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| STEM AP Access Expansion Opportunity Initiative  Year End Report – Year 3 |
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September 11, 2023

STEM AP Access Expansion Opportunity Initiative

*Year End Report – Year 3*

Prepared by the UMass Donahue Institute’s  
Applied Research & Program Evaluation Group

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# Acknowledgments

The UMass Donahue Institute extends its sincere appreciation to those who supported and collaborated with us on this Year 3 report. In particular, we want to thank students, parents/guardians, school personnel, and personnel from the Massachusetts Department of Elementary and Secondary Education and VHS Learning who participated in data collection and other evaluation activities this year.

# Executive Summary

This third year-end report is part of the ongoing evaluation of the STEM AP Access Expansion Opportunity (Expanding Access) initiative by the UMass Donahue Institute (UMDI), under contract with the Massachusetts Department of Elementary and Secondary Education (DESE). This report focuses on high-level findings about the third year of the initiative (2022–23 school year), which was the second year of in-school program implementation. This report is based on data collected through numerous activities: school site visit student and school administrator focus groups, interviews, and surveys; secondary data from DESE and VHS Learning; and notes from monthly collaborative meetings that included DESE, VHS Learning, and UMDI. This Executive Summary provides an overview of the key findings and strategic considerations.

## Key Findings

### 1. The number of participating schools and students increased, and student persistence rates improved.

The number of participating schools increased from 48 in FY22 to 82 in FY23, representing a 71% increase in school participation year-over-year. Course enrollment increased from 456 seats in FY22 to 556 seats in FY23, representing a 22% increase in enrollment. This increase in participation was in part attributed to the expansion of private school participation, which represented 28% (153) of all enrolled seats. Persistence rates were similarly improved year-over-year; 80% of enrolled seats in FY23 persisted to May 30, 2023.

### 2. Despite increased participation and persistence rates, overall enrollment remained below target levels.

Although DESE reduced the target enrollment for FY23 from the initial goal of 1,500 enrolled seats to 1,300 enrolled seats, participation in the initiative totaled 556 seats, approximately 43% of the initiative’s revised target enrollment. DESE has reduced targeted enrollment in FY24 to 800 seats, in part due to the enrollment numbers obtained during the first two years of implementation.

### 3. Opening the initiative to all schools across the Commonwealth provided broader access to virtual AP STEM courses, but resource disparities were noted at the school level.

Variation in resources and policies at participating schools resulted in some variation in student experiences. For example, some schools provided supplemental support, such as with tutors or technology, and other schools were unable to provide comparable resources, despite expressing a desire to do so. DESE recognized some of these differences in program implementation. In response, and in order to further support schools’ capacity to offer in-person AP courses, DESE contracted an external vendor for FY24 and all subsequent years of the initiative to provide AP computer science capacity building to 20 districts across the state.

## Strategic Considerations

### 1. Allocate additional time for recruitment of new schools, and to support the continued participation of currently engaged schools.

DESE and VHS Learning engaged in effective collaboration and implemented clear strategies to support recruitment for Year 3. Despite increased participation and persistence rates, total enrollment did not reach the target set by DESE. Engaging with schools earlier in the year may allow schools to more thoroughly evaluate the requirements of the initiative and better support their efforts to identify and recruit students who may be interested in participating.

### 2. Consider additional targeted communication for students.

Though most schools encourage their students to enroll in AP courses through the initiative, students can benefit from a more targeted communication. While various channels of communication and supports provided by VHS Learning and schools to students, there seems to be a need for additional, targeted communication with students about what is expected of them in their asynchronous, virtual AP courses, particularly prior to enrollment. Clarifying expectations at an early stage can play a pivotal role in mitigating attrition rates and improving student retention.

### 3. Identify and address barriers to retention of schools and students.

In FY23, there was a considerable increase in the number of participating schools and students. Despite this success, retaining the participating schools from Year 2 to Year 3 was a challenge, presenting a potential barrier to achieving the target student enrollment. We encourage DESE and VHS Learning to continue their efforts to identify and address barriers that hinder the effective recruitment and retention of schools and students. For example, DESE and VHS Learning may consider allocating some additional time and effort to understanding (or unpacking) why several schools were not retained from Year 2 to Year 3. Identifying and addressing challenges for participating schools support increased student participation and retention moving forward.

### 4. Continue to prioritize diversity, equity, and inclusion.

DESE expanded access to the initiative by opening participation to all schools, with a particular emphasis on serving diverse student populations. DESE and VHS Learning continued to encourage schools to actively recruit students from minoritized backgrounds and under-resourced environments. Additionally, despite the continuous efforts to recruit schools and students from priority zones, which have limited access to AP STEM courses, the majority of participating schools in Year 2 and Year 3 were not classified as priority zone schools. We encourage DESE to provide participating schools with continued guidance on recruitment strategies and best practices, collaborating to tailor these strategies to specific contexts and needs. To the extent possible, we also encourage DESE and VHS Learning to support recruitment of priority zone schools.

# Introduction

The University of Massachusetts Donahue Institute (UMDI) is working with the Massachusetts Department of Elementary and Secondary Education (DESE) to evaluate the STEM AP Access Expansion Opportunity (Expanding Access) initiative. The overarching goal of the Expanding Access initiative is to increase schools’ capacity to provide Advanced Placement (AP) STEM courses to high school students across the Commonwealth. By increasing enrollment in AP STEM courses, DESE is supporting students in their STEM career aspirations, enrollment, and persistence in STEM majors, and for students to ultimately pursue career opportunities in STEM fields within the Commonwealth. DESE partners with VHS Learning to provide students and participating schools/districts with virtual AP STEM courses and accompanying support services. VHS Learning is also collaborating with DESE and UMDI to support critical components of the evaluation.

The three main (and interrelated) objectives of the evaluation are to: (1) monitor and assess key metrics of program implementation and impact, (2) support continuous program improvement, and (3) foster organizational learning—particularly for DESE and participating schools/districts.

## Summary of Year 1 Activities

The first year of the Expanding Access initiative was largely a planning year for DESE and VHS Learning, which focused primarily on school recruitment for participation in the initiative. No students were served during Year 1. UMDI interviewed key personnel from DESE and VHS Learning to capture reflections and knowledge related to Year 1 project activities, initial implementation of the initiative as well as the impact of the COVID-19 pandemic on initiative launch. Over the course of Year 1, it was observed that DESE successfully engaged in purposeful and intentional planning leading up to the launch of the Expanding Access initiative and engaged partners in thoughtful and responsive collaboration around project planning and implementation.

## Summary of Year 2 Activities

The second year of the Expanding Access initiative marked the initial launch of the initiative in schools across the Commonwealth. During this first year of in-school implementation, seven virtual AP STEM courses were offered through VHS Learning programming, and 48 schools with a corresponding 456 seats enrolled in the initiative thanks to DESE’s extensive recruitment efforts, reflecting a successful launch of the initiative. Although the initiative was unable to meet its initial target enrollment of 1,500 seats, and course persistence rates were below VHS Learning’s programmatic average, over the course of Year 2 it was observed that DESE and VHS Learning engaged in effective collaboration and developed clear strategies for Year 3 recruitment. Similarly, in collaboration with DESE, UMDI agreed to modify data collection procedures in response to lower than anticipated respondents for focus groups and surveys with the goal of increasing the number of initiative participants engaged in evaluation data collection activities in subsequent years.

## Summary of Year 3 Activities

During Year 3, the initiative’s second year in schools, UMDI worked with DESE and VHS Learning to modify data collection procedures and data collection instruments to complete a variety data collection and analysis activities. During the third year of the initiative, 82 schools with a corresponding 556 seats enrolled in eight virtual AP STEM courses were provided through VHS Learning.

UMDI collaborated with students, parents/guardians and school administrators to a) further explore individual-level factors and contextual/structural factors that might influence experiences of students and schools, and b) distill insights and lessons to support the future success of the initiative. To further understanding of the initiative’s implementation in schools and the experiences of student participants, UMDI:

* Conducted six site visits at schools across the state, conducting student focus groups and school administrator focus groups.
* Distributed surveys to students, parents/guardians, and school administrators.
* Analyzed enrollment data provided by VHS Learning throughout Year 3.
* Analyzed secondary demographic data of students and school administrators provided by DESE and participating private schools.
* Held monthly joint meetings with DESE, VHS Learning, and UMDI.

Results from the analyses of these data collection activities are presented as integrated key findings throughout this report. This work continues to lay the foundation for future quasi-experimental/summative analyses that will be completed during the final year of the initiative.

# Methods

This report is inclusive of data from numerous sources: six school site visits; one group interview with DESE and one group interview with VHS Learning; surveys of students, parents/guardians, and schools; participant secondary data from DESE and VHS Learning; notes from monthly joint DESE, VHS Learning, and UMDI meetings; and electronic communications between DESE, VHS Learning, and UMDI. Further description of the methods utilized is provided in Appendix A.[[1]](#footnote-2)

Protocols for focus groups, group interviews, and surveys were initially developed in FY21, and underwent minor revisions in FY23 in consultation with DESE and VHS Learning.

## Evaluation Questions

During the initiative’s third year, UMDI was tasked with addressing evaluation questions related to the initiative’s implementation and success. These seven evaluation questions guided the development of survey, site visit focus group, and group interview protocols:

1. What implementation measures are being met? Why, why not?
   1. What implementation successes and barriers do DESE, the vendor, and schools/districts experience? What is working and what is not? How does this change over time?
   2. How do schools/districts recruit students? What data are schools/districts using to identify potential participants? Is the program reaching the intended target population?
2. What is the impact of COVID on program launch, implementation, and participation of schools and students[[2]](#footnote-3)?
   1. How has COVID impacted student preparation for AP courses? Have students been adequately prepared in pre-AP courses and supports?
   2. What summer courses and supports are districts/schools providing to bolster preparation for AP courses?
   3. How prepared do participating students feel for AP courses?
3. What strategies do schools/districts use to support students who take AP STEM coursework through this program?
   1. What strategies do schools/districts use to ensure that a high percentage of participating students sit for the end-of-course examinations?
4. What are the impacts of the program on student access, participation, and performance? (i.e., AP course taking & passing, AP exam taking & passing, graduation, dropout, and post-secondary attendance, retention, & completion)
   1. Do program impacts vary by subject? For which student groups is the program most effective?
   2. Do program impacts vary based on types of supports available (e.g., intensive, high dosage versus drop-in tutoring)?
5. What is the cost of the initiative per student (including student supports, such as tutoring)?
   1. Which costs are fixed, and which are variable? Does cost vary by course type?
6. What could/should DESE and schools/districts do to ensure students who are served by the intervention are connected to services that help support their post-secondary success while they are participating in the program?
7. What could/should DESE and schools/districts do to promote the stability of the program/services?
   1. What are schools/districts doing to maintain and grow student enrollment in the program?
   2. How do schools/districts leverage and invest in their own capacity to support the program/services? What systems and procedures have schools/districts implemented to sustain their work?
   3. How do schools/districts plan to ensure the continuation of the program beyond the life of the grant?

Responses to these evaluation questions are integrated throughout the Year 3 report findings. For additional information on how evaluation questions have been addressed across the Key Findings, please see Appendix B.

## Limitations

The data findings presented in this report were limited due to two factors that can be addressed in the future. The first is the limited access to student-level data for private school students. The second limitation concerns the number of students who engaged in the qualitative data collection.

1. **Private school data**

Private schools received a request to provide a subset of SIMS student-level demographic variables and EPIMS staff-level demographic variables. Schools were provided with modified SIMS and EPIMS handbooks and instructions for providing ‘valid’ data entry.

Acknowledging that private schools received no formal or informal training on SIMS or EPIMS data submission, it was not possible for UMDI to ensure data quality since we were relying on one-way reporting.

1. **Limited participation in data collection activities**

The limited number of data collection activities we were able to conduct and the number of respondents to our survey requests limit our ability to understand the experiences of all participants. While the survey response rate for schools and students was higher in FY23 compared to FY22, response rate for students remained relatively low at 21%.

Taking a closer look at the characteristics of respondents, survey responses were largely from students and school that were performing well in the initiative. Therefore, survey findings might not fully capture the experiences of schools who had higher rates of withdrawals or were newer to the initiative. Additionally, students and schools from non-priority zones as well as students of color were underrepresented in the survey sample. Specifically, the majority of the schools that responded to the survey were from non-priority zone schools (35 non-priority; 4 priority zone schools). Of 93 student respondents, 86 students were from non-priority zone schools while only 7 were from priority zone schools. None of the survey respondents identified as American Indian or Alaska Native, or Native Hawaiian or Other Pacific Islander and the number of student respondents who identified as Hispanic or Latino was limited.

# Findings

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| Summary of Key Findings |
| * The number of participating schools and students increased, and student persistence rates improved. * Despite increased participation and persistence rates, overall enrollment remained below target levels. * Opening the initiative to all schools across the Commonwealth provided broader access to virtual AP STEM courses, but resource disparities were noted at the school level. |

## Key Finding 1: The number of participating schools and students increased, and student persistence rates improved.

During this second year of the initiative’s implementation in schools, overall school and student participation increased and course persistence improved when compared to FY22. These changes are attributed to a combination of factors, including: improved communication between DESE, VHS Learning, and schools regarding expectations around participation in the initiative; greater understanding of the initiative among schools and Site Coordinators who were previously new to VHS Learning and the Expanding Access initiative in FY22; expanding access of the initiative to all schools across the Commonwealth, as well as the marked increase in representation of parochial schools; and schools overall satisfaction with the Expanding Access initiative and it’s virtual AP STEM course vendor, VHS Learning.

#### Summary of public and private schools’ enrollment

Summaries were generated to assess FY23 school participation and corresponding seat and student enrollment. Table 1 lists the schools enrolled in the Expanding Access initiative and whether the school is public or private.[[3]](#footnote-4) A total of 82 schools participated in the initiative, 65 (79%) public schools, and 17 (21%) private schools. Additionally, Table 1 indicates total enrollment information: total seats, and total students enrolled in the initiative by school. For FY23, 556 total seats were enrolled, corresponding to 524 students. Public schools enrolled the majority of those seats, 403 (73%), and private school-enrolled seats represent approximately one-third of total enrollment, 153 (28%).

Table . Summary of public and private schools in the Expanding Access initiative, and total enrollment

|  |  |  |  |
| --- | --- | --- | --- |
| **School Name** | **School Type** | **Total Enrolled Seats** | **Total Enrolled Students** |
| Algonquin Regional High School† | Public | 1 | 1 |
| Arlington Catholic High School | Private | 3 | 3 |
| Ashland High School\*† | Public | 11 | 11 |
| Athol High School\* | Public | 3 | 3 |
| Attleboro High School\* | Public | 2 | 2 |
| Barnstable High School† | Public | 3 | 3 |
| Bellingham High School | Public | 6 | 6 |
| Berkshire Arts & Technology Charter Public School | Public | 5 | 5 |
| Bishop Stang High School | Private | 15 | 14 |
| Blackstone Millville Regional High School† | Public | 1 | 1 |
| Bourne High School | Public | 1 | 1 |
| Cape Cod Academy | Private | 7 | 6 |
| Cardinal Spellman High School† | Private | 3 | 3 |
| Carver Public Schools† | Public | 2 | 2 |
| Cohasset High School† | Public | 3 | 3 |
| Concord-Carlisle High School† | Public | 10 | 10 |
| Dighton-Rehoboth Regional High School† | Public | 4 | 4 |
| Drury High School | Public | 7 | 6 |
| Easthampton High School† | Public | 3 | 3 |
| Edward M Kennedy Student | Public | 5 | 1 |
| Everett High School\* | Public | 7 | 5 |
| Excel High School\* | Public | 16 | 16 |
| Fairhaven High School | Public | 6 | 5 |
| Fontbonne Academy† | Private | 4 | 4 |
| Francis W. Parker Charter Essential School\*† | Public | 2 | 2 |
| Gateway Regional Middle & High School\* | Public | 1 | 1 |
| Georgetown Middle/High School | Public | 10 | 10 |
| Global Learning Charter Public School\* | Public | 1 | 1 |
| Hamilton Wenham Regional High School\*† | Public | 7 | 7 |
| Hampshire Regional High School | Public | 4 | 4 |
| Hanover High School† | Public | 2 | 2 |
| Hoosac Valley High School | Public | 1 | 1 |
| Hopedale Jr Sr High School† | Public | 8 | 8 |
| Hopkins Academy† | Public | 1 | 1 |
| Hull High School† | Public | 4 | 4 |
| Leicester High School\*† | Public | 3 | 3 |
| Leominster High School | Public | 4 | 4 |
| Lexington Christian Academy | Private | 21 | 21 |
| Libertas Academy Charter School | Public | 3 | 3 |
| Littleton High School\*† | Public | 6 | 6 |
| Lowell Catholic High School† | Private | 16 | 14 |
| Ludlow High School† | Public | 5 | 5 |
| Malden Catholic High School† | Private | 4 | 4 |
| Mashpee High School | Public | 12 | 12 |
| Medfield High School† | Public | 2 | 2 |
| Medway High School\*† | Public | 4 | 4 |
| Millbury Jr./Sr. High School† | Public | 2 | 2 |
| Monomoy Regional High School | Public | 5 | 5 |
| Mount Alvernia High School† | Private | 2 | 2 |
| Mt. Everett Regional High School\*† | Public | 2 | 2 |
| Murdock High School† | Public | 5 | 3 |
| Newburyport High School† | Public | 2 | 2 |
| Nipmuc Regional High School† | Public | 3 | 3 |
| Northbridge High School† | Public | 2 | 2 |
| Norwood High School | Public | 5 | 5 |
| Notre Dame Cristo Rey High School\*† | Private | 19 | 19 |
| Phoenix Charter Academy - Springfield | Public | 6 | 6 |
| Pioneer Valley Regional School District† | Public | 1 | 1 |
| Pope Francis Preparatory School† | Private | 2 | 2 |
| Quabbin Regional High School\* | Public | 14 | 14 |
| Ralph C. Mahar Regional School District\*† | Public | 1 | 1 |
| Rockland High School | Public | 1 | 1 |
| Saint Paul Diocesan Jr. Sr. High School† | Private | 16 | 15 |
| Shrewsbury High School† | Public | 5 | 5 |
| Sizer: A North Central Charter Essential School\*† | Public | 3 | 3 |
| South Shore Charter Public School† | Public | 25 | 25 |
| Springfield High School of Science and Technology | Public | 7 | 7 |
| Springfield Honors Academy\* | Public | 14 | 14 |
| St. John Paul II High School† | Private | 17 | 17 |
| St. Mary's High School† | Private | 6 | 6 |
| Taunton High School | Public | 1 | 1 |
| The Academy at Charlemont† | Private | 9 | 9 |
| The Learning Center for the Deaf\* | Private | 4 | 4 |
| The Springfield Renaissance School† | Public | 52 | 38 |
| Uxbridge High School | Public | 3 | 3 |
| Waltham High School | Public | 4 | 4 |
| Ware High School† | Public | 4 | 2 |
| Wellesley High School† | Public | 3 | 3 |
| Westborough High School\*† | Public | 15 | 15 |
| Whitinsville Christian School† | Private | 5 | 5 |
| Whittier Regional Vocational Technical High School | Public | 33 | 33 |
| Worcester Technical High School\*† | Public | 9 | 8 |

Note: \* Indicates schools that participated in the Expanding Access initiative in FY22. A total of 21 schools from FY22 participated in the initiative in FY23.

