StudyForge
DIGITAL CURRICULUM

41%

HIGHER THAN AVERAGE

AP EXAM SCORES

Online learning. Classroom results.

Virtual learning. Concrete success.

Can *online* AP students score high enough on their exams to receive college credit and placement?

It turns out for students of Heritage Christian Online School (HCOS) taking AP Calculus AB and BC using StudyForge's award winning curriculum, the answer is an emphatic yes! From 2015 to 2019, their AP Calculus BC students scored 12% above average, and their AP Calculus AB students scored 41% higher than average.

However, if you narrow it down to the subset of students who had a certain minimum level of healthy interaction with the curriculum, the numbers skyrocket. Read on to see how 100% of these engaged students passed the AP exam, with an 88% chance of becoming "very well qualified" (4) or "extremely well qualified" (5).

41%

HIGHER THAN AVERAGE

AP Exams

Scoring and Average results explained.

The following table[1] shows how AP scores correlate to post-secondary preparation and course grades.

1 Source: https://apstudents.collegeboard.org/about-ap-scores/ap-score-scale-table

AP Exam Score	CollegeBoard Recommendations	College Course Grade Equivalent
5	Extremely well qualified	A+ or A
4	Very well qualified	A- B+ or B
3	Qualified	B- C+ or C
2	Possibly qualified	--
1	No recommendation	--

Average Scores of AP Calculus

Scoring of AP Calculus for 2015-2019

There are two AP Calculus exams offered every year:

1

AP Calculus AB
Covers roughly the first 65% of first year university calculus.

2

AP Calculus BC
Covers the entirety of first year university calculus.

Note: If students take the AP Calculus BC exam, they are also given a sub-score for AP Calculus AB exam. Thus, if their score on the BC exam is not high enough to warrant credit for a full year at post-secondary, perhaps their AB score will be sufficient for first semester.

Worldwide AP Calculus Results

	AP Calculus AB	AP Calculus BC	
		Entire Test	AB Subscore
2015	2.86	3.72	4.04
2016	2.96	3.80	3.98
2017	2.93	3.78	4.00
2018	2.94	3.74	3.97
2019	2.97	3.80	4.04
Average	2.93	3.77	4.01

Note: In 2019, AP Calculus BC and it's AB Subscore had the second and third highest average of all the 47 AP exams offered.

Can a Virtual School Compete?

In a word? Yes.

On all three AP Calculus exam scores, HCOS students consistently achieved better results than the average AP Calculus student. It turns out students can learn math online.

