

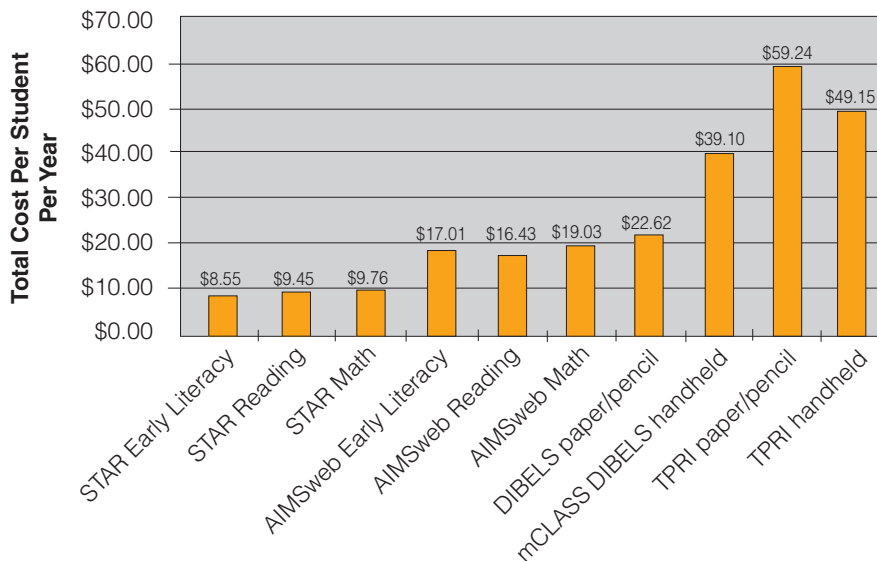
## STAR Assessments Are Most Cost-Effective Assessments in Comparison Study

Provide valid & reliable results while maximizing time for instruction

### Introduction

Christensen Associates, an independent economics consulting firm, conducted a study to estimate the true costs associated with schools' use of Renaissance Learning's STAR Early Literacy™, STAR Reading™, and STAR Math™ assessments, AIMSweb®, the Dynamic Indicators of Basic Early Literacy Skills (DIBELS®), mCLASS® DIBELS by Wireless Generation®, and the Texas Primary Reading Inventory (TPRI™). Graph 1 breaks down the various total costs of these assessments per student, per year. All assessments are used widely for periodic assessment and have published reliability and validity statistics.

**Graph 1: Total Cost Per Student**



Note: Graph includes both direct and opportunity costs. Specific costs are presented in Results section, Tables 1–3.

Recent major initiatives at the federal, state, and local levels have promoted increased accountability and greater emphasis on periodic assessment. Consequently, many schools have dramatically increased the frequency of early literacy, reading, and mathematics assessments, and are better integrating assessment data into their instructional decision-making processes.

### Main Findings

- STAR Early Literacy, STAR Reading, and STAR Math were determined to be the most cost-effective assessments compared to AIMSweb, DIBELS, mCLASS DIBELS, and TPRI.
- Taking into account costs of both materials and teacher time, the total cost of the STAR assessments was approximately one-half the cost of AIMSweb, one-third the cost of DIBELS and approximately 15–20 percent the cost of TPRI.
- Teachers and administrators agreed the assessments studied were highly correlated and assessed many of the same skills but the STAR assessments were the easiest to administer.

When assessments are evaluated for use by schools and policy makers, the primary considerations are usually the tests' technical merits, specifically reliability and validity. But also of importance are tests' usability, meaning the resources required to administer the tests and access their results. Key usability factors include how much the materials cost, how much time they take to administer, and the ease of obtaining and using the results. Usability is a growing concern due to the sheer amount of testing now occurring in schools. The bottom-line usability question is: Does the quantity and quality of information provided by the test justify its resource costs?

While technical data on tests is readily available, unfortunately, the true resource costs of assessments are rarely documented. This makes it difficult for schools to accurately evaluate tests on usability, and easy for misconceptions to arise. For example, some assessments are considered to be "free" but often carry hidden costs for scoring, reporting, and/or the burden of time to administer.

## Study Description

To assess the total resource costs of administering each assessment, interviews were conducted at 12 public schools in eight states. The schools were selected because they used one or more of the following: STAR Early Literacy, STAR Reading, STAR Math, AIMSweb, DIBELS, mCLASS DIBELS, or TPRI. Interviewees included teachers and support staff (e.g., technology coordinator, reading specialist) who administered the tests or used their results, as well as administrators. Ten schools used at least one of the STAR assessments, three schools used AIMSweb, seven of the schools used DIBELS, and two schools used TPRI.

