



# Charting New Growth Pathways

## Lexile and Quantile Measures and ESSA Accountability

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# About MetaMetrics®

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MetaMetrics, founded in 1984, is an educational measurement and technology organization whose mission is to connect assessment with instruction. The company's distinctive frameworks for reading and mathematics bring meaning to measurement and are used by millions to differentiate instruction, individualize practice, improve learning and measure growth across all levels of education.

## Introduction

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For the past three decades, researchers from MetaMetrics—creators of The Lexile® Framework for Reading and The Quantile® Framework for Mathematics—have been working to quantify text complexity, student reading ability and the demands of a variety of post-secondary texts. More recently, these same researchers have been applying similar strategies to quantifying mathematical ability and demands as well. Now, with these strands of research firmly at hand, MetaMetrics has shifted its focus to the topic of career preparedness to better understand the reading and mathematical demands that a new employee would likely encounter when entering a specific occupation. When taken as a body of research, these findings offer a wealth of information that can be used to inform instruction and monitor student growth towards college and career readiness in reading and mathematics. These measures also have potential for inclusion as growth and college and career readiness measures in new accountability systems aligned with the federal Every Student Succeeds Act (ESSA).

## The Lexile Framework for Reading and the Quantile Framework for Mathematics

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The Lexile Framework for Reading ([www.Lexile.com](http://www.Lexile.com)) measures reading ability and text complexity on the same developmental scale. Unlike other measurement systems, the Lexile Framework determines reading ability based on actual assessments, rather than generalized age or grade levels. Domestically and internationally recognized as the standard for matching readers with texts, tens of millions of students worldwide receive Lexile® measures that help them find targeted materials from the more than 100 million articles, books and websites that have been measured. Lexile measures connect learners of all ages with resources at the right level of challenge and provide a scale in which growth towards state and national standards can be measured. In addition to the numerous states that report Lexile measures from their statewide assessment, more than 50 popular reading assessments and programs have been linked with the Lexile Framework for Reading. Major testing and instructional companies reporting out Lexile reader measures include Achieve3000®, myON, DRC,

Dynamic Measurement Group, ERB, *ETS*®, Hampton-Brown, Houghton Mifflin Harcourt, Scholastic, The Riverside Publishing Company and the Smarter Balanced assessment system.

Similarly, the Quantile Framework for Mathematics ([www.Quantiles.com](http://www.Quantiles.com)) measures student achievement and the difficulty of mathematical skills and concepts on the same scale. The Quantile Framework describes a student's ability to solve mathematical problems and the demand of the skills and concepts typically taught in kindergarten mathematics through Algebra II, Geometry, Trigonometry and Pre-calculus. Quantile® measures inform instruction by describing which mathematical skills and concepts the student has learned and is ready to learn. They help teachers improve mathematics teaching and learning by targeting instruction and monitoring student growth toward state proficiency standards and the mathematical demands of college and careers. In addition to the numerous states that report Quantile measures from their statewide assessment, more than 20 instructional programs and assessments are linked with the Quantile Framework for Mathematics. These tools report Quantile measures for students and come from a variety of sources, including DRC, i-Ready, Think Through Math, *Math Inventory*, Voyager Sopris, aimsweb™ Plus, the Smarter Balanced assessment system, among others.