AP Calculus AB

AP Avg.	HCOS
2.93	4.14

41% BETTER

AP Calculus BC

AP Avg.	HCOS
3.77	4.22

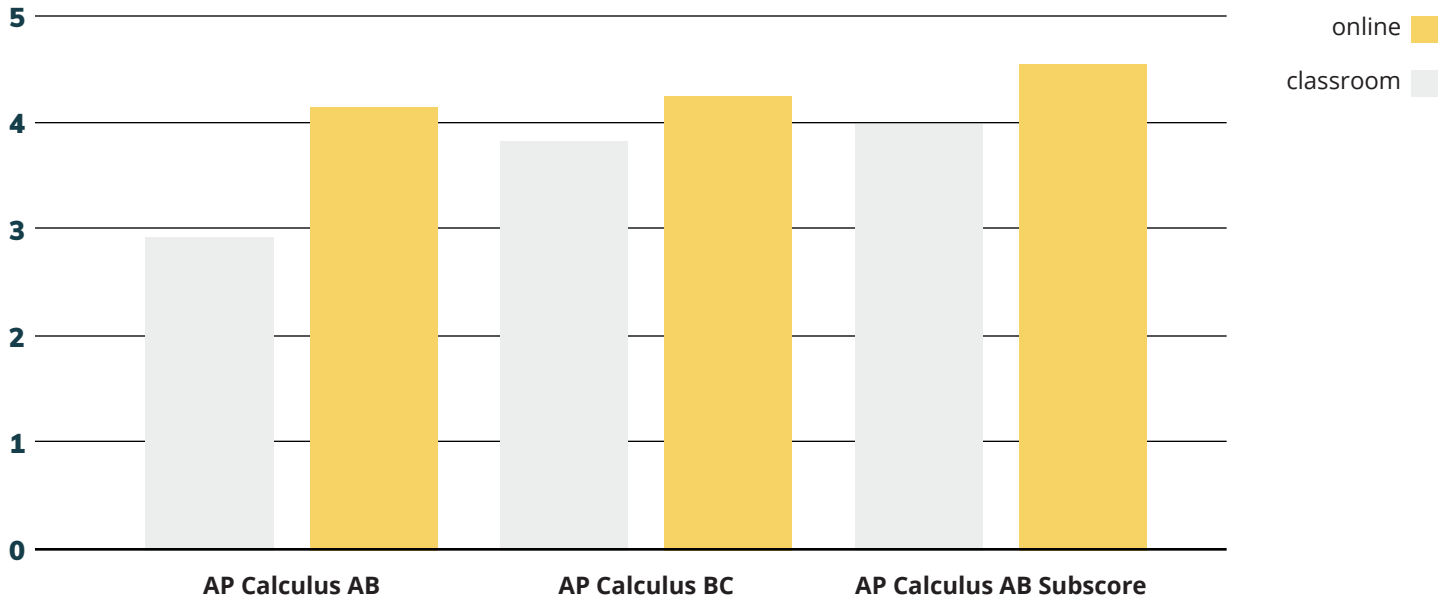
12% BETTER

AB Subscore

Ap Calculus BC

AP Avg.	HCOS
4.01	4.56

14% BETTER



What's the Secret?

Excellent video content.

Students clearly found that something special happened when they engaged with StudyForge content . See what students had to say about the StudyForge video lessons.

> I really like the explanations and the clarity of the lessons it really helps!
>
> *- Fatemeh H.*

> I like how the lessons explain everything in detail, without being too long and boring.
>
> *- Jessica J.*

> The video explanations are soooo good.
>
> *- I. Moon*

> Many of the concepts that I didn't get from school were made so easy on your lessons.
>
> *- Melody L.*

> I really love those videos...!
>
> *- Erica C.*

> I think this is extremely well organized and easy to understand. The videos and video notes are terrific.
>
> *- JunWei S.*

> It's awesome. The videos are amazing. I've never seen anything like that.
>
> *- Cissey H.*

Another Video?

Most Educational Videos are Mediocre at Best

If someone sat down to watch every video that was uploaded to youtube in the past 24 hours, they would finish watching today's content about 55 years from now. That's because every minute over two weeks of videos are added to youtube, a large percentage of which are educational videos.

Do we really need another video resource?

Yes, because not all educational videos are created equal. For example, most educational videos use the "slide-show" model, where content is visible for a second, and then gone. By the time the video is over the learner has seen pages of content, and simply can't remember it all.

