learners were asked to complete. This balance is shown in Table 1 below.

Table 1

KD Item Type Balance by Recipient

Recipient	Balance
Volk (Supervisor)	25.6%
Shirley (Consultant)	15.4%
Dmitri (Team Member)	12.8%
Entire Team (including Victor)	12.8%
Client	7.7%
Everyone	7.7%
Amy (Team Member)	7.7%
None	10.3%

With the exception of articles by Tannenbaum and Katz (2021) and Wetzel et al. (2021), the special issue is based on deliberation of, and experiences with, this WEC model.

4.0 Guiding Questions

Throughout the planning and review process of the special issue, the editors were informed by four broad questions. The first three are inspired by questions raised by Messick (1994) regarding inquiry processes, especially determining the “knowledge, skills, attitudes, motives, and other attributes” targeted in an assessment (p. 12). We refer to these targets as KSAs, although we are aware, following Mislevy (2018), that that the phrase “knowledge, skills, or other attributes” is cast in psychological terms “suggesting greater stability, integrity, and modularity than a resources perspective would presume” (p. 97). The last question is inspired by Messick’s (2000) discussion of consequences related to information use. These four questions are discussed below.

1. *What complex KSAs should be assessed in WEC?* Because KSAs are explicitly or implicitly tied to instructional objectives or are otherwise valued by society, they are



often ubiquitous. But in that pervasiveness, specificity is needed to gather evidence related to validity, reliability, and fairness.

2. *What kinds of behaviors or performances should reveal those WEC KSAs?*

Organizational processes are dynamic and interrelated. It is therefore challenging to represent that dynamism while targeting behavioral and performance instances that, when drawn down into tasks, result in naive construct simplification and unwelcome construct underrepresentation.

3. *What WEC tasks should elicit those KSAs?* Educational measurement teaches us that the nature of the construct guides the selection of the relevant tasks as well as the evidence to collect, analyze, and report back to users of the assessment, including administrators, instructors, and students. Nevertheless, while a great deal is known about the design of constructed response tasks in academic settings, comparatively less is known about what kinds of tasks are needed to capture the constructs such as communication that are pervasive in nonacademic settings.

4. *What are the consequences of assessing these WEC KSAs?* Evidence related to fairness can help us identify varied forms of consequences in designing, developing, analyzing, and using data from assessments. When *AjL* is operationalized as a research genre, however, less is known about the consequences of assessment *for* learning more about communication in nonacademic settings and assessment *as* a way of learning how to actually do these assessments.

An analysis of these questions is important to shed light on which KSAs are of value, which kinds of behaviors can be evaluated to elicit information on differences in student proficiency, which tasks can be developed to assess the targeted KSAs, and what the consequences might be for assessment.

These four questions raise the need for a definition of 21st century communication abilities (Thompson, 2020). Here, we follow the definition offered by the National Research Council (2012) in its consensus study of transferrable KSAs in the 21st century. Following that report, we define complex communication as a form of sophisticated discourse in which organizational and disciplinary norms for framing and communicating information are used for a variety of aims, from individual critical reading to collaborative problem-solving. This broad definition is, in turn, made specific by Corrigan and Slomp (2021) in this special issue through a sociocognitive construct of writing expertise (Figure 2). This sociocognitive construct model is then used to map specific WEC features.

While the theme of the special issue is broad, authors lend precision to the theme through the lens of WEC described in §2.0. Because this special issue focuses on the teaching and assessment of WEC, we provide an overview by raising and answering three specific questions with respect to the assessment of WEC:

1. *What is the value of WEC (e.g., what is the cost of low proficiency in WEC) for stakeholders such as employers, employees, instructors, and students?*

2. *Which processes can be used to identify the WEC KSAs relevant to both workplace and academic settings?*
3. *What AfL strategies best support teaching and learning of WEC?*

We now turn to each question individually in order to frame the special issue from the point of view of the editors.

Question 1: What is the value of WEC (e.g., what is the cost of low proficiency in WEC) for stakeholders such as employers, employees, instructors, and students?

Communication KSAs are among the top five most important abilities needed for the workplace (Casner-Lotto & Barrington, 2006; Hart Research Associates, 2015). These are important for various national stakeholders, their businesses (e.g., employers and employees), and educational institutions (e.g., instructors and students). For the employment sector (employers and employees), the consequences of not reacting and adapting quickly to keep up with the increased demands for workplace preparation with needed KSAs may adversely impact businesses' ability to remain competitive. Consequences may also reduce worker employability and companies' financial prosperity or give rise to more companies investing in English-speaking nations (Stickel, 2010). Further evidence of adverse consequences is provided by the results of a large-scale global survey conducted by *The Economist* Intelligence Unit with 572 executives from over 250 international companies (Bolchover, 2012). Survey results showed that low communication abilities may lead to loss of revenue resulting from misunderstandings in communication, which prevents the completion of major cross-border transactions (Bolchover, 2012; Welch et al., 2001). Across such instances, employers may incur extra expenses, and do incur lost productive time, as additional employees are needed to translate information across offices (Bolchover, 2012) or departments within an organization.

So great is the need for WEC skills that failure to provide students with opportunities to learn them may justifiably be seen as an occasion for precarity—the economic insecurity that, as Johnson and Johnson (2020) observed, becomes “enmeshed with race, gender, ability, and politics” (p. 370) to the extent that groups and individuals are disenfranchised from a society's opportunity structures. The program of research presented in this special issue may therefore be seen as a means of ensuring that students are not unduly exposed to risk because important communication KSAs are not taught and assessed in academic settings. Curricula that do not provide opportunities for WEC exposure, we hold, create circumstances for structural oppression. As such, the value of WEC KSAs is paramount if educators are to mitigate precarity and advance equality of opportunity.



