The Skills Underlying Writing Expertise: Implications for K-12 Writing Assessment

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This paper undertakes a review of a model developed as part of the Cognitively Based Assessment of, for, and as Learning (CBAL) initiative, an ongoing research and development project at ETS that is exploring new ways to assess students in kindergarten through Grade 12 (K – 12). The model is:

- based on modern cognitive understandings;
- built to include integrated constructed-response tasks that can be equally useful for assessment and for instruction;
- and structured to allow multiple measurements over the course of a school year.

The model described in this paper, which emerges from a review of the literature on writing, places a strong emphasis on writing as an integrated, socially situated skill. Such skills cannot be assessed properly without taking into account the fact that most writing tasks involve management of a complex array of skills over the course of a writing project. A skilled writer integrates language and literacy skills, document creation, document-management skills and critical-thinking skills, among others, and has strategies for coordinating them effectively.

More than anything else, this paper is about connections. We are concerned with connections among writing, reading and critical thinking; with relating writing to its social context; and, above all, with making strong connections to how writing is tested and how writing is taught.

The context is an ongoing effort at ETS to develop a new approach to K – 12 writing assessment in which these connections are not only respected but deeply embedded into the very design of assessments. Writing is not an isolated skill. It builds upon a broad foundation of prerequisite literacy skills, both supports and requires the development of critical-thinking skills, and requires the writer to address a complicated array of rhetorical, conceptual, and linguistic problems.

None of these themes are new in and of themselves. To point out a few of the more salient discussions, Shanahan (2006) examines complex interconnections and interdependencies among reading, writing and oral language. Applebee (1984) reviews older literatures connecting writing to the development of critical thought, while Hillocks (1987; 1995; 2002; 2003b) emphasizes the importance of inquiry in writing, noting that students need above all to learn strategies that will enable them to think about the subject

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1 The project reported in this paper reflects the work of many people at ETS. The larger project of which this is a part was initiated under Randy Bennett’s leadership and reflects his vision for an integrated assessment system. Nora Odendahl played a major role in the original conceptualization and development, and key features of the design reflect her insights. Mary Fowles has been an equal partner in the work at every stage, and the assessment designs reported here reflect her leadership and the work of many test developers at ETS, including Douglas Baldwin, Peter Cooper, Betsy Keller, and Hilary Persky. Other contributors to the work include Russell Almond, Marjorie Biddle, Michael Ecker, Catherine Grimes, Irene Kostin, Rene Lawless, Tenaha O’Reilly, Thomas Quinlan, Margaret Redman, John Sabatini, Margaret Vezzu, Chris Volpe, and Michael Wagner.
matter of their writing (Hillocks, 2003a). And the literature on the social aspects of writing is even more extensive, so that the comments that follow can do little more than indicate major themes.

In recent years, a number of themes have been emphasized. Literacy is a complex, varied, highly nuanced class of social practices in which school literacy has a privileged but specialized position in our society. Students who may do poorly on literacy tasks in a school setting may nonetheless display considerable sophistication on related skills embedded in well-defined, socially significant practices (Hull & Schultz, 2001). Reading and writing are not monolithic entities, but complex skill sets deployed in historically contingent contexts; that is, the choices of forms and genres available to the author, and the modes of communication and interaction with which they are associated, have evolved and are evolving under the influence of social and technological factors (Bazerman & Rogers, 2008; Bolter, 2001; Foster & Purves, 1991; Heath, 1991; Howard, 2008; Murray, 2009; Street, 2003; Venezky, 1991). Education in reading and writing should be viewed not simply as the inculcation of a skill set, but as socialization into literate communities, and therefore as learning how to participate in a specific set of concrete and socially valued practices (Barab & Duffy, 1998; Barton & Hamilton, 1998; Barton, Hamilton, & Ivanic, 2000; Carter, 2007; Englert, Mariage, & Dunsmore, 2006; Lave & Wenger, 1991; Marsh & Millard, 2000; Reder, 1994; Resnick, 1991). There is broad consensus that writing skill is most effectively acquired in a context that makes writing meaningful, both in relation to its content and to the social context within which writing takes place (Alvermann, 2002; Graham & Perin, 2007; Langer, 2001).