†Indicates schools that have previously partnered with VHS Learning in the past five years, excluding the Expanding Access initiative. A total of 48 schools have previously partnered with VHS Learning.

#### Number of participating schools by region and local designation

Analyses were conducted to identify participating schools by region, and local designation (Figure 1). The majority of the schools participating in the Expanding Access initiative 45 (55%) were in Eastern Massachusetts followed by Western Massachusetts 19 (23%) and Central Massachusetts 18 (22%). Most of the schools were in non-urban/non-gateway cities 54 (66%), and the remaining schools 28 (34%) in urban/gateway cities. [[4]](#footnote-5)

Figure 1. Participating schools by region and local designation

#### Number of participating schools by priority zones

Analyses were also conducted to assess the number of participating schools by priority zones. The majority of the schools participating in the Expanding Access initiative 69 (84%), were located in non-priority zones while a small number 13 (34%) were located in the priority zones.

Figure . Participating schools by priority zones

#### Number of new schools

Analyses were conducted to identify the number of new schools from the 82 schools participating in the Expanding Access initiative (Figure 3). The majority of the schools 61 (74%) were new to the initiative. A greater proportion of the new schools had previously engaged with VHS Learning 36 (59%), while 24 (39%) did not have previous experience with VHS learning.

Figure . Participating schools new to Expanding Access and previous VHS Learning experience

Note: Missing bar N=1 represents the number of missing values in the data for the variable that was used to identify the number of new schools with and without previous VHS Learning experience.

### Enrollment relative to select demographic variables

#### Race/ethnicity

Analyses were conducted to assess the number of students enrolled in the Expanding Access initiative by race and ethnicity and by public and private school status (Figure 4).[[5]](#footnote-6) Enrollment was highest among White students in public schools at 54% (202) and private schools at 38% (56), followed by Asian students in public schools at 16% (61) and private schools at 22% (32). Latino students followed comprising 16% (59) of participants in public schools and 12% (17) of participants in private schools. In public schools, enrollment among Black students was 10% (36) and mixed race students was 5% (18). Enrollment among Both American Indian, Alaskan Native and Native Hawaiian, Pacific Islander students had a 0% (0) participating in the initiative for public and private schools. [Additional content has been removed due to small sample size.]

Figure . Participants by race and ethnicity by school type

Figure removed due to small sample size.

#### Gender

Analyses were conducted to determine the number of female and male students enrolled in the Expanding Access initiative at public and private schools (Figure 5).[[6]](#footnote-7) Female enrollment 203 (54%) surpassed male enrollment at 173 (46%) at public schools, while female enrollment (59 students) and male enrollment (60 students was nearly equal at private schools.

Figure . Participants by gender and by school type

Note: Missing bar N=29 represents the missing values from private schools that did not submit SIMS data for the variable that was used to identify students’ gender.

#### English learners

Analysis was conducted to identify the number of participating students engaged in English language programs by public and private schools’ status (Figure 6). Among all participants, a total of 11 (2%) students were enrolled in an English language program. [Additional content has been removed due to small sample size.]

Figure 6. English learners by school type

Figure removed due to small sample size.

#### 504 Plan

Analysis was conducted to determine the number of public and private school students enrolled in the Expanding Access initiative with and without a 504 plan. Figure 7 shows 5% (20) of the public school students participating in the initiative had a 504 plan. [Additional content has been removed due to small sample size.]

Figure . Students with and without a 504 plan by school type

Figure removed due to small sample size.

#### Disability status

Analysis was conducted to determine the number of students who participated in the initiative and who were classified as having a disability, by public and private school status (Figure 8). Among participating public school students 11 (3%) had a reported disability. [Additional content has been removed due to small sample size.]

Figure . Students with and without a disability by school type

Figure removed due to small sample size.

#### Low-income status

Analysis was conducted to determine the number of students in the initiative categorized as low-income relative to the number of students who were not categorized as low-income (Figure 9).[[7]](#footnote-8) Among the participating students, 29% (107) of the public school students and 12% (17) of private school students were categorized as being low-income.

Figure . Low-income students by school type

Note: Missing bar N=40 represents the missing values from the participating private schools that did not submit SIMS data for the variable that was used to identify students who are low-income.

### Course Enrollment

Eight courses were offered to students during the second year of the program implementation: AP Biology; AP Calculus AB; AP Chemistry; AP Computer Science Principles; AP Environmental Science; AP Physics 1; AP Physics C; and AP Statistics (Figure 10). Analyses were conducted to assess enrollment by course utilizing the enrollment information provided by VHS Learning. Among the courses, AP Computer Science Principals had the highest enrollment (30%, 19), followed by AP Environmental Science at 19% (103), while AP Calculus AB had the lowest enrollment 3% (14) followed by AP Physics C at 4% (22). Noteworthy is the high rate of enrollment in AP Computer Science relative to the other AP courses.

Figure . Enrollment by course subject

#### Course enrollment by school type

Analyses were conducted to further assess course enrollment by school type (Figure 11). Noteworthy AP Computer Science Principles had the highest enrollment across both public schools 121 (30%) and private schools 44 (29%), followed by AP Environmental Science for public schools 79 (20%) and AP Physics 1 for private schools at 31 (20%).

Figure . Course enrollment by school type

#### Number of participating schools

Analyses were conducted to compare the number of participating schools in FY22 with the number of participating schools in FY23 (Figure 12). Notable is the increase of participating schools from 48 in FY22 to 82 in FY23, representing a 71% increase in school participation year-over-year.

Figure . Number of participating schools in FY22 and FY23

#### Number of repeated schools by school type

Analyses were conducted to determine the number of schools participating in the initiative in FY23 that also participated in FY22 by school type. Figure 13 shows 29% (19) out of the 65 participating public schools participated in the initiative in FY22, while 12% (2) out of the 17 private schools also participated in the initiative in FY22.

Figure . Number of new and repeating schools in FY23 by school type

#### Summary of enrollment in FY22 and FY23

Analyses were conducted to determine the number of seats enrolled in the Expanding Access initiative in FY22 relative to FY23. Figure 14 shows enrollment increased from 456 seats in FY22 to 556 seats in FY23, representing a 22% (100 seats) increase in enrollment.

Figure . Expanding Access initiative FY22 and FY23 total seats enrolled

### Persistence Rates

Over the course of FY23, 80% (447) of the overall enrolled seats (556) persisted through the end of May 2023, a marked increase compared to the 46% of enrolled seats in FY22 that persisted (Figure 15).[[8]](#footnote-9) Persistence rates were higher for students attending private schools than for students attending public schools, and there were also notable variations in retention rates by course subject and select demographic variables described below.[[9]](#footnote-10)

Figure . Persistence rates for FY22 and FY23

#### Summary of enrolled seats and persistence by school type

Analyses were conducted to compare overall enrollment and persistence by school type. The overall enrolled seats for the initiative in FY23 was 556 seats. Figure 16 shows the majority of the enrolled seats were from public schools at 73% (403), compared to private schools at 28% (153). Persistence rates varied by school type (Figure 17). It is noteworthy that 71% (312) of public school seats persisted, and 87% (135) of private school seats persisted.

Figure . Summary of enrolled seats by school type

Figure . Persistence by school type

#### Persistence by course subject

Analyses were conducted to assess persistence rate by course subject (Figure 18). Among the eight courses, the course with the highest persistence rate was AP Physics C at 91% (20), followed by AP Physics 1 at 87% (72) and AP Computer Science Principles at 82% (136). The persistence rate for AP Chemistry was the lowest at 69% (18), followed by AP Statistics at 75% (57) and AP Biology at 76% (51). Noteworthy is that across all subjects, over 69% of students persisted in each course subject.

Figure . Persistence by course subject

### Performance

At the end of May 2023, UMDI received performance data (grades) assigned by VHS Learning for student participants. To better understand the overall course performance, UMDI clustered the assigned grades for simplicity: A average, B average, C average, D average and F.[[10]](#footnote-11) Analyses showed notable variations in overall course performance by school type, persistence rate, and by course subject.

#### Summary of overall course performance

Analyses were conducted to assess the course performance for the students enrolled in the initiative. Figure 19 shows 35% (195) of students earned an A average, and 20% (113) earned a B average, while 29% (162) students enrolled in the initiative did not pass. Noteworthy is that over 50% of students received an A or B average.

Figure . Summary of course performance in the initiative

#### Performance by school type

Analyses were conducted to further assess the average course performance by public and private school status. Figure 20 shows 32% (130) of public school participants received an A average, compared to 42% (65) of private school students enrolled. Noteworthy is that 33% (134) of public school participants and 18% (28) of private school participants received an F.

Figure 20. Average course performance by school type

#### Course performance by persistence

Analyses were conducted to assess student course performance by persistence (Figure 21). Out of the 195 seats that received an A average 96% (188) of those remain enrolled. Out of the 113 seats that received a B average 92% (104) remain enrolled. Out of the 53 enrolled seats that received a C average 87% (46) remain enrolled. Out of the 33 that received a D average 58 % (19) remained enrolled and out of the 162 that received a D average 56 % (90) remained enrolled. Overall, Figure 21 shows that students who were more likely to do well academically were also more likely to remain enrolled.

Figure . Average course performance relative to persistence and withdrawal

#### Insights into Improved Persistence Rates

The number of participating schools, course enrollment, and overall persistence rates increased in FY23 compared to FY22. This improvement is likely attributable to factors such as improved communication among all interested parties, some schools’ increased familiarity with VHS Learning, a general improvement in the degree to which expectations for participating schools and student participants were understood at the outset of the year, and the expanded access to the initiative to all schools across the Commonwealth.

**Communication**

DESE attributed improved participation to improved and increased communication with schools, which they are hopeful will also contribute to repeat participation in FY24:

*[DESE has] been much stronger in framing what the initiative is, to mitigate against misunderstanding on the front end… From what [DESE has] heard, [there’s been] less confusion on the school or site coordinator side about their role [in the initiative]. I’ve heard in conversations with VHS Learning that they haven’t run into a lot of issues like we did in the past... communication has been a lot stronger.* [DESE group interview]

*…what we did last year seemed to work well and we’re hoping we’ll get repeat [schools] for [next] year.* [DESE group interview]

*Timeline going into year 2 was so much better… Having that longer timeline and the emphasis on the completion of work to get students ready to take the courses contributed to that success.* [DESE group interview].

In focus groups conducted with school administrators, schools similarly echoed positive sentiments regarding communication with both DESE and VHS Learning.

One school that was new to the initiative, stated that VHS Learning and DESE were very responsive to the needs of students and schools:

*They’ve been great with me. They’ve been fantastic. We actually had a kid email VHS Learning directly after the enrollment deadline and said he’d missed the announcement. They called me, signed him up, and gave him two extra weeks to complete the summer work.* [School Administrators group interview]

Similarly, during school site visits, Site Coordinators shared that there had been strong communication between themselves and VHS Learning, as well as between Site Coordinators and virtual instructors:

*I feel supported; the communication has been great; they’re definitely responsive to emails. The emails and links are user-friendly. I feel I was able to access what they needed and wanted me to access. I was able to do that pretty easily without being frustrated or overwhelmed.* [School Administrators group interview]

*The communication, not just with VHS, but with the instructor, as well, has been phenomenal. There’s a communication channel.* [School Administrators group interview]

*Communication has been very effective. Problem solving issues that come up; there’s always someone at VHS who’s able to help. They’re always available to pick up the phone. They were great in supporting me as I was learning to be a Site Coordinator, as well.* [School Administrators group interview]

This improved communication was also attributed to improved student persistence as schools and students, particularly those with prior experience with VHS Learning programming, generally expressed a clear understanding of expectations regarding the Expanding Access initiative.

More specifically, Site Coordinators and school administrations also shared that VHS Learning had been very communicative in regard to student progress. School administrators expressed their appreciation for the weekly updates provided by VHS Learning, which showed student grades and assignments. They also noted that these updates prompted communication with parents, who received the same updates:

*Communicator, support, and follow-up. It’s been terrific in terms of communications I get from VHS; I get copied on all the emails the kids get. That gives me the opportunity to follow up with any kids who are stumbling. It also gives me the opportunity to give kudos to those who are doing well. I have one student who’s been struggling with the work, and I’ve been meeting with the student to see what he needs to do to adjust his work habits, to adjust his time management to be successful. It’s all about communication and support.* [School Administrators group interview]

*It’s also helpful that I get weekly progress reports on Thursdays, the same communication that goes to students. For one student, I received the email at 5 o’clock this morning, and I received an email from mom at 5:10. So, there’s a lot of transparency, not only passively, but actively. I have access to kids’ grades, everything they’re doing, everything they’re not doing. If I don’t have time to check, I get an email at 5 a.m. and I know what they’re doing.* [School Administrators group interview]

*I can’t think of a way they [VHS Learning] could better support me because they give me a lot of time to do it. For this young man who’s struggling, I’ve probably spent 5-6 hours on addressing the situation. (5:10) “I have the capacity to support the kids as much as I possibly can.* [School Administrators group interview]

One school that was new to the initiative shared that communication with VHS Learning helped them attend to student needs in a timelier manner, and that contributed to student persistence and success their school.

*In my mind, it’s been an unbelievable success. Students are not just surviving; they’re thriving in these classes. I just find that it’s been great. I’ve had a very positive experience. The students themselves seem to be really succeeding.* [School Administrators group interview]

**Opportunities for improved communication**

There are still opportunities for improved communication, particularly in helping students understand expectations. For example, during site visits some students noted that they did not fully understand what, or at times which courses, they were registering for:

*…There are two AP Computer Science classes, and I think we signed up for the wrong one. We were hoping to learn more coding skills, which is Computer Science C and using Java. We’re in Computer Science Principles, which is more conceptual about how the internet works.* [Student group interview]

Additionally, several students who were new to the initiative described initial challenges in navigating the virtual platform, and shared that they would benefit from additional support with troubleshooting technical issues:

*It was very difficult for me to navigate at first because I’ve gotten very low averages for some early assignments because I didn’t know to complete the assignments because I didn’t know how the platform worked. Some assignments have early deadlines, and it can be hard to find that information. Once the weeks picked up, I did get used to it. It’s learnable and easy to use once you get used to it.* [Student group interview]

*I think a little bit of better guidance over the summer. Taking the class for the first time and then getting a confusing email about how to set everything up; I was lucky that I knew people and could text them and ask how they set up their accounts. If I didn’t have those resources, I probably would have messed something up because I’m not great with technology.* [Student group interview]

*I was using the wrong version of code.org, so my teacher wasn’t getting any of my assignments. It took me a while to figure out how to change the version.* [Student group interview]

*I think having more guidance regarding with how to use the program as a whole. I thought it was pretty hard, and I’m lucky that at our school, it’s pretty normal for students to take VHS classes, so I can ask for help. For other schools, where VHS isn’t as common a choice, it would be difficult to seek help with these things.* [Student group interview]

In addition to students, one Site Coordinator also shared that additional tutorials and resources would be helpful for students who are not familiar with VHS Learning platform:

*All online platforms are different. When I was looking at the VHS Learning platform, it looked more like Canvas, whereas our students are more used to [alternative online platform]. So, that did take some time to get used to the online platform. I don’t know if there’s a general tutorial on how to navigate the platform, including modules, assignments, videos, and texts. There was a learning curve regarding the platform. The interfacing was different than what the students are used to here daily.* [School Administrators group interview]

Additional technical support may also combat early course withdrawals, as two students who withdrew from their AP courses shared that the difficulty with navigating the platform and class materials contributed to their decision to withdraw from their AP courses:

*One of the biggest things was that you open the topic and what you need to do, and I would get so confused. You have to click so many links—the textbook, then the PDF, then another source. It was so confusing for me that I didn’t think I’d be able to manage it well this year. I know myself enough to just drop it instead of stressing myself out for the whole year.* [Student group interview]

**Increased marketing**

One way schools are seeking to mitigate misunderstandings around the initiative is by requesting additional marketing materials.