Question 2: Which processes can be used to identify the WEC KSAs relevant to both workplace and academic settings?

Research on an expanded communication skillset, including research on pragmatics, highlights the need to focus on teaching and assessing workplace discourse and pragmatic competence (Candlin, 2002). As Geluykens and Pelsmaekers (1999) suggest, successful communication requires not only technical correctness but also attention to socially contextualized aspects of language use (e.g., the status of each interlocutor and the means by which communication is conveyed). In this context, it has become clear that automation and increased uses of technology have led to the need for an expanded skillset (Oliveri et al., 2020a). Accompanying the need for a definition of complex communication such as that provided above is the necessity to identify relevant KSAs associated with WEC.

Haigler (2021, this issue) elaborates on the importance of academic and workplace alignment—an excellent example of a comprehensive effort to address precarity through alignment of educational standards. Haigler describes the Standards Alignment to Industry Clusters (SAIC) project funded by the Texas Workforce Commission. The stakeholders—Literacy Texas, Literacy Coalition of the State of Texas, ETS, and Haigler Enterprises International—combined efforts to fine-tune the adult education content standards and increase the relevancy of focal KSAs taught in the classroom to those needed in the workplace. The goals were to inform the development of associated instructional and assessment materials to align with the more critical KSAs needed by adult learners for in-demand, entry- and intermediate-level jobs and careers across industry sectors (e.g., advanced manufacturing and construction). Investigators also sought to reduce the disjuncture between the academic content taught to adult learners and the demands of real jobs in key industries. Colleagues worked with subject matter experts from industry and adult education to identify high-demand jobs within industry clusters in the U.S. Department of Labor’s occupational O*NET network database. They collected job descriptions for key industry clusters and analyzed O*NET questionnaires related to KSAs to create detailed descriptions of abilities required in entry- and intermediate-level jobs by industry cluster. They also synthesized O*NET and Texas industry information and designed overlays in key areas (e.g., English language arts) to align high-demand jobs, the Texas Content Standards, and specific local businesses (Association for Talent Development, 2018; for a random control study confirming the importance of such partnerships, see Rosen et al., 2020).

The resulting crosswalks and associated illustrations used real industry examples to identify KSAs of value to both workplace and academic settings, which are available in the *Texas Adult Education and Literacy Content Standards 2.0* (Texas Workforce Commission, 2018). This document provides instructors, career counselors, and program developers with immediately useful information to focus adult learning on what is required for career success and higher education and to develop action plans for public-private partnerships. This painstaking process suggests the concentrated stakeholder effort central to aligning—and ultimately expanding—WEC KSAs that matter to both workplace and academic settings. In terms of the KD simulation

described in §2.0, Corrigan and Slomp (2021, this issue) and Aull and Aull (2021, this issue) provide a tailored model of the relevant WEC KSAs of value and associated guiding principles for the design of teaching and assessment episodes with abilities of value for both academic and workplace settings.

Question 3: What AfL strategies best support teaching and learning of WEC?

Researchers have articulated desirable features related to AfL, such as considerations for expanding construct coverage and expanding assessment focus. Bennett (2016) explained new forms of assessment are likely to be more complex than traditional assessments. These new assessment genres, formative in nature, are best advanced through the following general design aims: employment of performances through simulations and scenarios that gauge students' acquisition of the targeted competencies, use of timely feedback to learners as they progress through the tasks, and integration of technology for distributive uses. Along these lines, various researchers and consortia suggest more detailed ways to improve the design, interpretation, and use of assessments (Gordon Commission, 2013; Partnership for 21st Century Skills, 2008; Pellegrino et al., 2001). For instance, the National Research Council (2012) articulated the need for developing formative assessments that measure learning outcomes and student progress, and inform instruction. The National Research Council (2012) report also described the need for assessments that provide models for instruction and offer opportunities for students to learn and practice the WEC KSAs necessary for success in current post-secondary environments and receive feedback on their learning. In other work, Wylie and Lyon (2017) highlighted the use of formative assessments (as part of the balanced assessment approach) as ongoing classroom assessments that occur more frequently and are better integrated in high-quality instruction classrooms as part of a planned and ongoing process in which all students and teachers participate throughout the learning process. These instructionally integrated assessments are designed to elicit and identify evidence of student learning with the intent of improving the teaching of discipline-specific learning outcomes, supporting students, and encouraging them to become increasingly independent learners.

As the articles in this special issue highlight, a valuable approach to teaching, learning, and assessing WEC may include consideration, at least, of the following features. Based on our experiences, at the present time, there appear to be three AfL areas that best support teaching and learning of WEC. We will return to the areas in Table 2 below:

- *Anticipatory Design*: The ability to apply a sociocognitive approach to assessment incorporating anticipatory design principles, with special attention to appropriate use with diverse populations (Oliveri et al., 2021; Oliveri et al., 2021a, 2021b), as well as special attention to validity considerations in the complex tasks required in simulations and scenarios (Tannenbaum & Katz, 2021). In terms of the present research, as we will illustrate as we turn to our conceptual model, anticipatory design strategies encompass all AfL areas and related activities.



- *Construct Modeling*: The ability to address an expanded skillset that includes a representative set of KSAs defined with a precise construct model aligned with academic and workplace settings (Corrigan & Slomp, 2021).
- *Teamwork*: In terms of subject matter expertise, the ability to understand multifarious linguistic characteristics involved in WEC genres (Aull & Aull, 2021), with special attention to the ability to address challenging pedagogies required to help students understand these genre-based characteristics (Haigler, 2021; Wetzel et al., 2021). In terms of stakeholder responsiveness, the ability to design reports for teachers and their students so that information provided by the assessment may be used formatively to improve student learning (Zapata-Rivera et al., 2021).