Criticisms of particular methods of writing assessment often revolve around the contrast between the testing situation and the situation in which writers ordinarily write. For instance, in a timed impromptu essay examination, the writer may have:

- no control over the topic and often little knowledge or interest in it;
- no access to any source of information about the topic;
- little time to think deeply about the topic;
- considerable incentive to focus on surface form (since the scoring rubric may penalize grammatical mistakes or favor those students who produce the standard five-paragraph essay).

And yet this list of flaws (from the writer’s point of view) can readily be transformed into a list of virtues (from a test administrator’s point of view), such as fairness, uniformity of testing conditions, objectivity and consistency of scoring, and efficiency. In short, progress in writing assessment requires us to reconcile the twin virtues of validity and cost, which are often in tension, and which may lead to fundamentally different solutions, with fundamentally different implications for instruction.
Assessment constitutes a social context in its own right. It holds a central place in our educational institutions and has a powerful impact upon instruction, not always for the better. What teachers teach is strongly influenced by what is on the test and even by seemingly minor details of test format. Frederiksen (1984) discusses a variety of ways in which the format of a test, and the implicit link between instruction and assessment can have unintended consequences. As Frederiksen (p. 201) puts it,

> The ‘real test bias’ in my title has to do with the influence of tests on teaching and learning. Efficient tests tend to drive out less efficient tests, leaving many important abilities untested—and untaught. An important task for educators and psychologists is to develop instruments that will better reflect the whole domain of educational goals and to find ways to use them in improving the educational process.

Responses to this issue have gradually led toward broader use of performance-based assessments in writing. As Yancey (1999) notes, the general trend from the 1950s to the 1970s was to assess writing indirectly with multiple-choice tests, with direct writing assessment and then portfolio-based assessment gradually entering the picture (Elliot, 2005; White, 2004). A landmark of direct writing assessment, Ed White’s *Teaching and Assessing Writing* (1985) established holistic direct writing assessment as the norm; and we find in White (2005) a continuing focus on developing effective methods of writing assessment—in this case, methods of portfolio assessment that connect portfolio contents to curricular goals via student reflective writing. Yet there is considerable room for improvement, particularly if we take connections into account – connections that make it almost impossible to assess writing meaningfully if it is viewed merely as an isolated skill.

In 1984, Norman Frederiksen made the following observation (1984, p. 200):

> Over the past 25 years or so, cognitive psychologists have been investigating the mental processes that are involved in such tasks as reading, writing, solving puzzles, playing chess, and solving mathematical problems. The result is a theory of information processing that has important implications for teaching… Some of the cognitive processes that have been identified have to do with the development of internal representations of problems, the organization of information in long-term memory for efficient retrieval, the acquisition of pattern cognition and automatic-processing skills, use of strategic and heuristic procedures in problem solving, and how to compensate for the limited capacity of working memory. Such skills are not explicitly taught in schools today, but we are at a point where cognitive psychology can make substantial contributions to the improvement of instruction in such areas.
Frederiksen postulated that this class of skills can most readily be tested with situational tests (that is, with tests that simulate the typical conditions under which such skills are used) and suggested that:

Perhaps an adventuresome consortium of schools, cognitive scientists, and testing agencies could carry out demonstration projects to test the feasibility of systematically using tests to influence the behaviors of teachers and learners and to provide the large amount of practice needed to make the skills automatic.

The past 25 years have seen further progress in modeling the cognitive foundations of reading, writing, and other intellectual skills, and even greater progress in building socially as well as cognitively sophisticated models of instruction. But thus far, nothing like Frederiksen's vision has been realized, not least because it requires synthesis and coordination across several disciplines and the solution of a wide range of practical and technical problems.