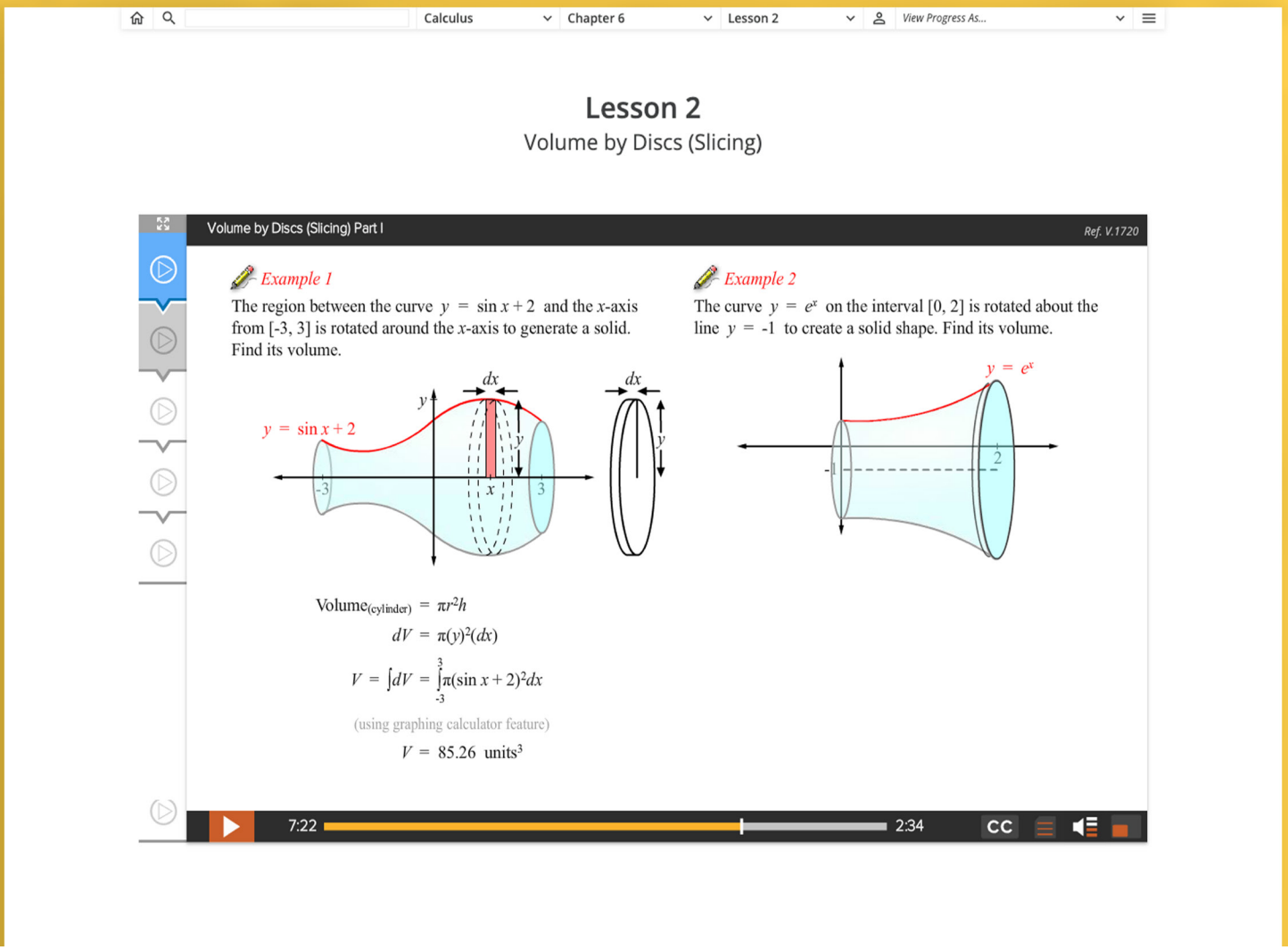
In addition, they often have multiple things happening on the screen at once and inconsistencies between what's being said, shown, and written on the screen. The student's brain is often torn between what to focus on. This results in crucial information being missed.

Congnitive Load Model

StudyForge video pedagogy is based on the best research in how the brain digests and retains new concepts.

Instructional videos in StudyForge employ the cognitive learning principles of multimedia, coherence, signalling, and more, which have been empirically proven to benefit learners.

2 Clark, Ruth C.; Mayer, Richard E. (2011). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning



Meticulously Crafted Content

6-Second Rule

Onscreen action occurs every few seconds to keep the eyes and brain focused on exactly what is discussed.

Whiteboard Model

One idea fills up the screen at a time, developing complete pictures in bite-size chunks.

Streamlined

Videos do in minutes what takes hours in the classroom, without missing information. And they're often more engaging.

Continuity Principle

Content floats from the diagram into the equation. This helps learners keep track of what came from where and not get snagged trying to figure out where that number "6" came from, missing valuable, key information.

Note-Taking Supplement

The student notes match the whiteboard and have some of the information already shown, such as questions, partial diagrams, etc., allowing for meaningful yet efficient note-taking,

Focused Attention

Student concentration remains focused through principles such as Synchronized Highlights to direct student's attention, The 6-Second Rule, where onscreen action occurs every few seconds to avoid distraction, and Media Consistency, where audio, images, and text are coordinated to avoid cognitive dissonance.