Our broad and specific guiding questions allow us, in turn, to offer a conceptual model for 21st century WEC KSAs.

5.0. Conceptual Model

The increasing importance of hard-to-assess WEC KSAs in diverse populations illustrates the general challenges facing educational assessments today. DiCerbo (2020) summarized concerns with existing assessment systems as follows:

(1) They do not help inform classroom instruction, (2) they do not make accurate inferences about diverse learners, and (3) the things they ask learners to do are far removed from the real-life applications of knowledge and skill we desire them to be able to master. (p. 93)

To address such challenges, Gordon (2020) advocated a paradigm of *assessment in the service of learning*, integral in

an approach to pedagogy in which assessment, teaching, and learning are organically interrelated such that these three processes are dialectically and reciprocally employed each in the service of the other. . . . [A]ssessment information can be not only diagnostic, but can inform teaching and learning, can inform accountability, and can itself be catalytic, didactic, and educative. (p. 73)

As evidence of the force of *AJL*, the articles in this special issue demonstrate the force of this genre.

The first two decades of the 21st century have produced advancements in educational measurement that would seem to be part of a solution: advances in cognitive and learning sciences, conceptualization of social and cultural influences on what and how people learn, and technologies for interactive learning environments that capture and analyze complex performances while integrating assessment and instruction. The articles in the special issue draw on instances of these developments.

To contribute to these advancements—and thus make sustained progress toward Gordon’s vision—we now turn to a conceptual model that builds from what we have learned in the special issue. Based on our experiences, we believe that the model holds the potential to guide the construction of compatible assessment practices, across forms and contexts, as tailored to multiple purposes and diverse learners (Pellegrino, 2020). The model finds its origin in National Research Council (2012) scholarship, as well as work by authors and editors of this special issue (Elliot & Aull, 2021; Mislevy, 2018; Mislevy & Elliot, 2020; Oliveri et al., 2020a; White et al., 2015).

In Figure 2, we present a typology of the conceptual model. The model represents what we consider a new paradigm for AfL in general, with particular application to WEC assessments. While we provide here a general conceptual model of WEC, we return to it in §1.0 of the afterword to provide lessons learned from the model (Slomp et al., 2021). Each plane represents a center of activity in which varied activities occur. Lexicographical order, a procedural stipulation requiring satisfaction of one principle before a second is satisfied, specifies that those planes earlier in the ordering have absolute rank. In the model we propose, Plane 1 has priority. Once a sociocognitive framework is accepted as *primus inter pares*, the other activities may proceed concurrently. We elaborate further on each component of Figure 2 in the following sections.

5.1 Plane 1: Nomothetic Domain Modeling

Plane 1 identifies the model foundations as located in a situative, sociocognitive psychological perspective for designing, interpreting, and using assessments in context (Mislevy, 2019). We call this foundation a nomothetic modeling in which considerations of generalized typology are made. Just what these terms mean becomes apparent in the special issue articles themselves, but the following thumbnail descriptions may aide the reader (see Mislevy, 2018 and Mislevy and Elliot, 2020, for a more comprehensive treatment).

