Synchronous and Asynchronous Learning in Virtual Schools

Division of Teaching and Learning

Office of Research, Planning, and Program Evaluation

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EQUITY AND EXCELLENCE

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Introduction

In accordance with § 2–1257 of Senate Bill 610, passed in 2023, Maryland State Department of Education (MSDE) is submitting the present report to the Maryland General Assembly on "findings and recommendations regarding the appropriate balance of the number of hours of synchronous learning and asynchronous learning for instructional effectiveness for students in virtual schools based on research that has systematically examined this issue and collaboration with local school systems."

To respond to this request, MSDE collected and analyzed data in five (5) areas:

(1) A literature review of recommended number of hours of synchronous learning for virtual programs
(2) State policies on the number of hours of synchronous learning for virtual programs
(3) Maryland local education agency (LEA) data on synchronous instructional learning time
(4) Perspectives of Maryland students/families and educators about their experiences with synchronous learning
(5) Virtual student outcomes in Maryland, including course failures in core content areas and student growth on state English language arts (ELA) and mathematics assessments, and their relationship with synchronous instructional time

The following sections describe findings from each of the areas listed above and conclude with a summary of the findings.

Background

When the COVID-19 pandemic closed public school buildings in Maryland in March 2020, schools switched to fully virtual instruction through the remainder of the school year and, in many school districts, for much of school year (SY) 2020-2021. Although all districts returned to in-person instruction in SY 2021-2022, twenty-one (21) of the 24 local education agencies (LEAs) in Maryland also offered families an option of a fully virtual program in lieu of in-person schooling. In SY 2022-2023 and in SY 2023-2024, nineteen (19) LEAs offered a virtual program. Table 1 provides a breakdown of the number of LEAs offering virtual programs by school level.

Table 1: Number of Maryland Local Education Agencies Offering Virtual Programs

School Level	2021-2022	2022-2023	2023-2024
Elementary	16	12	10
Middle	20	17	15
High	19	18	18
At All School Levels	14	11	11
At Any School Level	21	19	19

In order to offer a fully virtual program in SY 2020-2021, LEAs obtained permission from the Maryland State Department of Education (MSDE) and engaged in meetings to discuss components of the programs.[1] LEAs could choose from a blended virtual program, which was required to include both synchronous and asynchronous learning, and an asynchronous program, which had no minimum synchronous requirement. Synchronous learning is learning that happens in real-time with teachers and students in a face-to-face or virtual classroom setting, i.e., access from home via web conferencing. Asynchronous learning is learning that happens without real-time interaction or instruction by teachers, e.g., pre-recorded video lessons or assigned readings. Components of the virtual program included having a sequential curriculum that meets LEA standards, regular assessments in core areas of instruction, and the assurance that facilitators/educators are certified to teach.

[1] In subsequent years, LEAs needed to notify MSDE and obtain superintendent approval to operate full-time virtual schools/programs.

Research on Synchronous Instructional Time

A systematic review of research indicated an increase in the number of studies in the last decade-and-a-half on K-12 online teaching and learning (Martin et al., 2023).[2] However, the research has focused on topics such as student and teacher characteristics, engagement, and course design and facilitation, not on effectiveness of asynchronous and synchronous instruction or the optimal balance between the two.

There has similarly been an increase in research studies on virtual education since the onset of the COVID-19 pandemic, but these have focused on the impact of virtual education compared to in-person learning, regardless of whether the virtual learning was synchronous or asynchronous. Most studies focus on the concept of learning loss, that the effects of the pandemic, including the reduction or absence of in-person learning, had deleterious effects on student achievement. Unfortunately, the existing research literature is unable to inform the question of the appropriate balance between synchronous and asynchronous learning in virtual schools. In the absence of this research, the following sections of this report provide other data and perspectives to inform this question.

[2] Martin, F., Bacak, J., Polly. D., & Dymes, L. (2023). A systematic review of research on K12 online teaching and learning: Comparison of research from two decades 2000 to 2019. *Journal of Research on Technology in Education, 55*(2), 190-209. https://www.doi.org/10.1080/15391523.2021.1940396

Synchronous Learning Time in Other States

In order to provide context to the question of the appropriate balance between synchronous and asynchronous learning, MSDE staff researched state policies regarding synchronous learning for all 50 states and Washington D.C. Only three (3) states - Indiana, Massachusetts, and Rhode Island – were found to have requirements for the number of hours of synchronous learning within the instructional day. Across these three states, the required number of hours of synchronous learning ranged from two and a half (2.5) to four (4) hours a day.