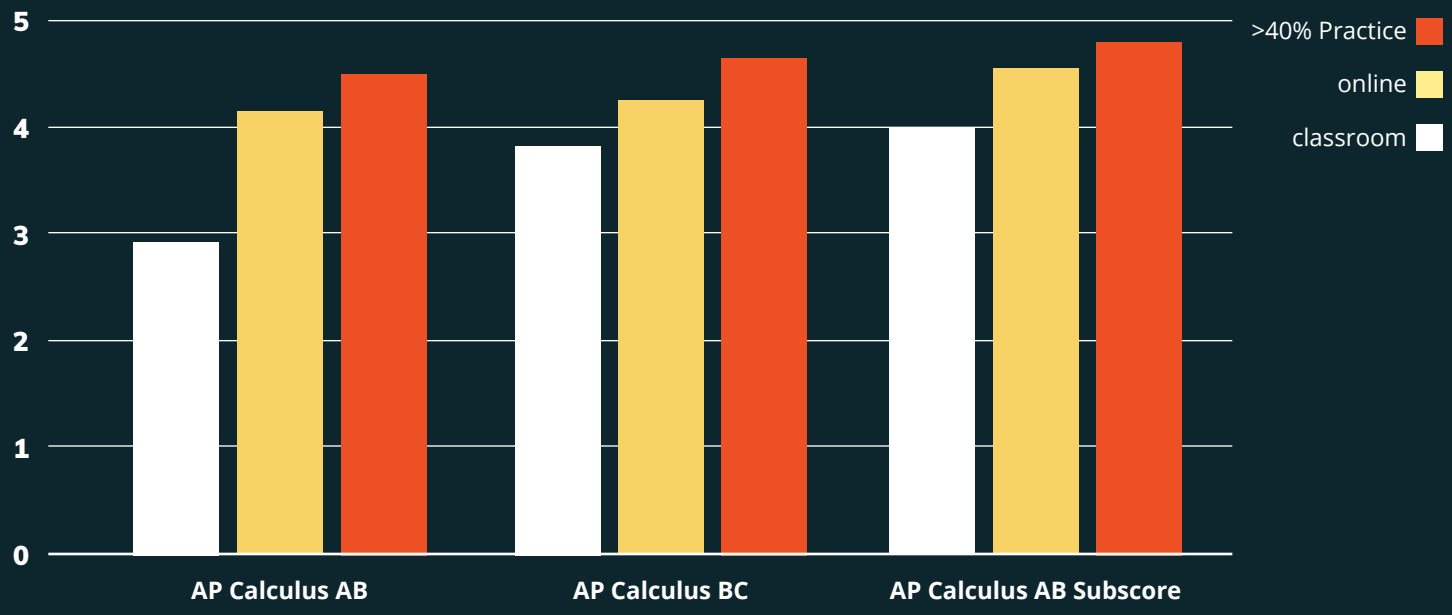
The Magical Number: 40%

How certain behaviours guarantee success.

In addition to having content that goes beyond what is possible in the traditional classroom, learning online provides certain advantages. Students can self-pace and slow down to make sure they understand concepts before moving on. These courses were set up to ensure students achieve mastery before moving on.

But there was one specific behaviour that was the greatest predictor of success: engaging with at least 40% of practice questions. Students who interacted with this base amount of practice achieved scores 57% better than the average AP Calculus AB student, and 24% better than the average AP Calculus BC Student.

In addition, 100% of students who did at least 40% of the practice questions passed the AP exam (a score of 3 or more), with an 88% chance of being "very well qualified" (4) to receive college credit and placement"