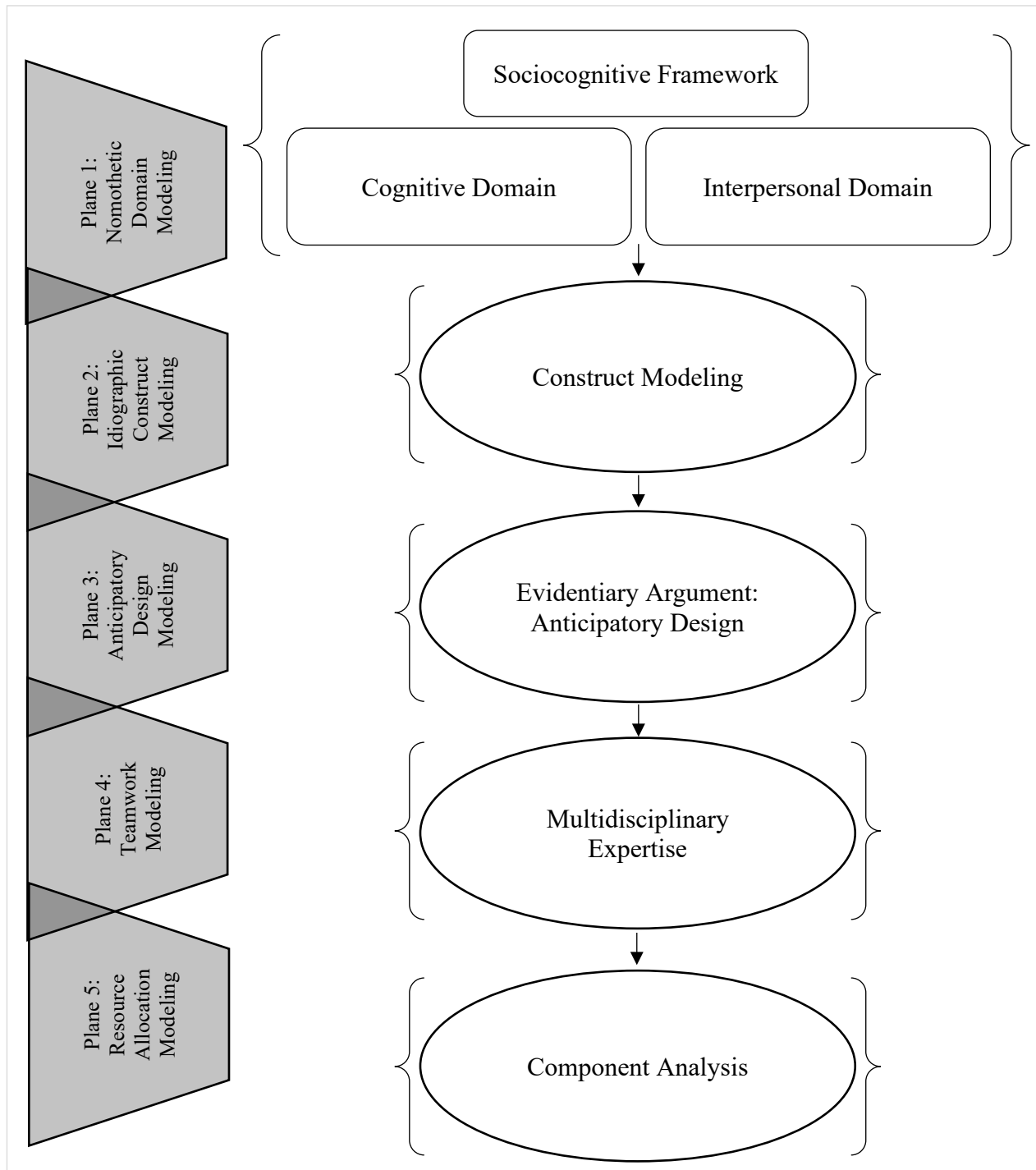
In the context of research reported in the special issue, a sociocognitive perspective is a synthesis coalescing across diverse fields—such as cognitive science, sociology, linguistics, neuroscience, anthropology, and domain learning—regarding the nature of human capabilities, how they develop, and how individuals use them to act in the physical and social world (Gee, 1992; Sperber, 1996). Such a perspective highlights the interplay between what happens between and within persons in the complex adaptive systems in which people live, learn, and interact. It is from this perspective that we develop and integrate Gordon’s organic view of interrelated assessment, teaching, and learning.

In the special case of WEC, we have identified two domains: cognitive (including the language arts model of writing, reading, speaking, and listening) and the interpersonal domain (including collaborative activity). Other domains such as intrapersonal abilities (involving regulation of behaviors related to openness, conscientiousness, extraversion, agreeableness, and

stability) could be included in the model; however, these have not been identified as part of WEC in the special issue and are outside the scope of information presented in this issue.

Figure 2

Complex Tasks of Hard to Assess 21st Century Communication Skills: Conceptual Model for Workplace English Communication (WEC)



5.2 Plane 2: Idiographic Construct Modeling

With the sociocognitive model and attendant domains identified in Plane 1, Plane 2 invites consideration of the construct as it is drawn down into a specific assessment episode as a form of idiographic modeling. As domains are drawn down into specific constructs, these can be used to model relationships among variables. While all dimensions of Plane 1 are always present, they can never be fully represented in a single assessment episode suggested by Plane 2, no matter its complexity.

In the special case of WEC, as noted above, Corrigan and Slomp (2021, this issue) have provided a construct model for WEC in their Figure 2. Their model describes seven interrelated domains of knowledge that contribute to WEC expertise: metacognitive knowledge, critical discourse knowledge, discourse community knowledge, rhetorical aim knowledge, genre knowledge, communication task processes knowledge, and substantive knowledge. Two of these domains—metacognitive and critical discourse—are super-ordinate to the other five. Rhetorical aim and discourse community knowledge function in tension with one another and are super-ordinate to the remaining three domains—genre, communication task process, and substantive. Readers are referred to the authors' analysis for further detail.

5.3 Plane 3: Anticipatory Design Modeling

As we noted above, anticipatory design frameworks are, by their very nature, intended to address central instructional and assessment activities. In Plane 3, therefore, we might imagine that all the activities on Planes 1, 2, 4, and 5 are brought into play under varied assessment design frameworks. The elements of Plane 3 guide us in using what we understand from a sociocognitive perspective to design and use assessments, both with traditional forms of assessments and new ones, with familiar forms of data and new ones, in familiar and new contexts and purposes.

In the special case of WEC, we have, as noted above, selected these frameworks: Evidence-Centered Design, expanded Evidence-Centered Design, Theory of Action (Oliveri et al., 2021a, this issue), and an Integrated Design and Appraisal Framework (Oliveri et al., 2021b, this issue). We propose that these anticipatory designs be considered under an argumentation framework. Under an evidentiary argument framework, we invite perspectives that view assessment as activity centering on some aspects of learning, for some purposes, for some populations, in some contexts. While measurement concepts and methods still prove useful in some context and purposes, we find it more useful to see it, rather, as evidentiary argument, situated in social contexts, shaped by purposes, and centered on students' developing capabilities for valued activities.

5.4 Plane 4: Teamwork Modeling



In Plane 4, we invite consideration of disciplinary, interdisciplinary, transdisciplinary, and multidisciplinary teams. As Choi and Pak (2006, 2007) have demonstrated in the case of health care research, each form of collaboration, while falling along a continuum of disciplinary involvement, has distinct benefits and challenges.

