Principles of Scientific Based Research in MobyMax

Students who have spent just 20 hours using MobyMax average one full grade-level increase in both math and language. These results are due to MobyMax's pedagogy, which incorporates multiple research-based techniques that have proven highly effective in increasing student achievement.

Formative Assessment

There are four decades worth of empirical evidence attesting to the instructional dividends of the formative assessment process. Reviews of more than 4,000 research studies show clearly that when formative assessments are well implemented in the classroom, it can essentially double the speed of student learning.

In fact, research shows that the formative assessment process is so effective that different teachers can use it in diverse ways and still produce great results with their students.

MobyMax takes formative assessment to a whole new level by continually monitoring student progress from the moment a student begins the diagnostic placement test in a subject. Teachers can immediately see every exercise a student has completed and make informed instructional decisions based on Moby's easy to use data dashboards.

Accelerated Curriculum

Moving gifted students through the curriculum at an accelerated rate has been shown to yield significant gains in student achievement (Kulik and Kulik, 1984). Acceleration vastly outperforms enrichment in terms of student outcomes for gifted students, and some research suggests that this effect may extend to non-gifted students as well. MobyMax capitalizes on this research by differentiating learning for each student, filling in any gaps in student learning first and then allowing the student to move through the curriculum at an individualized pace. When a student fails to master material, they receive remedial instruction, and conversely, when a student is able to demonstrate rapid mastery, they are able to move forward more quickly.

Mastery Learning

The use of formative assessment for student feedback paired with appropriate corrective procedures in the classroom has dramatically improved student performance in all subject areas. In a 1984 study, renowned education scholar Benjamin Bloom determined mastery learning students performed one standard deviation above the average student, outscoring 84% of students in conventional classrooms.
What’s more, 70% of mastery learning students attained summative achievement reached by only 20% of conventional classroom students, while also showing significantly more time on task in their respective learning environment.

MobyMax students are mastery learners. By providing thorough and effective feedback through diagnostic tests and formative assessments, MobyMax automatically implements the appropriate corrective procedures for each individual student. Teachers are easily able to monitor student progress towards mastery of specific standards by grade and subject.

**Immediate Feedback**

After reviewing 8,000 studies John Hattie (1992) concluded, “The most powerful single modification that enhances achievement is feedback. The simplest prescription for improving education must be ‘dollops of feedback.’”

The timing of feedback has proven to be very important, with immediate feedback proving to be the most effective. In addition, specific feedback, such as the specific explanations that accompany every problem in MobyMax, has been proven to enhance achievement.

**Motivation**

All teachers know the impact that motivation can have on student outcomes. In fact, research has shown that student motivation has a direct impact on student achievement (Logan, Medford & Hughes, 2011). Using insights from research on human motivation, MobyMax has built dozens of motivational tools—both intrinsic and extrinsic—into its platform to ensure that students are motivated to continue learning and progressing.

In addition, MobyMax is cognizant of the fact that the success of an educational program or intervention often hinges on how well the program is implemented in schools. As such, MobyMax takes responsibility for ensuring that the both students and teachers are excited about MobyMax and motivated to use the program by offering contests, rewards and other motivational tools.

**Direct Instruction**

Direct instruction is frequently confused with rote memorization and repetitive drill, both of which can be boring and negatively affect student outcomes. However, direct instruction, when implemented correctly, has been proven to foster significant gains in student achievement and result in deep and enduring understandings (Péladeau, Forget & Gagné, 2003). Direct instruction involves providing a discrete learning target with success criteria, implementing clear modeling and guided practice, and offering ample and varied opportunities to practice and extend a specific skill while providing useful feedback. MobyMax excels at harnessing the power of direct instruction.
by breaking down standards into clear learning objectives for students, providing easily understood instruction in the form of teach me lessons, and presenting students with multiple experiences to practice and develop a deep understanding of specific skills while providing high-utility feedback throughout the learning process.

**Parental Involvement**

Research indicates that the influence of a student’s home life varies widely with respect to student achievement. However, high parental expectations have consistently been shown to be one of the strongest indicators of increased student achievement (Hung & Ho, 2005). MobyMax’s parent portal allows parents to monitor student progress in real time, celebrate student successes, and become more involved in their student’s education through a single, easy-to-use interface.

**Writing**

Teaching strategies for planning, revising, editing, and writing are powerful indicators of student success (Graham & Perin, 2007). Understanding the power of writing instruction, MobyMax has implemented writing across the entire curriculum. All subjects include writing components, allowing students to gain experience with a variety of writing types and receive instruction and feedback from a variety of teachers. In addition, MobyMax has developed a standalone writing skills curriculum to harness the power of writing instruction to increase student achievement.