## MetaMetrics' Research: College and Career Readiness

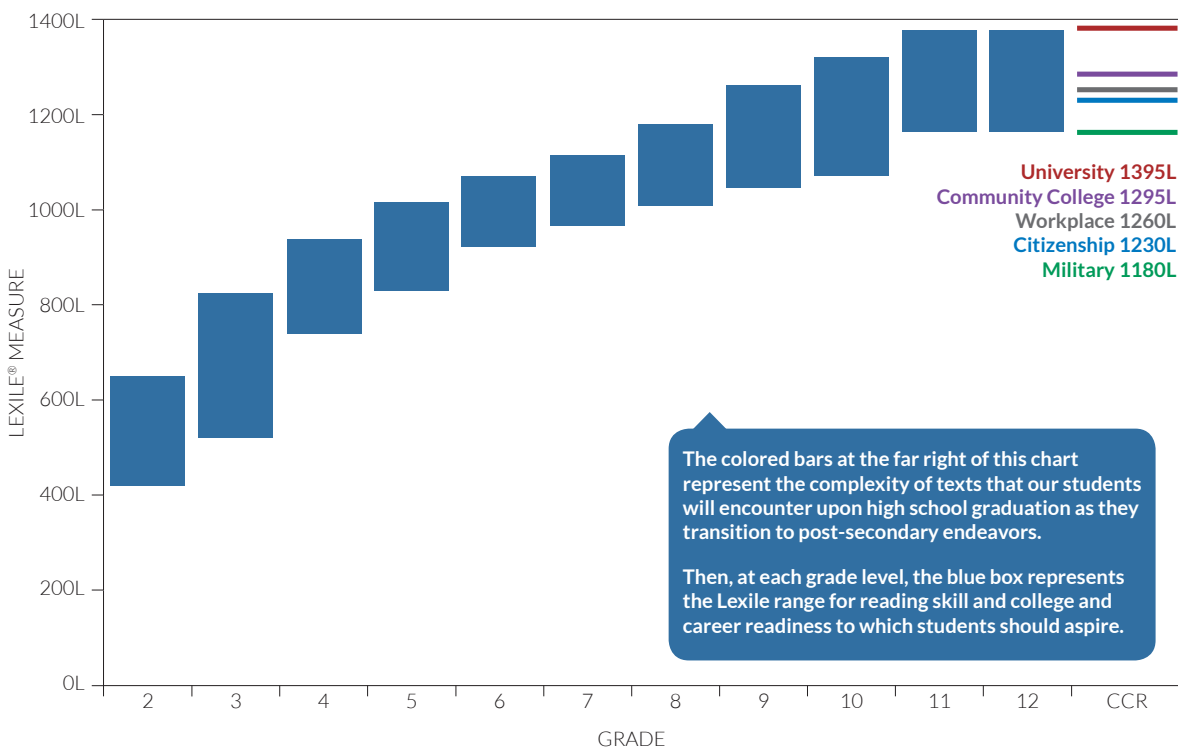
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With the help of research from MetaMetrics, parents, educators and policy makers have the ability to quantify the skills necessary at each grade level to form a road map that charts a student's pathway to his or her chosen post-secondary endeavor. For example, in the area of reading, we now know that a Lexile measure of 1300L represents a good target for college and career readiness. A student reading at this level will likely continue to encounter a range of texts at a variety of levels of text complexity, but should find the vast majority of those texts well within his or her independent reading level.

As one can see near the upper right-hand corner of Figure 1, the average level of text complexity varies based

on the post-secondary pursuit: university 1395L, community college 1295L, workplace 1260L, citizenship 1230L and military 1180L. Equally important are the individual grade level ranges that—taken in their entirety—present the pathway a student should aspire to follow in order to reach his or her goals of graduating college and career ready from high school. With this information, a student—equipped with his or her Lexile reader measure—can instantly see whether or not he or she is on the path, exceeding the path or not yet reaching the path to college and career readiness in reading.