The nature of the problem can be measured in part by the kinds of difficulties encountered by the performance-assessment and authentic-assessment movements (Haertel, 1999; Hamilton, 2003): It can be very difficult to make an assessment more closely resemble real-life performance or bring it more closely into alignment with best practices in instruction and curriculum while meeting all of the other constraints intrinsic to summative assessment situations, including the powerful constraints of cost and the way that testing is budgeted in particular institutional settings. Instruction and curriculum are variable, as is practical performance outside a school setting, and both are dependent on context in ways that can make performances difficult to assess and compare. It is not easy to devise an assessment system that delivers good measurement, models the kinds of tasks we want teachers preparing students to perform, and supports instruction.

Bennett and Gitomer (2009) sketch out one possible strategy for dealing with these issues, involving coordinated development of summative assessments, classroom assessments, and professional support materials. Bennett and Gitomer set as their goal an integrated assessment that does more than fulfill a simple accountability function. They advocate a form of assessment intended simultaneously to document student achievement (assessment of learning), support instructional planning (assessment for learning), and engage students and teachers in worthwhile educational experiences during the testing experience (assessment as learning). They argue that these goals can be achieved by leveraging advances in cognitive science, psychometrics, and technology to build much richer assessment experiences.
In 2009, the National Academy of Education issued a white paper on standards, assessments, and accountability that endorses a similar set of goals. The academy recommends a series of summative assessment reforms in which modified test designs are based upon a strong cognitive foundation and coordinated systematically with support systems for classroom teachers (including professional development and support systems, parallel formative assessments, and other supports for classroom instruction). \(^2\)

The research reported in this paper applies Bennett and Gitomer’s (2009) ideas to writing assessment in primary and secondary grades. It focuses on three aspects of the overall vision:

- Understanding the cognitive basis for effective writing instruction
- Designing formative and summative writing assessment designs that use richer, more meaningful tasks, provide effective support for instruction, and constitute valuable learning experiences in their own right
- Conceptualizing an approach to essay scoring that maintains a strong rhetorical focus while using automated methods to assess key component skills.

A key conceptual element of the analysis to be presented derives from activity theory (Engestrom, Miettinen, & Punamaki, 1999), which treats interactions among people in a social environment as the fundamental unit of analysis. Particular institutions, the tools or skills that enable people to participate in those systems, and the social conventions which govern interaction are all part of activity systems in which people act to accomplish goals that emerge from and are partially defined by the roles and situations in which they are participating. Activity theory leads directly to a constructivist view of learning, in which learning a skill emerges naturally from participating in the activities for which the skill is intended (Hung & Chen, 2002; Jonassen & Rohrer-Murphy, 1999). The fundamental goal of the research outlined in this paper is to help redefine writing assessment so that it more directly supports learning and helps to engage novice writers in appropriate communities and practices.

Writing as a Complex Cognitive Skill: Connections and Disconnections Among Writing, Reading, and Critical Thinking

If we examine some of the classical cognitive models of writing, we discover many disagreements in points of detail, but several common themes. One is that expert writing clearly involves at least the following elements:

- A set of **expressive** skills that enable fluent text production. In Hayes and Flower (1980) this is the *translating* process. In Hayes (1996) it is *text production*. In Bereiter and Scardamalia (1987) it is the *knowledge-telling* process.
- A set of **receptive** skills that support self-monitoring and revision. In Hayes and Flower (1980) this is the *reading* process. In Hayes (1996) it is *text interpretation*. In Bereiter and Scardamalia (1987) it is largely kept in the background except in Chapter 9, which argues for significant parallels between reading and writing processes, and Chapter 11, which presupposes self-reading as part of the feedback loop necessary to revision.
- A set of **reflective** skills that support strategic planning and evaluation, or *deliberation*, which requires a combination of metacognitive representation and executive control. In Hayes and Flower (1980) reflective skills are distributed among the planning, monitoring, and editing processes. In Hayes (1996) these elements are unified into a single category labeled *reflection*. In Bereiter and Scardamalia (1987) the knowledge-transforming model is intended to capture strategic, reflective thought. It differs from the Hayes and Flower (1980) model by postulating distinct rhetorical and conceptual problem spaces and subjecting both to problem analysis and goal-setting processes.

