

## **rDOK Procedure for Classifying the Cognitive Complexity of English Language Art (ELA) Items**

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The RTD (Rigorous Test Development) project is an attempt to build a professionalized content development practice that focuses on individual item quality, particularly by leaning into the importance of validity throughout the content development process. It assumes that content development professionals develop professional judgment that can be raised, honed and calibrated by providing frameworks and clarifying expectations in ways that account for the constraints and demands of typical practice within test development, today. RTD is a conscious and deliberate attempt to respond to the disparity in status, training and shared knowledgebases between psychometrically oriented professionals and content development professionals.

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# RTD Approach DOK (ELA)

The white paper *An RTD Approach to Using Norman Webb's Depth of Knowledge (rDOK) Typology of Cognitive Complexity*<sup>1</sup> lays out a general approach to understanding rDOK (i.e., *revised Depth of Knowledge*) and general approaches for applying it to standards and for applying it to items. Across all the content areas, rDOK is a lateral extension of Norman Webb's original Depth of Knowledge (2002), and is *very* strongly grounded in that original approach. However, actual application to items varies a bit from content area to content area. This is simply a product of the nature of the different disciplines and the assessments of them, given the different the ways that DOK's conception of cognitive complexity appears in each content area. Hence, rDOK is built of the same principles, goals as assumptions across the content areas, and the work out somewhat differently because of deep differences between the content areas.

rDOK ELA differs from rDOK Math and rDOK science in two very important and fundamental ways. First, the ELA construct is has long been recognized as having two components (i.e., reading and writing) in a way that math and science do not. While next generation standards in math and science each present a set of *practices* – which admittedly some educators<sup>2</sup> think are the deepest heart of each content area – these are a relatively recent *formal* addition to more traditional sort of *content* or *DCI* (i.e., *disciplinary core idea*) standards that also appear in next generation standards. While large scale assessment's history of writing assessment is checkered, it is not short and (virtually) no one questions the importance of assessing *both* reading *and* writing.

Perhaps more importantly, there nothing in math or science that matches *the centrality of text* in ELA standards, instruction and assessment. The main ELA driver through the grade levels is that texts get more complex, subtle, nuanced and (usually) longer. The same standards persist across the grades, but their applications develop across the grades as grade-appropriate texts develop across the grades. Hence, CCSS (i.e., the Common Core State Standards) calls these *anchor standards*, then is explicit in laying out how each of them develops through the grades. Math and science have strands that develop across multiple years, yes. But in ELA, expectations for text—be it what students read or what students write— continues to increase every year, and each year the same set of anchor standards subtly develop to match the new demands and expectations of those developing texts.

Thus, in ELA it is not so much that the standards themselves demand more of students every grade as it is that the *texts* demand more. Certainly, the texts that students read ask more of students. At the same time, similarly more is expected of the texts that students write. Very much the same anchor standards, but applied with greater and greater levels of proficiency and skill.

This means that the range of cognitive complexity that might be recognized in potential applications of single ELA standard is even broader than in a single math or

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<sup>1</sup> Wine M. & Hoffman A. (2020). *RTD Approach to Using Norman Webb's Depth of Knowledge (rDOK) Typology of Cognitive Complexity* [White paper]. AleDev Research. DOI: 10.13140/RG.2.2.13393.61280

<sup>2</sup> Including us.

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science standard. The cognitive complexity of the specific task—of the specific application of the targeted cognition—starts with the demands of the text (i.e., the specific elements and/or traits of the text that relate to that standard). Of course, as explained below (and more fully in *An RTD Approach to rDOK*), cognitive complexity is a trait of *the cognitive path* that individual test takers take as they respond to items. rDOK recognizes the level of cognitive demand of their path on them, and it recognizes that as learners become more proficient, they are able to take cognitively simpler paths. That is, they develop simpler paths than the more labored and arduous paths of the less proficient.

### What rDOK ELA is *Not*

Cognitive complexity is a particular (and perhaps peculiar) concept, and it is easily conflated with other important ideas. Therefore, it is important to disentangle a handful of other important ideas from rDOK.

First, cognitive complexity is not *difficulty*. Difficulty is a particular technical term, in the context of assessment. It refers to an empirical measurement the share of test takers who respond to the item successfully. It is a measure of *results*, without any consideration of cognitive *process*. It does not look at validity or anything in the item itself. On the other hand, cognitive complexity is all about the process, all about students' and test takers' cognitive paths. Of course, there are things that can both make an item more difficult *and* prompt more complex cognitive paths, and things that both make an item less difficult and prompt less complex cognitive paths. Thus, cognitive complexity and difficulty *are* related. But they also not the same thing.

For example, consider the question, *With whom did Romeo say he was in love before he meant Juliet?* Like any question about relatively minor details in longer texts, this item can be very difficult without access to the text. That is, few students or test takers would respond to this question successfully. On the other hand, this simple task of remembering minor details is *not* cognitively complex. That is, one knows the answer or one does not. Simple recall—however difficult—is the prototypical example of *low* cognitive complexity.

Second, *stamina* is an important issue in both reading and writing. Reading stamina and writing stamina are built up over time, and lack of reading and/or writing stamina can seriously impact student performance. Nonetheless, stamina is *not* the same thing as cognitive complexity and longer works do not *necessarily* require greater cognitive complexity. Webb (2002) is clear over and over again that more or longer work is *not* itself sufficient to make for greater cognitive complexity. More of the same is simply more of the same. Of course, longer texts—be they read or written by students/test takers—*do* lead to greater cognitive complexity *when they demand more complex cognitive paths from students*.