**Figure 1. Where students' reading skills should be to graduate college and career ready.**

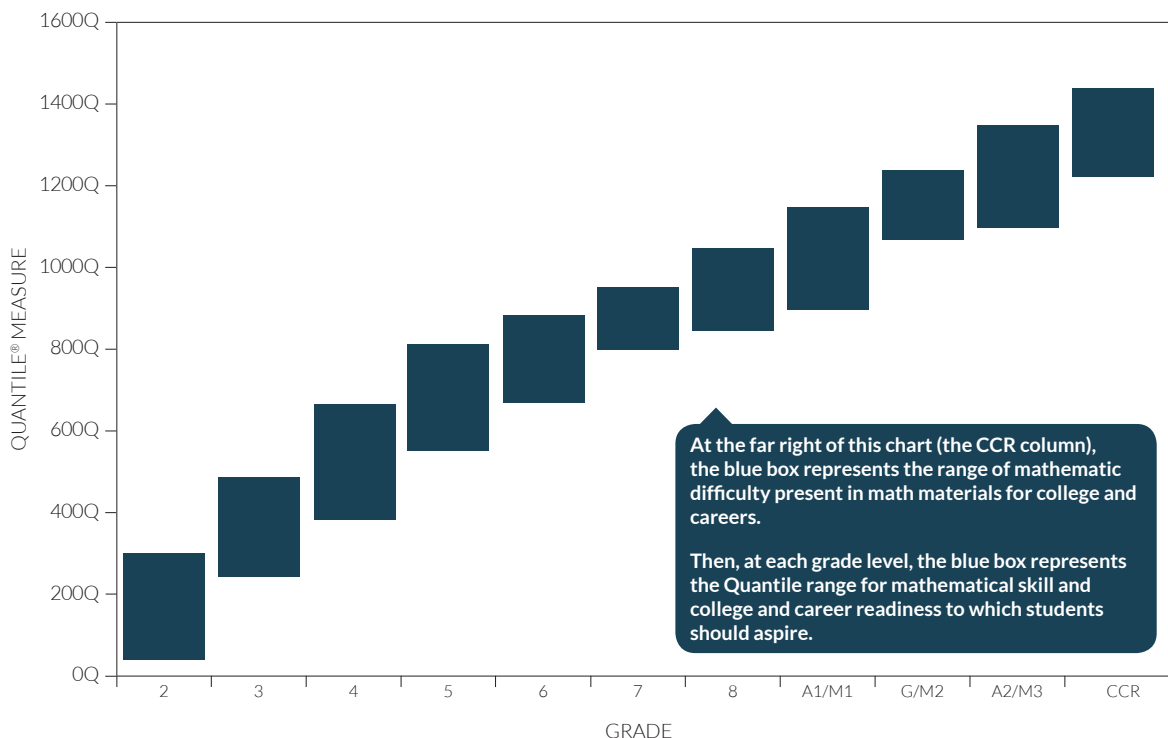


More details outlining the methodology of how researchers from MetaMetrics have assembled this pathway are presented in a series of research briefs ([The Lexile Framework for Reading Quantifies the Reading Ability Needed for "College & Career Readiness,"](#) [The Text Complexity Continuum in Grades 1–12](#) and [Bending the Text Complexity Curve to Close the Gap](#)). In short, the first research brief outlines how MetaMetrics established the post-secondary text complexity continuum. The second brief explains how researchers analyzed the text

complexity continuum in grades 2–12. When the results of these two endeavors were compared, the “gap” between the secondary world and the post-secondary world became apparent. The third brief, then, outlines how the “stretch” continuum was created to close that gap and establish the grade level ranges that form the pathway to college and career readiness.

In the area of mathematics, we see something very similar. Again, near the upper right-hand corner of Figure 2 are the range of mathematical demands of post-secondary pursuits, ranging from approximately 1220Q to 1440Q. We also see the individual grade level ranges for students’ mathematical skills, again forming the pathway toward college and career readiness. Students, their parents and their teachers can use this trajectory to monitor their growth and progress over time.

**Figure 2. Where students’ math skills should be to graduate college and career ready.**



Additional details outlining the methodology MetaMetrics’ researchers used to construct this pathway for mathematics are presented in a series of research briefs ([A Quantitative Task Continuum for K-12 Mathematics](#)

and [The Quantile Framework for Mathematics Quantifies the Mathematics Ability Needed for College and Career Readiness](#)). The first link describes MetaMetrics' research into the continuum of math lessons in grades K–12. The second link complements the first and describes the most recent research to support interpretations for college and career readiness.

## MetaMetrics' Research: Career Preparedness

Now, researchers from MetaMetrics are engaged in a new focus of research to drill down into the concept of college and career and examine the reading and mathematical demands of more than 400 high-interest, high-demand occupations. For each occupation, the researchers are gathering a variety of materials—certification assessments, keystone course materials, materials from professional organizations, business and institutional onboarding materials, etc.—and measuring those materials using the Lexile and Quantile scale. So, as we see in Figure 3, we know that if a student is interested in a career as an electrician, that student needs an independent reading skill of about 1270L and a mathematical skill of 1045Q in order to be prepared for that profession.<sup>1</sup> With this research, we can help individual students better imagine the destination for their own learning based

### Career Preparedness

Figure 3. The reading and mathematical demands of materials that a prospective employee can expect to encounter upon entering the occupation of an electrician.

The Lexile and Quantile measure are the only metrics available to compare and describe the reading and mathematics demands of careers.



Electrician Career has a reading demand of **1270L** and requires mathematics skills capability of **1045Q**.

<sup>1</sup> Although an individual new to a career will initially encounter introductory skills and concepts, 1350Q represents a good target for college and career readiness for those careers that require a high school diploma.



on their own unique goals. So that when a student answers that age-old question “What do you want to be when you grow up?” some conversation can occur on what the academic requirements of that occupation may demand.

In addition to the conjoined measurement characteristic that places both students and materials on the same scales, the Lexile and Quantile Frameworks also offer the advantage of being linked with a variety of assessment and instructional products. In fact, there is no single “Lexile test” or “Quantile test.” MetaMetrics believes the world of education does not need more tests; instead the education world needs to get more from the tests that are already being given. The common, universal scales of these two frameworks afford us the opportunity to look at student learning and growth in more of a longitudinal fashion from the early elementary grades all the way through high school. By leveraging these common, universal scales, we can track a student’s growth—across time and across a variety of different assessments—on a consistent, easy to communicate scale. So, from the earliest grades all the way through high school, a student’s performance can be expressed in Lexile and Quantile measures even when those instructional programs and assessments change many times.

