THE SCIENCE BEHIND LIGHTSAIL

Learn about the research basis behind LightSail in this white paper developed in collaboration with MetaMetrics®, a leading educational research organization, recognized worldwide for its distinct value in differentiating instruction and personalizing learning. The paper reviews the science and the classroom-based evidence that form both LightSail's theory of action and its product thesis: Access + Engagement + Motivation = Mastery.

The paper is designed to support educators with the research they need to understand if LightSail is right for their districts.

EXECUTIVE SUMMARY

The fundamental purpose of this paper is to support school district decision makers by providing the research basis behind the LightSail product. To that end, this paper introduces LightSail, describes its structure and delves into the theory of action that promotes LightSail usage to improve student learning. In the process, we will provide a broad review of the science that grounds LightSail. By doing so, we aim to help decision makers understand and validate the LightSail product thesis for themselves.

This review was conducted in conjunction with the research team at MetaMetrics®, an organization focused on developing scientific measures of academic achievement, including Lexile® measures of text complexity and student development toward college and career goals. The MetaMetrics team has over 200 years of teaching experience at the elementary through university level and its products serve 55 million students across over 14,000 districts and 100,000 schools.

This paper is focused specifically on the science and research literature supporting LightSail's product thesis: Access + Engagement + Motivation = Mastery. The review will not address the technical aspects of LightSail, or possible integration of LightSail into local technology environments; those can be found at http://edu.lightsailed.com/technology.

We begin with a general description of LightSail—its design features and implementation characteristics. Next the reader is introduced to The Lexile® Framework for Reading which LightSail uses to measure student reading ability and the text complexity of reading materials.

The main body of the paper reviews the research and the classroom-based evidence that form both LightSail's theory of action and its product thesis. The fundamental insight is that the LightSail product thesis is strongly supported.

THE LIGHTSAIL® READING APPLICATION

In the most general sense, LightSail is a personalized learning application designed to foster reading engagement and to facilitate students' academic growth. Specifically, LightSail is distinguished by the broad range of reading material it offers within an engaging and motivating reading experience that generates actionable data to monitor and guide student learning.

DESIGN

One differentiating feature of the LightSail application (http://lightsailed.com/) is that it offers access to a robust library of digital books (currently over 80,000 titles) across a variety of topics, genres, and levels. Content coverage in the LightSail library is diverse, including: science, mathematics, social studies, history, and economics. The library provides both nonfiction and fiction, including classical literature and winners of the Hugo Awards, the John Newbery Medal, and the Man Booker Prize, among others. The LightSail library contains both English and Spanish content and reflects cultural interests for African-American, Asian-American, Native American, and Latino American students. The LightSail library is designed to support teachers in classrooms ranging from grades 2 – 12.

The LightSail application incorporates state-of-the-art embedded assessments to determine each student's reading level and to monitor the development of reading ability over the course of the school year. LightSail's placement test, The LightSail Power Challenge™, is administered at the beginning of a student's experience with the application. This assessment provides a mechanism for matching students with appropriately complex texts starting with their first LightSail reading experience. Subsequently, unobtrusive text-embedded assessments provide continuous measurement of student reading ability and comprehension. The system uses a variety of assessment types, including cloze, multiple-choice and short written-response assessments. Students answer questions as they read and receive instant feedback on responses to multiple-choice and cloze questions as well as feedback from teachers on written response questions. Students' reading performance is continually updated as they progress.

The use of text-embedded assessments and real-time analytics makes it possible for LightSail to provide students *and* teachers with immediate, actionable data about

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student reading behaviors and abilities. LightSail provides easy-to-read performance reports, which display summaries of time spent reading, number of pages read, and current measures of student achievement and growth over time (both quantified on the Lexile® scale). Teachers are able to monitor student reading performance and provide support in real time.

The premise behind the design of the application is that LightSail engages students through several psychological motivators. LightSail allows the users to choose titles and authors that they are excited to read. In addition, LightSail provides instructional tools such as an annotation feature that allows students to record notes about the texts they are reading, collaborative dialogue tools to enable students and teachers to comment and discuss titles being read, and a text-embedded dictionary. Students also have access to a full portfolio that catalogues past work on annotations and assessments. It also includes a personalized vocabulary word wall and a badge library that highlights and rewards continuous student achievement. Custom data dashboards show students their current and predicted Lexile growth as well as other achievement metrics.

