

Partnership for the 21<sup>st</sup> Century

**Response to West Virginia  
Proposed Standards**

**FINAL 09/05/06**  
**P21 RESPONSE TO WEST VIRGINIA PROPOSED STANDARDS**

**OVERVIEW**

The West Virginia 21<sup>st</sup> Century Standards represent an exceptionally ambitious and impressive effort to align teaching and learning in the state's schools with the framework developed by the Partnership for 21<sup>st</sup> Century Skills. The content standards, specifically those developed for Science, Mathematics, and Social Studies, introduce a level of rigor and comprehensiveness that are likely to serve as model documents for the rest of the country. These standards respond well to the challenge issued by the National Governor's Association to ensure that all students complete rigorous and demanding course work in high school. Further, West Virginia has been particularly successful in not only incorporating 21<sup>st</sup> century content into core subjects, but embedding throughout the standards an emphasis on teaching and learning practices that emphasize analysis, interpretation, critical thinking, collaboration, and appropriate life skills, including leadership, self direction, and ethical behavior.

Across the disciplines the elementary standards set high expectations for the skills, concepts, and content that young children should master. Significantly, the middle grades documents continue this emphasis and lay the foundation for the increasingly challenging content that will be taught at the high school level. The high school math and science standards represent a mix of general level courses that will ensure that the majority of students leaving West Virginia's high schools exit with a solid foundation in core subject matter, and more demanding course work for those students ready and able to tackle challenging subject matter.

Our comments below center around two strands: one is more thought provoking and focused around the evolution of this 21<sup>st</sup> century standards project; the other is more specifically centered on the language in the standards you have proposed.

**THOUGHTS ON CRITICAL FACTORS FOR IMPLEMENTATION**

Like all standards, we recognize that West Virginia's 21<sup>st</sup> Century documents will help to set expectations for the state's educators. However, the extent to which they will be realized effectively in classrooms will depend on several critical factors.

**1. Professional Development**

Ongoing professional development for the state's teachers, particularly in those areas that represent major departures from the old standards framework, is essential. Designing and/or identifying professional development opportunities that genuinely incorporate 21<sup>st</sup> century skills and

content is no small task. The state may wish to create guiding materials for districts that delineate components of effective 21<sup>st</sup> century professional development programs. In addition, we are wondering how the state will align the standards documents with teacher certification requirements, and how schools of education will be drawn into this work. Ensuring that new teachers are being exposed to course and practicum experiences that provide the foundation for teaching 21<sup>st</sup> century skills is essential.

## **2. Materials and Resources**

Textbooks that teach both the content and skills outlined in the standards will need to be identified and further supplemented with digital resources that can help to extend and deepen this work. Districts should be encouraged to move their faculty away from a "single text model of instruction" toward instructional practices that draw on multiple resources and routinely make use of rich media. A school library media program that offers a full range of print and electronic resources is essential to these practices. School library media specialists skilled in identifying high-quality, 21<sup>st</sup> century instructional materials are a critical component of successful implementation. Identifying such high-quality, 21<sup>st</sup> century instructional materials is a critical component of successful implementation.

We applaud your intention for the state education department to use a range of 21<sup>st</sup> century tools to support teachers and school leaders as they move this work forward. One possibility under consideration is to build a web resource where lesson plans and best practices for teaching and learning the different skill and content areas can be posted. This has the potential to be a powerful way for educators to see how the standards translate into instructional practice, and to develop a more grounded understanding of the proficiency descriptors (i.e., mastery, novice, and distinguished) for different grade levels and subject areas. Discussion forums can further support teachers in talking about their rationales for rating students' work. The Council for Basic Education used this model effectively in their *Schools Around the World* project (<http://www.edc.org/CCT/saw2000/>). The program helped teachers to grapple with what constitutes "world class" standards and works by giving them the opportunity to examine and reflect upon their teaching practice via the analysis of student work.

## **3. Assessments**

Identifying existing or developing new assessments that measure the skills and competencies outlined in the standards is essential. Assessments, particularly the high stakes variety that populates today's education landscape, are powerful drivers of instructional practice. Aligning state assessments with the skills and content objectives specified in the standards documents will help to move teachers' practices toward 21<sup>st</sup> century learning. Furthermore, ensuring that the assessments used by the state have a healthy mix of open-ended questions and performance based tasks is the only way to genuinely determine whether West Virginia's students are

meeting proficiency in key 21<sup>st</sup> century skill and content areas. This will entail setting new requirements for test developers that explicitly call for different kinds of tests.