During site visits and in survey responses several school administrators shared that students and parents/guardians would benefit from additional information emphasizing/clarifying the expectations and requirements of the initiative prior to enrolment:

*In my mind, I think VHS does a very good job of explaining the requirements. It’s all right there. What they don’t do a good job of is explaining those requirements before students sign up. You sign up for the class, then you get all that information. You have access to the syllabus when you’re signing up, but all the other stuff about what’s expected of you happens the first week during orientation. It would be nice if there were more information that we could give to students, something written saying here’s the deal, here are the requirements for VHS. They’re basically the same for every AP class, so it doesn’t matter if it’s STEM.* [School Administrators group interview]

*… Somebody coming in in May or June before the school year ending. Like, “you guys have indicated that you’d be interested in taking these VHS classes, this is what you can expect over the summer, this is the lead-up, this is who you can reach out to for support.” Almost having a couple different meetings with kids who are interested in it so that you grab them before the summer. Once they’re out for summer, some of them stay around, some of them are gone, and they can’t use their school emails. If you identify them before they walk out the door, that’d be better.* [School Administrators group interview]

*One thing that could be helpful for potential students/parents is a mandatory/required (virtual) session to explain the teaching and learning style of the course. Although we communicated that information several times to the students and their families through verbal and written communication, some of the parents seemed to be "surprised" or "unaware" that the course was largely asynchronous learning. This way, there is clear documentation on the VHS Learning end (and not just the participating schools) that students and parents/families are aware of this before the Site Coordinator approves their registration.* [Survey response]

**Expanding access**

In addition to communication,DESE has also attributed growth in participation and greater course persistence to both increasing access of the Expanding Access initiative to all schools across the Commonwealth:

*The timeline was so much better going into Year 2 of the implementation, a longer runway. We have tried to accommodate late registrations for schools. I would say a longer timeline and the emphasis on completion of pre-work that prepares students to get ready for their courses contributed to greater participation and persistence. This year, we are offering AP Physics C that was an addition this current school year and there is a huge amount of interest in that course. Having a new course offering also helped growth in participation.* [DESE group interview]

**Positive experiences with VHS Learning**

Schools reflected positively on their engagement with VHS Learning, and VHS Learning reflected that returning participating schools seemed more comfortable with the virtual platform.

Overall, schools were excited for the opportunity to provide their students with AP courses through the Expanding Access initiative and stated that initiative could reach more students with better marketing strategies.

*More marketing tools and information for the students to make them aware of the programs. An in person outing or field trip to a lab/career opportunity (real world connection).* [Survey response]

*We need more marketing materials (posters, etc.) and it would be great if someone from VHS or DESE could come to meet with interested students.* [Survey response]

*One of the benefits of this program is the help with the summer assignment, which you can get. Every VHS AP has a summer assignment attached. It would be great if we could market it saying, ‘You’re going to have to do this assignment, but you’re going to get so much help.’ That shouldn’t be a barrier, either. I think we could market it better.* [School Administrators group interview]

Among schools that participated in both FY22 and FY23, DESE and VHS Learning both reported that participating schools seemed much more confident with the initiative this year than they did last year.

However, despite reported improvements in communication, participation, and retention of students, a relatively low percentage (44%) of schools that participated in FY22 were retained to FY23 (Figure 22).

Figure . Participating schools in FY22 that were retained in FY23

Despite some challenges with re-engaging schools, the reason for low school retention is not currently known. Overall, schools reported positive experiences with the initiative, and students who completed a survey generally indicated that it improved their desire to pursue a STEM career or major.

## 

## Key Finding 2: Despite increased participation and persistence rates, overall enrollment remained below target levels.

Although target enrollment for FY23 was reduced from the initial goal of 1,500 to 1,300 seats, participation peaked at 556 seats for FY23, approximately 43% of the initiative’s target enrollment (Figure 23). The 556 seats enrolled in the initiative are from 82 schools, of which 26 % (21) were repeaters from FY22 (Figure 24).

Figure . Target enrollment for FY23 relative to seats enrolled

Figure . Number of repeated schools in FY23

#### School participation

To assess the number of public school students enrolled in the initiative relative to the total school enrollment, UMDI used enrollment data from VHS Learning along with the aggregated public school data from DESE. Public school students participating in the initiative represented approximately 1% of the total enrollment of the participating schools. Further information is provided in Appendix O.[[11]](#footnote-12)

While participation increased from FY22, this is in part due to the significant growth in private school participation. In FY22, only 8% (4) of schools participating in the initiative were private schools compared to the 21% (17) of participating schools in FY23.

There was an increase in the proportion of participating schools that had a prior relationship/were familiar with VHS Learning programming before joining the initiative (Figure 25). Noteworthy is that 40% (19) of the participating schools in FY22 had prior VHS Learning experience compared to 59% (48) of the participating schools in FY23 with prior VHS Learning experience.

Figure . Summary of FY22 and FY23 participating schools with prior VHS Learning experience

**Recruitment**

DESE collaborated with VHS Learning to support in-person and virtual recruitment efforts, in part due to DESE’s limited bandwidth on this initiative. DESE acknowledged that this may have contributed to the increase in participating schools that had previously engaged with VHS Learning.

**Planning ahead**

Heading into FY24 and FY25, DESE reduced the target enrollment to 800 seats. DESE announced that some resources that were initially intended to support the STEM AP Expansion Opportunity (SAPAO) initiative were being reallocated to support a new Computer Science Advanced Placement Access Expansion Opportunity (CS-APAO) initiative. VHS Learning shared that they were informed of this shift in scope for FY24 and FY25:

*The idea with the new initiative [CS-APAO] is that the schools will get professional development through CS for Mass, and they eventually will build capacity to offer computer science locally so they [schools] can have a scaffolded approach to introductory computer science courses. From what we learned, maximum of 20 schools or teachers can participate in this professional development and 60 students total will enroll in CS courses in Year 1. The only CS courses they will be enrolled through us will be AP CSP or AP CSA, particularly AP CSP as it doesn’t have any prerequisites. Schools we currently focus on don’t offer AP CS courses.* [VHS Learning group interview]

In FY24, with the launch of the new CS-APAO initiative, VHS Learning will continue to recruit schools and students from participating districts. In addition, the amount of time allocated for recruitment of students for the upcoming school year was shorter this year than last year, which created recruitment challenges for VHS Learning.[[12]](#footnote-13) While VHS Learning`s recruitment efforts were impacted by the changes in the scope of the Expanding Access Initiative heading into FY24, it was anticipated that the recruitment challenges resulting from a constrained timeline would be limited to the upcoming fiscal year.

## Key Finding 3: Opening the initiative to all schools across the Commonwealth provided broader access to virtual AP STEM courses, but resource disparities were noted at the school level.

Students from high resource environments had access to in-person content instructors to support their learning while students from schools that offered no (or very limited) in-person AP STEM course offerings did not. For example, some schools, but not all, provided supplemental in-person tutoring, while other schools lacked the resources to provide this support.

Several students shared that they did not always have access to in-person content instructors to reach out to for support, and that such support would have been helpful:[[13]](#footnote-14)

*…A lot of the extra time we use isn’t for the assignments, it’s for teaching ourselves. We don’t always have access to a teacher.* [Student group interview]

*I am very fortunate to have my classmates, because if I have any questions, I can turn to them. There is no form of meetings except for once per week, which is tremendously difficult. The way the class is structured, we’re given everything we need to do throughout the week, and we’re expected to work at our own pace. It’s sometimes hard without any instruction from the teacher. Academically, I don’t really know anyone I can reach out to with questions. I’ve reached out to my VHS instructor about what I can do to better manage my time, since I’m taking two VHS classes, and he told me to reach out to my VHS coordinator. Aside from that, I don’t think there’s any staff involved.* [Student group interview].

Students from high-resource schools noted their appreciation for the support they receive from their in-person content instructors:

*For stats, we’re lucky enough that our [school] teaches stats… She assists a lot when we’re confused.* [Student group interview]

*I asked [Site Coordinator] for a textbook, because the original textbook we received wasn’t great. She was able to get me one. We also have in-house science teachers who told us we could go to them for help.* [Student group interview]

In some cases, the support and resources students received from their schools varied based on the AP STEM subject. For example, while some schools had the capacity to provide in-person support for some AP courses offered through Expanding Access, they may have had limited or no capacity to provide similar support in some other AP STEM subjects such as AP CS:

*There aren’t many people I can go to for coding. I go online and ask questions.* [Student group interview]

In addition to students, one Site Coordinator from school mainly offering AP CS expressed similar opinions that their students would have benefited from the support of an on-site content expert, which they were not able to offer:

*…Having a content expert, we need more in-person supports for students. Even though it’s an individualized program and students need to be motivated and agree to the virtual component—knowing that it’s virtual and that you’re not in a traditional classroom setting with traditional classroom learning—we do need to have more content knowledge oversight and support. We can’t just say, “Okay, you’re on the computer now, it’s up to you.” Our students have shown us that they need more in-person support. The virtual support might be there, but from what we’ve seen this year, they need a little more in terms of the in-person encouragement to be successful.* [School Administration groups interview].

Resource disparities at the school level might have influenced the student performance. For example, Figure 26 shows 34% of students in public schools enrolled in the initiative received an A average, compared to 41% of private school students. Moreover, about 31% of participating public students received an F average compared to 18% of private school students. Further exploration of factors contributing to differences in student performance by school type may support student success.

Figure . Student performance relative to school type

Lack of access to adequate technology to complete coursework during school hours disproportionately impacted students from limited resource environments. For example, some students from limited resource environments said that they were unable to effectively utilize their designated school hours to complete coursework due to inadequate technology, requiring them to complete the work outside of school hours.[[14]](#footnote-15) Among students we spoke to in focus groups, this often resulted in delays in completing their work, with students feeling pressured to be absent from their brick-and-mortar school on days virtual coursework was due. Consequently, in these instances we heard that students were relying on their brick-and-mortar peers, regardless of whether they were enrolled in the same course or section, for support.

Some students expressed frustration with technological restrictions which occasionally made it difficult for them to complete their Expanding Access coursework during the school day. Students noted that additional support with technology would make a significant difference in terms of their productivity:

*There’s a motion-detector software called logger-lite. It was given to us in our lab kits with an entire lab dedicated to it, but it wasn’t compatible with our Chromebooks, the computers in the library, or any of my friends’ or family’s laptops. It was difficult to trouble-shoot that. We could have gone to the engineering lab and begged for one of their fancy [computers]…They go past the school’s firewalls, so they can use other software. We have a lot of restrictions on the Chromebooks.* [Student group interview]

*I think that the Chromebooks that we have are really slow. I think we should be able to get better Chromebooks. 100% of my work is on the computer, and it takes a long time to get around the website.* [Student group interview]

*As someone who doesn’t own a computer or other devices, it does get difficult; I have to constantly borrow the school computers to get my work done. They have a lot of our stuff blocked, so I have to find a way to work around them to complete my assignments. So, that computerized-forced setting, I have an issue trying to get through that. Otherwise, they’re very accommodating, very helpful.* [Student group interview]

*It’s hard to access some materials with all the restrictions. The teachers aren’t in our network, so we can’t share everything with them.* [Student group interview]

Students had different experiences completing the course work and lab assignments during the designated school hours due to school policies. Some students shared that their school provided them with sufficient support to effectively complete their assignments within school hours:

*When we do the labs in school, we try to do it in school, but we’re only given 45 minutes because that’s how long our block is. Some of the labs can take up to an hour, so if you’re trying to do it at home, it doesn’t work as well. We keep our lab stuff here. We also don’t have the same support at home, since we have in-class support in school.* [Student group interview]

*They [school] provide us a period in the learning. We always meet in the library. You can bring your laptop and headphones and they won’t bother you. We can use our own laptops.* [Student group interview]

Others shared that some of the restrictions resulted in allocating additional time to AP coursework outside of school hours:

*We can’t keep our lab kits at the school; they have to be left at home. So, if we are supposed to do a lab activity during our VHS Learning block during school, we can’t. That’s a bummer sometimes.* [Student group interview]

One student who was new to the initiative reported that these challenges resulted in delays to completing their work and led them to be absent from their brick-and-mortar school on days virtual coursework was due:

*There have been a few days where I’ve asked my parents to have my dismissed so I could catch up on my AP work. Then, having to miss my in-person classes was tough. I was working until 8:30 that night, so there’s a lot of lack of time involved.* [Student group interview]

In both instances, where students received in-school support from AP instructors and where students were seeking each other out for support, the students experience became closer to that of a hybrid course rather than entirely virtual course, which is the intended design.

Several school administrators stated that while some students enjoyed the independence of virtual learning, other students reported that in-person course offerings were more compatible with their learning style. Specifically, school administrators from four out of six schools that participated in focus groups, indicated that some students preferred in-person instruction to virtual learning, particularly for AP STEM courses.[[15]](#footnote-16) Additionally, 10 out of 38 school administrators indicated through open-ended survey responses that they believed one of the factors that contributed to students’ decision to withdraw from their Expanding Access STEM AP course was challenges with virtual learning.[[16]](#footnote-17) DESE`s efforts to support schools in building capacity to provide in-house AP courses was expected to support the recruitment of a greater number of students with diverse learning needs.

In order to build capacity, DESE has contracted an organization to provide professional development in AP Computer Science to staff at 20 schools. In line with the 2016 Digital Literacy and Computer Science (DCLS) K-12 Framework, DESE will reallocate resources, which were initially intended for enrolment in STEM AP Expansion Opportunity (SAPAO) initiative, to a new Computer Science - Advanced Placement Access Expansion Opportunity (CS-APAO) initiative. The primary goal of the new initiative is to increase district capacity to offer sustainable access to high quality computer science coursework through building capacity for in-house AP Computer Science teaching in schools. As part of CS-APAO, participating schools will be provided with DCLS professional development workshops which are intended to prepare schools to provide pre-AP and AP courses by FY25.[[17]](#footnote-18)

In discussing this new initiative, DESE reflected on some of the limitations that the Expanding Access initiative has in facilitating capacity building in schools:

*[The Expanding Access initiative] is a great opportunity as a turnkey initiative for districts, but it’s not developing capacity, and we know within [computer science] in particular that’s a real need. So that’s why we’re using some of the grant dollars in years 4 and 5 to help train folks who would be at the schools to teach [computer science] courses. [Computer science] was selected in consultation with folks on our curriculum instruction side in STEM, and there’s already some existing work in [computer science], so this is to bring [the Expanding Access initiative] in alignment with that.* [DESE group interview]

The decision to build capacity appears to be well-aligned with the feedback provided by participating schools through surveys, where some expressed support for building internal capacity to offer in-house AP courses.

Specifically, when we ask what supports school currently provide to students enrolled in Expanding Access, out of 60 responding schools, only 11 school (18.3%) indicated that they provided in-school tutoring to their students (among other supports). Several schools also shared that they occasionally face challenges in adequately supporting students due to the lack of in-house instructors who have the expertise in some AP STEM subjects:

*We are a small school and do not have the expertise to really help student[s] with the content of the course, especially in areas of coding.* [Survey Response]

*There is nothing you can do. I need more staff, but I don’t have the money in my budget.* [Survey Response].

Similarly, of the 61 schools that responded to the survey, 48 (or 79% of total respondents) indicated that their school lacked adequate staffing capacity necessary to offer (in person) the same AP STEM courses that their students are currently participating in through the Expanding Access Initiative.[[18]](#footnote-19) However, the majority of responding schools indicated a strong desire to develop the capacity to offer the same courses in their school: 37 schools (or 78% of total respondents) indicated that their school want to develop the staffing capacity necessary to offer (in person) the same AP STEM courses that their students are currently participating in through the Expanding Access initiative.[[19]](#footnote-20)

# Discussion

In FY23, the number of schools and students participating in the Expanding Access initiative increased, and student persistence rates improved. While participation and persistence rates have improved, total enrollment continued to lag behind target. Additionally, despite increases in the number of participating schools, retention of schools, particularly priority zone schools, from Year 2 to Year 3 was low, with an increase in private schools and schools familiar with VHS Learning programming. Approaching the fourth year of the Expanding Access initiative, we encourage DESE and VHS Learning to consider allocating additional time and support to better understand why several schools were not retained from Year 2 to Year 3. Identifying and addressing the challenges that might be negatively impacting school retention could support increased school and student participation in subsequent years.