IMPLEMENTATION

While students are reading, LightSail monitors reading behaviors and comprehension, and provides real-time feedback to students and teachers. A student begins working in the application by taking The LightSail Power Challenge™ placement test, which generates an initial Lexile measure that reflects his or her reading level. The system then presents the student with a personalized library based upon those results. Books that are within the student's zone of proximal development (Vygotsky, 1978) are called *Power Texts* and have a Lexile text complexity measure within 100L of the student's demonstrated reading ability. *Power Texts* are indicated to students by a lightning bolt icon.

As students read, completion of text-embedded assessments in the *Power Texts* produces measures of students' reading abilities. LightSail employs a Bayesian scoring algorithm within the application to provide continually updated measures that reflect reading progress. The Bayesian engine incorporates the student's raw score from the thirty most recent cloze assessments, as well as the prior Lexile measure and uncertainty of that prior score. In this way, the engine quantifies the degree of uncertainty of a student's performance each time a measurement is taken. Over time, the data then allows

LightSail to estimate the growth that is likely to have occurred since the last Lexile cycle, or a new "ability estimate." And, as more measurements are taken, the engine produces greater statistical precision and can therefore more accurately match students with appropriate texts and provide more accurate data to teachers.

The *LightSail Technical Guide* (MetaMetrics 2015), which can be found at http://edu.lightsailed.com/MMtechnicalguide, provides users with Lexile Framework validity and reliability data, as well as a broad research foundation for the LightSail assessment components. Such research is essential when deciding if and how the LightSail assessment results should be used and what kinds of inferences about readers are permissible.

AVAILABILITY

LightSail supports any 2-12 reading program or model, from independent reading to small group instruction or whole class reading. It is designed to enhance current approaches to literacy instruction—not to change them. The LightSail application has been available for download on iPads since 2013 and on Android and Chrome devices since 2016.

THE LEXILE FRAMEWORK FOR READING

DESIGN

In a general sense, The Lexile Framework for Reading developed by MetaMetrics helps teachers and educators link assessment results with reading instruction. More specifically, the Lexile Framework is a psychometric system for matching readers with texts of appropriate difficulty. This is possible because the Lexile Framework is able to place both the reader (ability) and the text (complexity) on a single measurement scale. Thus, a Lexile measure is the numeric representation of an individual's reading ability or a text's complexity (or difficulty). A Lexile measure is specified as an Arabic numeral (up to four digits), followed by an "L" (for Lexile). The Lexile scale is a developmental scale for reading, which ranges from below 0L for emerging readers and beginning texts to above 1600L for advanced readers and texts. Values at or below 0L are also reported with a Beginning Reader (BR) code.

In this way, the engine quantifies the degree of uncertainty of a student's performance each time a measurement is taken. Over time, the data then allows LightSail to estimate the growth that is likely to have occurred since the last Lexile cycle, or a new "ability estimate." And, as more measurements are taken, the engine produces greater statistical precision and can therefore more accurately match students with appropriate texts and provide more accurate data to teachers.

Extensive information about the development of the Lexile Framework can be found in the "Research and Publications" section of the Lexile website (http://lexile.com/research-and-publications/). Lennon and Burdick (2014) provide a detailed description of each component of the Lexile Framework.

IMPLEMENTATION

A Lexile text measure is obtained through analyzing the text complexity of a book or a piece of text. The Lexile® Analyzer, a software program specially designed to evaluate the reading demand of text, analyzes the text's semantic and syntactic characteristics and assigns it a Lexile measure. All reading materials in the LightSail library have been assigned Lexile measures to quantify their respective text complexities.

A Lexile measure for a reader is typically obtained by administering a test of reading comprehension. The LightSail Power Challenge™ and embedded cloze assessments are reported on the Lexile scale. Because both readers and texts are measured using the same scale, it is possible to match readers with texts of appropriate difficulty to facilitate reading improvement AND measure progress.

LightSail builds the rigor and transparency of the Lexile Framework directly into each reading experience. Districts who adopt the LightSail application for student reading time gain visibility into each reader's developing reading ability, helping to measure (and project) progress - all without the disruption and pressure of high-stakes tests.

THE LIGHTSAIL PHILOSOPHY

The LightSail team is comprised of acclaimed teachers, school administrators, and education advocates who joined together to create the LightSail literacy solution. The thesis behind the LightSail product is distilled from years of evidence-based practice and research into education, psychology and neuroscience. It expresses a theory of action that underlies how students read and learn. LightSail has reduced the years of research and teaching success into a potent formula, which guides the product's focus. In the next few sections, we explain how LightSail's formula – Access + Engagement + Motivation = Mastery – is supported by the research.