### **STANDARDS FOR THE 21<sup>ST</sup> CENTURY – CONSIDER A PHASED APPROACH:**

It is obvious that the state of West Virginia has embraced the challenge to create and support 21<sup>st</sup> century teaching and learning throughout the state. The Partnership for 21<sup>st</sup> Century Skills applauds this effort.

As we have reviewed these documents, we have come to the realization that it is nearly impossible to create truly visionary 21<sup>st</sup> century skills standards in one fell swoop. In saying this, it is important to stress that the documents proposed by West Virginia are exemplary at meeting the current need to integrate 21<sup>st</sup> century skills in core subjects. However when we discussed the eventual implications of this effort, it became clear to us that there is a need a long-term approach to creating standards that will continue to meet teacher and student needs in the 21<sup>st</sup> century.

As a result, we have begun to think about West Virginia’s current undertaking—the proposed standards documents—as a Phase 1 effort, which has by necessity focused on integrating 21<sup>st</sup> century skills into a traditional standards framework. We have included our Phase 1 comments later in this document.

At the same time, we sense an exciting opportunity to advocate for a second phase to continue this exemplary work. This continuation--Phase 2--could become part of an ongoing effort to migrate these standards to an innovative, groundbreaking 21<sup>st</sup> century format. The focus would be on creating standards documents that are more succinct, easily attainable and consistent with expectations about how much work can effectively be done in the classroom.

A Phase 2 approach to standards would take to heart the following principles:

1. *Consider carefully the role these standards documents should play over time.* The National Council of Teachers of Mathematics, the first professional organization to issue standards in 1988, suggests that role of standards is to:
  - a. Set forth a comprehensive and coherent set of learning goals for all students from kindergarten through grade 12 that will orient curricular, teaching, and assessment efforts during the next decade.
  - b. Serve as a resource for teachers, education leaders, and policymakers to use in examining and improving the quality of instructional programs.

- c. Guide the development of curriculum frameworks, assessments, and instructional materials.
- d. Stimulate ideas and ongoing conversations at the national, state or provincial, and local levels about how best to help students gain a deep understanding of important concepts.

This last point is particularly important to consider. Standards should be fodder for discussion. Education professionals – from classroom teachers to district level administrators – must be invited to think about and debate how standards can most effectively be acted upon at the local level. Educators need the opportunity and the time to make standard documents meaningful in their own terms.

2. *Articulate the vision.* Each of the standards documents should be framed by a vision of what comprises 21st century teaching and learning. This vision should describe the importance of “learning how to learn.” Essentially this would mean creating an introductory section for each standards document that articulates the importance of enabling students to engage in deep—rather than broad—exploration in ways that enhance key 21st century skills.

3. *Embrace the big ideas - consider that less is more.* When U.S. curricula are compared to that of other countries we are consistently criticized for being overly broad – “a mile wide and an inch deep” is the familiar adage. This is especially important advice to keep in mind when considering the skills students need to succeed in the 21<sup>st</sup> century. Learning how to problem solve, think critically, and communicate effectively requires that students engage deeply with content, debate ideas, and practice communicating what they are learning in multiple formats. For this to effectively take place in schools will require sufficient room in the curriculum to allow students the opportunity to engage in sustained inquiries. We think the West Virginia standards documents could benefit from a ‘less is more’ goal that would ensure each standard is focused on essential content and skills. There is growing momentum for this kind of standards work--the National Council of Teachers of Mathematics is set to release their “Curriculum Focal Points” on September 12, which are designed to enable this less-is-more approach.

In each subject area, for example, the standards should establish a developmental trajectory for student learning that focuses on the essential concepts or the major ideas that students are expected to have in hand at a particular grade level. Rather than creating a grade by grade rubric, for example, the standards could describe outcomes for particular age ranges—such as lower elementary (K-2), upper elementary (3-5), middle (6-8), and high school (9-12). Ideally, essential concepts should be culled from the research literature or

from national standards documents. The standards would provide teachers with a conceptual map for the foundational skills that students must have in hand so that the big ideas can be taught effectively. This approach would allow 21<sup>st</sup> century standards documents to fully embrace the concept of “less is more.” It is commonly accepted that, due to the overwhelming volume of available knowledge, students can’t possibly master all the content they need to know. However if 21<sup>st</sup> century standards documents can be anchored in foundational concepts, it becomes possible for teachers to imagine letting students “go deep” instead of broad because what they are learning is not a broad smattering of content knowledge, but deeper understanding of particular content and the ability to connect that content to the foundational concepts.