**Vocabulary**

Research has shown that vocabulary acquisition is important not only in the context of reading and language proficiency, but also for student success more generally in a range of different subjects (Nagy & Townsend, 2012). Based on this research, MobyMax has incorporated efficient and engaging vocabulary instruction into each of its curriculum modules. In addition, MobyMax offers a standalone vocabulary program preloaded with a research-based list of thousands of vocabulary words.

**Homework**

Homework has become a hotly contested topic in modern education. Research shows that the wrong types of homework have no meaningful impact on learning and can even undermine student motivation (Trautwein, Koller, Schmitz & Baumert, 2002). However, by providing students with quick, rigorous, and varied exercises MobyMax is able to capitalize on research that highlights the significant gains that these types of assignments can deliver. Because every practice set in Moby is accompanied by a Teach Me lesson and immediate feedback, homework on Moby is more akin to
guided and independent practice during class. The student has all the resources they need to achieve success.

**Systematic Review**

MobyMax's systematic review continually reinforces lessons over multiple years based upon a student’s proven mastery of a concept.

Newell and Rosenbloom (1981) and Anderson (1995) found that students must receive focused practice to achieve mastery of skills and that it takes more than 24 practice sessions before students reach 80 percent mastery. They also found this practice must occur over a span of days or weeks.

MobyMax's systematic review ensures that students develop enduring understandings by utilizing a systematic review cycle to revisit previously mastered material and ensure that mastery is retained.

**Goal Setting**

Research shows a consistent, positive relationship between setting goals and successfully performing tasks. To this end, MobyMax integrates IEP goals directly into the student’s curriculum and data reporting.

**Simple Cognitive Skills**

From academia to professional sports training, cognitive theory recognizes that complex knowledge is composed of simple cognitive skills and that the most efficient way to learn any complex skill is to practice each of the small, discrete skills that compose the complex task.

MobyMax’s curriculum breaks complex skills into small, achievable sub-skills, spiraling knowledge throughout a lesson to achieve eventual mastery of complex skills. This pedagogy has been shown to not only increase achievement, but also improve confidence and motivation as students master each individual sub-skill.

**Fact Fluency**

Basic concepts like addition, subtraction, multiplication, and division are the foundation for more complex math procedures. The National Math Panel’s “Foundation for Success: Final Report” (2008) advocates that all students develop automatic recall of math facts in order to be prepared adequately for higher level math. MobyMax has incorporated fact fluency directly into its
curriculum and has also created a standalone fact master module that ensures students get the practice necessary to achieve automatic recall of all math facts.

**Student Data**

Using data to inform instructional decisions leads to improved student outcomes (Wayman, 2005; Wayman, Cho, & Johnston, 2007; Wohlstetter, Datnow, & Park, 2008). MobyMax allows all parties involved in a student's education, including the student, to easily access student achievement data. MobyMax continuously monitors student progress with regard to mastery of the CCSS standards and displays the data in multiple, easy-to-interpret formats.

**Additional Research Citations**

**Formative Assessment**


**Accelerated Curriculum**


**Mastery Learning**


**Immediate Feedback**

Krause, Ulrike-Marie (2009). The effects of cooperative learning and feedback on e-learning

Opitz, Bertram (2011). Timing Matters: The Impact of Immediate and Delayed Feedback on Artificial Language Learning

Li, Shao-feng (2010). The Effectiveness of Corrective Feedback in SLA: A meta-Analysis

Feyzi-Behnagh (2012). The Effectiveness of a Pedagogical Agent’s Immediate Feedback on Learners’ Metacognitive Judgments during Learning with MetaTutor


Epstein, Michael (2002). Immediate Feedback Assessment Technique Promotes Learning and Corrects Inaccurate First Responses

Epstein, Michael (2006). Adjunctive role for immediate feedback in the acquisition and retention of mathematical fact series by elementary school students

Samuels, S. Jay (2010). The Effects of Immediate Feedback on Reading Achievement

**Motivation**


**Direct Instruction**


**Parental Involvement**


**Writing**


**Vocabulary**


**Homework**


**Systematic Review**

Smith, Troy A (2010). Learning from feedback: Spacing and the delay-retention effect


**Goal Setting**

Moeller, Aleidine J. (2012). Goal Setting and Student Achievement: A Longitudinal Study

Murayama, Kou (2009). The joint influence of personal achievement goals and classroom goal structures on achievement-relevant outcomes

Wilson, Kristin (2012). A study on student achievement of classes that set goals and self-monitor their achievement

Shannon, King R. (2011). Examining the role of goal setting and self-monitoring on sixth grade students’ motivational beliefs and performance

Smithson, Marla (2012). The positive impact of personal goal-setting on assessment

Stronge, James H. (2009). Student achievement goal setting: Using data to improve teaching and learning

Hamilton, Laura (2009). Using student achievement data to support instructional decision making

Patel, Namisha (2012). Utilizing goal setting strategies at the middle level: Helping students self-regulate behavior


**Fact Fluency**


**Student Data**