Normally, we expect to find parallel expressive, receptive, and reflective skills across tasks with similar domains in play. These are different modes of thought, but they invoke the same mental representations. A reader may start with letters on the page and end up with ideas. A writer may start with ideas and end up with letters on the page. A thinker may deal simultaneously with letters and words, sentences, paragraphs, documents, ideas, and rhetorical goals.

Classical models of writing also distinguish several forms of representation that play critical roles in the cognition of composition:

- **Social and rhetorical elements** are among the most complex aspects of writing skill, requiring the writer to be consciously aware of and able explicitly to model personal interactions (specifically rhetorical transactions between author and audience) and to respond strategically to social and institutional expectations. While this aspect of writing is somewhat backgrounded in Hayes and Flower (1980), it is foregrounded in Bereiter and Scardamalia (1987) in the form of the rhetorical problem space and is a major theme in sociocultural accounts of the writing process, as discussed above.
• **Conceptual elements** (representations of knowledge and reasoning) are also critical in the classical cognitive models of writing. Bereiter and Scardamalia (1987) represent this aspect of writing skill as the *conceptual problem space*. By definition, the process of planning and evaluating writing must address its content, and as Hillocks (1987) and Graham and Perrin (2007) indicate, few things are more necessary to the writer than to have effective strategies for dealing with the subject matter that they wish to address.

• **Textual elements** (representations of document structure) also play a key role in all models of writing. From Hayes and Flower (1980) onward, document planning is largely a matter of deciding how to produce a coherent, well-structured text.

• **Verbal elements** (linguistic representations of sentences and the propositions they encode) are the essential targets of text production in every model of writing. While control of verbal elements is as much a part of oral language as writing, writing depends first and foremost upon fluency of verbal production (McCutchen, 2000).

• **Lexical/orthographic elements** (representations of how verbal units are instantiated in specific media such as written text) obviously also play a role in writing, though they are not in focus in the major cognitive accounts discussed above. (See Berninger 2005)

Therefore, we cannot be too wrong if we conceptualize skills relevant to writing by modes of thought (receptive, expressive, or reflective) and by types of cognitive representation (social, conceptual, textual, verbal, or orthographic). Figure 1 (p. 10) presents a visualization of writing skills that embodies this understanding. It is possible to interpret Figure 1 as a list of competencies or skills, viewed in an entirely cognitive mode, but we intend it to have a richer interpretation. It can be viewed as a kind of cross-section of cognitive processes likely to be taking place in close coordination during any act of writing. It can also be viewed as an inventory of the types of *activities* in which literate individuals commonly engage, and thus be viewed as part of the definition of activity systems relevant to writing.

Table 1 (p. 9) presents some of the cognitive elements that play a key role at each level of representation. The items listed under “Range of Activities and Skills” are intended to indicate aspects of conceptual structure that are shared across different modes of thinking. For instance, anyone who must deal with social situations must consider what people intend (intentionality), how they see things (perspective), and how they feel (affect). It does not matter whether they are doing so in order to interpret a text, create a document, or perform some other sort of thinking task. Similar points apply at each level: Whether one is engaged in interpretation (a typical reading focus), expression (a typical goal of writing) or thoughtful deliberation, the fundamental information to be represented remains the same. It is not the content that changes, but the kinds of cognitive processing to be performed on them. There is thus significant sharing of literacy skills across modalities.
In Figure 1 we present the kinds of cognitive activities needed to support skilled writing by providing a single action verb such as inquire, structure, or phrase, intended to name the activity we have in mind (and to indicate indirectly what skills are therefore critical). In the text that follows Figure 1, we elaborate each of these action verbs and provide a detailed description of each cell. Each layer of the model — social, conceptual, textual, verbal, and lexical/orthographic — covers a range of phenomena including those elements listed in Table 1, which helps to clarify the kinds of tasks and thought processes to which each mode of representation applies.