One of the original goals of the Expanding Access initiative was to provide equitable access to AP STEM courses to students underrepresented in AP STEM courses. While the decision to open enrolment to all schools across the Commonwealth has provided broader access to virtual AP STEM courses, resource disparities were noted at the school level. Without adequate resources in place to support student success, particularly at the school level, there is a potential that the initiatives efforts will serve to further entrench, rather than mitigate, existing inequities. Providing professional development opportunities that supports the implementation of AP Computer Science in schools that do not offer this course seems to be promising step in the right direction.

# Strategic Considerations

## Allocate additional time for recruitment of new schools, and to support the continued participation of currently engaged schools.

DESE and VHS Learning engaged in effective collaboration and implemented clear strategies to support recruitment for Year 3. Despite increased participation and persistence rates, total enrollment did not reach the target set by DESE. Engaging with schools earlier in the year may allow schools to more thoroughly evaluate the requirements of the initiative and better support their efforts to identify and recruit students who may be interested in participating.

Additionally, schools` decision to participate in the initiative often require involvement from various stakeholders, including school administrators, students, and parents/guardians. Having a longer runway for recruitment may provide additional opportunities for VHS Learning and DESE to address potential concerns, provide clarifications, and offer necessary support.

## Consider additional targeted communication for students.

Though most schools encourage their students to enroll in AP courses through the initiative, students could benefit from further targeted communication. While there have been various channels of communication and supports provided by VHS Learning and schools to students, there seems to be a need for additional, targeted communication with students about what is expected of them in their asynchronous, virtual AP courses, particularly prior to enrollment. A potential strategy for improving communication would be a readiness orientation for interested students to help them have a better understanding of what to expect, who to contact, and how to better manage their time when they enroll in a virtual AP course through Expanding Access. Clarifying expectations at an early stage help mitigate attrition rates and improve student retention. Extending the timeline for recruitment could also provide an opportunity for more effective support to students through targeted communication prior to their enrollment.

Furthermore, providing additional technical support to each student and ensuring their proficiency in navigating the virtual platform could yield significant benefits not only in supporting student success but also in terms of improving retention. Some students would greatly benefit from receiving continuous technical support before and during the first several weeks of their virtual AP courses. This proactive approach could help prevent instances where students fail or withdraw from the course due to technical difficulties. In addition to continuous, targeted communication to address concerns promptly, supplemental visuals and instructional videos demonstrating platform navigation such as assignment submission and communication with virtual instructors and peers would further support student success.

## Identify and address barriers to retention of schools and students.

In FY23, there was a considerable increase in the number of participating schools and students. Despite this success, retaining the participating schools from Year 2 to Year 3 was a challenge, presenting a potential barrier to achieving the target student enrollment. We encourage DESE and VHS Learning to continue their efforts to identify and address barriers that hinder the effective recruitment and retention of schools and students. Recruitment for the Expanding Access initiative occurs at two crucial levels: the school level and the student level, each posing unique challenges. For instance, at the school level, filling the role of the site coordinator stands out as a recruitment challenge. Similarly, at the student level, challenges related to evaluating student qualifications and aligning them with suitable course subjects may influence the recruitment of students.

To improve the retention of participating schools and students, we encourage DESE and VHS Learning to continue to assess the causes of recruitment challenges at both the school and student levels, and to address these challenges whenever possible. Given that the barriers at the school level and student level often intertwine, providing additional support to schools in resolving their concerns limiting their continued participation can subsequently improve student recruitment.[[20]](#footnote-21)

We encourage DESE and VHS Learning to consider allocating some additional time and support to understanding why several schools were not retained from Year 2 to Year 3. Identifying and addressing challenges for participating schools support increased student participation and retention moving forward. Additionally DESE and VHS Learning may consider analyzing existing data to better understand potential barriers for students who persisted in the initiative through the end of May 2023, but did not successfully complete the course. Reviewing this type of data may provide an opportunity for targeted communication to help re-engage those students with the initiative.

## Continue to prioritize diversity, equity, and inclusion.

DESE expanded access to the initiative by opening participation to all schools, with a particular emphasis on serving diverse student populations. DESE and VHS Learning continued to encourage schools to actively recruit students from minoritized backgrounds and under-resourced environments. Despite the continuous efforts to recruit schools and students from priority zones, which have limited access to AP STEM courses, the majority of participating schools in Year 2 and Year 3 were not classified as priority zone schools.

As moving into Year 4, we encourage DESE to continue to prioritize diversity, equity, and inclusion. We recommend DESE provide participating schools with continued guidance on recruitment strategies and best practices. DESE and VHS Learning can collaborate to tailor these strategies to schools’ specific contexts and needs, recognizing that each school may face unique challenges in recruiting students from diverse backgrounds. To the extent possible, we also encourage DESE to support recruitment of priority zone schools.

# Appendix A: Methods

### Focus Group and Group Interviews[[21]](#footnote-22)

#### School Site visits

Six schools were selected by DESE in consultation with VHS Learning. The schools that were selected for site visits represented a cross-section of participating schools. Selected schools varied based on the following: school type (priority zone and non-priority zone schools, as well as vocational, rural, and suburban); total number of students enrolled in the program at time of selection (ranging from 7-57 at the time of selection); and school’s prior engagement with VHS Learning (three schools had prior experience with VHS Learning while three had no prior experience). UMDI was notified of the selected schools by a member of VHS Learning.

Site coordinators for the six schools were subsequently notified by UMDI that their school has been selected by DESE to participate in a site visit with the UMDI team. Site coordinators were asked to coordinate with their school administrators and students to identify a day and time for UMDI staff to conduct a 2.5- 3 hours site visit. Site coordinators proposed a date for a site visit to be conducted between October 24, 2022 – December 2, 2022. UMDI complied with all CORI and SORI requirements to conduct site visits within schools. For students under 18 to participate in the focus group, site coordinators notified students to provide UMDI with a printed and signed copy of parent/guardian permission form. UMDI staff brought hard copies of all other consent forms (for staff and students over 18) to the sites, to review and sign in-person.

Six site visits were conducted between November 2, 2022 - December 14, 2022.[[22]](#footnote-23)Each site visit included a focus group of up to ten students, and a group interview with the school Site Coordinator and school administrators. Each site visit was conducted by two members of the UMDI team.

##### Student group interview

UMDI conducted 6, 45-minute focus groups with 34 students who were enrolled in 6 courses through Expanding Access.[[23]](#footnote-24)Each focus group involved up to 10 students enrolled in the initiative. We asked that these students be excused from class to participate in the focus group. During the focus groups, students were asked to share their virtual AP experiences in the initiative, preparedness for AP classes, AP exam intention and utilization of available resources.[[24]](#footnote-25)

##### School Administration group interview

UMDI conducted 6, 60-minute small group interview with 13 staff members (Site Coordinators and school administrators) participating in the initiative.[[25]](#footnote-26) In all of interviews, site coordinators were present, and they were accompanied by one or more school administrator in the majority of the interviews. The participants had various roles ranging from principal to teacher, director of guidance and curriculum director. School administrators were asked to reflect on the experiences of their school (rather than their individual perspective) about their decision to participate in the initiative, process of selecting a site coordinator, student recruitment and selection, school supports and their students` experiences in the initiative.

#### DESE group interview

One group interview was conducted in April 2023 with two members of DESE’s team about the key success and challenges during the third year of the Expanding Access initiative’s implementation in schools.[[26]](#footnote-27)

#### VHS Learning group interview

One group interview was conducted in May 2023 with three members of VHS Learning’s team.[[27]](#footnote-28)

### Surveys

#### Survey distribution

UMDI distributed surveys to participating schools, currently enrolled students, and parents/guardians.

##### School survey

UMDI sent the initial survey invitation to 82 schools on January 25, 2023. The initial two-week survey window for schools was between Jan 25, 2023 - Feb 8, 2023, however the survey completion deadline was extended to February13, 2023to increase response rates. UMDI sent three reminders to schools during this period.[[28]](#footnote-29)

##### Student survey

UMDI sent the initial survey invitation to all students that were currently enrolled as of January 30, 2023; a total of 449 public and private school students. The initial survey window for student survey was between January 30, 2023 - February 13, 2023; however the survey window was extended an additional week until February 20, 2023 to increase participation as well as resolve bounce backs stemming from firewalls and other email delivery issues. In addition to three reminders sent by UMDI, VHS Learning shared the student survey with students through the VHS Learning online platform.

##### Parent/guardian survey

UMDI sent the initial survey invitation to all parents that UMDI had contact information for that also had a student currently enrolled as of February 1, 2023. A total of 320 parents were contacted. The survey window for parents and guardians was between Feb 1, 2023 and Feb 15, 2023.[[29]](#footnote-30) UMDI sent a total of three reminders to parents/guardians.

#### Overview of Survey Data

**Student survey**

93 students out of 449 students enrolled in the initiative responded to the survey (21% response rate).[[30]](#footnote-31) A total of 72 students responded to the gender question. The number of male respondents is 34 (47%) and female respondents is 36 (50%) and 2 (3%) students chose not to answer gender question. A total of 74 students provided their race or ethnicity; the majority of students identified as White (65%), followed by Asian (20%) and Black or African American (15%). None of the respondents identified as American Indian or Alaska Native, or Native Hawaiian or Other Pacific Islander. The number of responses to the ethnicity question is not reported due to small number of respondents.

A total of 11 private schools and 28 public schools were represented in survey responses. Out of 93 students that responded to the survey, 26 were private school students and 67 were public school students. The majority of the respondent were from non-priority zone schools (35 non-priority; 4 priority zone schools). Of 93 students, 86 students were non-priority zone schools while only 7 were from priority zone schools. The average persistence rate was 84% for students who responded to the survey.

**School survey**

School administrators from 64 schools responded to the survey. Mostly, one school administrator responded to the survey (67%).[[31]](#footnote-32)In the majority of the schools, VHS Learning Site Coordinators (85%) responded to the survey and occasionally they were accompanied by other school administrators such as Principal (31%) and Guidance Counselor (28%). Most of the responding schools were new to the initiative (75%). The majority of school administrators who responded to the survey were from public schools (77%), non-priority zones (86%) and Non-Urban/Non-Gateway cities (67%). Most of the schools (61%) and Site Coordinators (78%) worked with VHS Learning in the last 5 years. The average persistence rate for responding schools was 74%.

**Parent/guardian survey**

A total of 32 parents/guardians responded to the survey.[[32]](#footnote-33) One participant completed the survey in Spanish.[[33]](#footnote-34)

### Secondary Data

Secondary data provided by VHS Learning included student and school participation information; DESE provided datasets for: the Student Information Management System (SIMS); and the Education Personnel Information Management System (EPIMS).

#### Enrollment Data

Enrollment data used for this report was provided by VHS Learning, and reflected enrollments, transfers, and course withdrawals from January 16, 2023, through May 30, 2023. Variables provided by VHS Learning included:

* Participating students first, last, and middle names
* Student email addresses
* Parent/guardian names and contact information (if provided by the school)
* Expanding Access course enrollment date; transfer date (if applicable)
* Course drop date (if applicable)
* Course subject enrolled
* Course identifier
* School name
* School code
* Letter grade and numeric
* Whether the school had previously partnered with VHS Learning
* Site Coordinator first and last name
* Site Coordinator email address
* Whether the Site Coordinator had previously been contracted with VHS Learning,

and if so in what capacity

##### Demographic Data: Students and Site Coordinators

The following SIMS demographic variables were utilized in this report:

* Race and ethnicity of students (RACE)
* Gender of students (GENDER)
* English language learners (ELP\_PROG)
* Student with disabilities (SPED\_DIS)
* Economically disadvantaged (LOW\_INCOME)

The following EPIMS demographic variables were utilized in this report:

* Race and ethnicity of site coordinators (RACE)
* Gender of site coordinators (GENDER)
* Job classifications of site coordinators (JOB\_CLASSIF\_NAME)

UMDI also generated additional variables for priority zone designation, locale, and region.

UMDI merged SIMS data with VHS Learning-provided Expanding Access student enrollment data and UMDI’s additional variables. Of all 556 cases of seats (which correspond to 524 primary cases, or individuals) enrolled in the Expanding Access initiative during Year 2 of the initiative’s implementation in schools, UMDI successfully merged 526 cases with SIMS data (495 primary cases, or individuals), resulting in a merge rate of (95%). The majority of those cases (383) were merged utilizing SASIDs, while (143) cases were merged using other information (i.e., first name, last name, school name or school code).

UMDI also merged EPIMS data with VHS Learning-provided Expanding Access Site Coordinator data. Of all the 82 schools, UMDI successfully merged 73 site coordinators resulting in a merge rate of (89%). The cases were merged using site coordinators first name, last name and school name or school code.

### Notes from monthly joint UMDI, DESE, and VHS Learning meetings

In addition to the protocols outlined above as well as VHS Learning enrollment, SIMS, and EPIMS secondary data, this report utilizes notes taken by UMDI during monthly joint meetings attended by UMDI, DESE, and VHS Learning.

# Appendix B: Evaluation questions and key findings

|  |  |
| --- | --- |
| Evaluation Question | Key Finding |
| 1. What implementation measures are being met? Why, why not? | Finding 1, Finding 2, Finding 3, Finding 4 |
| 1a. What implementation successes and barriers do DESE, the vendor, and schools/districts experience? What is working and what is not? | Finding 1, Finding 2, Finding 3, Finding 4 |
| 1b. How do schools/districts recruit students? What data are schools/districts using to identify potential participants? Is the program reaching the intended target population? | Finding 1, Finding 2 |
| 2. What is the impact of COVID on program launch, implementation, and participation of schools and students? | In consultation with DESE, this evaluation question was deprioritized for FY23 |
| 2a. How has COVID impacted student preparation for AP courses? Have students been adequately prepared in pre-AP courses and supports? | In consultation with DESE, this evaluation question was deprioritized for FY23 |
| 2b. What summer courses and supports are districts/schools providing to bolster preparation for AP courses? | In consultation with DESE, this evaluation question was deprioritized for FY23 |
| 2c. How prepared do participating students feel for AP courses? | Finding 1, Finding 3 |
| 3. What strategies do schools/districts use to support students who take AP STEM coursework through this program? | Finding 3 |
| 3a. What strategies do schools/districts use to ensure that a high percentage of participating students sit for the end-of-course examinations? | Finding 3 |
| 4. What are the impacts of the program on student access, participation, and performance? (i.e., AP course taking & passing, AP exam taking & passing, graduation, dropout, and post-secondary attendance, retention, & completion) | Finding 1, Finding 2 |
| 4a. Do program impacts vary by subject? For which student groups is the program most effective? | Finding 2, Finding 3 |
| 4b. Do program impacts vary based on types of supports available (e.g., intensive, high dosage versus drop-in tutoring)? | Finding 3 |
| 5. What is the cost of the initiative per student (including student supports, such as tutoring)? Which costs are fixed, and which are variable? Does cost vary by course type? | Finding 1 |
| 6. What could/should DESE and schools/districts do to ensure students who are served by the intervention are connected to services that help support their post-secondary success while they are participating in the program? | Finding 3 |
| 7. What could/should DESE and schools/districts do to promote the sustainability of the program/services? | Finding 3 |
| 7a. What are schools/districts doing to maintain and grow student enrollment in the program? | Finding 1, Finding 3 |
| 7b. How do schools/districts leverage and invest in their own capacity to support the program/services? | Finding 1, Finding 3 |
| 7c. How do schools/districts plan to ensure the continuation of program beyond the life of the grant? | Finding 1, Finding 2 |
| 8. What further research could provide additional insights relevant to the quantifiable impacts, fidelity of implementation, costs, and/or benefits of the program? | Finding 1, Finding 2, Finding 3 |

# Appendix C: Student focus group protocol

## Introduction and Consent [5 minutes]

Thank you for coming and agreeing to take part in this group discussion today.

**Who are we?** I’m [name], and I will be your moderator for the session. I’m a researcher from the UMass Donahue Institute, a research organization based in the University of Massachusetts Amherst. With me today is [name].

**Why am I here?** The UMass Donahue Institute is a third party, independent evaluator working with the Massachusetts Department of Elementary and Secondary Education (DESE) on a special initiative – called the STEM Advanced Placement Access Expansion Opportunity (which we’ll refer to as “Expanding Access”) initiative in Massachusetts – that gives high schools the option to participate in Advanced Placement (AP) math and science classes online. Part of what we are interested in is how this initiative works for you. We hope that this study will be useful for sharing information about the initiative’s strengths and identifying lessons to share with other schools and the Commonwealth. You have been invited to join this group because we want to learn from students enrolled in one of the AP classes covered by the initiative.