For example, constructing a complete essay may call for more planning and deeper thinking about ideas and evidence than writing a single sentence or paragraph. On the other hand, five unplanned paragraphs that lack the kind of thinking and development of a strong essay may well simply be more of the same low-to-middling level of cognitive complexity.

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Third, cognitive complexity is not *a trait of the final product*. While a final product should certainly be evidence of particular cognition, it is not *proof*. A highly polished essay *may* be the result of deep thinking, deliberative planning and careful revision, but it may also just be the product of someone who is so well practiced and such a natural writer that it just spilled out of them without forethought. In fact, less proficient students or test takers may adopt *more* complex cognitive paths because they lack the shortcuts and ease that the more proficient wield. (rDOK’s emphasis on recognizing this dynamic is the most significant difference between Webb’s original DOK and rDOK. It is a product of RTD’s emphasis on recognizing the range of typical test takers and the centrality of Fairness to all of RTD.)

For example, a more proficient student/test taker may already know an advanced word, and simply rely on unconscious recall of its meaning. On the other hand, a less proficient student/test taker may try to think of cognates, look for prefixes, suffixes and/or a root in the word that can help them. They may try to think about possible meanings for the word based on contextual clues in a text. Even if they both arrive at the same answer, this less proficient one had to use more a more complex cognitive path to get there. Therefore, one should virtually never try to judge the cognitive complexity of students’/test takers’ work products—at least not in the context of on-demand assessment.

Fourth, cognitive complexity is not simply *grade level*. While the highest levels of cognitive complexity are not found at the lowest grades levels, they certainly are present by the middle grades. And the lowest levels of cognitive complexity remain throughout the entire grade span. More advanced (i.e., higher grade level) standards of applications of standards should not be viewed as necessarily more cognitively complex.

For example, expectations for grade-appropriate vocabulary increase through the grades, but the cognitive complexity of knowing those words at higher grades is no different than knowing those words at lower grades.

Last, DOK—be it wDOK (i.e., Webb’s original 2002 Depth of Knowledge) or rDOK—is not about the complexity or demands of the *entire* cognitive path. Rather, it is about the complexity of the application of the *targeted* cognition—of the specific KSAs (knowledge, skill and/or ability). Webb twice says that DOK cannot be well applied when, “the major cognitive demand is inadvertently placed and is other than the targeted...skill, concept, or application” (p. 3 and again on 9, with *very* minor rewording). As we explain more fully in *An RTD Approach to DOK*, cognitively simple applications of KSAs that are embedded in larger or more complex endeavors are *not* made more complex themselves, simply for their context.

### **rDOK Reading**

The central thrust of wDOK is *automaticity*, and that is maintained in rDOK. rDOK also used Webb’s original four levels. However, rDOK’s acknowledgement of variation among students/test takers and of the developing nature of text across grades complexifies explanation of a typology of cognitive complexity in reading.

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## rDOK 1 (Reading)

rDOK 1 applications are the most automatic applications of reading KSAs. For most large scale test takers, sound-symbol relationships, sight reading of simple words and understanding/recall of the literal information in simple sentences are all rDOK 1 applications. These area all done in such a rote and automatic fashion that they require virtually no intentional effort. Of course, younger students who are still learning foundational reading skills may not yet have sufficient proficiency with even these skills for rDOK 1 automaticity. Similarly, older English Language Learners and students with reading disabilities may not have sufficient automaticity for things KSAs to be applied at a DOK 1 level.

Table 1: rDOK Reading Basics

Level	Name	Description
rDOK 1	Rote/ Recall	Fluid use of foundational reading skills. Rote or automatic recognition for letters and words. Effortless understanding of what is presented in text. Simple recall or recognition of information previously read. Cognitive processes when text demands are below proficiency levels of the reader, or even at the same levels
rDOK 2	Tactical Thinking	Intentional engagement with contents of a text to consciously build understanding or ideas. Quickly overcoming stumbles with words, syntax or meaning. Deliberate construction of responses to questions about a text. Cognitive processes when text is at or somewhat above the proficiency levels of the reader.
rDOK 3	Strategic Thinking	Reading process with <i>prospective</i> (i.e., planning) and/or <i>retrospective</i> (i.e., substantive review) reflection. May include selection of text to read or planning a reading strategy. Revisiting of text for examples, evidence or patterns—or to <i>explore</i> ideas or interpretations.
DOK 4	Extended Thinking	Extended higher order thinking to build understanding and/or ideas about a range of texts – including multiple texts and/or a single extended text. Theories may be built and then tested against other texts or portions of a text.

However, as texts themselves get more complex and advanced—including increasing vocabulary, more complex sentence and paragraph structures, and more subtle, nuanced and/or complex ideas—these same KSAs may not always be DOK 1 applications. As students become more proficient readers, more and more words can be automatically



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recognized and sight read. They can become so proficient that they automatically and unconsciously determine some workable meaning of new words. Therefore, texts that are at or below a reader's proficiency level may be read principally with DOK 1 applications of reading KSAs, whereas texts that are beyond a reader's proficiency level often cannot be read so automatically. Vocabulary drawn from expert jargon or terminology in a particular field can cause virtually *any* reader to slip out of automatic reading mode (and into greater cognitive complexity). Or, consider the very first sentence of this paragraph. For multiple reasons, it pushes many sophisticated readers to stop and reread it much more consciously and carefully in order to fully understand it—again, without the automaticity of rDOK 1 reading.

Of course, simple recall of the contents of an understood text is an rDOK 1 application. Matching such information to a straightforward question is also an rDOK 1 application—though it may get more *difficult* as texts lengthen.