ACCESS

Access is defined as the ability of students and teachers to find texts that are interesting, engaging, and further the educational goal of creating a literate and educated citizenry. In the best-case scenario, students have access to appropriate texts based on students' interests and current reading abilities as well as school district learning goals.

Benefits of Access. The primary benefit of access is a greater variety of choice. Research indicates that greater choice (a breadth of texts and the ability to select interesting texts) has positive benefits when it comes to improved comprehension and increased reading stamina.

Choice. In 2003, researchers Guthrie and Davis suggested that when students are given control over aspects of their learning (e.g., choosing what to read), it leads to independent thinking, greater personal responsibility for the activity, and feelings of autonomy (Guthrie and Davis, 2003). Additional research states that access to texts of interest, enhance student motivation to read independently (Guthrie & Humenick, 2004).

Improving Comprehension. Research also finds that self-initiated reading practice predicts students' knowledge of topics as well as their proficiency in vocabulary and text comprehension (Renck-Jalongo, 2007). In fact, interest may have an effect above and beyond the impact of prior knowledge and intelligence, as the relationship between interest and text is relatively independent of student age, text type, and the kind of comprehension test (Schiefele, 1991).

Building Stamina. There is substantial evidence that the amount of time spent reading is positively related to reading comprehension (Allington, 2012, 2009; Elley, 1992; Leinhardt, Zigmond & Cooley, 1981). Students are motivated to read for longer periods of time when they have access to texts that are personally-selected and are at an appropriate level. As students' performance on assessments improve, the LightSail application adjusts by offering students interesting texts at their new, higher ability levels. In this way, students experience sustained growth in their reading abilities. Access to appropriate texts is the beginning of an important cycle, which next leads to engagement and motivation, which in turn lead students to persist in the reading endeavor, all the while improving their stamina for reading.

Students who have access to more texts that are matched to their specified interests, read more actively and engage in more literacy activities; furthermore, students tend to read more, on average, and report more time spent participating in literacy activities when exposed to texts that match their reading interests (Kim, 2007).

LightSail's Approach to Access. LightSail is designed to empower students by providing a broad choice of reading materials in real time and within a student's zone of proximal development. LightSail's content experts help districts provision and curate digital libraries across publishers, genres and classroom subjects to unlock the power of access for each of their students. LightSail provides broad access to reading materials with the goal of fostering student choice, through libraries personalized by interest and ability.

ENGAGEMENT

Engagement refers to the manner in which students interact with personalized libraries, interesting and "just right" texts, and assessments aligned with proficiency-based standards and college and career readiness goals. It encompasses reading behaviors and students' responses to formative assessments that are aligned to the Lexile measures of their associated texts.

Benefits of Engagement. When students read text at their levels, they experience optimal reading comprehension for learning (Crawford, 1978; Squires, Huitt & Segars, 1983; Fischer et al., 1978; Five, 1986; and Heibert, 1998.) Crawford (1978) found that student success (as measured by a post-test taken after an instructional experience) was higher when the difficulty of instructional materials was matched with student ability (as measured by SAT Verbal and SAT Total scores). Furthermore, Squires, Huitt and Segars' synthesis of results from prior studies found that optimal student learning occurred when elementary students successfully responded to approximately 75% of the instructional tasks they were given (e.g., reading tasks, teachers' oral questions).

Some of the same research that supports student *Access* also suggests that students are more engaged, motivated readers when they personally select texts of interest (Kim, 2007; Guthrie & Humenick, 2004). Self-directed reading may predict a student's knowledge of topics as well as their proficiency in text comprehension, and interest may have an effect beyond the impact of prior knowledge and intelligence (Renck-Jalongo, 2007;

Schiefele, 1991). Additionally, engaged readers are typically higher achievers who read more often (Guthrie, 2004; Kirsch et al., 2002; Fischer et al., 1978; and, Wigfield & Guthrie, 1997). In international studies both within and across nations, reader engagement is positively correlated with student achievement (Kirsch et al., 2002). Furthermore, when students are given control over aspects of their learning such as choosing what to read, it leads to independent thinking and more personal responsibility for activities–both of which foster improvements in student learning (Guthrie & Davis, 2003). Five (1986) reported that appropriate selection of reading materials facilitates reading practice and comprehension, while Hiebert (1998) made a compelling case that having appropriate text matters in learning to read.