Cognitive models also highlight aspects of writing skill that depend upon more general features of cognition (Bransford, Brown, & Cocking, 1999). The role of short-term memory and long-term memory, for instance, can hardly be neglected (Kellogg, 1996, 1999, 2001). And yet accounts of the cognitive processes that support writing emphasize trade-offs between automated and strategic processes (McCutchen, 1988, 1996, 2006). Skilled writers combine efficient receptive and expressive skills with appropriate and effective reflective strategies. These considerations have significant implications for the assessment of writing, because they suggest that valid assessment will have to consider a very broad range of skills. A skilled writer will be able to engage in all of the activities listed in Figure 1, across a broad range of writing practices and genres, and will have effective strategies for coordinating those skills to achieve writing purposes.

<table>
<thead>
<tr>
<th>Level of Representation</th>
<th>Range of Activities and Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>Intentionality (genre, role, purpose)</td>
</tr>
<tr>
<td></td>
<td>Perspective (point of view, bias, voice)</td>
</tr>
<tr>
<td></td>
<td>Affect (stance, evaluation, tone)</td>
</tr>
<tr>
<td>Conceptual</td>
<td>Exploration (review, reflection, description)</td>
</tr>
<tr>
<td></td>
<td>Explication (generalization, definition, analysis)</td>
</tr>
<tr>
<td></td>
<td>Modeling (synthesis, application, hypothesis-formation, experimentation)</td>
</tr>
<tr>
<td></td>
<td>Judgment (evaluation, justification, criticism)</td>
</tr>
<tr>
<td>Textual</td>
<td>Document Structure (organization, rearrangement)</td>
</tr>
<tr>
<td></td>
<td>Cohesion (relevance, focus/emphasis, given/new, transitions, textual inference)</td>
</tr>
<tr>
<td></td>
<td>Development (topics, elaboration)</td>
</tr>
<tr>
<td>Verbal</td>
<td>Vocabulary (word familiarity, word choice, paraphrase)</td>
</tr>
<tr>
<td></td>
<td>Sentence Structure (sentence complexity, sentence variety, sentence combining)</td>
</tr>
<tr>
<td></td>
<td>Ambiguity/Figures of Speech (creative word use, semantic flexibility, clarification)</td>
</tr>
<tr>
<td>Lexical/Orthographic</td>
<td>Grammar &amp; Usage (standard English)</td>
</tr>
<tr>
<td></td>
<td>Spelling &amp; Mechanics (conventional written form)</td>
</tr>
<tr>
<td></td>
<td>Word-Formation (inflection, derivation, word families)</td>
</tr>
<tr>
<td></td>
<td>Code-Switching (register, dialect)</td>
</tr>
</tbody>
</table>

Table 1: Activity/Skill Categories Relevant to the Writing Process
The skills in Figure 1 could be presented as a simple table: three columns (deliberation, interpretation, and expression) by five rows (social modeling, conceptual reasoning, discourse modeling, verbal control, and print processing). We present it as a series of concentric circles in order to emphasize the following ideas:

- The skills interact and are closely intertwined.
- Skills nearer the center of the circle are central to literacy, but take their meaning and purpose from the outer circles, which provide them with an effective context.
- Skills from the same cognitive mode, such as expression, have a typical direction (e.g., from thought to text) but take their meaning only from their place in the entire circle of iterative, interactive thought processes that constitute literacy in its fullest sense.
We can elaborate on this understanding by defining the major headings in Figure 1 along the following lines:

A. Social Modeling

Social modeling is based upon the mental representation of other minds and social interactions among agents. It comprises a class of abilities that underlie the abilities people exercise when they understand social situations, interpret narratives, and formulate communicative goals. As such, it is closely connected to emotional intelligence.

