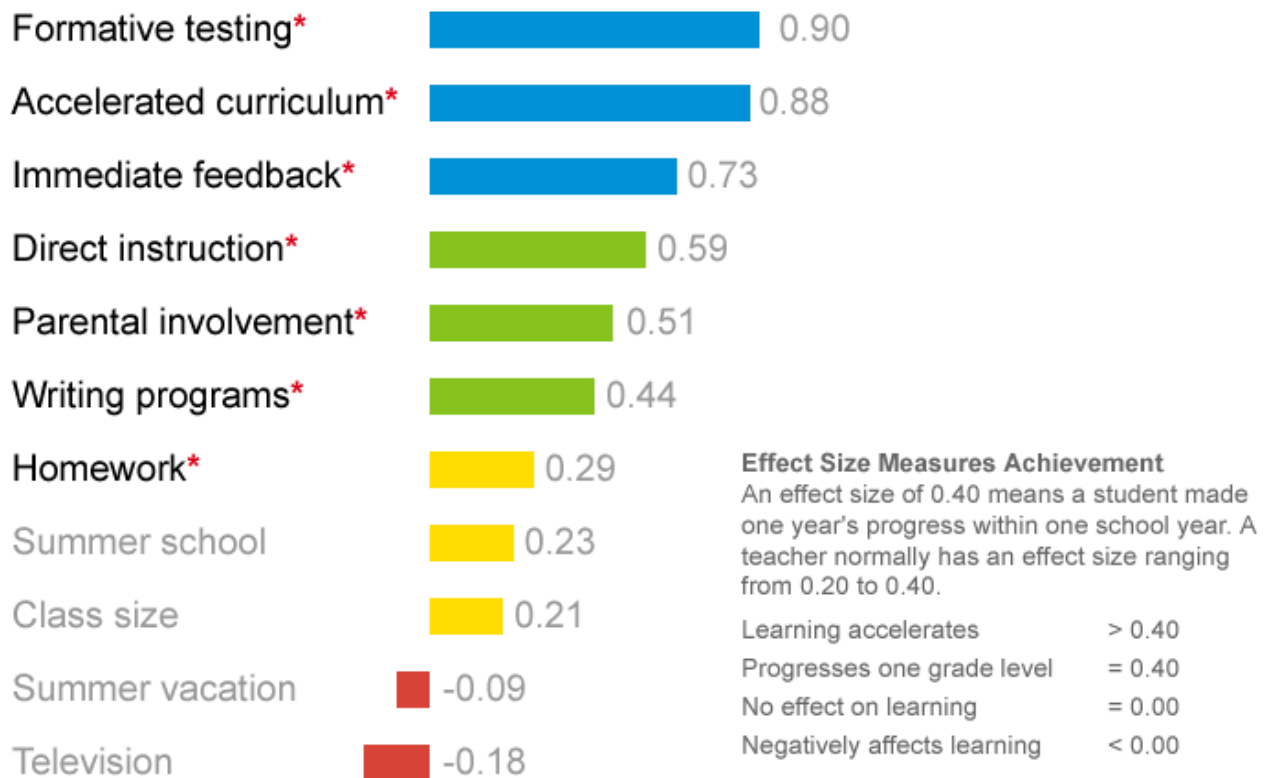# 2X Learning

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 largely to MobyMax's pedagogy, which incorporates multiple research-based techniques that have proven highly effective in increasing student achievement.