4. *Consider the importance of clearly defined performance descriptors.* More differentiation is needed across the performance descriptors. West Virginia may find that identifying three general categories of performance – below, meeting, and exceeding standards – is a strategy that could help to more clearly distinguish one category from the other.

We recognize that there are no models currently existing for this kind of transformation of state standards. We also understand that this Phase 2 endeavor is not something that West Virginia could or should be expected to accomplish in isolation. Partners should be identified to assist in convening national panels, comprised of experts, to help with this challenge. The Partnership would be very interested in pursuing a joint effort with West Virginia to identify and convene the best experts and strategic partners for such an exercise. One possibility we have discussed would be to work with West Virginia on a single core subject—such as Social Studies—and embark on a joint project to create a new 21<sup>st</sup> century model or framework for state standards.

## **SUMMARY OF RECOMMENDATIONS BY STANDARD**

The proposed West Virginia state standards are the result of an impressive and far-reaching effort to integrate 21<sup>st</sup> century skills into the state's classrooms. The Partnership for 21<sup>st</sup> century appreciates the opportunity to provide our feedback on the items below. A brief summary is given, with more specific commentary listed by standard on the subsequent pages.

- **Reading and English Language Arts**

- The term "effective media use" should be defined with greater specificity. Ideally, the standards should contain descriptors like the following: By the 4<sup>th</sup> grade students should understand the difference between using an image as evidence versus using an image as decoration.
- The term "research" should be defined more explicitly.
- The standard should specify across grade levels what skills and concepts students should master to be able to communicate effectively with multiple media formats. The model used by effective writing instructors to define the various components of writing skills may provide a useful example (see specific comments below).

- **Math and Science**

- It is critical that these standards are developmentally appropriate across grades and subjects. Subject matter, concepts, and skills, particularly for young children, needs to be manageable. The early elementary Math and Science standards should be examined to ensure they are not setting expectations that are beyond young children's competencies.
- Ensure that the emphasis on "real-world" applications, particularly in mathematics, emphasizes non-trivial engagement with concepts and skills. It may be worthwhile for West Virginia to examine released items from the PISA assessments to determine how this examination asks students to apply mathematical concepts to problem solving situations.
- Improve the representation of creativity, innovation and media literacy in the descriptors and objectives.
- For Science, ensure that both inquiry and design are fully represented in the descriptors and objectives.

- **Social Studies**

- Because these standards incorporate multiple content areas, it may be useful to consider the 'less is more' strategy. Think about ways the standard might allow for the range of content and skills to be taught deeply.
- The performance descriptors need to identify concepts and skills that genuinely differentiate performance levels. It is not clear,

for example, what makes the skills of 'recognizing' and 'identifying' substantively different from each other.

- Improve the representation of creativity, collaboration, innovation and media literacy in the descriptors and objectives.

- **Learning Skills and Technology Tools**

- We encourage West Virginia to integrate the two components (learning skills and technology tools) into one category, rather than keeping them separate.
- We encourage the use of the ETS ICT Literacy framework as a developmental model for student ICT competencies: access, manage, integrate, evaluate, generate, and communicate.
- Using this approach, an ideal ICT standards document would chart a path for early elementary (k-2), upper elementary (3-5), middle (6-8), and high school (9-12) that illustrates the ways in which technology can be used to support these cognitive skills for different content domains.

#### **DETAILED COMMENTS BY STANDARD:**

<b>Policy 2520.1 -- 21st Century Reading and English Language Arts Content Standards and Objectives for West Virginia Schools</b>
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The three major strands described in these standards – reading; writing; listening, speaking, and media literacy – are a powerful way to conceptualize the domain. Placing media literacy skills with listening and speaking acknowledges the critical 21<sup>st</sup> century skill of being able to use technologies to communicate effectively and persuasively.

We would recommend, however, that the document define the term "research" more specifically, so that it can be linked to specific objectives more clearly. Also, the performance descriptor for RLA.S.5.2 Distinguished level gives *Reader's Guide* as an example of a source of information along with "newspapers, electronic media." The print *Reader's Guide* may be an outdated reference as most schools use it in addition to other electronic periodical databases. (This is repeated in the Above Mastery Level for RLA.PD.6.2) Also, consider including a research component in Journalism, which currently does not have a reference to research, a critical skill for any journalist.