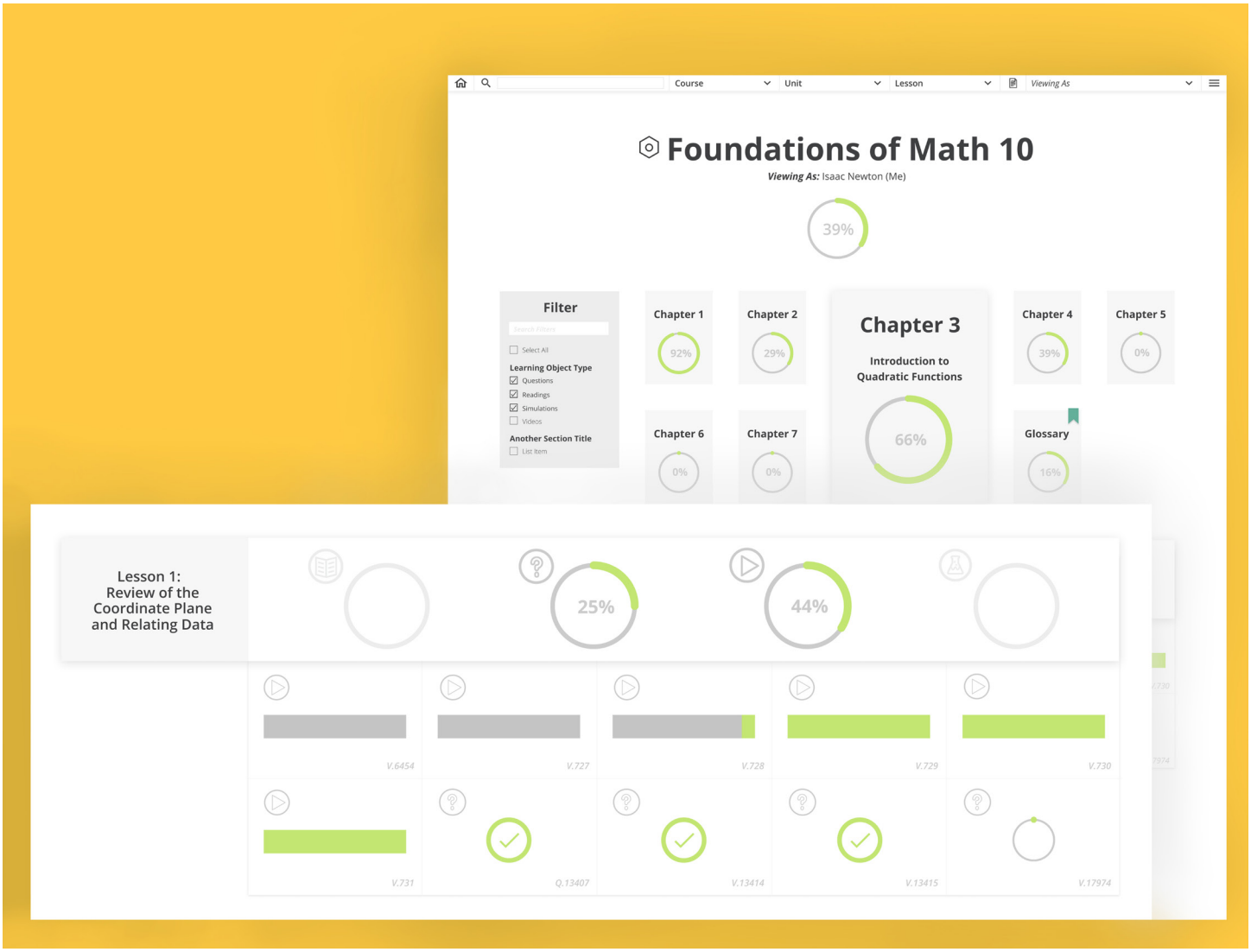


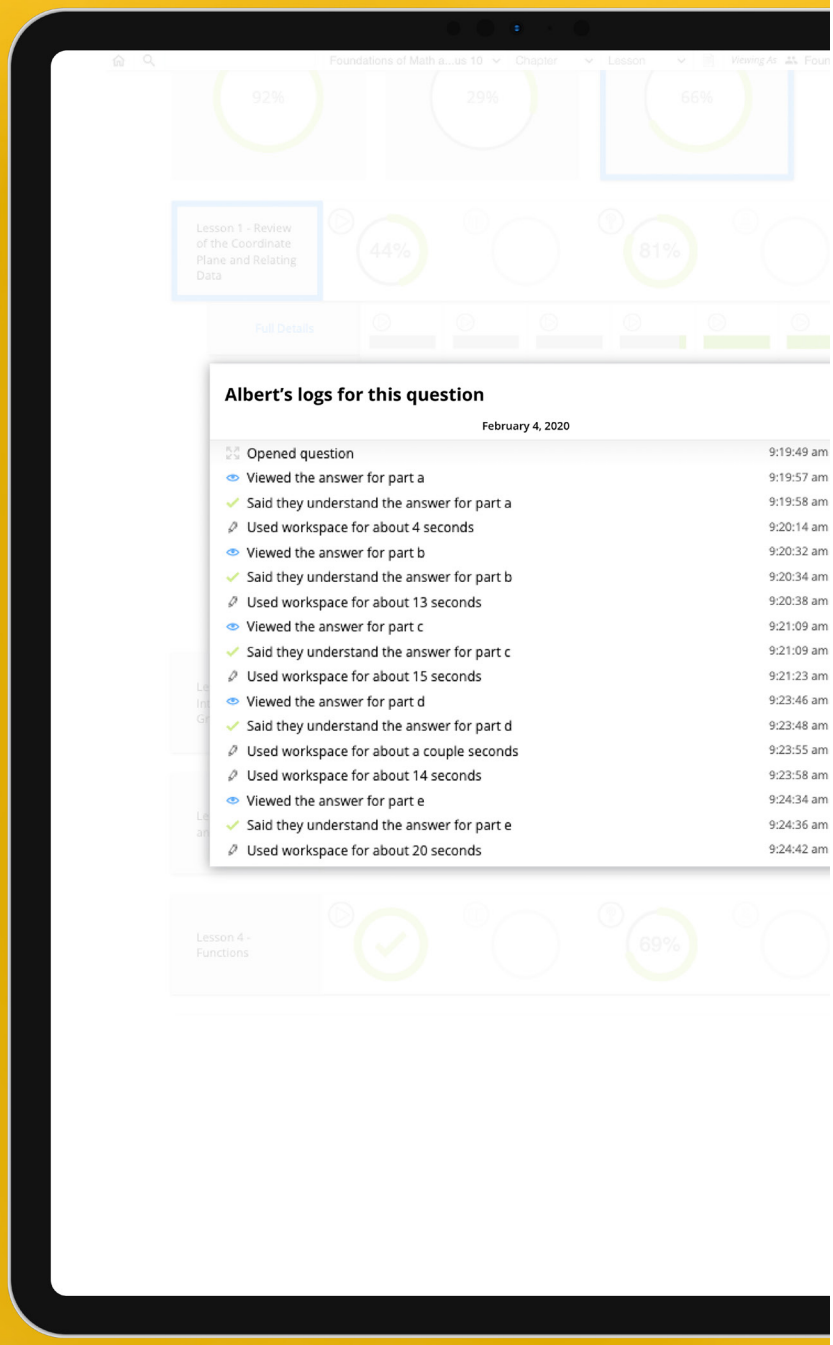
Actionable Insights

StudyForge Reports enable teachers to expertly guide students towards successful online work habits.

As stated previously, healthy work habits, such as completing at least 40% of practice questions are crucial to student success. The StudyForge platform tracks engagement, at the learning object level, reports it to the teacher, and helps them reach out proactively to students.

No other learning platform tracks interactions and behaviors at such a granular level. These insights are what allowed the discovery of the 40% magic number for extraordinary success in this course.