When we know the skills destination for an individual student and we know the pathway that will get him or her there, we can begin to do three things: (1) we can document a student’s growth and monitor his or her progress toward those goals, (2) we can forecast how much more growth will be needed to ultimately reach those goals and (3) educators can use this information to target instruction. Figure 4, on the following page, shows MetaMetrics’s newest technology, the Lexile and Quantile Growth Planners, that helps achieve these three things.

In this hypothetical example, we see the learning progress of an imaginary student. The very small blue dots on this graph represent the student’s past performance on assessments that are linked to the Lexile scale and at the far right we see the reading demands by someone entering this student’s chosen career field: video game designer. Based upon this student’s Lexile measures to date, it does not appear that she will grow enough in reading to be prepared for that career of video game designer. If we follow that blue dashed line forward from



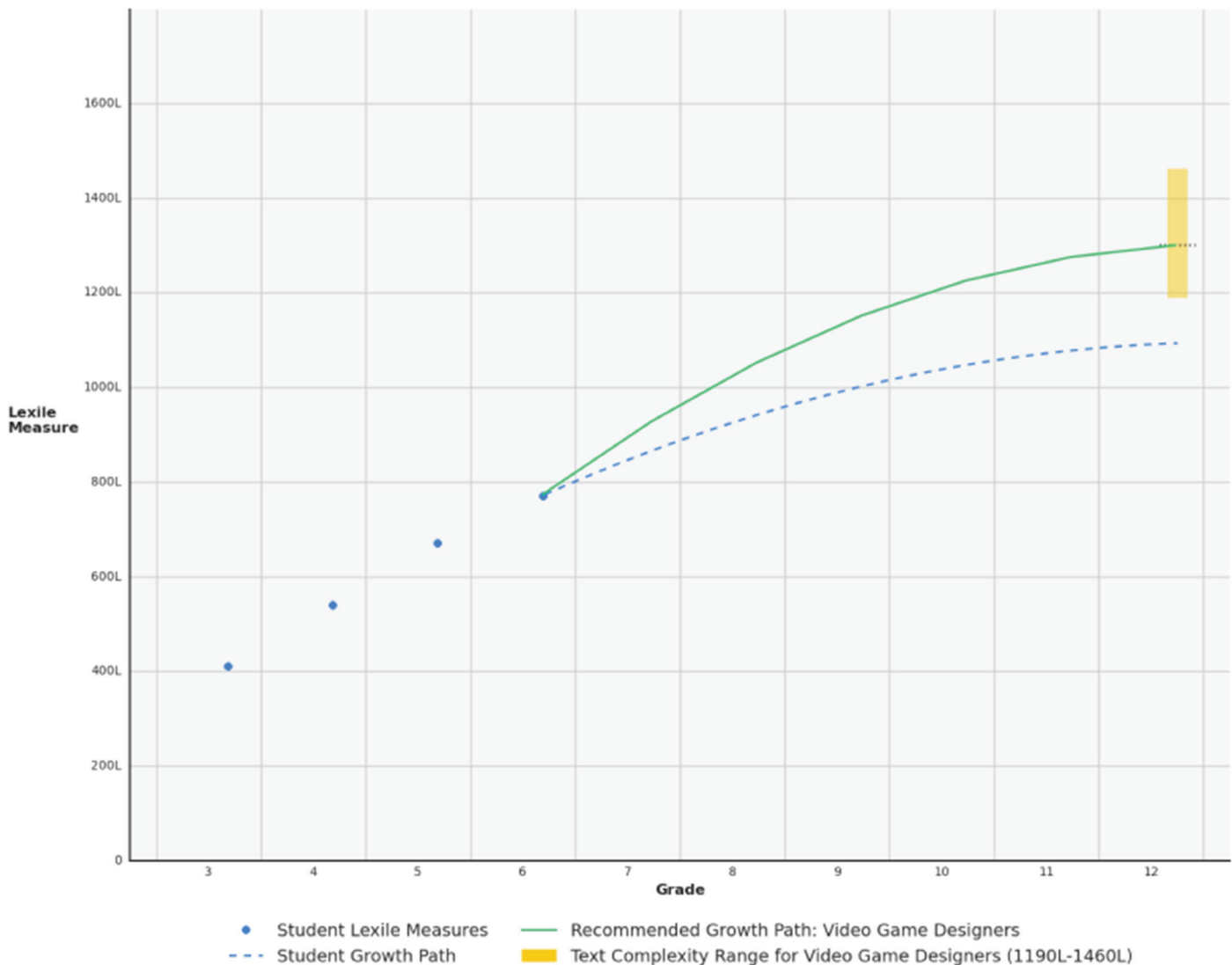
Figure 4. MetaMetrics' newest technology, the Lexile Growth Planner™ and Quantile Growth Planner™, showing the past performance and forecasted future performance of a hypothetical student.