We would also recommend that more attention be given to media literacy in the performance descriptors and objectives. The Partnership defines media literacy as follows: analyze, access, manage, integrate, evaluate and create information in a variety of forms and media. In the Speaking, Listening, Media Literacy strand, for example, the focus is more on understanding/communicating [Did you understand what he said? Can you

produce a PowerPoint presentation?] and less on critically examining how media messages are put together, the techniques used, the intended effects, etc. [why did she choose this picture or that music? Why is the PowerPoint slide constructed that way?] Media literacy is also missing from the journalism courses, where it could have great impact not only in helping journalism students understand audience effects but also in helping them create more effective stories.

Along these lines, teachers are very likely to need more guidance as to what constitutes *effective* uses of technologies for communication purposes. The following may be helpful in aiding West Virginia in delineating what some of the critical aspects of effective communication with digital media might look like, and can be further used as guidance to help the state consider ways to support media and digital literacy skills through professional development programs and instructional resources.

In early elementary school, simply being able to use technologies to narrate a story, for example, is “good enough.” Developmentally, it is the most we can expect of children and software like Kid Pix or other kinds of easy-to-use authoring programs enable young children to do this well and creatively. However, older children are capable of communicating with digital media in increasingly sophisticated ways and it is at the upper elementary, middle, and high school levels that it is essential to provide teachers and students with guidance on what effective multimedia communication strategies look like.

One strategy West Virginia may find useful could be to utilize a framework that helps teachers to think about media literacy in a language that is meaningful to them. One way to do this is to draw the connection between media literacy and traditional written literacy. It then becomes possible to describe unfamiliar media or digital skills using terms and concepts that are not only familiar, but also well understood by teachers.

When teaching and assessing writing, for example, teachers address three general areas of literacy skill – technical skill, compositional skill, and style – as well as content. When grading student work – a persuasive essay, for example – a teacher attends to each of these areas. The most basic area is **technical**. Has the student employed proper spelling, capitalization, and punctuation? Are the paragraphs properly indented, and have the basics of grammar been observed? At the same time, mastery of these techniques is meaningless unless students have the **compositional** skill to use words and punctuation to build sentences and paragraphs that convey their meaning clearly to the reader. Is the prose intelligible? Can the reader derive the necessary information from the text? Attending to the elements of **style** is a subtler endeavor, but at least as important; younger students may only have to report facts clearly, but more advanced students must communicate their ideas and argue their points of view persuasively. To do so, they must

correctly apply more sophisticated techniques, such as establishing a consistent tone, using irony or satire, and employing rhetorical devices such as foreshadowing, allusion, or metaphor. Finally, the **content** of the essay, the correctness of facts, is obviously important to the teacher. No one of these areas can be ignored when teaching and assessing students' writing, and teachers expect to look at all of these areas simultaneously without difficulty.

While content remains consistent in any medium, the literacy skills required vary from medium to medium. Like writing, the effective use of technology can be organized into specific skill areas that correspond to the elements of standard literacy: Digital Skill, Media & Meaning, Point of View, and Audience. The box below shows how these media skills correspond to the core elements of standard literacy.

Within each skill area, the goal is to provide teachers with concrete ideas about what skills students need to master, and how those skills can be taught and evaluated.

<u>Parallel Skills: Written &amp; Digital Communication</u>		
<b>Skill Area</b>	<b>Written</b>	<b>Digital</b>
<b>Technical skills:</b> Having the technical facility to make "readable" products.	Penmanship, punctuation, vocabulary, syntax, basic grammar.	"Digital Skill": Opening and saving files, inserting text, images or sound, formatting and editing documents, navigating software.
<b>Compositional skills:</b> Being able to send clear messages that communicate content.	Complex sentence structure, paragraph structure (topic sentence), outlining, descriptive language.	"Media & Meaning" Using all media elements – visuals, sounds, text, layout, animation, etc. – so that each contains and conveys information.
<b>Style and Rhetoric:</b> Being able to construct a persuasive argument that is tailored to a particular audience.	Essay writing, persuasive writing, creative writing, analytical writing, report writing, use of different styles (journalistic, satirical, etc.), rhetorical devices.	"Point of View" & "Audience" Using all media elements – visuals, sounds, text, layout, animation, etc. – so that each supports and strengthens an argument. Using media elements to build a tone or authorial voice. Making multimedia products that anticipate and respond to the questions and biases of a particular audience.