Hanlon (2013) investigated the effects of deliberate practice on reading achievement in the context of an online learning platform. In his study, *deliberate practice* was operationalized in terms of five characteristics of the reading experience: a) targeting (within +/- 100L of the reader's ability); b) feedback; c) distribution (over time); d) intensity; and e) self-direction (participants chose when to read and what to read). He found that "controlling for initial reading ability and socio-economic status, participants that engaged in more deliberate practice grew at a faster rate and achieved a higher estimated ability than participants that completed less deliberate practice" (p. 204).

FOSTERING ENGAGEMENT WITH LIGHTSAIL

When using LightSail, student engagement is fostered through three strategies: personalization, ongoing embedded assessments throughout each text, and student activities mapped to proficiency-based standards.

Personalization. Three types of personalization are delivered through LightSail: personalized libraries, personalized learning, and reading experiences targeted to an individual's zone of proximal development.

Personalized Libraries. As seen above, *Access* is based on the wide-ranging availability of texts in an extensive LightSail library. *Engagement* builds on *Access* by locating specific texts that optimally match the interests and reading abilities of individual students. Thus, a student is presented with his or her own personalized reading library, which is matched to the individual's ability. Books that are within the student's zone of proximal

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development are called *Power Texts* and have a Lexile text complexity measure within 100L of the student's reading ability. Students can identify their current *Power Texts* by looking for the *Power Text Shelf* or looking for a small green lightning bolt on the cover of a text. Because reading ability changes as a student develops, the personalized library is continually updated to match the reader. Each student is prompted to read texts at a "just-right" level to optimize growth. As a result, students have an adaptive learning experience. As students grow, their LightSail libraries grow with them.

Personalized Learning. In LightSail, an individual's daily progress is monitored with assessment questions, which are built into every text. Unlike other solutions, all texts in LightSail come complete with their own embedded assessments. Because students take assessments throughout each text, the LightSail application is able to produce ongoing measures of students' reading abilities as they learn and grow. Classroom snapshots provide teachers with real-time insight into student reading comprehension as well as behavior, such as time spent reading and number of pages read. Teachers can view up-to-the-minute classroom progress across multiple performance metrics.

Driving Personalization in the ZPD. LightSail's personalized libraries of *Power Texts* and personalized learning experiences rely upon the ability to measure a text's complexity and match the text with an individual student's reading level. To accomplish this goal, LightSail has integrated The Lexile Framework for Reading into the application. By presenting the reader with *Power Texts* that are within 100L of the student's reading ability, the reader is placed within a zone of proximal development (ZPD) (Vygotsky, 1978). LightSail's social network and communication tools enable the reader to receive support from peers and/or teachers, thus actualizing the learning experience within their ZPD. This strategy creates a personalized reading experience, which not only helps the reader to understand their current reading abilities, but challenges the reader to grow (Dweck, 2015). As a reader seamlessly moves up the staircase of text complexity based on assessment performance, the LightSail software adapts his or her personalized library in keeping with the student's current zone of proximal development. Thus, the ZPD is advanced with the reader's growing ability.

LightSail's Cloze Assessments. For students using LightSail software, reading ability is continuously monitored through engagement with *Power Texts*. In these books, students complete embedded cloze assessments as they read. The cloze assessments appear in couplets approximately every one to three pages in the text.

As the student approaches her 30th cloze assessment, her scores on all of the preceding assessments are incorporated into the Bayesian scoring algorithm and a new Lexile measure (with an accompanying statistical estimate of uncertainty) is produced. The updated Lexile measure makes it possible to refine the student's personalized library, thus enabling LightSail to sustain a personalized reading experience for the student.

 LightSail's suite of embedded assessments are designed to continually measure a reader's ability to comprehend texts of increasing difficulty. These assessments identify and target student reading material at an appropriate level of complexity, personalize the student reading experience, and serve as a tool for measuring reading growth.

Mapped to proficiency based standards. Standards-aligned questions provide insight into comprehension and writing skills (e.g., the ability to cite evidence from a text). In addition to monitoring student achievement and growth, assessments may help move students more quickly up the achievement ladder toward college and career readiness (CCR).

