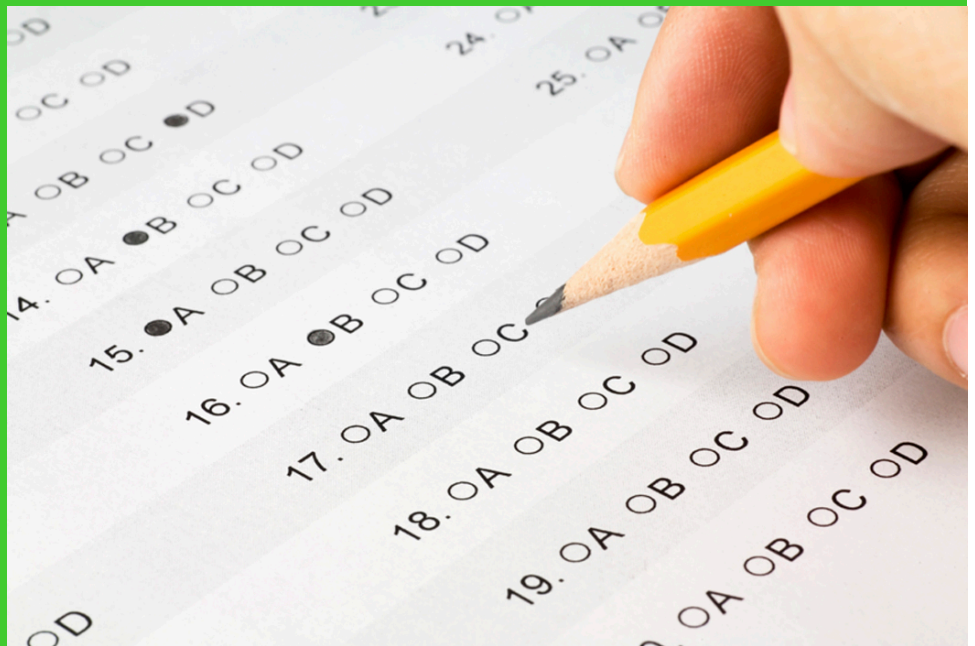# Moving Beyond Multiple Choice Items for Effective Classroom Assessment

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Introduction

Psychometricians love selected-response items (i.e., test questions such as multiple choice). Selected-response items are objective and free from judgment when scored. They are concise and effective instruments of measurement. When properly constructed and assembled together in an assessment, they produce highly reliable measurements and provide valid insights into what students know.

Back in the 1920s, selected response items were considered "innovative" item types. In today's modern world, the intersection of testing and technology has brought these once innovative items back into favor. For example, computer adaptive testing (CAT) uses primarily selected-response items. Yet, classroom teachers view these item types with distrust because they are often associated with accountability assessments. Furthermore, the SBAC (Smarter and Balanced Assessment Consortium) and PARCC (Partnerships for Assessment Readiness for College and Careers) assessments promote the use of "novel" item types such as performance-based tasks and technology-enhanced items to better measure not only what students know but also what they can do.

This paper gives teachers guidance on how to move beyond selected-response items. To be clear, this is not guidance on how to eliminate selected-response items from classroom assessment practice. When properly constructed, selected-response items have excellent measurement properties and can be effectively used in classroom assessment. So first, item-writing guidelines are presented to help teachers get the most out of selected-response items. Second, strategies to supplement and move beyond selected-response items are presented. Third, the role and use of novel items types in classroom assessments are discussed. Last, an approach to put it all together via a next generation assessment platform like Naiku is presented.

Guidelines for Writing Excellent Selected Response Items

Before presenting the guidelines for item writing, it is important to state the obvious upfront. To write quality items, it is imperative to have clear targets. What **learning targets** are to be assessed? Are the learning targets clear to both the teacher and the students? Once the learning targets are understood, the design of the assessment and the choice of items types follow.

The design of the assessment should be instantiated in a test blueprint. This blueprint should make clear how many items (or proportion of the assessment) should assess each learning target. It should also specify the balance of the cognitive level or level of thinking that is required to answer each item. For example, use Bloom's Taxonomy or Webb's Depth of Knowledge to ensure that you have sufficient rigor in your assessment. Lastly, the blueprint should specify the proportion of questions by item type.

In this paper, we consider three types of selected response items that can be commonly and effectively used in the classroom.

Multiple-Choice: Consists of an introductory part called a *stem* (either a statement or question) and a set of answer choices one of which is the answer. This item type is used when there is only one correct answer and several plausible incorrect choices that can help teachers diagnose student misunderstandings.

True/False: Consists of a statement or proposition for students to verify as true or false. These are best used when there is a large body of content to be tested.