Drawing a parallel between written literacy and media or digital literacy allows teacher to work from a familiar context. Teachers already know a great deal about teaching concepts for written communication – how to help students create a coherent sentence, paragraph, or story; to construct a persuasive argument; to use descriptive language, metaphor, and tone; and, to consider a particular audience when crafting a piece of writing. These skills are the meat of writing curriculum in any classroom. What many teachers may not yet know is how to teach these concepts as they relate to technology. How do the mechanics of constructing an argument change when students have more to consider than word choice and paragraph structure, and must now think about what images to use, what graphs or animation, what sound, and what links to other resources to use? How can a student transpose an argument she has presented in a five-paragraph essay to a nonlinear interactive website – in a way that exploits the unique qualities interactivity can bring to a persuasive piece? Finally, how can students’ engagement with these kinds of media or digital literacy skills actually deepen their interaction with content?

These are issues that most teachers have not had the time or training to consider, and in the absence of that time or training, the unique qualities of technology tools often become mere distractions: sound, pictures, animation, interactivity. Unless these are used critically, they tend to be add-ons that detract from students’ focus on content. Just think of typical 5<sup>th</sup> graders PowerPoint presentation that might be full of bells and whistles, but falls far short when it comes to using the capabilities of the media to more effectively communicate ideas. Teachers need meaningful support to assist them in understanding that these elements of multimedia tools need not be distractions – any more than adjectives, metaphors, or stylistic techniques are necessarily distractions to good writing. Teachers and their students should be able to distinguish when an image or graphic is merely decorative from when it is used to offer evidence of a particular phenomenon. Similarly, teachers and students should be able to discern when sounds clarify and/or enhance the meaning of a presentation and when they are simply distracters.

To the extent that West Virginia’s 21<sup>st</sup> Century Reading and ELA Standards can define *effective media use* with greater specificity, the more likely it will be that WV students will lead the country when it comes to communicating purposefully with multiple media. Ideally, the standards should contain descriptors like the following: By the 4<sup>th</sup> grade students should understand the difference between using an image as evidence versus using an image as decoration.

We think that West Virginia educators might find the following resources helpful. See:

[www.standards.dfes.gov.uk/schemes2/citizenship/cit09/?view=get](http://www.standards.dfes.gov.uk/schemes2/citizenship/cit09/?view=get)  
[www.frankwbaker.com](http://www.frankwbaker.com)

[www.frankwbaker.com/texas.htm](http://www.frankwbaker.com/texas.htm)

**Policy 2520.2 -- 21st Century Mathematics Content Standards and Objectives for West Virginia Schools**

West Virginia's proposed math standards present a challenging trajectory for mathematics learning. The work of developmental psychologists like Herb Ginsburg have shown that young children, in particular, are capable of more complex mathematical thinking and reasoning than our curricula typically make room for. In the course of play young children routinely engage in the following kinds of mathematical behaviors:

- Through block play they work with **patterns, shapes**, and make use of **symmetry**;
- **Enumeration** – young children talk about numbers, "I have 3..."
- **Magnitude** comparison – "I have more than you..."
- **Classification** – putting things like blocks away by size.
- **Dynamics** – interested in how things change "what happens when I take one away?"
- **Spatial relations**. "My doll is under the bed."

The WV elementary math standards emphasize all of these skills, and do so in ways that set high expectations for teachers and students. Although developmental psychologists have taught us that young children are capable of quite sophisticated mathematics, this same research also underscores that young children's learning of mathematical procedures and concepts can happen with fair amounts of variation. Not all Kindergarteners will be able to count to 100 or even to 20, and counting backwards is skill that many children at age 5 may not be able to perform. The danger of outlining these kinds of specific benchmarks, particularly for young children, is that they become prescriptive and push teachers toward identifying deficits and labeling some children as competent and others as not. It is thus critical to ensure that the standards that are being set are, indeed, developmentally appropriate.

The state may want to consider having this set of standards documents reviewed by someone like Dr. Herb Ginsburg, who is one of the leading experts on the development of mathematical understandings in young children.

The middle grades math standards also place an emphasis on challenging content, and problem solving is a key strategy used to engage students in the application and practice of key mathematical concepts. This is appropriate and important and will help prepare students for the demands of more sophisticated high school mathematics courses.

The high school math standards represent a mix of general level courses that will ensure that the majority of students leaving West Virginia's high schools exit with a solid foundation in core subject matter, and more demanding course work for those students ready and able to tackle challenging subject matter.

The standards could do more, however, to include media literacy. Objectives and performance descriptors could be included that deal with the visual representation of information (graphs, charts etc.) and the ability of technology to make simulations, visualizations and manipulations. In today's world, so much information in the media is numerical and much of it is manipulated to appear as or say something it really isn't/doesn't. This is an important reason and opportunity to stress media literacy.