- Indiana requires at least two and a half (2.5) hours of synchronous learning in grades 1 to 6 and three (3) hours for students in grades 7 to 12.[3][4]
- Massachusetts requires that districts and schools provide at least 40 hours of synchronous instruction over a 10-school day period across all grades, or an average of four (4) hours a day.[5]
- Rhode Island requires a minimum of three (3) hours of synchronous learning.

Additionally, other states, including Maryland and New York, set requirements for synchronous learning time only in school year 2020-2021, the first full school year in the COVID-19 pandemic. In both states, the minimum number of synchronous instructional hours per day was three and a half (3.5) hours.[6][7]

[3] Infante-Green, A. (2023). Rhode Island Department of Education virtual instruction: Guidance and application for ensuring educators, families, and students are supported during inclement weather and emergency days. Retrieved from https://ride.ri.gov/sites/g/files/xkgbur806/files/2023-08/Virtual%20Learning%20Guidance_v082423.pdf
[4] Jenner, K. (n.d.) . Guidance on instructional time for schools. Retrieved from https://content.govdelivery.com/attachments/INDOE/2022/05/26/file_attachments/2170314/Instructional%20Time%20Guidance%20Document.pdf
[5] Massachusetts Department of Elementary and Secondary Education (2022). 603 CMR 27.00: Student Learning Time. Retrieved from https://www.doe.mass.edu/lawsregs/603cmr27.html?section=all#:~:text=effective%20January%2019%2C%202021%2C%20districts,in%20the%20remote%20learning%20model
[6] Giambattista, S. (2021). 180 day requirement compliance for the 2020-21 school year. Retrieved from https://stateaid.nysed.gov/attendance/pdf_docs/Reporting%20Instruction%20on%20Form%20A%20in%202021-22%20SAMS.pdf
[7] Minutes of the Maryland State Board of Education, September 1, 2020. Retrieved from https://marylandpublicschools.org/stateboard/Documents/minutes/2020/September12020Minutes.pdf

Synchronous Learning Time in Maryland

MSDE collected data from LEAs starting in SY 2021-2022 on the number of hours of synchronous learning in fully virtual programs in a typical week. Table 2 shows the LEA average and range by school level and school year. The average synchronous learning time in SY 2023-2024 is approximately five and a half (5.5) hours per day at the elementary level and four (4) hours at the middle and high school levels. Within these averages, there is wide variation across LEAs, from approximately four and a half (4.5) to six and a half (6.5) hours at the elementary level and from two (2) to six and a half (6.5) hours at the middle and high school levels. It should be noted that, in most cases, both the average and range of synchronous learning hours has increased since SY 2021-2022.

Table 2. Number of Hours of Synchronous Learning by School Level and School Year

School Level	Measure (per week)	2021-2022	2022-2023	2023-2024*
Elementary	Mean Range	25.0 5-37.5	28.9 25-32	27.5 22-33
Middle	Mean Range	22.1 3.33-37.5	22.2 11-32.5	21.1 10-33
High	Mean Range	18.4 3.33-37.5	20.9 11-32	20.1 10-32

*Based on 17 of 19 LEAs with fully virtual programs.

SYNCHRONOUS LEARNING TIME BY SUBJECT

Twelve (12) LEAs reported that the number of hours of synchronous learning in the virtual program in SY 2023-2024 differed by core content area (ELA/reading, mathematics, science, and social studies) at any grade level.

- The number of hours of synchronous learning was similar for ELA and mathematics and for science and social studies across all school levels.
- Generally, a greater number of hours of synchronous learning in ELA and mathematics were provided for elementary and middle school but a greater number of hours of synchronous learning in science and social studies were provided for high school.