When social modeling capacities are developed in a literate community in support of reading, writing, and verbal reasoning, the following skills emerge:

- **Sitate (Contextualization)** – *The ability to interpret or form representations of texts or other forms of communication in a rich, socially perceptive fashion that takes into account the motivations, perspectives, and attitudes of author, intended audience, and individuals referenced in the text.*

  This ability draws inferences from general models of human interaction, but is sensitive to all the specifics of context, including social, cultural, or historical situations and differences. Contextualization supports the ability to “read between the lines” and thus underlies indirect modes of communication such as irony and sarcasm.

- **Engage (Rhetorical command)** – *The ability to achieve complex social or emotional aims directed at a target audience in a disciplined and effective way using written expression.*

  Rhetorical command requires knowledge of a wide range of written genres and common literacy social practices and constitutes the ability to utilize this knowledge to create documents that achieve the writer’s purpose, including maintaining a voice and tone appropriate to that purpose.

- **Reflect (Situated Metacognition)** – *The ability to think and reflect explicitly on what one is doing across the full range of social practices associated with highly literate communities (such as critical interpretation of text, presentation of research results, and reasoned argumentation).*

  Deployment of this skill requires sensitivity to the social, cultural, and emotional transactions that such social practices may entail, including choice of register and genre to suit the social situation and rhetorical purpose, choice of stance, and sensitivity to multiple perspectives (including an awareness of bias and prejudice).
B. Conceptual Reasoning

Conceptual reasoning is based upon the kinds of mental representations that support categorization, logical inference, and causal reasoning. It is best suited to building, presenting, and evaluating general, decontextualized models. As such, it is closely related to the constructs of classical intelligence theory.

When conceptual reasoning capacities are developed in a literate community in support of reading, writing, and verbal reasoning, the following skills emerge:

- **Enrich (Focused Interpretation)** – The ability to selectively evaluate features of a text, such as its credibility or usefulness to achieve specific goals, to deeply integrate information from a text with prior knowledge, and thus to adapt one’s reading performance flexibly to achieve goal-specific requirements.

  This skill goes beyond the ability to build what might be termed a canonical situation model (see discussion of Discourse Modeling, p. 13), because it involves the focused application of reasoning and inference to build a textual representation rich enough to solve problems and make use of the text to achieve specific goals. At this level, especially when working across multiple texts, the reader calls upon skills such as skimming, scanning or closely reading a text to selectively evaluate whether it is credible or serves the reader’s purpose. At higher levels of this skill, readers are able to subject a text or a set of documents to close reading in which they go beyond literal meaning, integrate textual content deeply with prior knowledge, and fully engage the underlying ideas.

- **Conceptualize (Development of Ideas)** – The ability to develop ideas in an organized and systematic way such that they can be presented clearly and convincingly to someone who does not already understand them.

  The focus for this skill is the ability to organize and categorize complex ideas, particularly when they must be communicated without supporting context or prior understanding. It is the skill of making the structure of ideas explicit to oneself and thus potentially to others. Techniques such as concept maps and outlines represent one important class of strategies intended to support effective conceptualization, though a variety of other strategies and techniques are available to those who have achieved high performance levels in this skill.

- **Rethink (Critical Inquiry)** – The ability to evaluate, critique, and modify one’s own or another’s ideas using evidence and logical reasoning.

  The focus for this skill is the reflective and evaluative capacities that underlie effective inquiry, which entail strategic awareness and control of one’s own reasoning processes. Mastering critical inquiry thus involves the development of argument-building skills and acquisition of the metalanguage for rational discourse.
C. Discourse Modeling

Discourse modeling is based upon the ability to represent a document as structured content. It comprises the ability to model the propositional content of a text within a rhetorical frame. As such, it is concerned with the relationship between text structures and rhetorical purposes, whether from an author’s or reader’s perspective.