Additionally, the standard could do more to incorporate elements of innovation and creativity throughout.

The math standards document stresses the application of mathematical ideas to real world situations and problems consistently. It is critical that the emphasis on real world be done in a way that is genuinely rigorous. A reanalysis of the TIMSS and PISA data on students' mathematics performance makes the following important observation about U.S. mathematics teaching practices:

*Teachers in the United States are likely to devote more instructional time to making mathematics relevant to students. Two-thirds of U.S. teachers include the relevance of mathematics as a topic in at least half their classes, which is nearly double the average percentage of classes that the 11 comparison countries devote to tying mathematics instruction to students' daily lives. This evidence, along with the evidence that data and statistics are emphasized in the United States, suggests that the United States must do more than simply increase its emphasis on real-world mathematics problems as a way to improve its international standings, at least not in the way real-world applications are currently introduced in the classroom. It is relevant that PISA's real-world applications stress students' understanding and application of mathematics concepts (e.g., high percentage of open-ended problems) and not mechanical solutions to simple mathematics problems presented in a real-world context. (Ginsburg, Cooke, Leinwand, Noell, & Pollock, November 2005)*

Therefore it will be essential for West Virginia to identify instructional materials that support the development of students' conceptual understanding and enable students to demonstrate understanding through robust problem-solving activities. It would be worthwhile for West Virginia to examine released items from the PISA assessments to determine how this examine asks students to apply mathematical concepts to problem solving situations.

### **Policy 2520.3 – 21<sup>st</sup> Century Science Content Standards and Objectives for West Virginia Schools**

These science standards, throughout the grade levels, place an important emphasis on students engaging with scientific methodology by requiring that at least 50% of instructional time be devoted to hands-on activities and laboratory based research projects. This is a bold step that will require teachers to substantially alter how they teach science. At the elementary level students are expected, for example, to understand science as a multifaceted discipline that includes the fields of biology, chemistry, physics, earth and space sciences. Throughout the standards the importance of science as an historical discipline – one that is constantly evolving – is emphasized. Analytic, problem-solving and critical thinking skills are emphasized in ways that dramatically shift the teaching of science as “fact” to science as inquiry, discovery, refinement and critique. One point to note, however, is the relative lack of emphasis on “design” in the science standard. We would recommend that both inquiry and design be integrated throughout the document. Overall, the science standards appear to do an effective job of communicating that the way to help students learn rigorous content is to engage them in using a wide range of analytic learning strategies.

There are two additional issues to keep in mind. The first is ensuring that there is an appropriate balance between depth and breadth. As mentioned above, it appears that West Virginia is attempting to manage this concern through the use of a spiraling, inquiry-based approach to the study of the major scientific disciplines. Research, however, points to the fact that the majority of U.S. science curricula currently in use tend to cover multiple topics, but in superficial ways. Countries such as Singapore that routinely outperform the U.S. on international assessments tend to use materials that support students’ deep exploration of a narrower range of content. Based on what we know about how students learn, there is good reason to believe that an approach that enables students to engage in deep inquiry is more likely to result in the development of 21<sup>st</sup> century skills and core content that can, in turn, be applied to other scientific domains (See John Bransford’s *How People Learn*).

Second, West Virginia may find it helpful to have the elementary standards reviewed by a developmental specialist with an expertise in how young children learn scientific concepts. Ensuring that these standards support the most recent research in developmental psychology and cognitive science is critical to their success. We would recommend getting in touch with Dr. Leona Schauble at Vanderbilt University.

Finally, ensuring an adequate representation of creativity, innovation and media literacy in the descriptors and objectives is critical for the success of this standard.

**Policy 2520.4 -- 21st Century Social Studies Content Standards and Objectives for West Virginia Schools**

Of all of the 21<sup>st</sup> century standards documents, social studies is most ambitious in scope – incorporating citizenship, civics/government, economics, geography, history, and reading.

While the scope of this document is quite impressive, we see many opportunities for media literacy to be better represented in this document. For example, the term “media” appears in the 12<sup>th</sup> Grade, but not in the lower grades. We believe media literacy provides an essential foundation at every grade level that can lead to:

- Explaining how songs, symbols and slogans demonstrate freedom of expression and role of protest in a democracy
- Comparing, analyzing and interpreting historical data
- Researching and describing how special interest groups influence government and the law-making process in West Virginia (e.g., West Virginia Education Association, United Mine Workers, Division of Tourism).
- Reading and discussing the literature, art and cartoons of a period
- Understanding how citizens can monitor and influence government

Additionally, while there is discussion of “participatory skills” (SS.S.1.1) there is very little mention of collaboration as a device for participatory development or project implementation. Collaboration skills are fundamental 21st century skills and should be integrated wherever possible.