**AIMSweb** is a timed assessment and includes a number of components for each grade level, including Test of Early Literacy (TEL), Reading CBM (R-CBM), Maze CBM (which tests comprehension), Mathematics CBM (M-CBM), and Math Concepts and Applications (M-CAP). Some of the measures are administered one-to-one, such as the TEL and R-CBM, while the Maze, M-CBM, and M-CAP are administered to a classroom or group at one time. To use AIMSweb, schools pay an annual per-student fee and may then download and print test materials from the website. Administration of AIMSweb using a web-enabled device is also possible for an additional fee to access AIMSweb's Data Capture Tools. None of the schools interviewed opted to use the Data Capture Tools package.

**DIBELS** is a timed assessment administered using a one-on-one interview format, either via paper/pencil or a handheld computer, and includes a number of

components for each grade level, including Letter Naming Fluency, Phoneme Segmentation Fluency, Oral Reading Fluency, Word Use Fluency, among others. The DIBELS booklets can be downloaded and printed from the DIBELS website at no cost (other than staff and materials costs related to printing and preparing the booklets). Test kits containing preprinted booklets and instructions can also be purchased from Cambium Learning for a fee. Schools are charged a per-student fee every year to use the online DIBELS Data System for reporting and tracking results. DIBELS includes three benchmark assessments per year and an optional progress-monitoring component. If a school chooses to implement DIBELS using a handheld device, this requires the purchase of Wireless Generation's mCLASS:DIBELS software and the handheld devices. Five of the study schools interviewed used the paper and pencil approach for DIBELS, while two utilized handheld devices and the mCLASS:DIBELS software.

**TPRI** is similar to DIBELS in that it is administered one-on-one and has several different components for each grade level, such as Graphophonemic Knowledge, Phonemic Awareness, Reading Fluency, and Reading Comprehension, among others. Unlike DIBELS, however, most of the components are not timed. At all grade levels, TPRI consists of both a screening section and an inventory section. Student performance on various sections determines exactly which sections they complete, and which they skip. To use TPRI, schools purchase classroom kits for each grade level for a flat fee that includes access to an online tabulation and reporting system. One TPRI school in the study administered the test using the paper/pencil version, while the other school used handheld devices.

**STAR Early Literacy, STAR Reading, and STAR Math** are computer-adaptive assessments, which adjust, in real time, the difficulty level of the questions each student receives based on each student's previous responses.

STAR Early Literacy was designed primarily for students in kindergarten through grade 2, but it can be used by students in Pre-K through grade 3. The assessment covers seven specific literacy skill domains: General Readiness, Graphophonemic Knowledge, Phonemic Awareness, Phonics, Comprehension, Structural Analysis, and Vocabulary. STAR Reading and STAR Math are designed for use in grades 1 through 12 and provide norm-referenced scores. STAR Reading assesses comprehension and general reading achievement and STAR Math assesses general math achievement.

The STAR assessments can be administered to an entire classroom simultaneously—students work at a computer using audio and/or visual prompts, requiring minimal

teacher involvement during testing. Each administration is scored automatically and produces a wide variety of reports at the student, class, and school level. To purchase STAR assessments, schools pay a one-time setup and license fee (per assessment) as well as an additional amount for each student enrolled to use each assessment.

Christensen Associates made no determination regarding the functional reliability or validity of the assessments studied. Based on the published technical information for each test, it is assumed that each is reliable and valid. The purpose of the study was to estimate costs associated with administering and using the results of each assessment.

## Results

The analysis consisted of two major cost components: direct costs (the price of testing materials, licensing fees, and/or fees for access to scoring and reporting services) and opportunity costs (time to administer, score, and report results—time that could be spent on instruction if testing was not taking place).

Direct cost data were collected from each school and averaged for each assessment. Because direct costs are a function of the number of classrooms and/or students a school has, an “average school” was used in the analysis that reflected the average characteristics of schools in the study. The average school consisted of 259 students in 14 classes, resulting in an average class size of 19 students. Direct costs for each assessment are detailed in the full report and summarized in Table 1.