The **Lexile** Growth Planner uses a student's Lexile measures to display his or her recorded and projected growth in reading ability. To begin, click on the **Add/edit Lexile Measure(s)** button to enter a student's Lexile measures from previously completed annual assessments.

Add/edit Lexile measure(s)

Try the Quantile Growth Planner!

Career: Video Game Designers



grade 6, we see that—unless her learning progress is altered—she will likely fall about 100L short of her goal. The green line moving forward from the grade 6 data point identifies the amount of additional growth this student needs each year to close that gap and be prepared to enter her chosen field. And with a utility like the Lexile and Quantile Growth Planners, this student, her family and her teachers can continue to monitor her progress and adjust her instruction and learning as necessary.

## Applying Lexile and Quantile Measures to ESSA Accountability Provisions

ESSA requires states to implement measures of reading and mathematics achievement to establish accountability for public education and “to ensure that every child achieves.” ESSA provides flexibility to incorporate not only student achievement measures but also measures of academic growth into state accountability systems.

The Lexile and Quantile Frameworks provide states with a way to measure growth in reading and mathematics based on actual student scores versus statistical growth models that may not be well understood by educators and parents. These measures of actual student performance can be used by states to inform policy decisions regarding setting growth targets for accountability. Teachers can use benchmark and formative assessments linked to the Lexile and Quantile Frameworks throughout the year to track individual student progress towards proficiency standards and use the data to target instruction. Additionally, the Lexile and Quantile Frameworks provide measures of career preparedness in addition to college readiness in reading and mathematics.

When improvements in student reading and mathematics achievement are tracked over time with the Lexile and Quantile Frameworks, there are two simultaneous benefits: a) student attainment can be interpreted in relation to the reading and mathematics demands of future courses and careers; and b) the rate of change in student achievement over time can be compared with the reading and mathematics pathways leading to college and career readiness. This makes it possible to assess whether students are progressing at rates that are sufficient

for them to reach their academic and career goals. While this idea is certainly important for individual students to track their own progress toward specific occupations, it may also be important in monitoring the progress of groups and sub-groups of students toward broader post-secondary pursuits as well.

Finally, when states link their reading and mathematics achievement scales with the Lexile and Quantile Frameworks, the states' grade-level performance standards can also be understood in relation to the reading and mathematical demands of instructional and occupational materials. These benefits help ensure that accountability aligns more closely with instruction, while providing increased transparency for educators, parents and students. When stakeholders can conceptualize student performance more clearly within the context of curricular material, it becomes far easier to begin thinking about the kinds of remediation, intervention and enrichment that can alter students' future learning.

## Conclusion

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Reading ability and mathematical understanding are at the heart of college and career readiness. Lexile and Quantile measures quantify these abilities and can be used to monitor growth towards evidence-based, grade-level benchmarks for college and career readiness.

New ESSA requirements for flexibility afford states a tremendous opportunity to transform their accountability systems to focus on student growth and the attainment of college and career readiness for individual students. Lexile and Quantile measures, and the decades of research behind them, offer the common, consistent scales necessary to track growth and monitor progress toward post-secondary goals. Additionally, because these measures are linked with a variety of materials, instructional programs and interim/benchmark assessment products, the Lexile and Quantile Frameworks help to synergize often divergent systems and help educators better gauge their work and positively impact the future learning of students.

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# About Our Authors

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DR. TERRY HOLLIDAY, PH.D., served as the Commissioner of Education for the Commonwealth of Kentucky from 2009–2015. During his tenure, the state was recognized as a leader in implementing college and career ready standards, assessments, and accountability. Kentucky was cited as a model for strategic planning and stakeholder communication strategies by numerous national organizations during Holliday's tenure. Kentucky high school graduates showed significant improvements in graduation rates and college and career ready rates during Holliday's tenure. Holliday was recognized by the National Association of State Boards of Education as the 2014 Policy Leader of the Year, by the National Board for Professional Teaching Standards as the 2015 James Kelly award recipient, and by the Association of Career and Technical Educators as the 2015 National Champion of the Year.



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