### **rDOK 2 (Reading)**

Level 2 is where the differences between Webb's original approach to DOK in ELA and rDOK's become most clear.

For example, Webb cites summarization as a Level 2 application, but the complexity of applications of this KSA depend upon the complexity of text. Some texts are so simple that summarization is truly just recitation of the simple facts of a relatively small number of sentences. This is certainly rDOK Level 1—and we suspect that Webb should have included it in his own Level 1. Other texts are sufficiently complex that one must make decisions about what to include and what to exclude when summarizing them—perhaps simply in real time when writing or telling the summary. This is certainly a DOK 2 application, both for wDOK and for rDOK. However, some texts are so complex that they may go beyond level 2. Consider works that contain numerous interconnected stories that are told in a non-chronological fashion (e.g., *Pulp Fiction*). Consider works with unreliable narrators or that are told from multiple perspectives (e.g., *As I Lay Dying*).

rDOK Level 2 is requires intentional engagement beyond the automaticity of Level 1. It requires some degree of *deliberative* processing, interpretation and/or decision-making. However, this rDOK 2 decision-making is focused on the immediate/tactical level. It is responsive to the needs of the moment—be they internally recognized or externally imposed. A reader who themselves realizes that they need to slow down and reread that problematic sentence above (i.e., at the bottom of the previous page)—or a portion of it—would have switched to an rDOK 2 application. Similarly, a reader who decided to go back to review when prompted to later in the paragraph would *also* have switched to rDOK 2. (On the other hand, a very proficient reader who unconsciously went back as much as needed and made it through the sentence without consciously even being aware of it would be engaged in a DOK 1 application.)

Inference is another major reading KSA whose cognitive complexity depends upon the interaction of text complexity and reading proficiency. The inference that a less

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proficient reader might have to deliberate to recognize may jump out as though it were explicit for a highly proficient reader. See this footnote<sup>3</sup> for an example (complete with spoiler) from a 1990's movie. In fact, most reading standards depend on the relationship between the demands of a text and proficiency of a reader to determine rDOK level.

When readers are reading to gain information, they are more likely to engage in this kind of deliberate interactions with a text than when reading for entertainment (i.e., particularly with lighter narrative texts). Note, however, that reading for information *can* include literary texts, such as when students are trying to complete many types of class assignments. That is, they may be looking for particular elements or contents in the text or looking for particular types of evidence or examples.

rDOK for reading is the same structure as rDOK for other content areas. As explained above, reading's dependence upon text and the nature of ELA standards (i.e., anchor standards that develop across the entire grade span—and beyond) make the application of rDOK even less deterministic in ELA than in the other content areas. That is, recognizing potential rDOK levels requires even more careful consideration in this content area than in others.

## **rDOK 3 (Reading)**

Level 3 entails what Webb calls *Strategic Thinking*, across various content areas. We apply that idea here in reading as the identifying trait of rDOK 3 cognitive paths. Strategic thinking requires looking forward to plan later efforts and/or reflecting back on earlier work to do something further with it. This kind of prospective or retrospective reflection is qualitatively different than the more tactical/in the moment deliberation of rDOK 2.

Perhaps the earliest *strategic* decision that a reader might make is in the selection of what to read. When a reader carefully considers and plans what text to select, they may be engaging in an rDOK 3 application. Certainly, emerging readers are taught a variety of strategies to use to find an appropriate text from classroom libraries. Readers who plan how they might approach, take notes on and review a dense informational text similarly are engaging in a kind prospective reflection that makes for Level 3 cognitive complexity.

Purpose is also important in the retrospective reflection of rDOK 3 reading. This kind of cognition is often tied to writing or otherwise preparing and developing an idea. Thinking through a text about major themes and building a strong case (i.e., a thesis and support for the thesis) is likely rDOK 3 reading, as it requires thinking beyond what is just immediately in front of reader. The reader may consider different parts of the text alongside each other to recognize commonalities or recurrences. Similarly, considering the *author's* purpose (as opposed to simply the reader thinking purposively) and how it shaped a work may entail thinking through various parts of text and perhaps considering them

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<sup>3</sup> The thesis advisor of one of us understood immediately that Dil in *The Crying Game* was trans, based on their adam's apple. His students variously inferred that along the way or even did not understand until it was made explicit in the film.



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alongside each other. Certainly, reviewing one's own thinking or interpretations of text in light of some new information, question or lens is rDOK 3 reading.

These ideas of planning, generalizing and developing ideas, and finding support for them in a text are part of Webb's own wDOK Level 3 for reading. Applying reading KSAs are not simply about what readers do in the flow of decoding and making sense of words and sentences. Rather, they are about the thinking and reasoning that readers do about what they have read—sometimes when still in the middle of a text and sometimes later. This is true both for wDOK and for rDOK. Where rDOK departs of wDOK is in recognizing that this level of deliberation in strategic thinking is prompted by the interaction of text (and its complexity) and reader (and their proficiency).

For example, a less knowledgeable reader might not understand what an author is getting at in their story about a widow Gerri (mother to Howard) when she marries Claud. However, a more knowledgeable reader might instantly recognize all the character, plot and thematic allusions to Hamlet. The less proficient reader may have to do more intentional searching and thinking about the parallels, whereas the more proficient reader starts to predict what is to come, without even trying. However, even the more proficient reader may engage in quite similar cognition when preparing to write or otherwise explain the connections between these two work, as selecting the *best* examples to support their argument usually calls for that level of deliberation. It is the level of deliberation—or even reflection—vs. automaticity that determines rDOK level.