Another item to consider is the attention to research in the standard. While research is well integrated, some of the research tasks focus on lower level thinking skills, e.g. “research the lives of famous Americans, customs and traditions using various forms a literature” (SS.O.3.5.6). If possible, the standard should include slightly higher-level research questions, along with the need to demonstrate understanding of ethical use of information (this extends beyond simply citing a source correctly, but also noting which sources are worthwhile.)

In addition, this was a domain where performance descriptors sometimes slipped into curriculum activities. In the 8<sup>th</sup> grade economics standard, for example, the ‘above mastery’ descriptor delineates a curriculum activity (i.e., an economic plan for West Virginia) rather than concepts and skills students should master.

Greater clarity and differentiation is needed for performance descriptors. They descriptors--evaluate, classify, recognize, identify, list--are not necessarily distinct enough to be meaningful. For example, what is the difference between recognizing and identifying?

Finally, it is critical to review the objectives and performance descriptors to ensure that creativity and innovation are integrated wherever possible.

**Policy 2520.14 -- 21st Century Learning Skills and Technology Tools Content Standard for West Virginia Schools**

This proposed standard raised the most questions in our review. In particular, we question whether it is advisable to create what appear to be two separate categories: learning skills objectives and technology tools objectives. Separating these two areas leads to objectives that seem in some cases to be watered down, and/or lacking context. Combining these two areas into a more robust and comprehensive standard would be advisable.

In the research reports that ETS has written about ICT Literacy they describe the cognitive components of ICT use, which, in turn, rest on basic or foundational technology skills. Foundational technology skills include things like:

- Use a mouse to move, point, and click
- Scroll
- Type
- Drag and drop information
- Copy and paste
- Use a pull down menu
- Use a drop down menu

This work further specifies what foundational skills look like in the three main technology environments (Web, email or instant messaging, and stand-alone applications)

Web:

- Use and embedded link
- Navigate back to a previous page
- Use a URL to go to a new site

Email/IM:

- Open a message
- Forward, enter an address and send

Stand-alone applications:

- Open

- Save
- Close files.

Students must have these foundational skills in order to be able to perform the more cognitively demand requirements that include using ICT to: access, manage, integrate, evaluate, generate, and communicate. These cognitive skills are defined as follows:

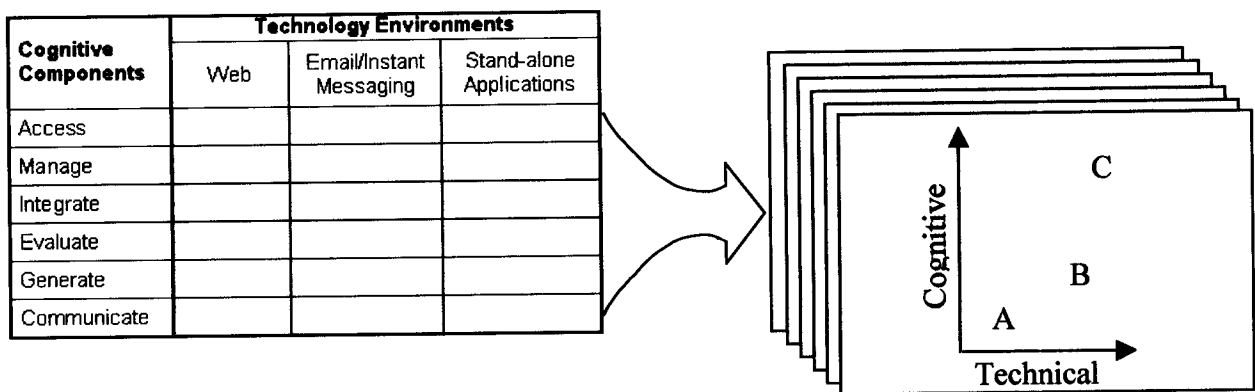
### ETS - Cognitive Components, Their Definitions and Sample Tasks