**What is a discussion group?** Discussion groups are a way to find out what people think about an issue through group discussion. We are interested in learning about your ideas, feelings, and opinions about this AP class. There are no right or wrong answers. We want to know what you think. You should feel free to disagree with each other; we hope to hear as many points of view as possible in response to the questions I’ll ask. Your participation is very important to the success of this study.

**How does this work?** The session today should last about [45] minutes. I may remind you occasionally to speak one at a time so that we can hear your comments, and ask that you provide non-verbal affirmations if you agree with whomever is speaking. I am your guide, but this is a group discussion; everyone should feel free to speak. To keep us on schedule, I may change the subject or move ahead. Please stop me if you have something to add.

**Privacy:** I will include a summary of this discussion in reports I write later this year. I won’t use your names and will not identify you specifically, but I might quote you anonymously. For example, I might write something like, “one student found tutoring to be very helpful. She said, ‘sometimes I just need a little bit of help when I’m really stuck. After that, I can usually figure it out.’”

Also, please respect people’s privacy once we leave this group. We strongly urge each of you to respect the privacy of others in the group and not repeat anything you hear in this discussion outside the group.

**Recording:** I will be recording the discussion because it would be impossible for us to accurately write the whole the thing down. We will be transcribing the recording, and one or two of our colleagues may also review the transcript. No other people will hear or see the whole discussion. Does everyone here agree to be recorded?

Are there any questions before we begin?

I will turn on the recorder now and let’s start.

I am here with students who are taking an AP course from VHS Learning. This is just a reminder that this conversation is being recorded. I would also like to confirm with you that I have permission to record this conversation [receive verbal confirmation from participants].

## Intro/Icebreaker [5 minutes]

1. To start, let’s quickly go around the room: please say which AP classes you are enrolled in this term, and whether you took a virtual AP course last year through this initiative.

## Recruitment and Introduction to AP [15 minutes]

1. \*How did you learn about this class[[34]](#footnote-35)? *(Eval 1a)*

*Probes:*

*If students were enrolled in any Expanding Access courses last year:* In what ways did that experience influence your decision to participate again this year, if at all?

1. How confident were you going into the course that you could do the work? Where did that confidence come from? *(Eval 1a)*
2. In what ways do you think your past experiences with virtual learning impacted your interest in and/or preparedness to begin a virtual AP course? (*Eval 2; 2a*)
3. Were you able to participate in any summer opportunities to help you prepare for the virtual AP course? If so, please describe them and the extent to which they were helpful. *(Eval 2c)*
   1. *If students mention specific supports:* How did you hear about these opportunities?

## Class Design and Teacher Involvement [5 minutes]

1. \*What are some things you like about your virtual class? *(Follow up with students for more detail when examples are provided)*

*Probes:*

* 1. What is your instructor doing that you find helpful?
  2. How well do lessons support your learning of concepts and skills?
  3. Is there anything that hasn’t been working well?
  4. How would you describe the course content and the class assignments? Do you think they are effective?

## Student Support [20 minutes]

1. We are about three months in. How would you describe your experience so far with your virtual AP course? *(Eval 1a)*

*For students enrolled in a VHS Learning course last year*: How would you compare your experience last year to this year?

1. \*To whom do you turn to for help with class assignments? *(Eval 6)*
   1. *Posed to the group:* How often do you interact with each other about your virtual coursework?
   2. Have you formed study groups with peers, either in-person or virtually? If so, describe how beneficial those have been.
   3. Are there any people or groups not part of the initiative that you turn to for help?
2. \*What support is your school providing you for this AP course? *(Eval 6)*
   1. What additional support would be helpful?

One of the goals of this project is to support the access and success of students who have minoritized identities, and when we think about minoritized identities these are aspects of who we are that we don’t often see represented, or positively represented, in our society. Historically marginalized identities can be racial (BIPOC), sex or gender-based (LGBTQIA+), those who are not native English speakers, people with a disability, or people who come from low-resource environments. And of course students might share none or one of these marginalized identities, but often people’s identities are intersectional. With all this in mind:

1. In what ways could your instructor, your school, your Site Coordinator, or your virtual classroom peers do a better job supporting students with minoritized identities in your online AP course(s)? (If student only mentions one role, probe for all four.)

## Wrap-up [time permitting]

1. What suggestions would offer to your teacher or your school to improve the VHS Learning AP classes? *(Eval 1a)*
2. \*Do you know any classmates who dropped their class last year? If so, what do you think were some of the potential reasons for withdrawal?
3. If another student was thinking of taking a VHS Learning AP class and asked for your advice, what would you tell them? Why? *(Eval 1a)*
4. We have asked all our planned questions – is there anything else you would like to clarify or add to anything you have already said? Do you have any questions for us?

# Appendix D: Summary of student focus group responses

## Intro/Icebreaker [5 minutes]

**Protocol 1:** *To start, let’s quickly go around the room: please say which AP classes you are enrolled in this term, and whether you took a virtual AP course last year through this initiative.*

A total of 34 students attended the focus group to share their experiences with Expanding Access initiative. Students were enrolled in 6 AP courses and the number of students enrolled in each course is as followed: AP Comp Science (13), AP Physics (8), AP Bio (6), AP Environmental Sciences (2), AP Stats (2), AP Chemistry (1). Two students initially enrolled in AP Chemistry, but both dropped a month into the school year. Most of the students reported that it is their first time taking an AP course. Several students mentioned taking a virtual course through VHS Learning but not through the Expanding Access initiative.

## Recruitment and Introduction to AP [15 minutes]

**Protocol 2:** *How did you learn about this class? (Eval 1a)*

1. *If students were enrolled in any Expanding Access courses last year: In what ways did that experience influence your decision to participate again this year, if at all?*

Each student had various experiences relative to learning about the Expanding Access initiative. Some students indicated that they were informed of the opportunity by a friend/classmate or a senior student who has taken a course through the initiative, while others shared that their teachers recommended virtual AP courses through the initiative due to the lack of in-person AP courses. Also, some students shared that they were enrolled in an AP course through the initiative due to scheduling conflicts with their in-person AP courses.

**Protocol 3:** *How confident were you going into the course that you could do the work? Where did that confidence come from? (Eval 1a)*

Students had various confidence levels going into their AP courses. While some students felt confident about the work, others shared that they were nervous about the workload and the virtual aspect of the initiative, but they believed they could manage it. Several students have never taken AP course before, yet they were confident that the in-person instructors would support them throughout the process. Several students mentioned that the VHS summer coursework helped them feel more prepared for their AP courses. Some students utilized senior students as a resource to learn more about the course requirements and time management strategies which helped them to be better prepared for their AP courses. Previous positive experiences with VHS Learning, an AP STEM course and remote learning also were mentioned by students as motivators.

**Protocol 4:** *In what ways do you think your past experiences with virtual learning impacted your interest in and/or preparedness to begin a virtual AP course? (Eval 2; 2a)*

Most students stated that they developed necessary skills for virtual learning such as self-studying/self-discipline during the pandemic which helped them to better navigate their virtual AP courses. While some students enjoyed the self-paced and flexible nature of virtual learning, others shared that they found it challenging due to the limited access to an in-person instructor.

**Protocol 5:** *Were you able to participate in any summer opportunities to help you prepare for the virtual AP course? If so, please describe them and the extent to which they were helpful. (Eval 2c)*

* 1. *If students mention specific supports:* How did you hear about these opportunities?

The majority of the students attended the summer coursework and office hours offered by VHS Learning and found the material to be accessible and helpful to understand the course content. For example, one student shared the following: “I really enjoyed the summer supports. There were Zoom meetings every week… For our assignment, it was a summary of for every topic of the whole year, so we’d get a brief overview of what we’d be talking about. I found it really helpful. If you didn’t understand what the question was talking about, you could go to the recording, and it would help you figure out what to do. I thought it was a good summer assignment; you get a nice preview of what you’ll be learning.” One student specifically stated that VHS summer coursework was a great way for them to get used to the website and learn how to navigate it. A few students shared that they didn’t participate any summer opportunities as they were either enrolled late or unaware of the opportunities.

While the VHS summer coursework content varied by course subject, they were designed to give a brief overview of the course content that would be covered during the school year. Students` experiences with the summer coursework seem to vary by course subject such that some students found the summer course content to be less challenging and only partially align with what is covered throughout the year. One student shared the following: “Personally, I don’t think it helped that much. A lot of the topics we were reviewing were the prerequisites for the course, and it felt like a lot of the review related to things I learned in freshman year. At the beginning, the course was okay, but it’s getting a lot harder than before. It would be more beneficial if office hours were more challenging. It would be nice to build off of what we’re going to learn instead of just prerequisites.” Students who attended the weekly office hours which was part of VHS summer coursework received extra credit for their participation. Two students mentioned that they participated a summer program offered by their school to prepare for their virtual AP courses.

## Class Design and Teacher Involvement [5 minutes]

**Protocol 6:** *\*What are some things you like about your virtual class? (Follow up with students for more detail when examples are provided)*

*Probes:*

1. *What is your instructor doing that you find helpful?*
2. *How well do lessons support your learning of concepts and skills?*
3. *Is there anything that hasn’t been working well?*
4. *How would you describe the course content and the class assignments? Do you think they are effective?*

In terms of class design, several students shared that they enjoy the independent and self-paced work structure which give them the freedom to learn the material and complete the assignments on their own time. For example, one student shared the following: “I like the amount of freedom you have. Right now, we have a week to do 4 or 5 assignments. There is no due date; you can turn everything in at the end of the week. I like that you can go at your own pace.” Some students added that the self-pacing structure support their learning as it allows them to allocate undivided time and attention to the course material in their own schedule.

Additionally, students shared that the course organization and structure enhanced their learning. Specifically, students mentioned that the weekly checklist of required activities/assignments, resource tabs, videos, notes and office hours supported their virtual learning. For example, one student shared the following: “I like the organization and structure. You get to see every week seeing what concepts you’ll be learning. They build off each concept well. There are also helpful resources.” Students also noted that, while the course structure is clear and organized, leaving the larger assignments for the end of each week is very stressful for students.

In terms of students’ experiences with lab activities, majority of the students shared that they enjoyed the lab experiments and were able to complete the lab activities with the lab kit provided through the initiative. However, a few students mentioned that they would appreciate clearer lab instructions and occasionally they purchased supplemental lab materials to complete their lab activities, which is often needed when the lab activity needs to be repeated or some of the materials aren’t available at home. One student in AP Environmental Science indicated that they often need to purchase or improvise with lab materials, because it is assumed that students have certain materials available in their homes.Another student shared the following: “I have materials, but I had to make my own lab for one of my assignments and I had to go to the store at 9pm to get materials because it was due later that night. The labs are planned at odd times, and if you don’t have all the materials, you need an extension.”

Students shared positive experiences relative to their virtual AP instructors. Several students found their virtual instructors to be very responsive to their needs/questions, including course related questions, and persona requests (e.g., deadline extension). For example, one student shared the following: “My teacher usually responds within the hour that I reach out. If I ask about a grade, she says she’ll look into it. She’s really responsive.” In some cases, students who take the same course from different instructors shared that the grading time, response time to their questions as well as rules for deadline extensions varied depending on the instructor.

One of the most shared challenges was related to the online platform. For example, one student noted the following when asked about what the most challenging aspect of their virtual AP courses was: “I think navigating the platform. Now that I’m used to it, it’s pretty easy to get around, but the learning curve around the first week was pretty hard.” Several students noted that they aren’t provided with feedback on quizzes, so they are unclear on what they are not retaining and how to fix it. Additionally, discussion board was mentioned by a few students as the least helpful activity.

## Student Support [20 minutes]

**Protocol 7:** *We are about three months in. How would you describe your experience so far with your virtual AP course? (Eval 1a)*

1. *For students enrolled in a VHS Learning course last year*: How would you compare your experience last year to this year?

Students’ overall experiences with their AP courses was positive. Several students noted that they valued the flexibility of their VHS Learning courses, particularly within the context of having the autonomy to work at their own pace (in accordance with deadlines) complete assignments throughout the week as they are able. Students generally expressed satisfaction regarding course content. Most indicated that they did not find the materials to be challenging, though they noted that assignments could be tedious, time-consuming, and mundane. Most students had positive feedback related to their VHS Learning instructors, noting their responsiveness and willingness to accommodate extensions, and additional assistance.

**Protocol 8:** \*To whom do you turn to for help with class assignments? *(Eval 6)*

1. *Posed to the group:* How often do you interact with each other about your virtual coursework?
2. Have you formed study groups with peers, either in-person or virtually? If so, describe how beneficial those have been.
3. Are there any people or groups not part of the initiative that you turn to for help?

Students shared that they often reach out to their virtual instructors, or in-person classmates who are enrolled in the same course when they need support with their virtual AP courses. Collaboration among virtual classmates reported to be limited to discussion posts. Those who have available in-person instructors at their school reach out to them with questions related to their virtual AP courses, but they acknowledge that in-person support is always not available. For example, one student shared the following: “…We all text each other and help each other out. Some of the guys in the IT department here majored in comp sci, so I always stop by there if they’re not busy.”

**Protocol 9**: \*What support is your school providing you for this AP course? *(Eval 6)*

1. What additional support would be helpful?

Schools provided various types of supports to their students who are enrolled in Expanding Access initiative, including access to computers, support with the lab activities, in-person tutoring and quiet study space with a time block dedicated to Expanding Access coursework. Although most students indicated that they don’t need any additional support, some students shared that additional support with technology, virtual platform and in-person support would be helpful. For example, several students noted that their school-issued Chromebooks are slow, making it difficult for the students to complete their Expanding Access coursework during the school day: “I think that the Chromebooks that we have are really slow. I think we should be able to get better Chromebooks. 100% of my work is on the computer, and it takes a long time to get around the website.” Additionally, several students also noted that certain software programs aren’t compatible with their Chromebooks, so they face significant challenges in terms of completing certain assignments. This was an issue for the AP Computer Science student and the AP Physics students, in particular. Students noted that upgraded technology would make a huge difference in terms of their productivity, since most of them are not allowed to bring personal devices to school.

**Protocol 10:** *One of the goals of this project is to support the access and success of students who have minoritized identities, and when we think about minoritized identities these are aspects of who we are that we don’t often see represented, or positively represented, in our society. Historically marginalized identities can be racial (BIPOC), sex or gender-based (LGBTQIA+), those who are not native English speakers, people with a disability, or people who come from low-resource environments. And of course, students might share none or one of these marginalized identities, but often people’s identities are intersectional. With all this in mind:*

*In what ways could your instructor, your school, your Site Coordinator, or your virtual classroom peers do a better job supporting students with minoritized identities in your online AP course(s)? (If student only mentions one role, probe for all four.)*

Overall, students did not report any concerns regarding the support for students with minoritized identities. Also, due to the virtual nature of their courses, students have limited opportunities for face-to-face interactions with their virtual classmates and mainly communicate via discussion posts. For example, one student shared the following: **“**Compared to a public-school setting, I haven’t seen any issues on that platform with sexism or racism or whatever, because all you really know about people is their profile picture and their name; you don’t know anything else about them. it’s sad not being able to communicate with other students and get to know them, but it gets rid of adversity that a lot of students face in a public-school setting.”

Some students shared that their instructor encourages them to share their preferred pronouns and talk about their interests. Also, one student mentioned that they have a section called a “watering hole” where students and teachers can interact about non-academic things, but none of the students utilize this section. While some instructors take time to get to know students, instructors’ approach to this issue seems to vary. One student shared the following: “My instructor is super “woke.” He had all of us enter our pronouns and talk about their interests and experiences in the “about me.” It depends on your instructor; some are work really hard to make everything accessible, easy, equal and collaborative. Others may not be the same.”

## Wrap-up [time permitting]

**Protocol 11:** *What suggestions would offer to your teacher or your school to improve the VHS Learning AP classes? (Eval 1a)*

Several students who take an AP course that involves lab activities shared that visuals or videos describing lab procedures would be greatly beneficial. Additionally, a few students noted that having feedback on quizzes would help them better avoid making the same mistakes in the future. For example, one student shared the following: “At our school, you can do quiz corrections to boost your grades. With VHS, I don’t know what I’m doing wrong so I’m probably repeating a lot of the same mistakes. You don’t get the same feedback.”

Also, one of the most common suggestions was related to additional guidance navigating the platform. For example, one student shared the following: “I think a little bit of better guidance over the summer. Taking the class for the first time and then getting a confusing email about how to set everything up; I was lucky that I knew people and could text them and ask how they set up their accounts.” Similarly, another student shared that navigating the online platform in the beginning of the school year caused them to miss assignments: “I didn’t know how to use the website when we first started, so I missed a lot of assignments. When I finally figured it out, it was too late to turn in my work. That’s really what brought my grade down a lot first term, and why I got a C. I didn’t know how to work the website.”