### **rDOK 4 (Reading)**

Webb calls his DOK Level 4, *Extended Thinking*, and is explicitly clear it is *not* merely a product of how much *time* a task takes. Rather, there is a level of cognitive complexity that is only reached when tasks are sufficiently involved as to require it. His unmistakable central idea in his DOK 4 for reading is that it involved *multiple* texts. For him, there is no upper limit for the range that those texts may span, going so far as to cite “texts from different cultures.”

rDOK 4 differs from Webb's original conception in that Webb suggests that *any* comparison across multiple texts is Level 4 cognition, and rDOK does not. While multiple texts taken together most often *does* constitute greater reading complexity than a single text, that is not *necessarily* the case. A small number of sufficiently simple texts may not even require rDOK 3 cognition from a sufficiently proficient reader with particular tasks. For example, comparing how many servings two different recipes produce or how much more time a recipe may take to complete than another may be a simple rDOK2 (or even rDOK 1) task for a sufficiently experienced cook. Their experience and expertise with *this* kind of reading can make such determinations quite simple, for them. On the other hand, readers with less experience reading recipes may have to be much more deliberate to even figure out how to approach answering those questions.

Both wDOK and rDOK agree, “Higher order thinking is central... to Level 4” (Webb, 2002, p. 2). Extended analysis of text, synthesis of ideas and understandings across texts,

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applications of idea from on text to another and other higher order thinking are usually rDOK 4 cognition. The youngest readers usually do not yet engage in such extended thinking, and the frequencies of such work in the middle and upper grades varies from program to program. Perhaps the most deliberate form advanced reading—level 4 rDOK cognitive complexity for *any* reader—is the work of conducting a scholarly literature review. But rDOK 4 does not require *that* scope of work or thinking, likely not for any readers.

Like other content areas, rDOK 4 reading is simply not prompted in large scale standardized assessment.

### **rDOK Writing**

rDOK for writing is quite similar to rDOK for reading. It is based on automaticity at lower levels and increasing degrees of deliberation at the higher levels. As with reading, the writer’s proficiency interacts with the demands of writing the text to determine the level of cognition demand and complexity. In practice, writing might tend towards greater deliberation than reading, and therefore greater cognitive complexity in the applications of the various targeted cognition. Nonetheless, rDOK for writing is again quite similar to Webb’s original DOK for ELA. Unlike wDOK, rDOK hardly notes *at all* the length of the writing produced.

### **rDOK 1 (Writing)**

rDOK 1 applications are the most automatic applications of writing KSAs. For most takers of large scale tests, producing words, sentences and even paragraphs are DOK 1 applications. These are so often done in such a rote and automatic fashion that they require virtually no intentional effort. Of course, younger students who are still learning foundational writing skills maybe not have sufficient proficiency with even these skills for their application to have the automaticity of rDOK 1. Similarly, older English Language Learners and students with reading or writing disabilities may not have sufficient automaticity for these KSAs to be applied at rDOK Level 1.

Writing calls on rDOK 1 cognitive paths when the KSAs in question are being applied without conscious or deliberative thought. For most writers, copying a text is obviously rDOK 1. Simply writing down one’s immediate answer or response to question is similarly rDOK 1. Once mastered, using standard conventions (e.g., spelling, punctuation) is also rDOK 1. Stream of consciousness writing, most journal and/or diary writing is generally rDOK 1, as well. All of these examples are easy and automatic forms of writing.

More experienced writers may be able to generate what amounts essentially to rote or boilerplate text for them, even though less experienced writers would have to deliberate a bit to produce such a product. Again, when the writing and thinking behind it is virtually rote and/or automatic, it is rDOK 1 application of writing KSAs.<sup>4</sup>

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<sup>4</sup> For example, we (Wine & Hoffman) can easily write, “Valid items elicit evidence of the targeted cognition for the range of typical test takers.” Originally, years of thought and effort went into developing the thinking behind that

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Table 2: rDOK Writing Basics

Level	Name	Description
rDOK 1	Rote	Fluid use of foundational writing skills. Rote or automatic production of words, sentences, paragraphs. Stream of conscious writing. Writing without conscious or deliberative thought, regardless of the length or qualities of the product.
rDOK 2	Tactical Thinking	Intentional writing that includes moments of deliberation and decision-making, regardless of the length or qualities of the product. First drafts that are <i>not</i> based on careful pre-writing thinking/planning. Much (most?) professional writing and/or careful casual writing is produced through rDOK 2 cognition.
rDOK 3	Strategic Thinking	Writing process with <i>prospective</i> (i.e., planning) and/or <i>retrospective</i> (i.e., substantive revision) reflection through the process, regardless of the length, qualities or complexity of the final product.
DOK 4	Extended Thinking	Writing process that thoughtfully considers the contributions of the various layers, aspects, technique and elements of the piece and how they can be revised or improved to more cohesively improve its effectiveness at achieving its purpose(s) and/or goal(s).

## rDOK 2 (Writing)

Level 2 writing requires some amount of deliberation and intentionality, in the moment. It is tactical thinking in the application of skills and concepts of writing, as rDOK 2 was in reading.

Simple punctuation decisions—as opposed to automatic use of punctuation—may be rDOK 2. For example, comma usage is often debatable. Similarly, decisions about semicolons and various other questions of syntax, grammar and style are often rDOK 2 matters. When they require conscious deliberation of the writer, they are rDOK 2; when they are made without truly deliberative conscious thought, they are rDOK 1.