In the special case of WEC, we have found that the development of cross-functional multidisciplinary teams is essential to facilitate the complex collaborations described in this special issue. The coordination of multidisciplinary experts' actions is needed to maximize the desired, intended consequences from the use of the assessments and minimize undesirable, unintended effects. As the special issue demonstrates, these collaborations involve considering (a) foundational principles associated with design and development, including the use of an evidence-centered design approach that acknowledges the needs of diverse learners; (b) foundational principles related to fairness and validity to advance diverse students' opportunities to learn; (c) psychometric models including the use of more advanced cognitive diagnostic models for multidimensional constructs; (d) analytics to explore the use of novel natural language processing and feedback models to enhance score-based interpretations of data from multidimensional constructs; and (e) reporting information in ways that are accessible, useful, and actionable for the various stakeholders using scores from the tasks.

One way to approach modeling cross-functional multidisciplinary teams is to conceptualize areas of research necessary for the successful completion of a simulation using scenario-based framing of complex tasks such as those found in WEC. Here, the U.S. Classification of Instructional Programs (CIP)—a federal system that provides a taxonomic scheme that supports the accurate tracking and reporting of fields of study—is especially useful (National Center for Education Statistics, 2021). Based on our experiences working with WEC, we have provided in Table 2 a multidisciplinary framework defining the three major A/L areas that best support teaching and learning of WEC.

Table 2

Classification of Instructional Programs: An AfL Multidisciplinary Framework for Workplace English Communication (WEC)

Relevant Disciplinary Program Content	11. Computer Information Sciences and Support Services	13. Education	23. English Language and Literature, General	30. Multi/ Interdisciplinary Studies	42. Psychology	44. Public Administration and Social Service Professions
Relevant Program Specialization	11.0104: Informatics	13.0301: Curriculum and Instruction 13.0601: Educational Evaluation and Research 13.0604: Educational Assessment, Testing, and Measurement 13.0607: Learning Sciences	23.1303: Technical and Business Writing 23.1304: Rhetoric and Composition	30.3001: Computational Science 30.2501: Cognitive Science 30.3101: Human Computer Interaction	42.2708: Psychometrics and Quantitative Psychology	44.0502: Education Policy Analysis

Table continued below.

AfL Strategies: Instruction and Assessment						
1. Anticipatory Design	11.0104: Informatics	13.0301: Curriculum and Instruction 13.0601: Educational Evaluation and Research 13.0604: Educational Assessment, Testing, and Measurement 13.0607: Learning Sciences	23.1303: Technical and Business Writing	30.3001: Computational Science 30.2501: Cognitive Science 30.3101: Human Computer Interaction	42.2708: Psychometrics and Quantitative Psychology	44.0502: Education Policy Analysis
2. Construct Modeling		13.0301: Curriculum and Instruction 13.0601: Educational Evaluation and Research 13.0604: Educational Assessment, Testing, and Measurement	23.1303: Technical and Business Writing		42.2708: Psychometrics and Quantitative Psychology	
3a. Teamwork: Subject Matter Specialization		13.0301: Curriculum and Instruction	23.1303: Technical and Business Writing		42.2708: Psychometrics and Quantitative Psychology	
3b. Teamwork: Informatics	11.0104: Informatics	13.0607: Learning Sciences				44.0502: Education Policy Analysis

As Table 2 illustrates, six areas of disciplinary specialization were needed to perform the research and development necessary to create the WEC scenario-based simulation. In turn, these six areas involve eleven areas of specialization. Because we view Plane 3, involving anticipatory design, as integrating all activities of Planes 1, 3, 4, and 5, we note that all areas of specialization need to be represented in this activity. Areas of specialization are then divided among areas involved with construct modeling, required subject matter expertise, and informatics requirements for report design. As noted above in §4.0, each of these areas supports AfL. While our project is a very specific instance of a complex task design, we believe that conceptualizing the kinds of specialization required for successful cross-functional multidisciplinary teams is usefully modeled through the use of CIP codes. We return to the topic of multidisciplinary collaboration in § 4.2 of the afterword (Slomp et al., 2021, this issue)

We also want to emphasize that, in our view, unique WEC subject matter specialization benefits substantially by the inclusion of Technical and Business Writing and Rhetoric and Composition. Taken together as areas of scholarship in the field of writing studies, programs of research in these fields have made substantial contributions to WEC instruction and assessment. Representative organizations and journals include the following: Association of Teachers of Technical Writing (*Technical Communication Quarterly*); Conference on College Composition and Communication (*College Composition and Communication*, *College English*, *Research in the Teaching of English*); Council for Programs in Technical and Scientific Communication (*Programmatic Perspectives*); IEEE Professional Communication Society (*IEEE Transactions on Professional Communication*); and Society for Technical Communication (*Technical Communication*). In terms of recent work in WEC assessment, we point to a recent special issue of *Assessing Writing* (Macqueen et al., 2020), as well as previous work on assessment of technical and professional communication (Hundleby & Allen, 2010). Since writing studies includes scholarship in technical writing, business communication, and academic writing, we believe that this area holds the potential to address key issues such as KSA transfer.

5.5 Plane 5: Resource Allocation Modeling

Plane 5 involves areas of reasoning regarding allocation of resources, especially in terms of cost. Substantial barriers may occur in the development of complex tasks such as WEC. In their systematic review of cost analyses for implementation of simulation-based education in healthcare, Hippe et al. (2020) found that methods, definitions, and reported estimates varied across the 47 studies they investigated. That is, fundamental cost components—development, training, equipment, facilities, administration, and maintenance—were not uniformly reported in the cost analyses methodologies. The authors recommended that assessing resource requirements, associated costs, and subsequent outcomes would optimize return on investments.