Discourse modeling is inextricable from the formation of genres within a literate community, and at high levels of literacy, the student will have acquired detailed mental models for a variety of genres, each embodying specific strategies for arranging text to achieve rhetorical goals.

- **Integrate (Discourse Comprehension)** – *The ability to read a document and build a coherent mental model of its content and structure.*

  By discourse integration we intend what current reading theories might refer to as the construction of a *situation model* — though we explicitly intend a *canonical* situation model — that is, a situation model that closely matches the author/publisher’s intended meaning and contains no information that would not be inferred automatically by a competent reader. Building a coherent situation model will draw upon social awareness, background knowledge, and inferencing skills and can go well beyond information directly available in the text, but is unlikely to require interpretive or creative leaps (unless the author is particularly inconsiderate or incoherent).

- **Structure (Organizational Control)** – *The ability to produce a written document that follows a plan, outline, or some other well-structured textual pattern or genre.*

  This skill requires at least a minimal knowledge of the purposes, formats, and intended audiences of various text genres and the literacy practices surrounding their use. In its simplest form, structural control can emerge through the use of textual templates that provide standard plans for producing texts within a specific genre. At higher levels of skill, performance is more flexible, and is more closely linked to communicative goals and conceptual reasoning about intended content.

- **Plan/Revise (Textual Design)** – *The ability to conceive a document structure that does not exist and plan that structure to serve a rhetorical purpose, or conversely, upon determining the structure of an existing document, to evaluate how well it organizes and presents its content and rework it accordingly.*

  Textual design is the reflective skill critically involved in planning and revision tasks, and entails the ability to form metacognitive representations of reading and writing processes. At high levels of skill, readers and writers can accurately discuss how well particular rhetorical structures achieve their purposes, and they are able to adjust and plan their own writing to increase its rhetorical effectiveness.
D. Verbal Control (Meaning and Form)

Verbal control is based upon the mapping between form and meaning established by the grammar and lexicon of a language. To have verbal control is to master the use of the language to encode and decode meaning.

In the first instance, verbal expression and verbal comprehension are based upon oral language skills. However, when these skills are specialized for literate discourse, they require greater awareness of and much more explicit control over the relationship between form and meaning than is usual in a conversational context.

- **Parse (Verbal Comprehension)** – *The ability to understand the explicit meaning of a text — that is, the ability to extract literal meaning from a sequence of sentences.*

  This skill supports the construction of a complete propositional model (or text-base), a literal understanding of the text that can be read off directly from the phrases and sentences that it contains. If a text is competently constructed, it will communicate the same propositions to any competent reader. This skill also involves routine inferences such as bridging inferences and calls upon more active forms of text interpretation only as required to achieve a coherent representation of the text. However, success at this level does not guarantee that readers will be able to build coherent situation models that integrate this textual content with what they already know.

- **Phrase (Verbal Expression)** – *The ability to express oneself clearly — that is, the ability to choose the right or appropriate words and phrasings to convey one’s intended conceptual meaning.*

  Being able to speak a language entails some reasonable fluency at producing words and phrases with appropriate meanings. But when this ability is deployed to produce written text, it often miscarries in characteristic ways. Written text must often be read without contextual support, by readers not personally known to the author, under circumstances very different from those that stimulated the original composition. Control of verbal expression entails the ability to choose grammatical structures and words that will communicate the intended propositions even in the absence of supporting context.

- **Edit (Formal Control)** – *The ability to identify locally and globally whether and how well word choice and phrasing convey the intended meaning clearly and accurately and then to come up with alternatives that work better in context.*

  The skills mobilized by an effective editor involve a reflective, metalinguistic representation of text that goes beyond editing behavior to support collaboration and communication in text production. Knowledge of grammar and grammatical terminology form part of this skill to the extent that they support metalinguistic awareness of how meaning is formally encoded by text.
E. Print Processing

Print processing skills represent text in formal, visual, and orthographic terms. They require knowledge of orthographic/spelling systems, prescriptive grammar rules, and typographical conventions (e.g., punctuation, indentation, directionality of text, etc.). Mastery of print processing skills presupposes code-switching abilities — that is, an understanding of the contexts in which Standard English is to be used in place of less formal or nonstandard forms of the language.