Beyond the early grades, the primary driver of cognitive complexity in producing writing is generally *not* in the mechanics of writing or even of language. Instead, cognitive complexity in writing is found in the *thinking* behind those sentences and paragraphs. Even choosing *just* the right word can be rDOK 2 cognition (e.g., *complexify*, on page 3, above). *Figuring out* what to say here and how to say it is rDOK 2 cognition/writing.

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sentence. We worked to make it more focused, and succinct—yet complete. When asked today what makes for high quality items, that very dense and thoughtful response no longer requires any thought at all to produce. In fact, one of us even has a macro in Microsoft Word to produce it!

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Regardless of the length of the product, when the deliberative thinking and resulting text are focused in the moment and on *this* spot in the text, it is rDOK 2 writing. This matches how wDOK 2 writing “requires some mental processing”, unlike wDOK 1. Webb points to “first draft writing or brief extemporaneous speaking.” Of course, much writing only has that first draft. rDOK 2 for writing is *very* similar to Webb’s DOK 2.

Again, the major difference between rDOK and wDOK is in rDOK’s recognition that more proficient writers can engage KSAs with greater skill even as they do so with greater automaticity/less deliberation than less proficient writers. A more proficient writer might easily go back and fix that earlier sentence or paragraph as part of producing a first draft, whereas the same kind of editing only happens for less proficient writers with the kind of intentionality of higher rDOK levels. That is, the more proficient writer might realize that they have contradicted an earlier paragraph or that something needs to be added above, now that the thinking in the current paragraph is coming out as it is. The less proficient writer might not recognize that in the moment and may need to review the text to make such changes (i.e., rDOK 3).

### **rDOK 3 (Writing)**

The *Strategic Thinking* of both wDOK 3 and of rDOK 3 requires looking forward to plan later efforts and/or reflecting back on earlier work to do something further with it. That is, planning the contents of a text and then drafting it, or drafting it and then revisiting it for substantive revision—or perhaps even planning, drafting *and* revising. ELA teachers easily recognize this as the writing *process*. Even a single paragraph can go through such a process. In our own work, the single sentence of a research question goes through such a process. That is, rDOK 3 is not determined by the *length* of a text or the complexity of its sentences. (Webb’s suggests that more complex sentences and/or the existence of *multiple* paragraphs might get something to DOK 3, but rDOK does *not*.)

Of course (and as mentioned above), the polish of a piece of writing does *not* prove whether it went through a rDOK 3 process. Highly proficient writers can generate quite clean text, even in their first draft. However, there are amounts of idea development and wielding of evidence that are *strongly* suggestive of rDOK 3 *reading* KSAs. This is where deliberative *reading* and thinking is not truly separable from deliberative thinking and *writing*. With next generation standards’ writing focus on *writing about text*, more cognitively complex reading and more cognitively complex writing can become difficult to separate. Certainly, rDOK 3 reading often blends right into rDOK 3 writing.

In such cases, the careful thinking of Level 3 reading can essentially be the planning of writing, and thereby a first draft that resulted from a planning process. That is, planning does not *have* to include developing an outline or other sort of graphic organizer of ideas. What matters is that the ideas are carefully thought about before the paragraphs are written. Alternatively, the original drafts of paragraphs may be revisited and reworked in light of the that rDOK 3 reading/thinking. No doubt, writing and revision of text often

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prompts revision of thinking, which can further prompt revision of text. Thus, rDOK 3 writing is not only an engine for improved text, but also an engine for improved *thinking*.

Again, the most proficient readers/writers may be able to produce a polished text full of idea development and evidence without that even that kind of process. But the greater the idea development and the better the evidence presented, the less likely that is.

### **rDOK 4 (Writing)**

As in all other areas, rDOK 4 for writing is about *extended thinking*. With writing, it is about extending that conscious deliberation across the many layers and elements of a piece, and considering how they cohesively contribute toward its effectiveness at its purposes.

That is, rDOK 4 writing can include consideration of voice, style, tone, organization, flow, idea, allusions/references, evidence, idea development, length and/or vocabulary in light of intended audience and intended purpose or effect. For some works—especially much poetry—it can include the musicality and rhythms of the *sounds* of the words. For longer pieces, it might include considering the various sort of repeated motifs—be they notable words, phrases and/or ideas—and how they can be traced from section to section. rDOK 4 writing takes into account that these different elements and layers must work in support of each other and looks for dissonance and/or opportunities to strengthen the piece by improving its cohesiveness.

Note that the application of writing KSAs do not reach Level 4 simply because the project including rDOK 4 *reading* cognitive paths. One can do an enormous amount of background and preparation work without engaging in the sufficiently complex *writing* deliberation. For example, one might do enormous amounts of work to research something—as conducting a scholarly literature review—and yet produce a slapdash write up of the results. Because the amount of thinking and deliberation before the first draft, it would be rDOK 3 writing (see above), but no quantity of thinking and planning constitutes rDOK 4 *writing*.

Like the other levels of cognitive complexity, rDOK 4 is *not* about the quality of the final product. Supremely gifted authors may sometimes be able to produce such cohesively effective and affecting works without high degrees of deliberation. Less gifted authors may at times think hard to consider the contributions of many layers and the cohesiveness of the larger text, and yet still fall short of producing a high effective or affecting work. It is the complexity of the cognitive path taken by the author that is at issue, rather than the quality of the final product. Regardless of the grade level of the writer or the effectiveness of the product, when the writer is thinking about how to make the different layers and elements work cohesively and better achieve the piece's purpose, there is Level 4 cognitive complexity.

And like other content areas, rDOK 4 is not prompted in large scale standardized assessment.