Table 3. Number of Hours of Synchronous Learning by School Level and Subject

	Average Number of Hours of Synchronous Learning (Per Week)			
School Level	ELA	Mathematics	Science	Social Studies
Elementary	8.4	7.1	3.4	3.4
Middle	3.6	3.6	3.0	3.0
High	3.5	3.5	5.3	5.3

RATIONALE FOR SYNCHRONOUS LEARNING TIME

When explaining the rationale for setting the number of hours of synchronous learning for SY 2023-2024, eight (8) of 17 LEAs indicated that the instructional day was modeled after that of in-person learning, and eleven (11) used student performance data and student and parent feedback.[8]

From SY 2022-2023 to SY 2023-2024,

- 3 LEAs reported providing a greater number of hours of synchronous learning.
- 12 LEAs reported providing the same number of hours of synchronous learning.
- 1 LEA reported providing a lesser number of hours of synchronous learning.[9]

The LEAs that increased the number of hours of synchronous learning from SY 2022-2023 to SY 2023-2024 indicated the ability to rework the schedule due to an increase in staff; realization that students needed more support, particularly diverse students; and moving personalized learning to before or after school. The LEA that indicated a decrease in number of hours indicated that upon review of the numbers reported, they realized that they needed to adjust how they were counting synchronous learning. The LEAs that did not change the number of hours indicated that they wanted to mirror in-person programs; performance data and student and parent feedback revealed satisfaction with the provided number; and there were no data suggesting that adding synchronous learning improved student outcomes.

[8] The same reasons were cited for setting synchronous instructional time in SY 2022-2023.

[9] One LEA did not have a virtual program in 2022-2023, so they could not make a comparison.

Perspectives on Synchronous Learning

To gain a more holistic understanding of synchronous and asynchronous learning in fully virtual schools, MSDE sought to hear from those participating in virtual learning. In November 2023, MSDE convened two (2) focus groups, one composed of fully virtual students and their families, and one composed of fully virtual teachers in Maryland. Participants were asked to share their perspectives on the benefits and challenges of, and the balance between, synchronous and asynchronous learning.

STUDENTS' AND FAMILIES' PERSPECTIVES

A total of ten (10) virtual students and/or families of virtual students from five (5) LEAs in grades 2 to 12 participated in the focus group.[10] Several families had multiple children in virtual schools and several families/students had health issues or special learning needs..[11]

Participants identified the benefits of synchronous instruction included:

- the ability for students to receive quick and live feedback
- real-time interactions with the teacher and other students

The challenges of synchronous instruction that were mentioned included:

- internet connection difficulties, which led to stress and getting behind in the lesson
- students distracting others
- limited flexibility in scheduling

On the contrary, the benefits of asynchronous learning mentioned by participants included:

- the ability to learn at their own pace, by spending more time on needed areas and less time on areas not needed
- the opportunity to learn to be responsible and manage their time
- the flexibility to go to appointments without missing instruction

However, with asynchronous learning, families/students expressed there was a greater burden on students to do the learning and reach out for assistance and teachers may not have been able to provide immediate support.

Students and families reported that the current amount of synchronous learning they received ranged from 50% to 100% of their overall schedule. Overall, students/families reported that the students preferred asynchronous learning because it was more flexible, where work could be completed on students' own time, and students could work appointments and other commitments into the day without missing instruction. When asked whether they would want a greater, lesser, or the same number of hours of synchronous learning than they currently receive, the consensus was that students and families would want the same or fewer hours of synchronous learning.

TEACHERS' PERSPECTIVES

Twelve (12) teachers from six (6) LEAs, that taught a range of grade levels and subject areas, participated in the focus group discussion.

[10] LEAs represented were Baltimore City, Baltimore County, Frederick, Howard, and St. Mary's.

[11] We do note that the perspectives reported in the present report are not representative of all students/families but rather, represent a small sample.

The benefits of synchronous learning cited by teachers were similar to those that students and families described:

- students were able to engage in conversations with teachers and peers in the moment, ask questions and receive immediate answers, collaborate, and build relationships
- engage in small group instruction

In regard to challenges, teachers were also subject to internet issues but stated other issues with synchronous learning:

- ensuring that the students were attending and were engaged
- distractions in the students' home
- preparation was more time intensive than for in-person instruction
- meeting the needs of all learners
- overcoming student anxiety and shyness
- student mobility
- access to updated technology

The benefits of asynchronous learning cited by teachers were:

- students were able to develop self-reliance and advocacy skills
- flexibility – students had the ability to work at their own pace and customize their schedules based on their needs
- students had the opportunity to apply what they learned and try on their own
- the LEA could save money because substitute teachers were not needed

The overall drawbacks of asynchronous learning, from the teachers' perspective, was that sometimes students lacked time management, executive function skills, and motivation to complete the work.