In a study of a unique method of resource allocation modeling—cost-effectiveness analysis (Levin et al., 2018)—Barrett et al. (2020) used incremental cost-effectiveness ratios for a grammar school mathematics intervention. By conceptualizing the intervention according to its



components (identified as ingredients) and calculating the ratio of the costs in relationship to its effects (measured by effect size), the researchers were able to calculate the following: costs per ingredient, total costs, costs per classroom, costs per student, and marginal costs to implement the program under varied conditions. While the ingredients method is valuable at the beginning stages of cost planning, it is important to note the linking cost to effectiveness, as measured by effect size, is a post-hoc procedure. As such, while it may be some time before ingredients can be linked to outcomes, identifying the ingredients early in the planning process will have important analytic benefits later.

6.0 Technical and Instructional Challenges

It is important to note that, at the present writing, substantial challenges remain in implementing learning and assessment activities for WEC in practical learning contexts. Whether initiating by non-profit or profit sponsors, learning and assessment activities such as those described in the special issue are often developed in isolation using research-lab perspectives that ask learners to engage with prototypes in out-of-school contexts for specialized studies, especially at the early-to mid-stages of development. Consequently, insights gained from such prototype tryouts may be valuable for design iteration at a high level (i.e., scientific checks) but not necessarily transferable to deeply contextualized learning contexts expected from a finalized prototype. As such, it might be challenging to create situations for research and development that allow learners to engage with the learning and assessment activities in authentic ways, such as gauging learner motivation levels supported by incentive structures that mirror those in real life.

For eventual operational implementation, it is certainly desirable to try out prototypes of learning and assessment activities for WEC in real-life classrooms, whether they are remote or in-person; however, practical and pedagogical issues may stand in the way even at mid- to late stages of development. In the experience of the editors, it is common to encounter situations where individual schools were very willing to invite teachers to donate one or two class periods for this operational development work but that invitation was declined by teachers because of their own sound pedagogical agendas. To a classroom teacher, student success must always come first, and using precious time for experimentation may not yield sufficient benefits if the innovation is not closely linked to in-use pedagogies.

Based on our experience, factors related to prototype operational readiness and tryouts include the following technical and pedagogical considerations. Questions related to facets of each consideration may prove useful both to those who design assessments such as WEC and those who are involved in their classroom implementation.

6.1 Technical Considerations

From a technical standpoint, it is important to consider the following questions:

- *Data Throughput*: Is the prototype mature enough to be deployed at scale so that the system does not crash under real-time throughput demands that may involve thousands of learners at a time?
- *Longitudinal Robustness*: Is the system designed so that it can handle frequent changes in registrations, learner-to-class assignments, and other moving parts in the educational ecosystem?
- *System Compatibility*: Can the prototype be deployed in such a way that its system components can speak to other systems in the data processing and visualization educational ecosystem?
- *Accessibility*: Does the prototype follow models of universal design to provide sufficient affordances for learners with different visual, linguistic, auditory, or tactile needs?
- *Timeframe*: Is the timeframe for implementation flexible and sufficient to allow the host institution to use the prototype in the most effective way with the least amount of unnecessary disruptions to daily instructional practice?

6.2 Pedagogical Considerations

From a pedagogical standpoint, it is important to ask the following questions:

- *Conceptual Alignment*: Is the district or school conceptually aligned with the general purpose of the prototype and how learning and assessment are managed relative to frameworks such as educational standards, learning progressions, or educational approaches?
- *Curricular Integration*: Have curriculum specialists and teachers been sufficiently involved in the development of the prototype to understand under what conditions the prototype can be embedded in the instructional context?
- *Fairness and Sensitivity*: Has the prototype been sufficiently vetted following universal design models in order to eliminate design choices that disenfranchise learners?
- *Educator Training*: Will teachers be trained, either in-person or on-demand, so that they feel appropriately supported in the instructional embedding?
- *User-Friendliness*: Will learners of all backgrounds be able to navigate the interface with sufficient ease so as to pass “initial hurdles” for tryout?
- *Actionable Feedback*: Will teachers and learners be provided with sufficiently accurate, meaningful, and actionable feedback so that their engagement with the prototype is of instructional use in real time?
- *Management Summaries*: Does the prototype usage, especially when it provides novel data, yield summaries that are of use to principals, assessment specialists, or school management teams?



- *Development Voice*: Are there sufficient opportunities for the teachers and learners to provide feedback that will truly be used to make improvements to the prototype?

There are other factors that may be relevant for any particular instructional context of course. In terms of financial investment, we may ask if the costs of implementing the prototype, including costs the host institution has to invest for management, are acceptable to the institution or covered by the organization that developed the prototype. The main point in raising these questions is that we have encountered situations where well-meaning research and development teams were simply not ready for the demands and multiple constraints that, in daily educational practice, exert pressure on prototype tryouts. As a result, despite best intentions, field-testing opportunities—as well as important insights gleaned from them—may be severely limited. To leverage such opportunities, using the planes identified in Figure 2 in the research planning stages provides a principled direction for successful development and implementation.

7.0 Article Overviews

As noted throughout this introduction, the articles in this special issue describe the complexities associated with designing, developing, and using WEC assessments that integrate teaching and assessment. To this end, the articles discuss modern conceptions of the targeted competencies and approaches to aligning instructional and assessment activities to assess those modern conceptions, in addition to describing cutting-edge approaches to designing and interpreting complex assessments. The articles also discuss common intended and unintended consequences of traditional assessment approaches that have often underrepresented the constructs and reduced opportunities for learners to engage with more authentic tasks needed to prepare them with needed workplace-relevant KSAs for today's economy (Oliveri et al., 2020b). Additionally, the articles propose ways forward to conceptualize and expand the focal skill sets assessed, use alternative forms of assessment that better integrate teaching and learning, and jointly consider the needs of diverse stakeholders impacted by the assessments. Following are brief summaries of each article.