21st Century Skills. As mentioned earlier, LightSail provides content suitable to a diverse population of students, with content coverage across a variety of literary genres and academic disciplines (Tatum, 2012). LightSail assessments provide state-of-the-art measurement through multiple modalities: baseline assessments, text-embedded cloze assessments, multiple-choice assessments, and short written-response assessments accompanied by scoring rubrics to allow for grading by teachers. These assessments are aligned with highly regarded educational content standards, such as the Instructional Materials Evaluation Tool (IMET) (Student Achievement Partners, 2015) and the Common Core State Standards for English Language Arts & Literacy in History/Social Studies, Science, and Technical Subjects (Common Core State Standards Initiative, 2010). Such standards embody a widely-adopted vision of what it takes to be a literate citizen prepared for success in the 21st century.

College and Career Ready (CCR). LightSail is also aligned with the Common Core Reading Anchor Standards for college and career readiness. Lexile measures can be used to track student progress toward CCR, and Lexile reader measures also provide insights with regard to how well students may be able to understand reading materials likely to be encountered in various postsecondary experiences (Williamson, 2008), including specific occupations spanning 16 career clusters identified by the United States Department of Education (Williamson & Baker, 2013).

MOTIVATION

Access and *Engagement* both have benefits for student learning, as described earlier in this document. They also appear to be intricately linked with student motivation. *Motivation*, in turn, has its own benefits for student learning.

Benefits of Motivation. Motivation is a key factor in reading achievement and has a significant impact on the amount students read – both in amount and breadth (Guthrie et. al, 2006). Research shows that reading motivation is a predictor for how much students will read, which in turn predicts comprehension levels. A study by Guthrie and Wigfied (2000) found that students who are motivated have better comprehension and stronger reading outcomes – corroborating earlier studies, which linked motivation to higher grades (Sweet, Guthrie, & Ng, 1998) and improved scores on standardized tests (Gottfried, 1985). Research also provides evidence that students who read a lot tend to be higher achievers, and that intrinsic motivations increase the amount of reading time and contribute more strongly to achievement than extrinsic incentives (Guthrie, 2004). Wigfield and Guthrie (1997) documented that students who are intrinsically motivated spend 300% more time reading than students who have low intrinsic motivation.

How LightSail Stimulates Motivation. In LightSail, motivation is stimulated through providing real-time data (feedback) and a focus on individual growth.

Real Time Data (Feedback). When students respond to cloze assessments as they read, they receive instant feedback about their performance. Students know immediately whether they answered correctly. If not, they are provided instant, corrective feedback, which allows them to continue reading without losing the thread of meaning.

Reporting Student Performance. Summaries of student reading performance are available to the student and the teacher through LightSail data portfolios, which display a variety of reading metrics. This includes total time spent reading, total number of texts read, number of *Power Texts* read, Lexile reader measure, trend in Lexile measure over time, growth expressed in Lexile units, and predictive Lexile data. Some (reading behavior) metrics are updated with every reading session, others are updated as Lexile measures are calculated and scored – motivating further engagement. Classroom snapshots provide the teacher real-time insight into individual student reading comprehension as well as behavior, such as reading time and pages read. Teachers can view up-to-the-minute classroom progress across performance metrics. Additional reporting provides weekly updates with the number of minutes read by students on LightSail by class, school, and district.

Forecasting Student Performance. As students take cloze assessments, the LightSail application is able to place the location of the reader on the Lexile map, an annotated continuum of measured texts. Consequently, once a reader is initially measured, LightSail uses the Lexile scale to predict how well the reader will comprehend thousands of books and articles that are also measured using the Lexile Framework. When reader and text measures match, the Lexile Framework forecasts 75% comprehension for independent reading (Stenner, H. Burdick, Sanford & D. Burdick, 2007). The greater the discrepancy between the text's complexity and the student's reading ability, the greater the impact on the comprehension forecast for the student. For example, when the text has a Lexile measure 250L higher than the reader measure, the Lexile Framework forecasts only 50% comprehension. When the reader measure exceeds the text measure by 250L, the forecasted comprehension is 90%. Stenner, Burdick, Sanford and Burdick (2007) described the mathematical basis for determining the impact that the reader-text discrepancy has on comprehension rate.

In addition to helping personalize the reading experience for students, the data provided by LightSail's embedded assessments can help educators make better-informed decisions about materials selection, particularly in cases where differentiated instruction is the goal. Furthermore, the results of LightSail assessments provide valuable information for teachers whose students require extra attention in reading, such as students

requiring an Individualized Educational Program (IEP) or students who are classified as English Language Learners (ELL).