Matching: Consists of two lists or phrases where the entries on each list are to be matched. The list of the left contains the *premises*. The list on the right contains the *responses*. Matching items are best used when there are many related thoughts or facts for students to associate to each other.

General Item Writing Guidelines

Developing assessment items is a relatively easy task. However, developing quality assessment items can be more challenging. The following general guidelines can help improve the quality of all items, regardless of item type. For more detail guidelines with example items, see Chappuis, Stiggins, Chappuis, & Arter (2012) and Popham (2011).

1. **Keep wording simple and focused.** This adage in effective written communication is

applicable when writing items as when writing expository essays.

2. **Eliminate clues to the correct answer**. Be careful that grammatical clues do not signal the correct answer within an item or across items on a test.
3. **Highlight critical or keywords**. Critical words such as "MOST", "LEAST", "EXCEPT" can be easily overlooked so highlight them for the student.
4. **Review and double-check the scoring key**. As in any written piece of work, it is always good practice to review and double check, especially the scoring key.

Multiple-Choice Guidelines
1. **Make the stem a self-contained problem.** Ask a complete question with all the necessary information to answer it contained in the stem. This aids in clarity and makes it easier for students to read through tersely stated answer choices to select the correct answer.
2. **Make all answer choices plausible.** All answer choices must be plausible with only one correct answer. Incorrect choices must be reasonable so that they can't be ruled out without having knowledge or proficiency in the content being assessed.
3. **Keep length of answer choices similar.** Answer choices that are parallel and of similar length do not cue the correct answer.

True/False Guidelines
1. **Include only one concept or idea in each statement.** Make the item completely true or false as stated. Don't make it complex, which will confuse the issue and students.
2. **Avoid using negative statements.** Negatives are often harder to understand and comprehend, especially double negatives. Use negative statements sparingly and avoid using double negatives at all cost.

Matching Guidelines
1. **Provide clear directions on how make the match.** It's important to let students know what the basis of the matching is supposed to be. If responses can be matched to multiple premises, make that clear in the directions.

2. **Use homogeneous list of premises and responses.** Keep the set of premises and response homogeneous. For example, don't mix events with dates or names.
3. **Keep responses short and brief.** Premises should be longer. Thus, the responses should be short and brief and parallel in their construction.
4. **Use more responses than premises.** When there are more responses than premises, this prevents students from arriving at an answer through a process of elimination.

Moving Beyond Selected Response Items

Now that you know how to write quality selected-response items and assemble them into a proper assessment that measures specific and clear learning targets, you will be more likely to get better and more useful information about what your students know and can do. But what else can be done? How can you get more out of these selected-response items?

Below are what I call **"better assessment"** strategies that help teachers get more out of their items and assessments. These strategies have been shown through research (e.g., Hattie, 2009, 2012) to have significant impact on student learning. These strategies help teachers move beyond simply using selected-response items on their assessments to using instructional strategies that help them turn testing moments into learning moments.

Confidence Ratings
In addition to asking students to choose the answer to your selected-response items, ask them to also select a confidence rating. Ask students to rate their level of confidence in the answer they have chosen. This can be as simple as giving students a choice of three options: *Low, Uncertain, and High* confidence.

When students rate their confidence in their answer, they are in effect predicting their level of success. The ability to predict or assess one's ability is a key metacognitive skill. Metacognition is often defined as "thinking about thinking." It is a higher-order thinking skill that involves active control of the cognitive processes engaged in learning. Hattie (2012) for

example found that metacognitive strategies have a significant impact on student learning.

"Tell Me More"

To go even further beyond, you can ask students to "tell you more" about how they arrived at their answer. Ask students to explain their reasoning for choosing the answer choice they selected. Or ask students to show their work for a math problem. Alternatively, ask students to explain their confidence rating.

When students "tell you more" and are asked to **explain**, they often reveal more of their level of understanding or misunderstanding of the content or skill being assessed. Knowing more about what students know is the objective of assessment. So to know more about your students, ask them to "tell you more."

Student Reflections

After predicting their performance and telling more about how they arrived at the answer, students now have the opportunity to reconcile their predictions with their actual performance. This is a key instructional strategy known as reflection. Ask students to reflect on their overall test performance, noting what they did well and didn't do so well. Also ask students to reflect on their performance on each item, providing feedback to themselves and their teacher whether they got the answer right because they *know and understood the concept or guessed correctly*. And if they got the item wrong, they can reflect on whether they got it wrong because they *don't know the concept or made a simple mistake*.

Reflection is also a powerful technique to help students practice and develop their metacognitive skills. In addition, the reflections allow students to provide feedback to themselves and to their teachers on their level of understanding.

Answer Rationale

Feedback that is constructive and timely is another great instructional strategy that has significant impact on student learning. When giving assessments with selected-response items, it is important to not only let students know whether they got the item right or wrong, it is equally important to tell them why the answer is right or wrong.