**Protocol 12:** \**Do you know any classmates who dropped their class last year? If so, what do you think were some of the potential reasons for withdrawal?*

Two students who withdrew from their AP courses indicated that the virtual format was not conducive to their learning styles. They found the platform to be convoluted, and one student noted that they expected the class model to reflect virtual learning during the pandemic. Both students felt that the asynchronous course structure did not allow them to learn as much as they had hoped. Additionally, several students shared that those who drop their AP courses often fall behind on their assignments/coursework and have a hard time catching up on the incomplete coursework. For example, one student shared the following: “You can get backed up with your assignments really easily. It’s a lot to keep track of at once. If I had gotten a little behind and it kept building and building, it’d be hard. Even if you’re just a little behind, it can make a difference.”

Additionally, several students noted that their classmates dropped their classes due to difficulties with the online platform. For example, one student shared the following: “In the beginning, I feel like most people who dropped did so because of the website. Even though it’s straightforward, it’s not user-friendly. It took most of us two weeks to figure out exactly what the website wanted, exactly what the teacher wanted, the format. We had to figure this out on our own, and we were getting penalized for not knowing, even though we weren’t figuring things out. It took me two weeks to figure out. It was very difficult.”

**Protocol 13:** *If another student was thinking of taking a VHS Learning AP class and asked for your advice, what would you tell them? Why? (Eval 1a)*

Students who are currently enrolled in the initiative recommended prospective students to do a thorough research about the class that they are interested in prior to enrollment such as workload, course content and course requirements. One student shared the following: “I would say getting used to the structure. Before I did VHS, I thought it was just completing work online. I had friends tell me that I should be cautious with taking two because it’s a lot of work. I have 13-14 assignments a week, which is a lot. Let students know what they’re actually getting into; what time it will take up, what the class will look like, and what they’ll be learning. I think that would be helpful.” Additionally, one student mentioned that it would be helpful for prospective students to know that their virtual AP courses require good time management skills.

**Protocol 14:** *We have asked all our planned questions – is there anything else you would like to clarify or add to anything you have already said? Do you have any questions for us?*

Overall, students indicated that they appreciate the opportunity to participate in the initiative, and that their summative reflection was that students would benefit from additional resources such as visual instructions for the lab activities and feedback on quizzes.

# Appendix E: School group interview protocol

## Introduction and Consent [5 minutes]

Thank you for coming and agreeing to take part in this [interview or discussion group] today.

**Who are we?** I’m [name], and I will be [interviewing you/your moderator] for the session. I’m a researcher from the UMass Donahue Institute, a research organization based in the University of Massachusetts Amherst. With me today is [name].

**Why am I here?** The UMass Donahue Institute is a third party, independent evaluator working with the Massachusetts Department of Elementary and Secondary Education (DESE) on a special initiative – called the STEM AP Access Expansion Opportunity (which we’ll refer to as “Expanding Access”) initiative – that gives high schools the option to participate in Advanced Placement (AP) math and science classes online. One of the things we are interested in is how this initiative works for schools. We have invited you to talk with us today because we want to learn from those who are involved in the initiative at schools, either as school administration or as the Expanding Access initiative’s Site Coordinator. Your participation is very important to the success of this study because it will help us understand the initiative’s strengths and identify lessons to share with other schools and the Commonwealth.

**For interviews (1 participant):**

**How does this work?** We will ask you a series of questions to learn about your experience, ideas, feelings, and opinions about the Expanding Access initiative. There are no right or wrong answers. We want to know what you think. The session today should last about [50] minutes. As a participant in this research, it is your choice to skip a question, pause or stop the recording, or end the interview early. To keep us on schedule, I may change the subject or move ahead. Please stop me if you have something you’d like to add.

**For discussion groups (More than 1 participant):**

**How does this work?** We will ask you a series of questions in a group setting to learn about your experiences, ideas, feelings, and opinions about the Expanding Access initiative. There are no right or wrong answers. We want to know what you think. You should feel free to disagree with each other. We ask that you keep this conversation confidential. Please do not repeat anything you hear in this discussion after it has ended. The session today should last about [50] minutes. I may remind you occasionally to speak one at a time so that we can hear your comments. I am your guide, but this is a group discussion; everyone should feel free to speak. As participants in this research, each of you individually can choose to skip a question, pause or stop the recording, or end the interview early. To keep us on schedule, I may change the subject or move ahead. Please stop me if you have something to add.

**Privacy:** We will include a summary of this discussion in reports we write later this year. We won’t use your name(s) and will not identify you specifically. No quotes will be attributed to individuals, and any quotes will be anonymous. For example, we might write something like, “one school administrator observed the Site Coordinator role to be very helpful. They said, ‘Our Site Coordinator has done an effective job in helping students stay on task.’”

**Recording:** I will be recording the discussion because we can’t accurately write down everything you say. We will be transcribing the recording. Only members of the UMDI research staff will have access to the transcript. No other people will hear or see the whole discussion, including no DESE staff. Do you, or does everyone here, agree to be recorded? Once I begin the recording, I’ll also ask you to verbally confirm that you’re consenting to participate in this discussion group.

Are there any questions before we begin?

I will turn on the recorder now and let’s start.

I am here with a school administrator and Site Coordinator whose school is involved with the Expanding Access initiative. This is just a reminder that this conversation is being recorded. I would also like to confirm with you that I have permission to record this conversation [receive verbal confirmation from participants].

## Participation and Recruitment [10 minutes]

1. **\*For schools new to the initiative:** We know DESE approached your school to participate in the Expanding Access initiative. Why did your school decide to take part in the initiative[[35]](#footnote-36)?
2. **\*For schools returning to the initiative:** We know this is your second year participating in the Expanding Access initiative. What pros and cons did your school weigh when making the decision to continue to participate?
3. **For school leadership:** How did your school recruit and select a Site Coordinator?
4. **For Site Coordinators**: How would you describe your work as Site Coordinator?
5. Are there any ways in which your school could better support you in your role as Site Coordinator? If so, how?
   1. Are there ways VHS Learning could better support you in your role as Site Coordinator? If so, how?

## Student Preparedness and Student Support [12 minutes]

1. \*How were students recruited and selected for participation? *(Eval 1b)*
2. \*One of the goals of this project is to support historically marginalized students. Please describe for us the ways in which considerations for diversity, equity, and inclusion impacted your school’sdecision-making around recruitment for this virtual AP initiative.
   1. Were there any specific student groups that you intentionally recruited or encouraged to enroll (such as students who’d never taken an AP or honors course before)?
3. Do any students who are currently enrolled in the initiative at your school have an IEP or 504 plan?
   1. **If yes:** Has it been challenging to provide all of the services and/or accommodations required by student IEP or 504 plans? *(Eval 3; 5)*
   2. **If no:** What factors might be limiting their participation?
4. Are any of the students currently enrolled in the initiative at your school English language learners?
   1. **If yes:** Has the school needed to, or been able to, provide additional supports for English language learners who are participating in the initiative? (*Eval 5*)
   2. **If no:** What factors might be limiting their participation?

1. In what ways do you think students’ past experiences with virtual learning influenced or impacted how well-prepared they are for their virtual AP courses?

## Successes and Challenges [15 minutes]

1. \*In this year, have there been any noteworthy successes in regards to the initiative? (*Eval 1a*)
   1. **For returning schools:** In what ways have these successes been similar to or different from last year’s successes?
2. \*In this year, have there been any noteworthy challenges? (*Eval 1a*)
   1. **For returning schools:**In what ways have these challenges been similar to or different from last year’s challenges?
3. How did you go about integrating this/these courses into students’ schedules?

*Probes*:

* 1. Given that your school uses a [semester; block; trimesters; etc.] schedule, in what ways have you had to adapt to the virtual AP course’s year-long schedule to fit with your school’s existing scheduling format? (*Eval 1a*)

1. How has VHS Learning positively supported student success? (*Eval 1a*)
   1. What feedback might you give, if any, to VHS Learning to help them better support student success?

## Initiative Sustainability [5 minutes]

1. From your perspective, what kinds of supports do you envision your school would need in order to continue this initiative once the grant funding has ended? (*Eval 7; 7b; 7c*)

## Wrap-up [time permitting]

1. \*Is there anything else you think is important for us to know regarding your school and your students’ experiences with this initiative? (*Eval 8*)
2. What have you learned about the Expanding Access initiative that would be helpful to share with other school administrators or Site Coordinators who are interested in participating in this initiative?

Alternative Questions

1. **For Site Coordinators:** What kinds of opportunities have you had to engage with Site Coordinators at other schools, if at all?
2. In what ways, if any, do you think COVID impacted student preparation for, or participation in, these virtual courses? (*Eval 2; 2a*)

## AP Exam Intent [2 minutes]

1. Does your school encourage students participating in the Expanding Access initiative to register for AP exams? If so, how?(*Eval 3a*)

## Post-secondary Support [3 minutes]

1. What supports does your school offer students who are preparing to enter college? (*Eval 6*)

# Appendix F: Summary of school group interview responses

## Participation and Recruitment [10 minutes]

**Protocol 1:** \**We know DESE approached your school to participate in the Expanding Access initiative. Why did your school decide to take part in the initiative?*

Relative to school’s decision to participate in the Expanding Access initiative, majority of the focus group participants shared that their school had previously partnered with VHS Learning, and it was a great opportunity to expand with STEM and with VHS Learning. Limited in-house AP seats and positive experience with VHS Learning seemed to be the major factors for participating in the initiative. One focus group participant shared the following: “VHS Learning seems to be more organized, and it aligns nicely with our academic calendar. It’s a week or two off from the end of our quarter, which is nice because it keeps the students on track.” Another participant said this about the initiative: “Any opportunity we can give students to engage in upper-level classes that don’t fit a traditional schedule is great for them. So, if that opened up additional seats for students to take AP classes, that’s a win-win. It didn’t seem like something we should be saying “no” to.”

Focus group participants from schools without a previous relationship with VHS Learning also saw the initiative as an opportunity to increase the number of AP courses available at their schools. Overall, in-house AP course availability and limited staff appeared to be the top two motivators for participating in the initiative. One participant also mentioned that the informational sessions that the state held helped with the decision process.

**Protocol 2: *\*For schools returning to the initiative:*** *We know this is your second year participating in the Expanding Access initiative. What pros and cons did your school weigh when making the decision to continue to participate?*

Relative to the decision to continue to participate in the Expanding Access initiative, it seems there were more pros to continue to participate in the initiative and there wasn’t any cons. One administrator mentioned that the initiative was consistent with the school’s culture and wished more students would take advantage of the opportunity. The same focus group participant said the following: “We like to be involved in these kinds of things; we have a diverse student body, and we have a good, strong sense of culture that matches this sort of thing. We hope that our students and participation can help with state and local organizations make good decisions to expand access to students across the state and region. Or, if it goes federal.”

**Protocol 3: *For school leadership:*** *How did your school recruit and select a Site Coordinator?*

One focus group participant noted that the site coordinator volunteered because no one else wanted the position. One administrator mentioned that their site coordinator reached out and volunteered for the position because of their current role as an AP course coordinator. Others mentioned that they were giving the role due to their affiliation as previous AP coordinators, their role as an administrator, and their position in the STEM field. One school administrator from the focus group noted that DESE recommended the site coordinator be an administrator and someone in the STEM field.

Interestingly, one school administrator said they posted the site coordinator position and interviewed several candidates. The school selected someone with experience working in an online environment, and ideas on how to provide support to the VHS students. Additionally, the candidate had the bandwidth to dedicate one period a day and after school to meet and support any students. The administrator said the following about the site coordinator position: “We consider it a teaching responsibility, being Site Coordinator.”

**Protocol 4: *For Site Coordinators****: How would you describe your work as Site Coordinator?*

1. *Are there any ways in which your school could better support you in your role as Site Coordinator? If so, how?*
2. *Are there ways VHS Learning could better support you in your role as Site Coordinator? If so, how?*

Several site coordinators in the focus group described their role as a facilitator engaging with students and providing support and helping with issues that arise. One school administrator said the site coordinator role was similar to a school administrator role. It consisted of developing strategies to help students succeed, and bridging communication between students and VHS teachers. Another site coordinator in the focus group mentioned that role was a lot more than expected to be and said the following: “Getting to register them without their parent/guardian information, but then having to go back and set up the parent/guardian accounts and so forth; I will say that aspect of it was tedious.”

Several site coordinators in the focus group felt supported by VHS, and communication has been great. VHS Learning was very responsive to emails. A site coordinator mentioned having a site coordinator for the summer access could be beneficial. The site coordinator said the following: **“**I think one of the things that I would like to have more involvement in is the summer access. I feel like you kind of need a SC for that, too. Not everyone is as crazy as I am and wants to be a SC over the summer. I do think they should have access to someone who’s connected with the school for summer work**.”** Another site coordinator in the focus group noted a Zoom training with someone from VHS Learning would have been beneficial. The focus group participant said the following: “I would have benefited possibly from a zoom with someone from VHS walking me through everything. Just because you’re dealing with the VHS website itself, the faculty login, then you’re dealing with the LMS component. I understand that as an adult, I should be able to read pages of instructions, but the nitty-gritty details are hard. You can go back to the help list and find answers to some questions, but there are other things that are not as straightforward.”

## Student Preparedness and Student Support [12 minutes]

**Protocol 5:** *\*How were students recruited and selected for participation? (Eval 1b)*

In terms of student recruitment, some focus group participants indicated that their school reached out to students via email. In particular, one respondent said: “I sent an email to all the kids and included school forms. I followed up with the kids who expressed interest and registered them in June.” One participant noted that their school conducted informational sessions in-person to introduce the Expanding Access initiative to students. Another participant said their school conducted virtual meetings with both students and parents to introduce the initiative. One Site Coordinator stated that their school had open enrollment where individual counselors assisted with the selection process by looking for red flags such as attendance and credits.

One focus group participant noted that their science department, teachers, and guidance counselors were involved in the recruitment process. Furthermore, their entire science department was notified about the virtual courses being offered and made an effort to encourage students to take the Honors and AP-level courses. To increase enrollment students were told that their AP exam fee would be waived if they enrolled in these courses.

Other focus group participants noted that their school involved in-class teachers in English, special ed, and ELL classes do some targeted outreach to students. One participant said this related to student encouragement: “Sometimes the students themselves don’t think they can do it, so if the teachers who are there to support those students are giving good messages and letting them know they can do it and will have support.”

**Protocol 6:** *\*One of the goals of this project is to support historically marginalized students. Please describe for us the ways in which considerations for diversity, equity, and inclusion impacted your school’s**decision-making around recruitment for this virtual AP initiative.*

1. *Were there any specific student groups that you intentionally recruited or encouraged to enroll (such as students who’d never taken an AP or honors course before)?*

Among the focus group participants none indicated that their school prioritized the recruitment of marginalized student populations for the Expanding Access initiative. One administrator noted their school focused more on academic qualifications and DEI was not a primary focus. Furthermore, their school has a diverse student body which is largely reflected in the pools of students taking advanced courses. Other respondents noted that they made the opportunity available to all students and they did not have any barriers. More specifically, one participant said the following: “When we presented the opportunity to take VHS, we made sure that all kids were aware of it and that all kids had access. So, we didn’t do anything specific and say we’re going to find students that are part of this group, but we did offer it to all.”

Additionally, one Site Coordinator noted that their diversity comes in terms of socioeconomic status. One focus group participant said the following: “We have an accountability plan, and part of that is that 30% of our high-needs students will take an AP course. That’s in our accountability plan, as is a portion of our senior class getting a 3 or above on an AP exam at some point over the course of their academic career. We specifically focus on high needs, and we look at the DESE categorization of high needs, which includes special education, EL, and low-income.”

**Protocol 7:** *Do any students who are currently enrolled in the initiative at your school have an IEP or 504 plan?*

1. ***If yes:*** *Has it been challenging to provide all of the services and/or accommodations required by student IEP or 504 plans? (Eval 3; 5)*
2. ***If no:*** *What factors might be limiting their participation?*

Among focus group participants, many reported that their school had a few students with an IEP or 504-plan enrolled in the Expanding Access initiative. One Site Coordinator noted that probably 30% of their students enrolled in the initiative had an IEP or a 504 plan.

Another focus group participant said the district provided time and resources to support their students with a 504 plan. That same participant said the following: “If I ran into a problem with a kid getting services for a 504, there are personnel here that I can work with to support that student and support VHS.” Other focus group participants mentioned that VHS teachers, in-person teachers and the guidance department are all great supports for students in the initiative with a 504 plan.

In terms of challenges, one focus group participant reported communication as a challenge and said the following: “What’s hard is that the students are sometimes having a hard time communicating with me or the instructor about their basic accommodations, maybe they need more time on an assignment.”

There were some focus group participants who reported not having any students enrolled in the initiative with an IEP or a 504 plan. In terms of support, one participant noted that their school has IEP and 504 support for their traditional AP classes and could provide support if they had any students with an IEP or 504 plan enrolled.

**Protocol 8:** *Are any of the students currently enrolled in the initiative at your school English language learners?*

1. ***If yes:*** *Has the school needed to, or been able to, provide additional supports for English language learners who are participating in the initiative? (Eval 5)*
2. ***If no:*** *What factors might be limiting their participation?*

Among the focus group participants, one participant noted that their school had enrolled English Language Learners (ELL) in the Expanding Access initiative. Some of the participants who said they did not have any ELL students enrolled, did however reported having Former English Language Learners (FELL) enrolled in the initiative. One Site Coordinator with FELL students shared that those students have learned English are no longer considered beginners. Another Site Coordinator noted that while FELL students are still monitored, they don’t receive direct services.