**Table 1: Direct Costs for Assessment Materials** (Annually, over three years)

Direct Costs, Annually	STAR Assessments			AIMSweb			DIBELS		TPRI	
	Early Literacy	Reading	Math	Early Literacy	Reading	Math	Paper/Pencil	mCLASS Handheld	Paper/Pencil	Handheld
<b>Per Test Kit/ Software</b>	\$1,599	\$1,599	\$1,599	\$110	\$110	\$110	\$55	\$6,464	\$220	\$207
<b>Annually, Over Three Years</b>	\$533	\$533	\$533	\$43	\$43	\$43	\$765	\$4,878	\$3,079	\$2,898
<b>Per Student Fees</b>	\$0.99	\$0.99	\$0.99	\$2.26	\$2.61	\$2.87	\$1.00	\$0	\$0	\$6.50
<b>Average Annual Fees/ School Year</b>	\$256	\$256	\$256	\$586	\$675	\$742	\$259	\$0	\$0	\$1,684
<b>Total Direct Costs/Year</b>	\$789	\$789	\$789	\$629	\$718	\$786	\$1,024	\$4,878	\$3,079	\$4,582

*Note: mCLASS/DIBELS costs are based on an average access cost per classroom based on our interviews; TPRI costs are based on published pricing from Brookes Publishing benchmarking kit and student record sheet costs per classroom.*

**Table 2. Opportunity Costs** (Based on the average respondent school)

Opportunity Costs (per round of testing)	STAR Assessments			AIMSweb			DIBELS		TPRI	
	Early Literacy	Reading	Math	Early Literacy	Reading	Math	Paper/Pencil	mCLASS Handheld	Paper/Pencil	Handheld
<b>Per Student (minutes)</b>	16.94	20.00	22.17	6.59	6.17	3.61	10.56	9.16	26.80	17.80
<b>Per Classroom (minutes)</b>	28	28	29	125	117	69	201	174	509	338
<b>Per School (minutes)</b>	389	385	404	1752	1642	961	2809	2437	7129	4735
<b>Per School (hours)</b>	6.5	6.4	6.7	29.2	27.4	16.0	46.8	40.6	118.8	78.9
<b>Avg. Hourly Compensation</b>	\$36.58	\$43.10	\$43.10	\$43.10	\$43.10	\$43.10	\$34.41	\$43.10	\$34.41	\$34.41
<b>Total Costs/ Round</b>	\$475	\$553	\$580	\$1,259	\$1,179	\$1,381	\$1,611	\$1,750	\$4,089	\$2,716

**Table 3: Summary of Total Costs**

Assessment		Annual	Per Administration	Per Student
STAR Early Literacy		\$2,214	\$738	\$8.55
STAR Reading		\$2,449	\$816	\$9.45
STAR Math		\$2,529	\$843	\$9.76
AIMSweb Early Literacy		\$4,405	\$1,468	\$17.01
AIMSweb Reading		\$4,255	\$1,418	\$16.43
AIMSweb Math		\$4,928	\$1,643	\$19.03
DIBELS	Paper/Pencil	\$5,858	\$1,953	\$22.62
	Handheld	\$10,128	\$3,376	\$39.10
TPRI	Paper/Pencil	\$15,344	\$5,115	\$59.24
	Handheld	\$12,729	\$4,243	\$49.15

In order to quantify opportunity costs, the researchers measured the time staff spend administering each assessment and used an average salary and benefit rate to determine the cost of time spent on assessments instead of delivering planned instruction (see Table 2.)

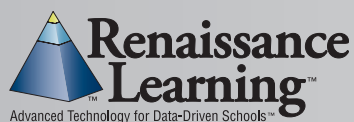
Total costs were calculated as the sum of direct costs and opportunity costs. To ensure a fair and direct comparison of the assessments, costs assume each test was administered three times per year (see Table 3.)

### Conclusion

The study concluded STAR Early Literacy, STAR Reading, and STAR Math are much more cost-effective assessments compared to AIMSweb, DIBELS, mCLASS DIBELS, and TPRI. Taking into account costs of both materials and

teacher time for one administration, the total cost of the STAR assessments ranged from \$738–\$843 per round of assessment, which is significantly lower than the other assessments: Approximately one-half the cost of the AIMSweb range (\$1,418–\$1,643) and DIBELS paper and pencil (\$1,953), one-fourth the cost of mCLASS DIBELS (\$3,376), and 15–20 percent the cost of TPRI (\$5,115 for paper/pencil, \$4,243 for handheld). It is clear the STAR assessments are the most cost-effective assessments.

In addition to their cost-effectiveness, the STAR assessments were widely recognized by respondents for the ease with which they can be repeatedly administered by a variety of staff (teacher, computer lab facilitator, aide, and so forth), for performance reports that can be accessed immediately, and for the quantity and quality of information those reports convey.



*For more information, or for additional copies of this report, contact:*

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