- **Decode (Reading Fluency)** – This skill comprises the ability to decode printed text and read it either aloud or silently with appropriate prosody — that is, the ability to convert characters on the page into mental representations of speech. This cognitive ability is inclusive of decoding (knowledge of sight-to-sound correspondences); orthographic conventions; and knowledge of how words, phrases, sentences, and print cues (e.g., punctuation, italics, etc.) are parsed to approximate speech equivalents (e.g., finding phrase boundaries; rising tone for questions, etc.) (Kuhn, Schwanenflugel, & Meisinger, 2010).

- **Transcribe (Text Production)** – This skill comprises the ability to take words and sentences and convert them into printed Standard English; that is, it constitutes the cognitive and motor abilities needed to produce words and sentences fluently and accurately in written form.

  This cognitive ability draws upon many of the same skills as reading fluency, but requires greater control of some elements (such as spelling and print conventions). It also entails mastery of motor routines, whether for handwriting or keyboarding, necessary to convert mental representations of text into physical signs.

- **Proofread (Orthographic Control)** – The ability to examine printed materials, identify nonstandard patterns and errors, and modify them so that they conform to the norms of Standard English grammar and orthography.

  This skill requires the ability to form metacognitive representations of text as formal objects and to inspect and manipulate their properties without interference from context and intended meaning. Like any reflective process, proofreading activities tend to interrupt or suspend automated routines such as fluent text production and reading for content. Mastery of print processing skills requires acquisition of effective strategies for coordinating fluent text production and comprehension with the type of metacognitive processing that underlies effective proofreading.
Implications

The picture we have just drawn places literacy skills in the context of a series of activity systems, or literate practices. The goal of writing instruction is to engage students in cognitive apprenticeships that enable them to coordinate literacy skills to participate in the same practices themselves. The goal of writing assessment is thus to measure student progress in developing literacy skills and applying them to writing tasks. If this is our goal, we cannot simply measure the final, written product. If students fail to write well, they may fail for many reasons, and we need to know why.

We have therefore worked out an approach to writing assessment that has the following characteristics:

- It explicitly links test design to a constructivist framework grounded in activity theory, in which the genres of writing are well-defined social and rhetorical constructs. Assessment design is structured to support internalization of norms for each genre.
- It explicitly grounds writing assessment design in a cognitive framework that captures the rich array of skills that skilled writers need to acquire.
- It makes use of assessments with a scaffolded, scenario-based structure that links genres to writing strategies, and provides a way to capture how well students have mastered key writing and thinking strategies that may not be measured effectively by the final written product.
- It provides for a sequence of assessments over the course of the year, thus supporting a richer understanding of the writing construct than is possible in single-shot essay assessments.
- The content of the tests, and the way they are sequenced, work together to create a testing experience that constitutes a learning experience in its own right.

This work is still in a relatively early stage. ETS is still engaged in developing tests, trying out ideas, and piloting them, and at the time of writing this paper, data from the first large-scale pilot are still being analyzed. Even in this admittedly early stage, however, the framework has important and interesting features. It tests more than one genre of writing. It places each genre into a well-defined social context, communicates the critical thinking expectations for each writing task, and models the kinds of procedures that novice writers need to learn in order to master each form. The designs we are experimenting with derive from one fundamental insight. We recognize that successful writers know more than rigid procedures: They are skilled practitioners who have mastered a broad variety of literacy skills, learned how to coordinate them effectively, and have thereby achieved the skills they need to participate in a literate community.
References Cited