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## The Impact of Typing on Cognitive Complexity

Typing requires less physical effort and mental energy than writing things by hand. Even mediocre typing<sup>5</sup> is faster than writing by hand. For these reasons, typing generally enables greater cognitive complexity in writing, even for writers who do not suffer from dysgraphia. As the production of letters and words require less time and less mental focus, more of each are freed to consider the ideas that being expressed. For a given amount of time to produce a text, typers have more time to stop and deliberate when typing than hand writers<sup>6</sup>.

Furthermore, the use of even the most simple word processing capabilities also support greater cognitive complexity. Revision of handwritten work is incredibly laborious, requiring either writing out entire new drafts, lots of physically erasing work and/or huge amounts of blank space to be included in each non-final draft. On the other hand, word processors make addition or removal of words or sentences as easy in revision as they were originally. It makes the movement of sentences or other segments of text (i.e., cutting and pasting) far far easier than doing so on a physical page. There is more time for deliberation (i.e., rDOK 2) than when writing by hand and it is far easier (and faster) to make the alterations that make up substantive revision.

Of course, this assumes that the writer is at least as fast a typist as they are a hand writer—but that is actually quite a lower level of proficiency because typing is so superior in these ways to writing by hand. It also assumes some basic familiarity with the essentials of word processing features. Therefore, while this technology generally supports greater cognitive complexity, it does not *quite* universally do so. And it can be used merely to support lower cognitive complexity paths, either to allow merely *more* writing or to produce writing faster. That is, it cannot assure greater cognitive complexity any more than it can assure better texts.

## A Note on Poetry

Poetry is an important illustration of the importance of text length to the cognitive complexity of both reading and writing. That is, it entirely disproves that length meaningfully contributes to cognitive complexity, directly. Webb (2002) himself addressed this point four times with the exact same sentence to address each content area, “The extended time period is not a distinguishing factor if the required work is only repetitive and does not require applying significant conceptual understanding and higher-order thinking.” He clearly erred when suggesting that the length might factor directly into the cognitive complexity of reading or writing.

In fact, reading and writing poetry to can demand the highest levels of cognitive complexity. Poetry can contain such idea density, such deliberate craft decisions, so many

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<sup>5</sup> Obviously, typing requires some amount of practice and/or training to obtain even mediocre proficiency. Of course, handwriting does, as well. The greater speed obtained by writing in script requires training and practice.

<sup>6</sup> For those with among the worst motor disabilities, access to a computer (and word processor)—even with additional adaptive technologies—may still be more burdensome than hand writing is for most students.



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layers of technique and meaning that writing even a short poem is often as cognitively complex and demanding as much longer prose pieces. This is equally true of reading poems. And while these points are fairly obvious for poetry, in fact the line between prose and poetry can be quite indistinct. There is nothing magical about a lack of intentional line breaks prevents prose from containing the idea density, layers of technique and/or meaning of the best poetry.

Hence, genre or form do not determine the demands of writing or reading a text. Rather, they must be considered in light of a specific text or task—and the proficiencies of the range of expected readers and/or writers. And, to be sure, some poems are products of lower cognitive complexity and some reads of poems are done with limited effort at the kind of careful deliberation of even rDOK 2.

### **Reminder: The Scope of DOK Determinations**

As explained in *An RTD Approach to DOK*, the context of the application of KSAs does not determine their cognitive complexity.

For example, one *could* view an entire larger ELA assessment in which individual items appear to be a single large context that readers/test takers must strategize their way through as they encounter a variety of texts and apply skills with a range of cognitive complexity. This view would suggest that *every single item* would have a high cognitive complexity, so long as ANY aspect or element of the test taker's cognitive path(s) was a high rDOK application. But this rather destroys the usefulness and meaning of cognitive complexity as a tool for developing high quality items. Furthermore, it suggests that the cognitive complexity of an item is dependent upon which *other* items a test taker attempted or skipped—and even *how* they attempted some other items. Clearly, that would be ridiculous. And once one recognizes that, it is clear that the context of the entire assessment and the context of the passage set are not the correct scope to consider.

While one should look at variety of cognitive paths that the range of typical test takers might follow, it is the application of *the targeted cognition* whose complexity should be examined. Is *this* KSA being applied with high levels of automaticity? Is it being applied with high levels of deliberation? Surely, *some* skills are being applied with automaticity (e.g., letter and/or word recognition), but what about *this* one?

This can be particularly difficult to interpret and sort out with some kinds of tasks. Math items can be focused such that the targeted cognition is surely the most difficult, demanding and complex step towards a response, in part because of the scale of math problems. Building understanding of a text or generating a text often relies a broader array of KSAs, applied in concert—include a broader array of grade-level KSAs. Like science students' multiple potential entry-points to make sense of a science scenario and its underlying phenomenon, the role of text in ELA provides students/test takers with multiple paths. These different cognitive paths can variously lean on different KSAs, as readers/writers lean into their greater proficiencies and away from their lesser proficiencies.

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For example, essay writing tasks may call on KSAs found in a range of writing and language standards. When the writing task is in response to one or more reading passages, that same task likely calls on a range reading standards, as well. That single task may be aligned to more than a dozen different standards!

Nonetheless, there is great value in recognizing the cognitive complexity of the application of *the (or each) targeted cognition* in the cognitive paths prompted by an item—usually because it is all too easy to produce items that prompt less complex cognition than standards, teachers and parents want students to develop. Larger constructed response tasks (e.g., essays) or even constructed understandings (i.e., as with lengthy, dense and or layered text) are more authentic experiences for test takers, in part *because* they call on a variety of KSAs to be used in concert. Ideally, they would not allow test takers avoid more complex cognition.