In the first article, María Elena Oliveri, Robert J. Mislevy, and David H. Slomp focus on sociocognitive frameworks in the first of three articles focused on anticipatory, principled development of WEC. Using a situative, sociocognitive psychological perspective for designing, interpreting, and using assessments in context, the authors focus on linguistic, cultural, and substantive (LCS) patterns to provide a framework for understanding the nature and acquisition of people's adaptive capabilities in social/cognitive complex adaptive systems. The authors then illustrate the application of the sociocognitive framework and related LCS patterns to WEC learning and assessment, with special attention to using LCS patterns as a starting point to ground measurement models—such as cognitive diagnoses modeling and Q-matrices—in terms formative A_JL uses.

In the second article, Oliveri, Slomp, Rupp, and Mislevy provide further deliberation on anticipatory, principled development of WEC. Using expanded Evidence-Centered Design (e-ECD) and Theory of Action (ToA) frameworks, the authors illustrate the benefits of using these frameworks. e-ECD can be used to identify, map, and categorize activity patterns associated with a particular context or practice to render test takers' implicit behaviors and attitudes observable and assessable in an operational assessment. ToA frameworks can be used to identify the components of an assessment, its action mechanisms, stakeholders' needs, and score-based decisions and their impact, as well as the services required for assessment success. WEC applications of each demonstrate the usefulness of the models as they increase our capacity to understand the core learning and assessment machinery of a given assessment genre and our need to anticipate systematic consequences of our implementation processes.

In the third article, Oliveri, Slomp, Rupp, and Mislevy conclude their deliberation on principled development of WEC. Using an Integrated Design and Appraisal Framework (IDAF), the authors emphasize the need for categorically identifying and ecologically modeling variables impacting WEC by developing clearly articulated content domains and construct models to underpin the assessment, incorporating a foundational focus on fairness, and integrating social consequences into the design process. As the authors conclude, the design of an assessment, especially a complex one such as WEC, is not a self-contained enterprise; rather, it is a process shaped by one's view of the system, values, and educational perspective of the environment in which it will function. Because they are detailed, transparent, and contextual, anticipatory frameworks such as sociocognition, e-ECD, ToA, and IDAF serve to guide educational stakeholders through this process. Taken together, they and related forms of evidence-centered design may justifiably be considered essential to the success of AfL as an assessment genre.

In the fourth article, Corrigan and Slomp describe construct domains of expertise in writing that meet contemporary needs of those who research, teach, and assess writing in a digital age. Their domain-based model is derived from a critical review of writing scholarship ($n = 109$) studies from 1971 to 2020. The review revealed writing knowledge domains that have predominated the literature in terms of seven areas: metacognitive, critical discourse, discourse, rhetorical aim, genre, communication task process, and substantive knowledge. The authors bring these domains together to form a sociocognitive construct of writing expertise aligned to WEC demands, with specific attention to construct implications for curricular development, pedagogical practice, and formative assessment. If the goal of WEC assessment is to make inferences about the underlying expertise that enable test-takers to create products involving the very KSAs being assessed, clearly mapped constructs are needed to support these inferences. This need for transparency is even more true for formative AfL genres designed to inform instruction in that, from first encounter, the focus is on learning to solve complex problems.

In the fifth article, Tannenbaum and Katz address validity considerations in complex tasks such as those used in WEC. As they establish, complex, digitally-based performance tasks present unique challenges in accumulating design-based and interpretation-based evidence of



validity that are necessary to support interpretation and use arguments. The authors segment the creation of digital performance tasks into three phases—early prototype, initial assessment, and deployed assessment—and discuss validity considerations germane to each of these phases. While issues related to design validity apply to all types of assessments, the authors conclude, these issues become elevated in the case of complex performance assessments undertaken in digital environments. While iterative task design, tryout, and revision, coupled with evidence collection is on the right track, the authors conclude, we will need to continue to explore new measurement and scoring models, new models of validity, and new approaches to validation.

In the sixth article, Aull and Aull investigate WEC through the study of email as a prominent workplace communication medium central to effective task realization, collaboration, and interpersonal relations in organizational settings. The article extends research findings on English workplace communication, teaching, and assessment to WEC, thus offering a meta-analytic synthesis to guide pedagogy and assessment of email workplace communication. Writing analytics, the authors note, may be particularly useful in the study of WEC given its focus on measurement and analysis of written texts for the purpose of understanding writing and improving teaching and learning, as well as its potential to gather evidence about the situated nature of language use. Following their analysis, the authors offer three overarching principles for assessing English-language workplace email communication: the importance of addressing the particular, multifarious characteristics of communication through email, including the interpersonal aspects of the genre; the need to inform and update research with ongoing investigation of authentic data that capture these characteristics; and the realization that the study of workplace communication genres is a form of research providing ongoing insights and evidence for supporting learners in non-academic settings.

In the seventh article, Haigler explores the ways in which research in both learning theory and skill applications have advanced our understanding of the role of competency frameworks in career readiness and workforce development. Examining the U.S. Department of Labor's O*NET and the Texas Workforce Commission's Standards 2.0, the author pays special attention to the significance of context in examining questions of learning transfer from classroom to workplace, as well as the role of metacognition and its relationship to collaborative problem solving. Exposing students to WEC is significant in introducing them to the demands of jobs that reflect the complexity of skills used in concert and in context. Such significance raises important issues of research related to transfer, measurement, and simulation use. Provocatively, Haigler raises a key question: Are competencies preferable to academic credentials as the basis for career success? As he concludes in his rejection of binary choices, alignment of academic instruction to workplace requirements is a useful way to re-position student success in both worlds.