**Protocol 9:** *In what ways do you think students’ past experiences with virtual learning influenced or impacted how well-prepared they are for their virtual AP courses?*

Among focus group participants, one respondent mentioned that some students learned their learning style through COVID. Some students preferred the independence of being virtual while others preferred brick-and-mortar learning. One Site Coordinator in the focus group said they try to highlight some benefits for taking and staying in the virtual class to encourage students with mixed feelings by saying the following: “If a student who’s already in a VHS course comes to me and says, ‘I can’t learn this way,’ I sometimes try to explain to them that this is the future. You’re going to have to learn how to work a discussion board in college. You’re not going to get out of college without having to do some online stuff. Maybe, if it’s not your way, this is the time to practice. That’s only if they’re already in the class. I try to get them to stick with it and learn because it’s a skill.” Another respondent said their students were comfortable with virtual learning because their school currently uses other virtual platforms on a regular basis.

One focus group participant said the following: “Unfortunately, throughout the pandemic, I think we’ve all had to make adjustments for workload and what we could realistically do online. I was just having this discussion with an adjustment counselor where we’re seeing the post-post-effects of COVID. I think there’s still an assumption that you don’t have to do everything; you can do 80%. I think we need to go back to if something’s due on this day, it’s due on this day and you need to do the whole thing. You may need to stay in class two extra minutes. It sounds trivial, but it’s really not. I think we’re seeing that. It’s understanding to have a demanding course online, what that looks like. I deal with students who go to college or who look at college courses online; it’s an interesting transition of skills for them to have, so it’s great for them to learn it from this. I think this group is doing really well. I’m glad we’re comfortable holding them to that standard, because I’m hoping by next year, if we do this again, we’ll see what’s expected and what the rigor is like. We can’t be afraid of saying “rigor” anymore. You’re seeing that more with college admissions and SAT requirements; those things are coming back.”Another participant followed and said: “I think with the rigor, too, comes time management. Hearing how they have to put in 4 hours of work for their class, that’s nothing. If we were in person, you’d be in it longer. In that aspect, remote learning may have put a damper on what their expectations were for this. We openly communicated time constraints with students when they signed their AP contracts; we say this course is however many hours per week plus these additional components. So, to me, it’s alarming to hear them complain about 4 hours of classwork when they’re getting time in school to do this, and there may be carryover time outside of that.”

Additionally, a few respondents mentioned that some students developed some bad habits during their virtual COVID learning experience since there were such low expectations. One participant noted that some students had different experiences with online learning since some schools were remote and some were hybrid. One participant said the following: “COVID learning wasn’t really interactive; for this, they have to be an active participant and learner.”

## Successes and Challenges [15 minutes]

**Protocol 10:** *\*In this year, have there been any noteworthy successes in regards to the initiative? (Eval 1a)*

1. ***For returning schools:*** *In what ways have these successes been similar to or different from last year’s successes?*

Among the focus group participants, some shared their successes and attributed their satisfaction with the Expanding Access initiative to their students’ experiences and successes with the initiative. One respondent said the following: “In my mind, it’s been an unbelievable success. Students are not just surviving; they’re thriving in these classes. I just find that it’s been great. I’ve had a very positive experience. The students themselves seem to be really succeeding.” Another participant shared the following: “We have high grades, which is great. We have a couple of students who are struggling, but they’re struggling in some very hard courses. They’re not failing, so we keep pushing them up. Every time I look at the grades, they’re excellent. No worries there.”

Additionally, a focus group respondent said the following: “I have the opportunity to watch a group of students work in a high topic area. It’s great to see them work together and to communicate, help each other out, and support each other. Outside academics, it was great to see students step up and help their peers when they had a hard time understanding the LMS format. That was a monumental success, especially coming out of the pandemic with socialization issues. We also have other students stepping out of their comfort zones to take courses they may not have taken in-house. I see their grades their grades every week, and they’re doing very well.”

One participant noted that students collaborated with each other even though they were not enrolled in the same courses or preferred to work alone. The respondent noted the following: “to see that collaboration is a big success because that doesn’t typically happen. They’re self-motivated, and it’s nice to hear them talk about it, rather than the somewhat perfunctory way students typically go through classes, mechanical and robotic. It’s nice to hear them share some of their ideas;”

**Protocol 11:***\*In this year, have there been any noteworthy challenges? (Eval 1a)*

1. ***For returning schools:*** *In what ways have these challenges been similar to or different from last year’s challenges?*

Among the focus group participants, several respondents noted challenges related to student success and experiences with the Expanded Access initiative. Among these challenges were logistics in terms of where the students were going to be and who was going to be supervising them, time management and student self-motivation to complete the assignment in the allotted time, student persistence in the course and other related course challenges pertaining to the online platform, uploading assignment and overall workload. One respondent said the following: “Sometimes, I find that the VHS course have too much work. There’s too much to do in a week. I think that some of the offerings might fall victim to that; that there’s just too much to do. Significantly more than they’d have in face-to-face. I think that’s part of the issue, that they get into these classes and realize that it’s too much work.”

Additionally, one respondent also noted the following challenge among online teachers and in-person teachers in relation to expectation: “There is a little frustration instructor to instructor; the expectations are different. I think it’s good for them to learn, because here we have several teachers who teach the same content, but their expectations can be a little different. I can see from their perspective how it’s frustrating.”

**Protocol 12:** *How did you go about integrating this/these courses into students’ schedules?*

*Probes:*

1. *Given that your school uses a [semester; block; trimesters; etc.] schedule, in what ways have you had to adapt to the virtual AP course’s year-long schedule to fit with your school’s existing scheduling format? (Eval 1a)*

Relative to students’ schedules, all the focus group participants indicated that Expanding Access-enrolled students are allocated time during regular school hours to complete their virtual course assignments. However, some participants indicated that it is not a rotating schedule and students have to drop one period each semester. One participant said the following: “Students just choose to drop one period each trimester, and they fill VHS in wherever there’s an empty block. That allows the kids to fit something into a schedule that may not have fit otherwise.”

This focus group respondent explained their scheduling process: “For the AP classes through VHS, we ask the student to be endorsed by a current teacher in that content area to make sure they can meet the demands of the class. Because we’re so familiar with it, we have a good understanding of what the workload and skill levels are for those classes. We basically fit that AP VHS Learning class into their schedule wherever there’s room. We schedule it for a given period, and a student will sign into the library and access that class during that period. We have the library open throughout the day, so we could easily move VHS classes to fit wherever; there’s no conflict.”

For one focus group participant students did not have to drop a period since they have a rotating block schedule, meaning: “They have this period every other day for 90 minutes. They’ll meet three days one week and two days the next week.” Furthermore, the respondent said attendance may become an issue at some point with this particular method: “If a student gets dismissed or is absent and they miss a class, they only have one or two other opportunities to catch up on schoolwork.”

**Protocol 13:** *How has VHS Learning positively supported student success? (Eval 1a)*

* 1. *What feedback might you give, if any, to VHS Learning to help them better support student success?*

Overall, the focus group participants expressed satisfaction with VHS Learning’s level of engagement, their frequent and effective communication, their flexibility, and continuous support for the schools enrolled in the Expanded Access initiative. One school administrator shared the following: “They do a nice job sending reports to site administrators and site coordinators. They send work and assignment reports, they know how long students have gone without logging in, and they let us know.”

Additionally, one respondent shared the following: “The kids who have 504 plans—the teachers have been really easy to work with on that. They get 50% more time; they’ve been really good about accommodating individualizing what those kids need based on whatever is in their 504.”

Among the focus group participants, two respondents noted VHS Learning online platform, and VHS Learning teacher and student’s parent communication as areas for better support. The challenges were with the VHS Learning online platform, students took some time to navigate through due to limited exposure. One respondent mentioned the following as a potential solution: “a general tutorial on how to navigate the platform, including modules, assignments, videos, and texts.” Another respondent said the following about virtual teacher and parent communication: “The only thing is that there’s no option for parents to contact the instructor directly. They can reach out to me, and I can be the intermediary, but I can’t give out the instructor’s contact information.” A father felt his student wasn’t seeing high success, so he wanted to speak to the instructor to see what he could do to help his child be more successful.”

## Initiative Sustainability [5 minutes]

**Protocol 14:** *From your perspective, what kinds of supports do you envision your school would need in order to continue this initiative once the grant funding has ended? (Eval 7; 7b; 7c)*

Several participants in the focus group listed some challenges that are areas where additional support is needed. Among those areas are better marketing for the summer program, early communication with students who are interested in the Expanding Access initiative to explain what to expect over the summer, and limited access to experienced staff who are content knowledge experts for support.

Relative to school participating in the Expanding Access initiative once the grant funding ends, some focus group participants shared that their school’s decision to continue participating in the initiative heavily relies on the cost and available resources. One focus group participant stated, “We’d have to look at how much it costs without the grant and how much interest it is when it’s not free.” Contrary to the previous statement another respondent shared “… we’ll continue providing these opportunities absent of any grant funding. It wasn’t the grant funding that sparked us to join. That comes down to our clientele; if we continue to have students who want to access those high-level courses, we’ll get them into them.”

## Wrap-up [time permitting]

**Protocol 15:** *\*Is there anything else you think is important for us to know regarding your school and your students’ experiences with this initiative? (Eval 8)*

The focus group respondents generally described their participation in the Expanding Access initiative as a positive experience. Some focus group participants expressed interest in participating in the initiative the following year. One administrator in the focus group shared “It’s always nice to see kids come pick up their lab kits; seeing the enthusiasm and the excitement is a huge success. There’s nothing different from last year or any other year. “There’s good collaboration between students who are taking the same classes,” though they are not in the same periods. They collaborate after school, that is something new that I hadn’t seen before. They have different teachers but the same content. It’s been neat to see. They have a passion for learning and are trying to make it work and are advocating for themselves. It’s nice to see their academic maturity.”

Some focus group participants, however, acknowledged several concerns and needs that students enrolled in the initiative can benefit from. For example, early communication explaining requirements to students prior to course enrollment, and the need for more in-person support staff who are content experts were mentioned. One participant said the following: “In my mind, I think VHS does a very good job of explaining the requirements. It’s all right there. What they don’t do a good job of is explaining those requirements before students sign up. You sign up for the class, then you get all that information. You have access to the syllabus when you’re signing up, but all the other stuff about what’s expected of you happens the first week during orientation. It would be nice if there were more information that we could give to students, something written saying here’s the deal, here are the requirements for VHS. They’re basically the same for every AP class, so it doesn’t matter if it’s STEM.” Additionally, one of the focus group participants said the following about the workload: “I think, to some extent, VHS Learning requires too much work. The difference in the amount of work that you get in a face-to-face class and the amount of work you get in work is significant.”

**Protocol 16:** *What have you learned about the Expanding Access initiative that would be helpful to share with other school administrators or Site Coordinators who are interested in participating in this initiative?*

The focus group participants shared several suggestions for school administrators and Site Coordinators interested in participating in the Expanding Access initiative. Some notable suggestions and comments were related to the benefit of the initiative in terms of course availability, staff involvement during the marketing and recruiting phase, and communication. In terms of staff involvement, recruitment, and communication, one respondent noted the following: “…starts with an individual teacher that recognizes a student in front of them has the capability to push themselves a little harder and pulling that kid aside and saying, ‘I think you’re ready for an AP course, here are some courses that are offered to you.’ We do have a course selection process and we work with the students directly, but if teachers aren’t taking the time to have those conversations with students, that’s a missed opportunity.” Additionally, one participant noted that it is also important for staff members to be able to speak about the initiative intelligently to students.

Alternative Questions

**Protocol 17: *For Site Coordinators:*** *What kinds of opportunities have you had to engage with Site Coordinators at other schools, if at all?*

No response was provided.

**Protocol 18:** *In what ways, if any, do you think COVID impacted student preparation for, or participation in, these virtual courses? (Eval 2; 2a)*

Some focus group participants noted that COVID impacted student preparedness for online learning. One focus group respondent said students also obtained some bad practices during the COVID learning phase since the expectations were less strict.

## AP Exam Intent [2 minutes]

**Protocol 19:** *Does your school encourage students participating in the Expanding Access initiative to register for AP exams? If so, how? (Eval 3a)*

Among the focus group participants, some respondents noted that their AP students are expected and were required to take the AP exams. Relative to the AP exams fees, one Site Coordinator noted that their students are required to take the AP exams at no cost to them, while a different Site Coordinator noted that their students were responsible for the cost. Interestingly, another respondent said at their school the AP students signed a contract generated by the school that included taking the AP exams.

Among the focus group participants who indicated that the AP exams were not a requirement, one respondent said because the exams are free for their students, they are encouraged to take them. Another respondent said the following about the exams: “It is voluntary, but if they don’t take the AP exam, they’d be taking a teacher-created exam. There would be a final exam. If a student is taking AP Physics through VHS and they don’t take the AP exam, we will create one for them to take. It’s a little incentive; they all take the AP exam. Some of them take both. It’s unbelievable. We won’t give them extra credit, but we’ll let them take it after school. It’s not going to count for anything; it’s one or the other.”

## Post-secondary Support [3 minutes]

**Protocol 20:** *What supports does your school offer students who are preparing to enter college? (Eval 6)*

No response was provided.

# Appendix G: DESE group interview protocol

## Introduction and Consent [5 minutes]

My name is [name], and I work with UMass Donahue Institute, an independent third-party research organization that has been contracted by DESE to conduct an evaluation of the STEM Advanced Placement Access Expansion Opportunity (Expanding Access) initiative in Massachusetts. Thank you for taking this time to speak with me about your experience with this initiative.

**Study Purpose**

As you know, DESE has contracted this study to monitor and assess key metrics of the Expanding Access initiative’s implementation and impact, facilitate continuous program improvement, and promote organizational learning. The input you provide today about your experiences as members of DESE’s team will inform and assist us in documenting and learning about the first year of implementation of the Expanding Access initiative.

**Confidentiality**

Information obtained today will be used for the purposes of improving the Expanding Access initiative’s implementation and to inform others about program impacts and lessons learned. We will be generating a brief summary from these interviews. Only UMDI will have access to the interview data—the data will not be shared with DESE. Because the number of interviewees is limited, we cannot guarantee your confidentiality. However, we will de-identify interviewees in the summary we produce—meaning that no names will be used (and if necessary, pseudonyms will be assigned), no quotes will be attributed to individuals, and your positions will not be revealed. We also ask that you each maintain the confidence of the other participants in this room.

**Permission to Record**

The interview is voluntary and will take no more than 1 hour. With your permission, I would like to record our conversation to ensure your comments are accurately documented. No one outside of the UMDI team will have access to the recording. If you want me to turn off the recorder at any point, please just let me know. **May I have your permission to record this conversation?** Before we get started, do you have any questions for me? Ok, I am turning on the recorder, and we will begin the interview.

## Successes and challenges over the last year [30 minutes]

* + 1. What have been some the key successes during the second year of the Expanding Access initiative’s implementation in schools? (*Eval 1A)*

*Probe if not addressed:*

1. What have been some of the key successes around school engagement and interest?
2. What have been some of the key successes regarding student preparation and recruitment?
3. What have been some of the key successes regarding VHS Learning as vendor?
4. What have been some of the key successes in relation to diversity, equity and inclusion?
5. What have been some of the key challenges during the second year of the Expanding Access initiative’s implementation? (*Eval 1A)*

*Probe if not addressed:*

* 1. **\***What have been some of the key challenges for students?
  2. \*What have been some of the key challenges for schools or Site Coordinators?
  3. What have been some of the key challenges in relation to collaboration with VHS Learning?
  4. What have been some of the key challenges in relation to diversity, equity, and inclusion? (*Eval Q1B*)

1. One of the goals of the initiative is to support participating students in achieving post-secondary success. How have DESE and VHS Learning pursued that goal over the past year? (*Eval 6*)
   1. What might DESE do moving forward to support participating students’ post-secondary success?
   2. What might VHS Learning do moving forward to support participating students’ post-secondary success?

One of the goals of the initiative is to support increased access to AP STEM courses for diverse student groups, and we know this focus has shifted a bit over the past year. Describe for us how that shift occurred, and how the initiative plans to move forward? (*Eval 1b*)

How have enrollment challenges impacted DESE’s goals around diversity, equity, and inclusion, if at all?

## Looking ahead [15 minutes]

1. What does DESE plan to do differently next year? What has influenced those plans? (*Eval 7*)
2. In what ways have you adjusted recruitment strategies with schools? (*Eval 1b*)
3. In what ways have you adjusted communication strategies with schools?
4. To what degree has DESE considered priority zone groupings in recruitment of schools for next year? (*Eval 1b*)
5. How would you describe schools’ general levels of interest in the initiative for next year? Compared to last year, has interest grown? What has most contributed to schools’ interest? (*Eval 7A*)
6. We’ve come to the end of the interview. Is there anything else you like to share with us regarding the Expanding Access initiative?

