Use of a Calculator as an Allowable Accommodation on Tests Designed to Measure Computation – A Policy Perspective Executive Summary

Through this brief review, the Indiana Department of Education (IDOE) considered foundational principles for accommodations and test construction for standardized assessments. The Department considered this key research question: Does the use of the calculator impact validity assertions on reporting categories such as computation and number sense? For this question, the review supported the following considerations:

- Participation of *all* students in assessment and accountability systems is an important issue.
- State Departments of Education are responsible for ensuring the assessment programs they build are both accessible and technically sound for *all* students.
- IDOE has taken a number of steps to ensure the ILEARN assessment is accessible, including adopting an Accessibility Framework which includes universal features available to all students and accommodations available to some students based on individual need.
- IDOE has determined that use of a calculator on the ILEARN mathematics tests in grades 3 – 5 should not be allowed given the constructs (i.e., knowledge and skills) the tests are designed to measure.
- Students with disabilities must be given the opportunity to learn the same grade-level concepts and skills as their non-disabled peers.

Participation of *all* students in assessment and accountability systems is an important issue. Historically, students with disabilities have not been given the same access to academic learning experiences and environments as their non-disabled peers. The reasons for excluding students with disabilities, particularly from assessments and accountability measures, ranged from the perception that the tests were not relevant to protecting students from frustration, to concern the anticipated poorer performance of students with disabilities would lower scores. Ensuring students with disabilities have the opportunity to learn the same grade-level academic content as their non-disabled peers as well as demonstrate their achievement is about equity.

State Departments of Education are responsible for ensuring the assessment programs they build are both accessible and technically sound for *all* students. The Every Student Succeeds Act (ESSA) of 2015 includes the explicit requirement that state assessment systems must "be designed to be valid and accessible for use by all students, including students with disabilities and English learners." Validity is the most fundamental consideration in developing and evaluating tests. According to the *Standards for Educational & Psychological Testing* (AREA et al., 2014), validity is defined as "the degree to which accumulated evidence and theory supports a specific interpretation of test scores for a given use of a test" (p. 225). Additionally, validation efforts seek evidence to answer such questions as 'Do the test scores mean what we think they mean?' and 'Can the test scores be used as we intend them to be used?' (Kane, 2016).

IDOE has taken a number of steps to ensure the ILEARN assessment is accessible, including adopting an Accessibility Framework which includes universal features available to all students and accommodations available to some students based on individual need. Accessibility strives to maximize the broadest range of examinees' opportunity to demonstrate their ability or achievement on the targeted construct measured. The *Standards for Educational & Psychological Testing* (AERA et al., 2014) define accommodations as "adjustments that do not alter the assessed construct that are applied in test presentation, environment, content, format (including response format), or administration conditions for particular test takers, and that are embedded within assessments or applied after the assessment is designed" (p. 215). The primary

purpose of test administration accommodations is to promote access, equity, and validity for students in need, such as students with disabilities. Accommodations maintain and facilitate access to content and allow students with disabilities to show what they know and can do without the interference of their disability.

Accommodations do not involve changes in the content of the test, be it the stimuli (such as passages or scenarios) or the test items themselves. The *Standards for Educational & Psychological Testing* (AERA et al., 2014) define a modification as "a change in test content, format (including response format), and/or administration conditions that is made to increase accessibility for some individuals but that also affects the construct measured and, consequently, results in scores that differ in meaning from scores from the unmodified assessment" (p. 221). Modifications change the construct (i.e., knowledge and skills that are the target of the assessment) and, as a result, change the meaning of the resulting score. Modifications pose a threat to validity. The differences between accommodations and modifications can be summarized as follows: the intended constructs of tests are upheld when accommodations are utilized; modifications alter fundamental elements of the test, which change the content and the skills measured and lower or significantly alter the achievement expectation.

IDOE has determined that use of a calculator on the ILEARN mathematics tests in grades 3–5 should not be allowed given the constructs (i.e., knowledge and skills) the tests are designed to measure. Test developers and users have a responsibility to establish the appropriateness of accommodations. ILEARN is designed to directly reflect the knowledge and skills outlined in the Indiana Academic Standards; the knowledge and skills inherent in the mathematics standards in grades 3–5 include computational understanding, accuracy, and fluency. The Indiana Academic Standards include the explicit expectation that students learn and perform computation (for example, Standard 3.C.1 reads, "*Add and subtract whole numbers fluently within 1000*."). A student using a calculator would not be engaging in computation (addition and/or subtraction) and as such, the resulting score would not have the same meaning as those from a student who did not use a calculator. Given computational accuracy and fluency are skills inherent throughout the grades 3–5 academic standards, use of a calculator would prohibit accurate measurement of a student's mastery of these standards.

According to the *Standards for Educational & Psychological Testing* (AERA et al., 2014), "comparability is the defining feature of a test adaptation to be considered an accommodation" (p. 59). A test is fair when it "reflects the same construct(s) for all test takers, and scores from it have the same meaning for all individuals in the intended population; a fair test does not advantage or disadvantage some individuals because of characteristics irrelevant to the intended construct" (p. 50). Fairness is a fundamental validity issue; test fairness, however, does not imply equal outcomes.

Students with disabilities must be given the opportunity to learn the same grade-level concepts and skills as their non-disabled peers. Because a student's disability may make learning a key skill such as computation more challenging, additional time, practice, and specialized instructional strategies may be warranted. Students with disabilities likely need additional opportunity and specialized support to master grade-level concepts prior to the introduction of a substitute tool such as a calculator. Accommodations are neither a substitute for nor a guarantee of student mastery. Test alterations that change what the test is designed to measure can mask important differences and, more importantly, student needs.