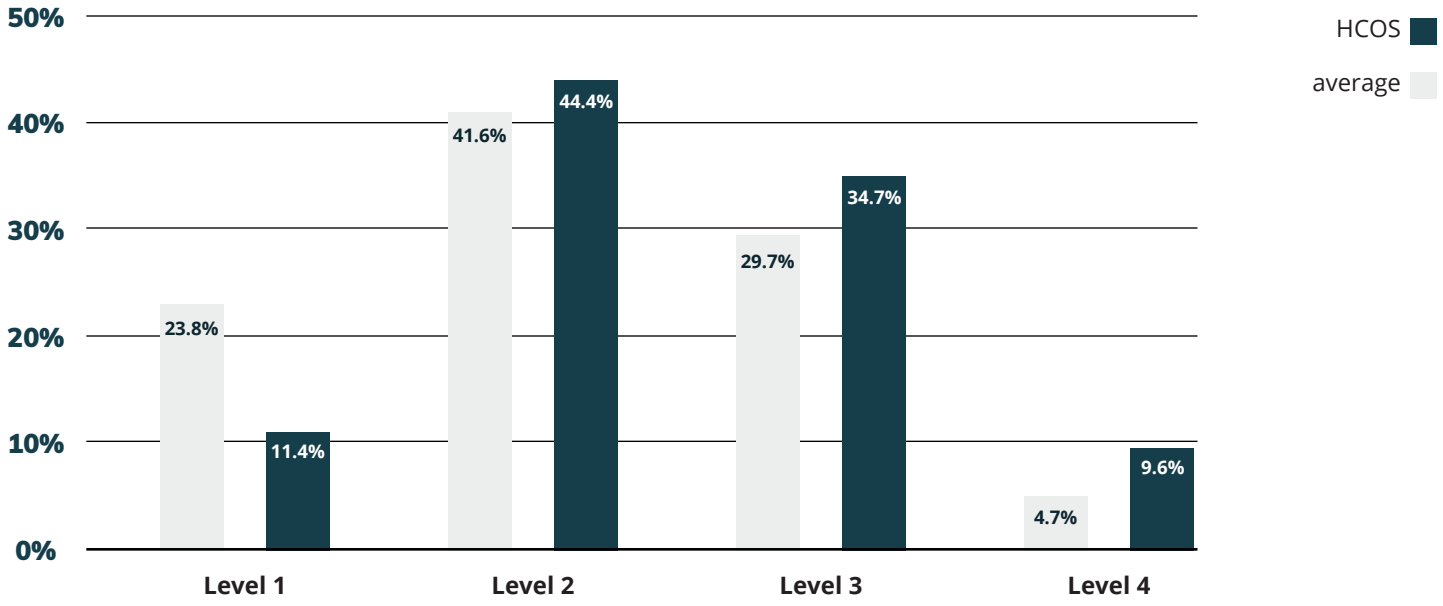

Albert's logs for this question
February 4, 2020
Opened question 9:19:49 am
Viewed the answer for part a 9:19:57 am
Said they understand the answer for part a 9:19:58 am
Used workspace for about 4 seconds 9:20:14 am
Viewed the answer for part b 9:20:32 am
Said they understand the answer for part b 9:20:34 am
Used workspace for about 13 seconds 9:20:38 am
Viewed the answer for part c 9:21:09 am
Said they understand the answer for part c 9:21:09 am
Used workspace for about 15 seconds 9:21:23 am
Viewed the answer for part d 9:23:46 am
Said they understand the answer for part d 9:23:48 am
Used workspace for about a couple seconds 9:23:55 am
Used workspace for about 14 seconds 9:23:58 am
Viewed the answer for part e 9:24:34 am
Said they understand the answer for part e 9:24:36 am
Used workspace for about 20 seconds 9:24:42 am

Consistent School-Wide Success

HCOS has seen the same level of success throughout its high school math courses.

StudyForge's outstanding content, mastery methodology, and educator tools for work-habit intervention have enabled HCOS students to experience success in all of its high school math offerings.

The same carefully crafted pedagogy is present in every course. Compared to the average of their region's high school numeracy assessment, HCOS students are twice as likely to demonstrate top (Level 4) proficiency, and half as likely to demonstrate bottom (Level 1) proficiency.



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Online Learning. Classroom Results

HCOS has been able to demonstrate that by using StudyForge math curriculum a virtual school can achieve results that exceed the performance of the classroom. They have demonstrated success across time given the 5 year sample size for the AP Calculus study. They have demonstrated success across grade levels as outlined in their numeracy results. Online learning can achieve classroom results.

"success across grade levels"

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Contact Information

WWW.STUDYFORGE.NET

INFO@STUDYFORGE.NET

888.504.3339