### The Most Difficult Determinations

No single response or student’s work should be evaluated for cognitive complexity. The purpose of cognitive complexity determination in assessment is to try to offer test takers items that prompt the range of cognitive complexity found in the standards and that they their schooling has encouraged. This means looking at each item for the range of cognitive complexity with which various test takers may apply the targeted cognition when responding to the item.

This can sometimes be difficult to determine. The lines between the automaticity of rDOK 1 and the in-the-moment deliberation of rDOK 2 lack definitive clarity. How deliberate and conscious must it be to slip out of rote exhibition of skill or simple recall? Similarly, how much thinking does it *really* take for something to count as planning and not simply tactical thinking? We certainly counsel being careful *not* to inflate rDOK levels. One fundamental goal of recognizing cognitive complexity in assessment is to highlight disparities with the cognitive complexity prompted in rich and challenging authentic classroom work.

These kinds of determinations are matters for professional judgement and often require the kind of calibration work described in *An RTD Approach to Using Norman Webb’s Depth of Knowledge (rDOK) Typology of Cognitive Complexity*.

### Range of Test Takers

As explained repeatedly above, the cognitive complexity prompted by an item can vary greatly from test taker to test taker. Recognition of this fact is *foundational* to rDOK, and it is the root of the differences between rDOK and Webb’s original Depth of Knowledge typology. Those evaluating the cognitive complexity of items should be careful that they not simply evaluate *their own* paths through items—either as adults or based upon their projections of what their paths might have been at the appropriate age. Yes, they can make use of those evaluations, but they should also consciously consider the nature of both more and of less proficient test takers’ solution paths when determining the rDOK classifications for items.

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This is not to say that *every* item elicits a wide range of cognitive complexity. For example, many simple reading comprehension items are DOK 1 for virtually every test taker. And some writing tasks are so demanding that it is difficult to think that anyone in the range of typical writers could do them at a low level of cognitive complexity. However, even though rDOK 4 tasks exist, they do not appear on large scale standardized assessment. And even the most demanding tasks that *do* appear on such assessments quite often can be done at an rDOK 2—perhaps even rDOK 1—level by at least *some* within the range of typical test takers. Similarly, many tasks that most test takers can accomplish with high automaticity require at least some deliberation by *some* within the range of typical test takers.

Therefore, it is important to be especially careful when it appears that an item only prompts one level of cognitive complexity. Such items *do* exist, of course. But one should review and revisit one's think to be sure when coming to such a conclusion. Generally, items should be recognized as potentially prompting multiple level of cognitive complexity with the targeted cognition, each for a significant share of test takers.

### **Be Careful of Masquerading Items**

Honestly, the purpose of recognizing the cognitive complexity of items – and of the applications of the targeted cognition within test takers' solution paths – is to do a better job of including items that require test takers to engage in levels of cognitive complexity that are as great as those described or assumed in the standards. There is a well-known history of dumbing down or simplifying the appearance of standards on standardized tests. Usually, this is entirely unintentional and is simply a product of the various constraints of standardized tests and their development. Everyone wants items and assessments that well reflect the contents and complexity of the standards.

Unfortunately, standardized tests' frequent reliance on the multiple choice item format frequently can lead to unexpected cognitive complexity levels of items. For example, recognizing (or ruling out) a snippet of text that supports a claim is a lower rDOK level than reviewing the larger text to find appropriate evidence. Thus, many problems that would be rDOK levels 2 or 3 as constructed response items can prompt lower rDOK cognition – for at least some test takers – when presented as selected response items. Other tasks can actually call on *greater* cognitive complexity when presented in a multiple choice format, though this is far less common. For example, a test taker might quickly offer a correct answer (when it is a constructed response task), but feel the need to review each of the answer options more deliberately to rule out options that would not otherwise occur to them (when it is presented as multiple choice task).

Therefore, it is vital that items be evaluated *as presented*, which means thinking through how test takers will respond to them *as presented*. One must read through the whole item – including the answer options – and consider the impact of the particular answer options when classifying the various rDOK level of an item.

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## Poorly Written Items

Frankly, poorly written items add additional cognitive burdens on test takers. They can turn direct and simple questions into puzzles that require additional work simply to be understood. They can unintentionally push student down unproductive path, raising item difficulty and requiring unexpected levels of cognitive complexity to recover. Sometimes, ELA texts and items *should* require test takers to do additional work to make sense of the texts contents, but sometimes this is instead additional work that simply creates unnecessary barriers to test takers' exhibitions of their abilities.

There is no question that poorly written items present additional challenges to those who would classify their cognitive complexity. The work of correctly responding to such items can include more complex cognition than the aligned standard describes or assumes, but the DOK classification of the item must nonetheless focus on *the application of the targeted cognition*, as explained above.

RTD recognizes that the *Key KSAs* of an item are those KSAs that differentiate successful test takers from unsuccessful test takers. That is, the KSAs that successful test takers are able to use but that unsuccessful test takers are not. These are the KSAs that any item *actually* elicits evidence of. Poorly aligned items are those for which the *Key KSAs* are *not* part of the purported aligned standard.

This is inevitably frustrating to committed and caring professionals when they recognize that that has occurred. It can require item developers to revise the item to make it focus better on the *targeted cognition*. Obviously, the earlier this is caught, the better.

When doing the work of final or confirming rDOK classification, assessment professionals must assume that the test taker correctly understood the intent of the item, regardless of how well it was written. Otherwise, something other than their application of the targeted cognition becomes the object of their classification work.