Cognitive Component	Definition	Sample Tasks
Access	Knowing how to locate and retrieve information	Open a file, e-mail message or application Access information using a browser Navigate within a Web site to locate information using links and hypertext
Manage	Organizing information into existing classification schemes	Manage email messages (file into locations, change locations) Organize and paste information into a table or chart Enter information into a database or online form
Integrate	Interpreting, summarizing, comparing & contrasting information using similar or different forms of representation	Contrast information presented in a video clip and graph Read several Web sites to compare and summarize information Interpret information in an online database to identify trends
Evaluate	Reflecting on and making judgments concerning the quality, relevance, usefulness or efficiency of information/knowledge	Evaluate several Web sites in terms of reliability and timeliness of information Evaluate information presented in several emails to determine relevance to a discussion group topic
Generate	Adapting, applying, designing, inventing, representing or authoring information	Write a brief e-mail message Develop a flyer using presentation software Transform one representation to another, for instance a table to a graph

Communicate	Conveying information and knowledge to various individuals and/or groups	Send a message (e-mail, instant message) Contribute to an online discussion or Weblog Create a presentation for a specified audience
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Tasks, of course, vary in the degree to which they are technically and cognitively challenging. Another ETS diagram illustrates this concept:

### **ETS - Cognitive and Technical Dimensions of Computer Literacy Tasks**



In this figure "A" represents a task that requires low levels of technical skills and low levels of cognitive skill. Opening an email message might be such a task. "B" is a task that requires more technical skill, for example knowing how to run a PowerPoint presentation, including making the embedded video clips play, but knowing little about the relationship between the images in the presentation and the subject matter, is an example of a task that is more technically demanding than cognitively challenging. "C" describes a task that have high levels of technical and cognitive demand--for example, knowing how to create a persuasive presentation that uses sound, images, and text in ways that clearly strengthen the argument.

We recommend that the West Virginia standards incorporate the ICT framework provided by ETS. Specifically:

- Integrate what are currently defined as learning skills objectives into a category that reflects the cognitive components in the ETS definition: access, manage, integrate, evaluate, generate, and communicate. We would suggest WV rename this category "ICT Literacy Objectives." Ideally, these objectives should reference examples that are drawn from the use of ICT in different content areas.

- Create a category called Foundational Technology Objectives or Skills. This category could specify the basic technical skills and understandings that students need to have in order to be able to meet the more cognitively demanding ICT Literacy Objectives.
- Make clear in the overview to the standards document that the goal of these standards is to enable students to use technologies in ways that enable them to think critically, analyze information, comprehend new ideas, communicate, collaborate, solve problems, and make decisions. These are the skills that are essential in today's knowledge economy.

### **West Virginia Technology Comprehensive Final Report:**

This document, based on state wide research and analysis, is the implementation proposal that will enable West Virginia to realize State Board Policy 2520: the learning skills and technology standards for preK-12 students. Like all of West Virginia's work that we have reviewed, this is an ambitious, comprehensive and far-reaching plan. The following suggestions are intended to help the state ensure that the technology plan works at every opportunity to ensure it is supporting WV's commitment to 21<sup>st</sup> century skills.

- Task 2: Access to virtual courses is a major focus of the plan. WV should ensure that these courses are aligned with the 21<sup>st</sup> century standards documents.
- Task 3: Online professional development for ensuring highly qualified teachers is a priority. Again, ensuring that course content is not only focused on the NCLB definition of highly qualified, but is helping WV teachers to gain familiarity with the goals and objectives outlined in the 21<sup>st</sup> century standards documents is important. New courses will undoubtedly need to be developed.
- Task 5: When researching the extent of technology integration in WV's teacher preparation programs it will be important to ensure that the strategies schools are using to prepare new teachers are aligned with the new standards documents.
- Task 5: The state of West Virginia should take on the task of developing a comprehensive list of technology resources that can be used to meet the state's standards.
- Task 8: Is the self-assessment intended to be a tool teachers use to judge their own competencies, that of their students, or both? It will be critical that the tool focus on user's abilities to use technologies in the service of tasks that demonstrate key learning skills. This is not a simple activity and WV should consider bringing together a panel of experts to inform the work.
- Task 10: If is still unclear whether the Federal Government is going to enforce the 8<sup>th</sup> grade technology literacy requirement. This potentially frees WV to think about using assessments that can inform teachers about students' strengths and weaknesses. Such assessments would

not have to be high stakes and could be used at the lower elementary, upper elementary, middle, and high school levels to generate information that would be instructionally useful to teachers. Again, thinking with a committee of experts might serve the state well.

- Task 11: Providing clear guidance to districts concerning technology that supports basic skills versus technologies used in the service of critical thinking, problem solving, effective communication, etc. is essential. Too often, schools understandably settle for using ONLY the skill building software. WV needs to underscore when it makes sense to use skill building programs and when other tools and applications should be selected.