In the eighth article, Wetzel, Brown, Werner, Ishizaki, and Kaufer present a case study on DocuScope, a computer-assisted rhetorical analysis tool used to design and deliver writing instruction within and across courses in the foundational writing curriculum at Carnegie Mellon University. To facilitate alignment of learning goals, assignments, and rubrics across courses, the

authors document the ways DocuScope visualizes rhetorical patterns in student texts so that classroom instructors can encourage rhetorical discussions around task types, thus bridging seemingly separate worlds of academic writing and workplace writing. Because DocuScope prioritizes rhetorical purpose and function rather than lexico-grammatical structures, the DocuScope information available to teachers and students is more nuanced and accessible than other types of corpus-driven writing information. This emphasis on rhetorical aim and action is relevant both to the text choices students make and to our administrative ability to view assessment as a rhetorical genre. The Carnegie Mellon study is of special interest to those who lead writing programs and desire to use writing analytics to better understand how to design, deliver, and assess instruction.

In the ninth and final article, Zapata-Rivera, Andrews-Todd, and Oliveri describe a theoretically-grounded approach to scoring and communicating assessment information to teachers and students in the context of the WEC KD simulation. The article focuses on prospective score reports—preliminary report designs shared with the assessment development team in order to identify potential misalignments between the desires of the audience and the type of assessment information available as part of the assessment. The authors address key aspects to consider in the design of WEC prospective score reports, scoring approaches used to produce the information included in the reports, and approaches for designing and evaluating reports with subject matter experts. Following their presentation of two reports—one for instructors and one for students—the authors emphasize the significance of prospective score reports for different audiences to provide the assessment development team with an opportunity to consider, document, and address audience requirements during the design process.

In the afterword, Slomp, Oliveri, and Elliot recall the lessons learned from the program of research reported in this special issue. The first author undertook a detailed, deliberate reading of the final versions of each article contained in the special issue, highlighting and entering key observations, ideas, and insights into a mind-mapping platform. Coded by article of origin, each insight was linked thematically to other insights from within and across SI articles. Insights were then organized by themes. This process allowed the authors to lend specificity to this special issue introduction in terms of the ways that the five modeling planes can be used to organize the details of WEC assessments in terms of knowledge transfer, LCS patterns, sociocognitive constructs of writing expertise, evidentiary arguments, anticipatory design frameworks, and research and development.

Future research following the publication of this special issue will, we hope, address such challenges as the following: clear definitions of the KSAs composing the construct of workplace communication; insights on the features that may lead to better types of measurements of the KSAs; identification of the environments that may lead to better transfer of KSAs from those learned in the academic context to their use in authentic, real-life workplaces; and knowledge and integration of stakeholders' needs, which are necessary to help improve workplace

preparation efforts. The stakeholders include individuals involved in the design, development, and use of the instructional units and digital tasks.

From our perspective, 2021 will be a time of seismic global shifts. While much is uncertain, there is also much to be gained. In education, ours is a time of opportunity as practices that once were thought of as inevitably enduring—such as summative assessments used for admission, placement, and certifications—are receding. During these periods, AfL programs of research such as that reported here provide innovative ways to think about ways to support student learning. While no one has yet found the key to teaching and assessing WEC through complex task-based simulations, we believe this special issue offers hope that, for the sake of our students, solutions will soon be found.

8.0 Acknowledgements

Members of our Board of Reviewers are the foundation of *Analytics*. For this special issue, our Board colleagues reviewed original manuscripts, offered suggestions for improvement, and read final submissions during the COVID-19 global pandemic. We do not have the words to thank our dear colleagues for the exacting work they did when the world could not see its own future. The names, institutional affiliations, and review specializations are noted in Table 3.

Table 3

Journal of Writing Analytics Board of Reviewers and Review Specialization, Volume 5, 2021

Reviewer	Affiliation	Review Specialization
Chris M. Anson	North Carolina State University	Rhetoric and Composition
Laura Aull	University of Michigan	Corpus Linguistics
Duncan Buell	University of South Carolina	Computer Science
Hugh Burns	Texas Woman's University and US Air Force Academy	Computational Rhetoric
David Kaufer	Carnegie Mellon University	Digital Textual Analysis
Andrew Klobucar	New Jersey Institute of Technology	Digital Humanities
Suzanne Lane	Massachusetts Institute of Technology	Writing in the Disciplines
Djuddah A.J. Leijen	University of Tartu, Estonia	English Language Learning
William Marcellino	The RAND Corporation	Analytic Toolsets
Mya Poe	Northeastern University	Writing Assessment
Valerie Ross	University of Pennsylvania	Critical Writing
Alex Rudniy	University of Scranton	Educational Data Mining
Erica Snow	Roblox	Artificial Intelligence

We also thank our ETS colleagues who reviewed manuscripts by authors from that institution through the ETS Research and Development Tech Review Process. ETS also paid the Elsevier licensing costs for Figures 4 and 5 in Oliveri, Mislevy, and Slomp's "Principled Development of Workplace English Communication Part 1: A Sociocognitive Framework." We are also thankful for the support of the Department of English at the University of South Florida. A generous grant of \$1,500 from the department supported the special issue.

We are also thankful to Susan Lang, Editor-in-Chief of the journal, as well as Michael Palmquist, our publisher. They supported the special issue from planning to publication, and the fact that it exists is testament to their commitment to research innovation.

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