Transparency for Student and Teacher. The instant feedback provided to both students and teachers creates an unparalleled transparency for the learning process. Students and teachers are empowered with knowledge and the ability to engage in real-time discussion of student insights and questions. The continuous feedback, coupled with student progress, enables and supports a mindset focused on growth.

Focus on Individual Growth. One of the premises of LightSail is that when students can see their own progress and monitor their own growth, they are more likely to develop a growth-oriented mindset and therefore are more inclined to focus their energies on self-improvement.

Fostering the Long-Term View of Growth. LightSail fosters a focus on growth through its real-time data feedback and its ability to forecast student performance. Unlike many assessment systems that permit only occasional status monitoring through a summative approach to student learning metrics, LightSail employs continuous, real-time measurement and feedback to build a long-term picture of learning. The longer a student engages with texts on LightSail, the more learning data is captured and the longer the student's history of measured performance and academic growth.

Building Stamina. Access to interesting texts that are within a student's ZPD encourages student *Engagement* through personalized libraries and adaptive assessments. When students improve their reading abilities they are intrinsically rewarded, which in turn motivates them to persist in their efforts to improve. This continued practice fosters stamina, or the capacity to persevere in their reading. As noted earlier, research has shown that volume of reading is correlated with reading comprehension (Allington, 2012).

Increased Reading. Not only does LightSail make it possible to measure students' reading abilities over time, it also provides measures of students' reading behaviors such as time spent reading and number of texts read. Students are rewarded with recognition badges and teacher feedback, as well as visualizations of their own progress. The LightSail application deploys positive reinforcements to encourage increased reading;

in turn, these extrinsic tools help build intrinsic motivation. Thus, commitment to read and time spent reading are both encouraged and monitored in the instructional setting.

MASTERY

Demonstration of mastery of literacy at each stage of the learning journey is the ultimate payoff for students using LightSail. Research has indicated that the cycle of *Access*, *Engagement*, and *Motivation* is conducive to mastery through accelerated reading achievement.

Focus on Literacy Goals. Students' Lexile measures can be used to identify reading materials that students are likely to comprehend with 75% accuracy. Both students and teachers can set goals to improve reading comprehension and plan clear strategies for reaching those goals using texts from the appropriate Lexile ranges.

Students. As a student's Lexile measure increases, the level of reading materials she can likely comprehend at 75% accuracy changes. Measurable goals can be clearly stated in terms of Lexile measures. For example, a student could set the goal of meeting the reading anchor standards for CCR (which can be expressed as Lexile measures) by the time the reader reaches the applicable grades.

Classes. Teachers can monitor not only reading comprehension, but also reading behaviors of students. Consequently, a teacher could specify goals for increasing the amount of time students spend reading during a week, as well as the amount of improvement expected.

School Districts. School districts often are responsible for evaluating educational programs and must provide evidence of meeting literacy goals. To help with such endeavors, LightSail provides a weekly report aggregated at the class, school and district level. Examples of measurable goals for a reading intervention program might include:

> **Goal:** At least half of the students will improve reading comprehension abilities by 100L after one year of exposure to a reading intervention program.

The LightSail application deploys positive reinforcements to encourage increased reading; in turn, these extrinsic tools help build intrinsic motivation. Thus, commitment to read and time spent reading are both encouraged and monitored in the instructional setting.

Goal: Students' attitudes about reading will improve after reading 10 texts within 100L of their demonstrated reading ability.

RESEARCH SUPPORTS ACCELERATED READING ACHIEVEMENT.

ACCESS + ENGAGEMENT + MOTIVATION = MASTERY

Based on a review of the research, there is ample evidence to support the efficacy of each one of the components of LightSail's design thesis as it contributes to accelerated reading achievement. While little research exists to document the outcomes achieved when all of these components are simultaneously integrated in a digital literacy solution, our hypothesis is that use of the LightSail application should result in improved student outcomes, including:

– *Increased motivation,*

– *Reading comprehension growth, and*

– *Competence (attainment of specific literacy goals).*

SUMMARY

This paper has provided a review of research related to the LightSail product thesis. The LightSail philosophy is based on the years of practice of the master teachers who helped to develop it, the available research around what works to promote literacy in K-12 education, and a commitment to study and document the efficacy of the LightSail solution on an ongoing basis. The fundamental insight is that the LightSail product thesis is strongly supported by this review of the research.

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