## DOK is not Difficulty

Every single one of us sometimes finds ourself confusing item difficulty and DOK – be it Webb's original DOK or rDOK – at least for a moment. There are items whose difficulty (or ease) seems a little at odds with their rDOK level, and it can take a moment to overcome an initial judgment that was distracted by that fact. Deliberate care and thoughtfulness when engaging in this work can take care of that.

Speaking of common mistakes with rDOK classification, it is even easier to get caught up with the cognitive complexity of the larger cognitive path of successfully responding to the item. This is why we have repeated the reminder that rDOK classification must *focus just on the application of the targeted cognition* so many times, above.

## rDOK is *Not* Merely Text Complexity

rDOK is enormously dependent upon text complexity because the cognitive complexity of consuming or producing text is so much a function of the complexity of that text. We have tried to avoid using the *term* "text complexity" – mostly to avoid confusion

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with the idea of *cognitive complexity* – instead addressing “demands of the text.” But the fact is that we *are* talking about *text complexity*. However, rDOK is *not* merely about text complexity. rDOK is about the interaction between proficiencies and the relevant attributes of the text that contribute to text complexity.

Unfortunately, too often the powerful idea of text complexity or the demands or the *level* of a text is reduced to single unidimensional measure. For example, Lexiles and other measures offer some *single* number of each text. Others offer simple judgments of the grade level of a text. But, in fact, texts can vary in their degree of demands across different traits. Some may have more complex narrative structures while still using a relatively simpler vocabulary. Some might present relatively dense and complex ideas, while still using simpler sentence structures.<sup>7</sup> rDOK requires one to unpack shoehorned unidimensional constructs of text complexity to recognize the multiple dimension that contribute to text complexity.

This recognition is necessary because cognitive demands increase when the demands of specific attributes of a text rise to and beyond the specific capacities/ proficiencies of the student/test takers. rDOK recognizes that a single text can require different levels of cognitive complexity from the reader/writer, *depending on what KSAs (i.e., standards) are being asked of them*. rDOK is about standard-specific interactions of text demands and reader/writer proficiencies.

rDOK does not attempt to define or lay out more specific markers or standards for text complexity because rDOK exists in the context of state standards. As a framework, rDOK defers to the elements of reading and writing that state standards highlight as the most important to make sense of texts or with which to build meaningful texts. For most, they are there in CCSS’s various anchor standards.

Of course, this leaves the very old challenge of recognizing and determining when a text is appropriate for grade – be it in vocabulary, sentence structures, ideas, length, contents of ideas or any other attribute. ELA teachers face these questions constantly, particularly when faced with finding texts that are appropriate for individual students. What should they expect students to be able handle—expectations for reading and expectations for writing? While many envision a single national standard for such expectations, opinions can differ across states, across districts, between individual teachers. Furthermore, to the extent that there are different proficiency levels within a single grade in a single school, the question of what counts as *grade level* or *grade appropriate* remains quite complex for ELA educators.

rDOK is *not* easy to apply in ELA. It depends on the kind of professional knowledge and professional judgement of ELA educators about the level of demand that various aspects of texts place on students, through the lens of the grade level in question. It is not a checklist of keywords or even of standards—because that is not how ELA standards, ELA instruction or ELA learning works. rDOK is not merely text complexity. Rather, it depends

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<sup>7</sup> Clearly, we have a tendency to complex and dense ideas while using complex sentence structures and challenging vocabulary. At least we try to offer readers more support in our structures.



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on making use of subtle, nuanced and expert understanding of text complexity, applied to the text in question and in light of professional knowledge of capacities the students who will be taking the test.

To be anything else, it would require standard-specific guidance for each grade for how to recognize when a text is below, at, or perhaps above the proficiencies of students at that grade. That would comprise many hundreds of descriptions that have the effect of substituting *our* judgment about all of this for the judgement of professionals closer to *that* population of students.



# ELA DOK Classification Procedure

Each item should be evaluated against *each* rDOK level, thus allowing for each item to be classified with up to three recognized rDOK levels. This recognition that different solution paths can have different levels of cognitive complexity *does* stand in contrast with traditional consideration of cognitive complexity.

Because of the ways a) that anchor standards develop across grades and b) the cognitive complexity of their application varies with i) the relative sophistication of the demands of a text and ii) the relevant proficiencies of a test taker, there is no list of standards, skills or categories that explains or exemplifies the various rDOK levels. This makes cognitive complexity determination rather different in ELA than in other content areas.

## rDOK 1

- Some test takers\* may apply the targeted cognition when reading the relevant portion(s) of a text with ease and fluidity and offering or recognizing the answer to a question so automatically as to feel nearly by rote.
- Some test takers\* may apply the targeted cognition with automaticity when producing text without conscious deliberation as to contents, wording or presentation, generally producing it near the limit of how quickly they can produce text with the available tools. (Quality of the produced text is not a consideration)

## rDOK 2

- Some test takers\* may apply the targeted cognition when pausing or slowing to consciously deliberate when building understanding of the relevant portion(s) of a text or when pausing to consciously deliberate over the correct answer to a question about the text.
- Some test takers\* may apply the targeted cognition when pausing or slowing down in the production of text in order to consciously deliberate on or work out what ideas to present and/or how to present them.

## rDOK 3

- Some test takers\* use the targeted cognition when planning how to approach a text or when revisiting a now-familiar text with particular purpose(s).
- Some test takers\* use the targeted cognition when engaged in prewriting thinking or planning, and/or when *substantively* revising a draft.

\* “Some test takers” refers to a significant fraction of the test taking population, and not merely the conceivable existence of a handful of test takers.