This can be done easily by creating answer rationale for each item. For the correct answer choice, give an explanation or rationale for why it is right. Similarly, for each incorrect choice, give a rationale for why it is wrong. After students complete their test, the rationale can be given to students automatically and immediately. When done in this way, the rationale serves as personalized and constructive feedback that is given to each student.

Using Other Item Types

In addition to writing better items and using better assessment techniques, there are other ways for teachers to take their assessment to the next level. One approach is to include other types of items. These include adding items that require students to construct, rather than select, an answer to show their knowledge or to show their skill through performance.

Constructed-Response Items

Items that require students to generate their own response, in contrast to selecting a response, are called constructed-response items. These can be simple items such as **fill-in-the-blank** items or more complex such as **extended-response** items. These types of items often require students to demonstrate more in-depth understanding than selected-response items.

When writing fill-in-the-blank items, ask students a question and provide a blank for the answer. When written as a question, it makes the item clearer and expresses a single complete thought. It is also best item writing practice to include only one blank in this question type. Ask on question (one blank) and move on to the next question. Quality fill-in-the-blank items are excellent ways to require students to demonstrate application of knowledge instead of mere memorization.

Extended-response items require more complex answers and higher-order level of thinking from students than a single word (or number) answer for fill-in-the-blank items. The desired student response can be as long as a paragraph or as extended as an essay. This item type requires more teacher time to score as the teacher must score it manually. To make scoring easier and fairer to students, use a rubric or scoring guide when judging student work. This makes

the evaluation criteria clearer to both the teacher and more importantly, to the student. Although these items may be time consuming to score, they offer teachers a way to assess a student's ability to synthesize and to evaluate complex content.

Performance-Based items

Effective classroom assessment practice must not only include items in which students sit down to select or construct an answer. They should also include tasks in which students demonstrate their knowledge and skill through performance. For example, a composition paper is a writing sample that demonstrates a student's ability to write, either generally or in a particular mode. A presentation or speech is a demonstration of a student's ability to give coherent and persuasive oral arguments. These performance-based assessments can provide a more accurate picture of a student's high-level skills. Typically, these high-level skills resemble real-world tasks students will face when they enter the workplace. Similar to extended-response items, these items are best scored with a rubric, which make the evaluative criteria clear.

Performance-based items may be more authentic and approximate real-world tasks. Over the past decade, they have been favored and advocated for by educators, parents, and assessment specialists. However, heed caution and don't rely too heavily on performance assessments. It can be difficult to generalize beyond the specific task at hand to the broader skills to which you want to infer. This is a serious shortcoming of performance tasks. Thus it is imperative to have a good mix of selected-response, constructed-response, and performance-based items in your assessment practice.

Technology-Enhanced items

At today's crossroads of technology and assessment, perhaps even more en vogue than performance-based items are technology-enhanced items. These item types are popular due to their inclusion on the forthcoming SBAC and PARCC assessments. These items are computer-delivered and require specialized students interactions. For example, students may be asked to drag and drop objects for one location to another or they may be asked to draw lines or connect objects.

The appeal of these items is that, like performance-based items, they approximate real-world tasks and

require more or higher level of thinking to complete. Although they may ask students to interact with the test item in specialized ways, for the most part, students are still asked to select or construct a response. Therefore, they can be viewed as no more than specialized selected-response or constructed-response items that are computer delivered. This is not to discredit these items and suggest that they should not be used on assessments.

Although, teachers may find it difficult to create these items for their own classroom assessments. There are not a lot of available tools for which teachers can use to create these types of items. However, there are many websites, such as the SBAC and PARCC websites, that provide examples of technology-enhanced items for practice. Teachers are advised to include those practice tests in their classroom assessment practice so that students are familiar and comfortable with how to interact with and answer those types of questions.

Putting It All Together

Knowing how to write quality selected-response items is as great start. Knowing how to move beyond selected response items to using better assessment techniques is another great step. Incorporating constructed-response, performance-based, and technology-enhanced items will make your assessment practice even more effective.   But how can a teacher incorporate all of these techniques in the classroom?

The answer lies at the intersection of technology and assessment. Today, next generation assessment tools such as Naiku allow teachers to easily incorporate all of the strategies espoused in this paper. With Naiku's web-based assessment creation and delivery platform, teachers can easily create selected-response and constructed-response items. The item types range from True/False, Multiple-Choice, Matching, Constructed-Response, and Essays.

Furthermore, teachers can engage students in better assessment techniques and ask students to select a confidence rating and provide an explanation of their answer in the "tell me more" field addition to selecting or typing in the answer.