MobyMax's pedagogy and curriculum system incorporate the most effective practices for increasing student outcomes as identified by Professor John Hattie's exhaustive research of over 800 meta-analyses.
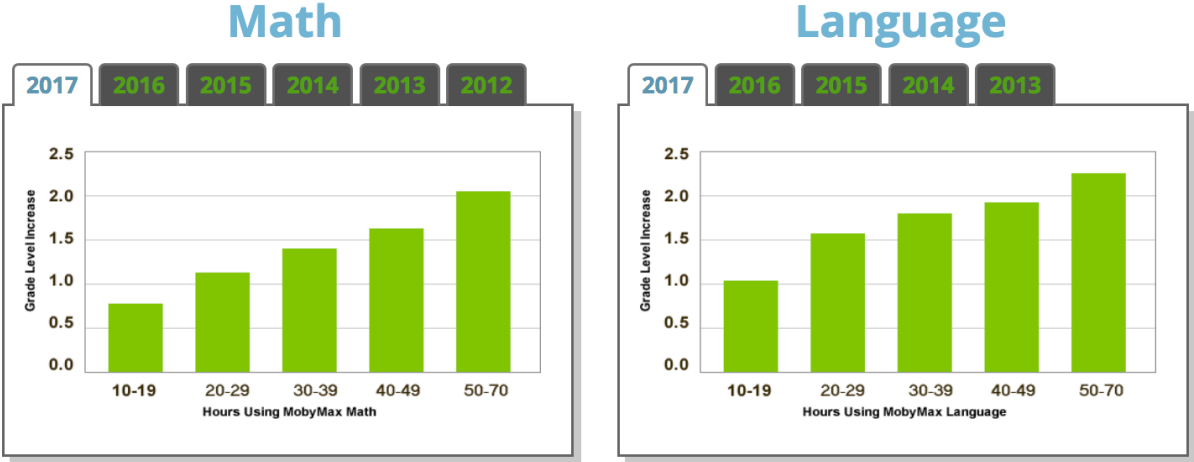
Chart is based on Professor John Hattie's research that synthesized over 1,000 meta-analyses of over 50,000 studies.

Formative testing*	0.90
Accelerated curriculum*	0.88
Immediate feedback*	0.73
Direct instruction*	0.59
Parental involvement*	0.51
Writing programs*	0.44
Homework*	0.29
Summer school	0.23
Class size	0.21
Summer vacation	-0.09
Television	-0.18

Effect Size Measures Achievement
An effect size of 0.40 means a student made one year's progress within one school year. A teacher normally has an effect size ranging from 0.20 to 0.40.

Learning accelerates	> 0.40
Progresses one grade level	= 0.40
No effect on learning	= 0.00
Negatively affects learning	< 0.00

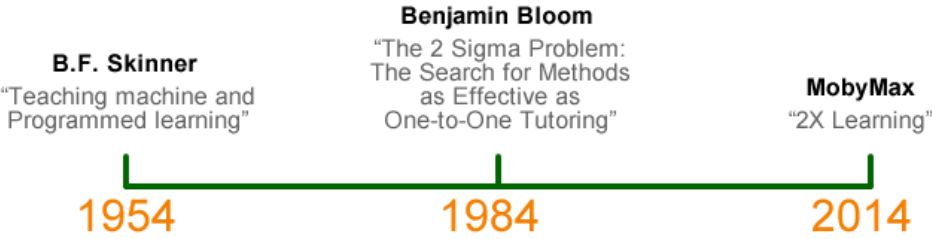*All part of MobyMax's curriculum system

Consistent MobyMax Results

Built on the back of research that identifies what works best for students and teachers, MobyMax's pedagogy has produced consistent gains in student achievement in both math and language over the past 5 years.

Math

2017	2016	2015	2014	2013	2012

Grade Level Increase vs. Hours Using MobyMax Math

- 10-19: ~0.75
- 20-29: ~1.1
- 30-39: ~1.4
- 40-49: ~1.6
- 50-70: ~2.05

Language

2017	2016	2015	2014	2013

Grade Level Increase vs. Hours Using MobyMax Language

- 10-19: ~1.0
- 20-29: ~1.55
- 30-39: ~1.8
- 40-49: ~1.9
- 50-70: ~2.25

The 60 Year History of 2X Learning

The potential for 2X learning has been realized by prominent researchers for the last 60 years.

B.F. Skinner
"Teaching machine and Programmed learning"

Benjamin Bloom
"The 2 Sigma Problem: The Search for Methods as Effective as One-to-One Tutoring"

MobyMax
"2X Learning"

1954 — 1984 — 2014

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.

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.

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.

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