



COMMONWEALTH of VIRGINIA

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DEPARTMENT OF EDUCATION
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November 6, 2017

The Honorable Stephen Newman, Chairman
Senate Education and Health Committee
Senate of Virginia
P.O. Box 480
Forest, Virginia 24551

The Honorable R. Steven Landes, Chairman
House Education Committee
Virginia House of Delegates
P.O. Box 12
Verona, Virginia 24487

Dear Senator Newman and Delegate Landes:

I am pleased to transmit the *Report on the Feasibility of Implementing a Partial Credit Scoring Model for the Standards of Learning Tests* submitted pursuant to the 2017 Acts of the Assembly which required the Department of Education to collaborate with the existing educational advisory committees to review multi-part Standards of Learning assessment questions and determine the feasibility of awarding students partial credit for correct answers. The report summarizes the steps taken to investigate the feasibility of partial credit scoring to date and potential next steps if this change to the current scoring procedures is made.

Should you have questions regarding the content of this report or need additional information, please do not hesitate to contact me. We appreciate your continued support of education for the Commonwealth's children.

Sincerely,

A handwritten signature in black ink, appearing to read "SRS", with a long horizontal line extending to the right.

Steven R. Staples

SRS/SLR/cb

Enclosure



VIRGINIA DEPARTMENT OF EDUCATION

REPORT

Report on the Feasibility of Implementing a Partial Credit Scoring Model for the Standards of Learning Tests

NOVEMBER 1, 2017

**DIVISION OF STUDENT ASSESSMENT AND SCHOOL
IMPROVEMENT**

Background:

Legislation enacted by the 2017 General Assembly required the following:

“The Department of Education shall collaborate with the existing educational advisory committees in the Commonwealth that advise on student assessments to review multipart Standards of Learning assessment questions and determine the feasibility of awarding students partial credit for correct answers on one or more parts of such questions. The Department shall report its determination to the Chairmen of the House Committee on Education and the Senate Committee on Education and Health by November 1, 2017. The Department shall not take action regarding the awarding of partial credit prior to the 2018 Session of the General Assembly.”

The majority of test questions (items) used on the Standards of Learning tests are presented in a multiple-choice format. However, approximately 15 percent of the test questions on the reading, writing, mathematics, and science tests are “technology-enhanced” items in which the student indicates knowledge or skills by performing an action such as editing a sentence by inserting punctuation marks or creating a bar graph.

A small number of the technology-enhanced items require students to provide more than one response to answer the item. Currently, the student must provide all of the responses required by the item to receive credit; no “partial credit” is awarded. Virginia educators have requested that students who answer part of the item correctly be given some credit for their correct responses. Of particular concern to educators have been items in which the student was told to provide “all correct responses” but was not told how many responses were required.

Since this issue was raised by educators several years ago, Department of Education staff have been working with the testing contractor to investigate the best way to address the concerns raised, including the possibility of implementing partial credit scoring. As a first step in addressing the concerns from teachers, all newly developed items which require multiple responses now specify how many responses are required. No additional items which require the student to provide all correct responses without specifying the required number of responses have been developed.

In addition, some existing items have been evaluated to determine whether they would be good candidates for a partial credit scoring model based on the skills and knowledge measured by the item. For example, an item that requires the students to provide different types of correct punctuation in four areas of a paragraph might be a good candidate for partial

credit scoring while partial credit might not be appropriate for an item that requires students to solve an equation and fill in the blank with the answer.

Feedback from Teacher Committees:

In the summer of 2017, the review of items to determine the feasibility of partial credit scoring was expanded to include educators who serve on the committees that meet annually to review items for each Standards of Learning test. Committee members were asked to review examples of multi-response technology-enhanced items and to provide advice regarding the feasibility of partial credit scoring for these items.