In the example problem below, note the fill-in-the-blank item for the math problem requires students to

construct their own answer. This is a step beyond if it were merely a multiple-choice item. Also note how Naiku enables you to go further beyond by asking students for their confidence and asking them to tell more about how they arrived at the answer. In this case, you can see that the student has shown the steps to how he solved the problem.
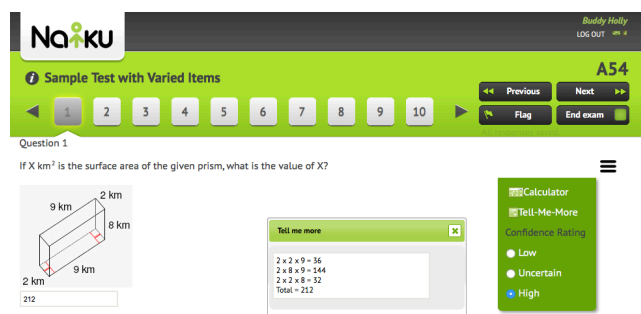

Figure 1. Fill-in-the-blank Item Requiring Confidence and Tell Me More

Although "tell me more" lends itself readily to "show your work" on math problems, it is a technique that is equally applicable and effective in other content areas. For example, you can use this technique on multiple-choice items on a science assessment. If a question asks students to infer or predict the outcome of an experiment, you can ask them to explain their inferential thinking in addition to asking them to select the best response. Similarly, on a reading comprehension assessment, for questions that ask students to make inferences (e.g., inferring the intention of the author on a reading passage), you can use "tell me more" to get a better indication of the students' inferential reasoning or thinking skills.

Including "tell me more" allows you to get the best of both worlds. You get the immediate, objective, and automatic scoring that you get from selected-response items. But you also get the benefits of an extended-response item when students write to explain their reasoning or show work to justify their answer selection. Thus, you get the quick and efficient way to collect student performance by standards or learning targets through the automatically scored selected-response portion of the item while also getting a deeper level of student understanding like an extended-response item through the "tell me more" portion. Furthermore, including "tell me more" in your

classroom assessment practice is a great way to incorporate writing across your curriculum.

In Naiku, teachers can also easily collect reflection data from the students. Reflection can be collected immediately after the student completes the test when important information such as answer rationale is provided to them immediately. In fact, one can posit that the confidence ratings and reflections in Naiku are specialized interactions required of students, which is characteristic of technology-enhanced items. These strategies are inherent in Naiku and enable better assessment, where teachers and students go beyond traditional assessment of "filling-in-the-bubble".
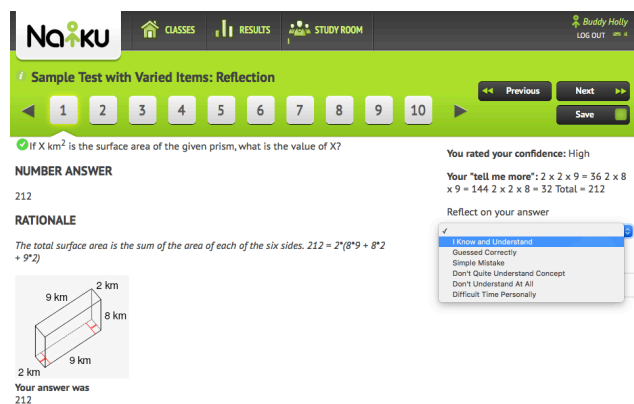

Figure 2. Student Reflection and Rationale

At Naiku, we believe that better assessment leads to better learning. It starts with solid foundation in selected-response items. It extends to constructed-response and performance-based items that can elicit higher-level thinking. It moves beyond item types to better assessment techniques such as confidence, reflection, and rationale. And it ends with reports for teachers and students that highlight what students know by item, by assessment, and by standards or learning targets.
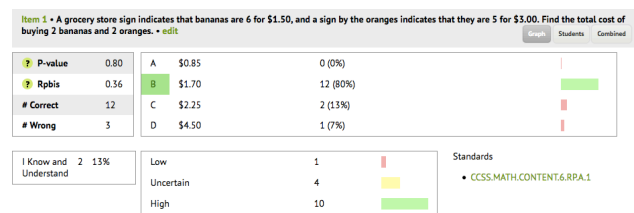

Figure 3. Naiku Item Analysis Report Shows Class Confidence, Reflections, and Answers by Standard or Learning Target

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Dr. Nhouyvanisvong received his Ph.D. in Cognitive Psychology from Carnegie Mellon and has spent his career in the design of educational assessments. He has taught graduate courses on assessment practice and theory. He is the author, co-author, and/or presenter of numerous papers and presentations on the subject of educational assessment and has ensured the psychometric integrity and soundness of various assessments while at the Minnesota State Department of Education, Data Recognition, and Pearson.