Many of the teachers stated that their students' schedules were 100% synchronous or that the structure aligned with in-person learning. However, a few teachers reported that between 20% to 80% of the instruction was synchronous. When asked whether they would want a greater, lesser, or the same number of hours of synchronous learning, in contrast to students/families' perspectives, most teachers thought that a greater number was better. Several teachers thought there should be a minimum amount of synchronous time of between 80-90% of the day or one hour per course per day. Teachers reported that some students needed guidance; otherwise, they would avoid class and miss many assignments. Finally, teachers did not think that synchronous time needed to be subject-dependent; that is, the same amount of synchronous instructional time should be devoted to each subject.

SUPPLEMENTAL SURVEY

Respondents who could not participate in the focus groups due to space limitations were invited to share their ideas about the balance of synchronous versus asynchronous learning via a survey question. Of the 17 respondents, eleven (11) were teachers and six (6) were family members representing four (4) LEAs.[12] Thirteen (13) participants represented high school, four (4) represented elementary, and two (2) represented middle school.

When asked how much synchronous and asynchronous time students need for learning, the families who provided specific distributions responded that between 50% and about 80% of instruction should be provided synchronously. Families with children in all grade levels responded similarly. Teachers responded that between

[12] LEAs were Baltimore City, Baltimore County, Frederick, and Harford.

10% and 90% of learning should be provided synchronously. The majority of teachers were at the high school level, so no observation could be made about whether there were differences for school grade bands.

Impact of Synchronous Instructional Time

To examine the impact that synchronous learning time may have had on student outcomes, variation in course failures and student growth on state assessments of fully virtual students in Maryland were analyzed.

Course Failures

The association between the number of hours of synchronous learning received and students' quarterly course failure rates was examined for SY 2021-2022 and SY 2022-2023. Course failure rates were examined separately by middle and high school and by ELA, mathematics, science, and social studies.

In SY 2021-2022,

- Synchronous instructional learning time was not significantly associated with course failure rates in middle or high school in any of the examined subjects.[13]

In SY 2022-2023,

- A greater number of hours of synchronous instructional learning in middle school was associated with lower course failure rates in middle school English, science, and social studies, while there was no association with failure rates in mathematics.
- A greater number of hours of synchronous instructional learning in high school was associated with higher course failure rates in high school English and science, while there was no association with failure rates in mathematics or social studies.

Student Growth

The association between the number of hours of synchronous instructional learning provided in SY 2022-2023 and students' growth on the Maryland Comprehensive Assessment Program (MCAP) in 2023 was also examined.[14] Student growth was measured using student growth percentiles, which are a method to examine how much a student grew, relative to others who performed similarly in the past.[15]

- A greater number of hours of synchronous instructional learning in elementary school was associated with lower growth in mathematics.
- Synchronous instructional time was not significantly associated with student growth in elementary ELA or middle school ELA or mathematics.

[13] Data were analyzed both by a correlational analysis between number of synchronous instructional hours per week and course failure rate and by analysis which compared course failure rates in LEAs with less than 10 hours of synchronous instructional time and LEAs with more than 10 hours.

[14] Synchronous time was averaged across quarters for each LEA and for each school level. SGPs are not calculated for high school, so only elementary and middle school SGPs were examined.

[15] RAND (n.d.). Student growth percentiles 101: Using relative ranks in student test scores to help measure teaching effectiveness. Retrieved from: https://www.rand.org/education-and-labor/projects/measuring-teacher-effectiveness/student-growth-percentiles.html

Summary

Summary

This report reviewed five areas of data on synchronous instructional time and reported the following findings:

1. Despite recent growth in research on virtual learning, no studies were found that directly address the question of the appropriate balance between synchronous and asynchronous learning.
2. Across three states that set a required number of hours of synchronous learning, the minimum ranged from two and a half (2.5) to four (4) hours a day.
3. The amount of synchronous instructional time in fully virtual programs in Maryland in SY 2023-2024 varied by LEA and grade level, from approximately four and a half (4.5) to six and a half (6.5) hours per day at the elementary level and from two (2) to six and a half (6.5) hours per day at the middle and high school levels.
4. While family/student and teacher focus groups generally agreed on the benefits and challenges of both synchronous and asynchronous modes of learning, teachers tended to favor a higher proportion of synchronous time, on the order of 80-90% of a student's schedule.
5. There were no clear, consistent relationships between the amount of synchronous instructional time and student course failures or growth in ELA or mathematics.

Despite examining the question of the appropriate balance between synchronous learning and asynchronous learning time with multiple types of data, no clear answer emerged. Therefore, MSDE is unable to provide any recommendations on the number of hours of synchronous learning based on evidence at this time.