It was hoped that this review might yield some criteria for partial credit that could be applied to existing items and to newly developed items. Unfortunately, the review did not yield overall criteria that can be used to determine whether items are good candidates for partial credit scoring. Instead committee members decided that the content of the item generally determines whether partial credit scoring should be considered, and, as a result, each item would have to be evaluated individually. For example, the teachers felt that partial credit scoring would not be appropriate for the item below because a student would have to sequence all of the options correctly to demonstrate understanding of the relationship between decimals and fractions.

Directions: Drag the answers to the correct boxes. Do not use a calculator to solve this problem.

Arrange the four numbers shown from greatest to least.

Greatest	<input type="text"/>
	<input type="text"/>
	<input type="text"/>
Least	<input type="text"/>


4.595	$4\frac{4}{5}$	4.49	$4\frac{1}{3}$
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Similarly, in the item below teachers believed that if the student placed any of the commas incorrectly he or she would not demonstrate the understanding of the comma rule being tested.

Directions: Drag the comma into the correct location within the sentence. There may be one or more correct locations.

Correctly punctuate this sentence.

The Spanish Riding School a specialized training program for these talented horses was created in 1572.



On the other hand, committee members felt that the item below could be a candidate for partial credit scoring because it asks for a specific number of words with positive connotations to be identified.

Directions: Select the correct answers.

In these sentences from paragraph 11, which three words have the most positive connotations?

There was an **abundance** of dumplings, oysters, and other **sublime** foods Brady could not **identify**. He **hesitated** to fill his plate, but the smell was very **inviting**.

As noted above, technology-enhanced items represent about 15 percent of the test questions students experience on a Standards of Learning test and only some of those items required multiple answers. Because many of the Standards of Learning tests have been shortened, the number of multi-response technology-enhanced items that a student would encounter on a test is small. For example, the grade 4 mathematics computer adaptive test has 35 items that count towards a student's score. Approximately five of those items might be technology-enhanced and of those items one or two might require multiple answers. In providing

feedback to Department staff, committee members observed that because of the small number of eligible items, the impact that partial credit scoring might have on a student's score would be fairly small.

In addition, as described above, the majority of items which require multiple answers now specify the number of answers required. In the computer adaptive tests, the test delivery system will not allow a student to go on to the next item until the required number of answers has been provided. Some committee members felt that students should be able to provide the correct number of multiple answers if they were told the required number within the text of the item.

Technical Challenges in Implementing Partial Credit Scoring:

All technology-enhanced items have been field tested and scored as either correct or incorrect; no partial credit scoring was applied to these items at the time of field testing. To implement partial credit scoring, the items deemed eligible for partial credit scoring would have to be statistically re-calibrated to be scored in this manner. This step is necessary to ensure accurate scoring of these items. Additionally, the algorithm currently used to deliver Virginia's computer-adaptive tests does not support partial credit scoring and would have to be modified to accommodate test questions scored using a partial credit model.

Summary:

Approximately 15 percent of the test questions on SOL tests in reading, mathematics, writing, and science are "technology-enhanced." Of that 15 percent, certain technology-enhanced items require students to provide multiple responses. Because many of the Standards of Learning tests have been shortened considerably, most students will encounter only one or two such items on a test. The Department of Education has previously implemented steps to address educators' concerns about the impact of these items on student scores. The development of new items that require multiple answers has been drastically limited and those that have been developed typically specify the number of answers required.

Implementing a partial scoring model would be a complex endeavor and would have a fiscal impact. Because there are no general rules that can be used to determine whether an item that requires multiple answers is a good candidate for partial credit scoring, additional review of the content and structure of potential items would be required. In addition, changes to the current computer adaptive algorithm would be required, and items selected for partial credit scoring would have to be recalibrated to allow for partial credit in the scoring system.

If the decision is made to move forward with implementing a partial credit scoring model, it would be most efficient to implement these changes concurrent with the development and implementation of the new tests that will be aligned to the revised Standards of Learning.

Based on the current schedule, such an implementation would include the potential for partial credit items being included on Standards of Learning tests for mathematics in 2018-2019, reading and writing in 2019-2020, and for science in 2021-2022. It should be noted that due to the small number of items deemed eligible for partial credit scoring, some students would not be administered partial credit items.