# Appendix H: VHS Learning group interview protocol

## Introduction and Consent [5 minutes]

My name is [name], and I work with UMass Donahue Institute, an independent third-party research organization that has been contracted by the Massachusetts Department of Elementary and Secondary Education (or DESE) to conduct an evaluation of the STEM Advanced Placement Access Expansion Opportunity (Expanding Access) initiative in Massachusetts. Thank you for taking this time to speak with me about your experience with this initiative.

**Study Purpose**

As you know, DESE has contracted this study to monitor and assess key metrics of Expanding Access initiative implementation and impact, facilitate continuous program improvement, and promote organizational learning. Your input today about your experiences as members of the VHS Learning team will inform and assist us in documenting and learning about the second year of implementation of the Expanding Access Initiative.

**Confidentiality**

Information obtained today will be used for the purposes of improving the Expanding Access initiative’s implementation and to inform others about program impacts and lessons learned. We will be generating a brief summary from these interviews. Only UMDI will have access to the interview data—the data will not be shared with DESE. Because the number of interviewees is limited, we cannot guarantee your confidentiality. However, we will de-identify interviewees in the summary we produce—meaning that no names will be used (and if necessary, pseudonyms will be assigned), no quotes will be attributed to individuals, and your positions will not be revealed. We also ask that you each maintain the confidence of the other participants in this room.

**Permission to Record**

The interview is voluntary and will take no more than 1 hour. With your permission, I would like to record our conversation to ensure your comments are accurately documented. No one outside of the UMDI team will have access to the recording. If you want me to turn off the recorder at any point, please just let me know. **May I have your permission to record this conversation?** Before we get started, do you have any questions for me? Ok, I am turning on the recorder, and we will begin the interview.

## Key successes and challenges [10 minutes]

1. What have been the key successes during the second year of the Expanding Access initiative’s implementation in schools? (*Eval Q1A*)

*Probe if not addressed:*

1. What have been some of the key successes for students?
2. What have been some of the key successes for schools or Site Coordinators?
3. What have been some of the key successes in relation to collaboration with DESE?
4. What have been the key challenges during the second year of the initiative’s implementation? (*Eval Q1A*)

*Probe if not addressed:*

* 1. \*What have been some of the key challenges for students?
  2. \*What have been some of the key challenges for schools or Site Coordinators?
  3. What have been some of the key challenges in relation to collaboration with DESE?

**We’d like to ask some additional questions regarding students, Site Coordinators, and schools. [35 minutes]**

1. Were most students adequately prepared for participation in their virtual AP STEM course(s)? How do you know? (*Eval Q1B*)
   1. Were schools’ procedures for identifying and recruiting students adequate? Did they reach the target population? (*Eval Q1B*)
   2. Have participating students typically required additional or different supports than other VHS Learning students? If so, what did those supports look like? (*Eval Q3*)
2. This past year, DESE shifted priorities around the recruitment of historically marginalized students. To what extent has this impacted the ways in which VHS Learning engages with schools, if at all?
   1. To what extent has this impacted VHS Learning’s engagement with Site Coordinators? The recruitment of instructors?
3. This year, students have remained enrolled in their courses at higher rates than students from last year. From VHS Learning’s perspective, what factors might have contributed to this?
   1. Please describe any noteworthy differences this year in students that may have attributed to reduced attrition. Schools? Site Coordinators?
   2. How might schools better support students to reduce attrition rates? (*Eval   
      Q3; Q7A*)
4. To what extent have Site Coordinators fulfilled their duties in support of the initiative? Is VHS Learning satisfied with their commitment to the initiative?
5. How invested do you believe participating schools are in the success of students who are enrolled in the Expanding Access initiative? (*Eval Q7*)
6. Do you believe that most participating schools intend to provide students with long-term access to AP STEM courses? Have your feelings on this changed since the beginning of the year? If so, why? (*Eval Q7B; 7C*)
7. We know that many schools that participated this past year had a prior relationship with VHS Learning. In what ways are the experiences of students at schools new to VHS Learning similar or different from the experiences of students at schools that are not new to VHS Learning? (*Eval Q1A*)
8. How has VHS Learning worked with DESE or schools to connect students with the knowledge, skills, and supports necessary for post-secondary success? What does VHS learning hope to do moving forward? (*Eval Q6*)

## Looking ahead [10 minutes]

1. What does VHS Learning plan to do differently next year?

*Potential probes:*

1. Are you planning any changes to support for participating schools/districts?
2. Are you planning any changes related to support and training for Site Coordinators?
3. Are you planning any changes related to support for participating students?
4. Are you planning any changes related to collaboration with DESE?
5. Are you planning any changes related to parent or guardian engagement in the initiative?
6. What next steps does VHS Learning have in mind to continue to promote diversity, equity, and inclusion through the Expanding Access initiative? (*Eval Q1B*)
7. Are you planning any next steps related to the hiring of a diverse teacher workforce?
8. Are you planning any next steps related to improving students’ sense of inclusion?

## Wrap up [5 minutes]

We’ve come to the end of the interview. Is there anything else you like to share with us regarding the Expanding Access initiative?

# Appendix I: Student survey protocol

## Introduction and Consent [2 minutes]

Thank you for taking the time to complete this survey. You are being invited to participate in an evaluation of the Expanding Access initiative, also known as “SAPAO,” because you are enrolled in at least one virtual Advanced Placement (AP) course offered through the initiative. This evaluation is being conducted by the UMass Donahue Institute (UMDI)—an independent third-party evaluator working with the Massachusetts Department of Elementary and Secondary Education (DESE).

**Why are we doing this survey?**

The purpose of this survey is to learn more about how the initiative works, and how to improve students’ experiences with the initiative.

**What will I be asked to do and how much time will it take?**

If you agree to participate, you will be asked to complete a survey about your experiences so far in your virtual AP STEM course(s). The survey will take about 15 minutes to complete**.**

**Will completing this survey help me in any way?**

While there are limited direct benefits, the information you provide will be used to improve the Expanding Access initiative for yourself and for other students. You may also benefit by reflecting on your experience in the initiative.

**How will my personal information be protected?**

To the best of our ability, your answers will remain confidential. To protect your confidentiality, only members of the UMDI team will have access to the survey data. Survey findings will only be reported to DESE as aggregate data, which combines responses from all students. Your responses will not be shared with your teachers, classmates, or parents, and will not impact your course grade.

**Will I be given any money or other compensation for completing this survey?**

We do not offer participation incentives for your involvement in this survey.

**What happens if I say yes, but I change my mind later?**You do not have to participate in this survey if you do not want to. If you agree to participate, but later change your mind, you may stop taking the survey at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

**Who can I talk to if I have questions?**You can ask any questions that you may have about this survey or the program evaluation. If you have a question, you can email Hanni Thoma at hanni@donahue.umass.edu or Jeremiah Johnson at jeremiah@donahue.umass.edu.

By clicking “I agree” below you are indicating that you have read this consent form and agree to participate in this survey. You are free to skip any question that you choose.

Please print a copy of this page for your records.

## Pre-AP [4 minutes 15 seconds]

1. How did you first learn about the Expanding Access initiative? (Please select all that apply) (*Eval 1A*)(30 seconds)
   1. My school notified me (either via email, phone, face-to-face, or through a virtual meeting) that I was eligible to participate.
   2. A teacher or guidance counselor told me about the initiative.
   3. A family member told me about the initiative.
   4. A classmate or friend told me about the initiative.
   5. Other (please specify):
2. What influenced your decision to enroll in an AP STEM course with the Expanding Access initiative? (Please select all that apply) (*Eval 2C*) (30 seconds)
3. I wanted to challenge myself academically.
4. I was interested in the subject.
5. I thought it would help me get into a good college or university.
6. I wanted to earn college credit.\* (Note: College credit may be offered by some colleges if a student earns a high enough score on the AP exam)
7. I thought it would improve my GPA.
8. I wanted to continue taking virtual learning courses.
9. My school encouraged me to enroll.
10. My family encouraged me to enroll.
11. My friends encouraged me to enroll.
12. Other (please specify):
13. Who encouraged you to enroll in an AP STEM course through the Expanding Access initiative? (Please select all that apply) (*Eval 1B*) (30 seconds)
14. My parents or a family member encouraged me to enroll.
15. My friend(s) encouraged me to enroll.
16. My teacher/counselor/coach/principal or other school staff member encouraged me to enroll.
17. No one encouraged me to enroll in a virtual AP course.
18. Other (please specify):
19. How prepared did you feel *when you began* your virtual AP STEM course(s)? (*Eval 2C*) (15 seconds)

Unprepared Somewhat unprepared Somewhat prepared Well prepared

1. **Display logic from Q3, if student selects ‘somewhat’ or ‘well prepared’:** What most contributed to your preparedness? (Please select all that apply) (30 seconds)
   1. Course content from a previous year
   2. Rigor or difficulty of course from a previous year
   3. Tutoring
   4. Independent study
   5. A previous virtual learning experience
   6. Study skills
   7. Summer school
   8. School-provided summer resources
   9. VHS Learning-provided summer resources
   10. Other (please specify):
2. While there was no requirement for students to do any preparation over the summer, please share whether the supports listed below were **available** to you. (*Eval 1A, 2C, 3*) (2 minutes)

This was available.

This was not available.

I don’t know whether this was available or not.

* 1. Meeting with a counselor or teacher
  2. Reading list
  3. Library access
  4. Virtual learning opportunities (such as lectures or courses)
  5. Tutoring
  6. VHS Learning summer orientation
  7. Summer coursework
  8. Other (please specify):

1. **Display logic based on question 6:** Which of these available resources, if any, did you **utilize**?

I did utilize this resource.

I did not utilize this resource.

* 1. Meeting with a counselor or teacher
  2. Reading list
  3. Library access
  4. Virtual learning opportunities (such as lectures or courses)
  5. Tutoring
  6. VHS Learning summer orientation
  7. Summer coursework

## Virtual AP Experience [7 minutes]

1. Please indicate the extent to which you agree or disagree with the statements below. (*Eval 1A, 6*) (1 minute 15 seconds)

Strongly Disagree Disagree Agree Strongly Agree

1. This course(s) is more difficult than I expected when I enrolled.
2. My academic course load this year has been manageable.
3. This course(s) requires significantly more time (studying and completing course assignments) than the other courses I’m currently taking.
4. My participation in this course(s) has positively impacted my performance in other courses.
5. My virtual AP course(s) has increased my interest in pursuing a STEM major or a career in STEM.
6. How much time do you spend each week completing the asynchronous assignments for your course(s)? (15 seconds)
   1. Less than 3 hours
   2. Between 3 and 6 hours
   3. Between 7 and 12
   4. Over 12 hours
7. How much do you interact (such as over the telephone, online, or through face-to-face communications) with the following individuals? (*Eval 1A*) (45 seconds)

Never A few times a month A few times a week Nearly every day Every day

* 1. My virtual AP teacher
  2. My AP Site Coordinator
  3. My virtual AP classmates

1. Who do you seek out when you need help with your AP course(s)? (Please select all that apply) (*Eval 1A, 3*) (30 seconds)
   1. My virtual AP teacher
   2. My Site Coordinator
   3. My virtual AP classmates
   4. A teacher at my school
   5. Other (please specify):
2. The following questions pertain to your experiences with your virtual AP teacher(s), classmates, and Site Coordinator. Please indicate how frequently you agree with the statements below. (2 minutes 30 seconds)

Never Some of the time Most of the time All of the time Not Applicable

* 1. I feel I belong in this virtual AP course.
  2. I feel supported by my virtual AP teacher.
  3. I feel supported by my Site Coordinator.
  4. I feel supported by my virtual AP classmates.
  5. I feel I am treated fairly by my virtual AP teacher.
  6. I feel I am treated fairly by my Site Coordinator.
  7. I feel I am treated fairly by my virtual AP classmates.
  8. I feel I can be my authentic self with my virtual AP teacher.
  9. I feel I can be my authentic self with my Site Coordinator.
  10. I feel I can be my authentic self with my virtual AP classmates.

1. Please indicate the extent to which you have improved the skills listed below *as a result of your participation in the Expanding Access initiative*. (*Eval 2C; 6, 8*) (1 minute 45 seconds)

Neutral (no change) Small improvement Moderate improvement Significant improvement

1. Critical thinking skills
2. Communication skills
3. Creativity
4. Ability to generate solutions to complex problems
5. Ability to work on my own
6. Time management skills
7. Confidence using technology
8. Other (please specify):

## AP Exam Intent [15 seconds]

1. Do you intend to take the AP exam(s) associated with the virtual AP STEM course(s) you are taking through the Expanding Access initiative? (*Eval 3A*) (15 seconds)
2. Yes
3. No
4. Unsure

## Wrap Up [3 minute 45 seconds]

1. What virtual AP STEM course(s) are you currently enrolled in through the Expanding Access initiative? (Please select all that apply) (30 seconds)
   1. AP Biology
   2. AP Calculus AB
   3. AP Chemistry
   4. AP Computer Science Principles
   5. AP Environmental Science
   6. AP Physics 1: Algebra-Based
   7. AP Physics C
   8. AP Statistics
2. What school do you attend? (Choose from list) (15 seconds)
3. Have you previously taken an AP course? (15 seconds)
   1. Yes
   2. No
4. Have you previously taken a virtual AP course through the Expanding Access initiative? (15 seconds)
   1. Yes
   2. No
5. Have you previously taken a virtual course through VHS Learning that was not part of the Expanding Access (SAPAO) initiative? (15 seconds)
   1. Yes
   2. No
6. Which of the following best describes your gender? (Please select all that apply) (15 seconds)
   1. Female
   2. Male
   3. Non-binary
   4. I choose not to respond
   5. Other (please describe if you like):
7. What is your race or ethnicity? (Please select all that apply) (15 seconds)
   1. Hispanic or Latino/a/x
   2. Not Hispanic or Latino/a/x
   3. American Indian or Alaskan Native
   4. Asian
   5. Black or African American
   6. Native Hawaiian or Other Pacific Islander
   7. White
   8. I choose not to respond
8. Do you have any additional feedback or reflections on your experience with the Expanding Access initiative that might help improve experiences for other students? (Short answer response) (*Eval 1A*) (2 minutes)

# Appendix J: Parent/guardian survey protocol

## Introduction and Consent [2 minutes]

Thank you for taking the time to complete this survey. You are being invited to participate in an evaluation of the Expanding Access (also known as SAPAO) initiative because you are a parent or guardian of a child that is enrolled in at least one virtual Advanced Placement (AP) course offered through the initiative. These courses are run by VHS Learning. This evaluation is being conducted by the UMass Donahue Institute (UMDI)—an independent third-party evaluator working with Massachusetts Department of Elementary and Secondary Education (DESE).

**Why are we doing this survey?**

The purpose of this survey is to learn more about how the initiative works, and how to improve students’ experiences with the initiative.

**What will I be asked to do and how much time will it take?**

If you agree to participate, you will be asked to complete a survey about your observations of your child’s experiences so far in their virtual AP course(s). The survey will take about 10 minutes to complete**.**

**Will completing this survey help me in any way?**

While there are limited direct benefits, the information you provide will be used to improve the Expanding Access initiative for students. You may also benefit by reflecting on your child’s experience in the initiative.

**How will my personal information be protected?**

To the best of our ability, your answers will remain confidential. To protect your confidentiality, only members of the UMDI team will have access to the survey data. Survey findings will only be reported to DESE as aggregate data, which combines responses from all parents and guardians. Your responses will not be shared with your child or their teachers or classmates, and will not impact your child’s course grade.

**Will I be given any money or other compensation for completing this survey?**

We do not offer participation incentives for your involvement in this study.

**What happens if I say yes, but I change my mind later?**You do not have to participate in this survey if you do not want to. If you agree to participate, but later change your mind, you may stop taking the survey at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

**Who can I talk to if I have questions?**You can ask any questions that you may have about this survey or the program evaluation. If you have a question, you can email Hanni Thoma at hanni@donahue.umass.edu or Jeremiah Johnson at jeremiah@donahue.umass.edu.

By clicking “I agree” below you are indicating that you have read this consent form and agree to participate in this activity. You are free to skip any question that you choose.

Please print a copy of this page for your records.

## Pre-AP [30 seconds]

1. How involved were you in your child’s decision to enroll in a virtual AP STEM course through the Expanding Access initiative? (*Eval 2C*) (15 seconds)

Not at all involved Slightly involved Moderately involved Extremely involved

1. How motivated do you believe your child is to succeed in their virtual AP course through the Expanding Access initiative? (*Eval 1A*) (15 seconds)

Not at all motivated Slightly motivated Moderately motivated Extremely motivated

1. Has your child previously participated in the Expanding Access initiative? (15 seconds)
   1. Yes
   2. No
   3. Unsure

## School and VHS Learning Supports [2 minutes 30 seconds]

1. While there was no requirement for students to do any preparation during the summer, please share whether the supports listed below were available to your child, *and* what supports they utilized, if any, to prepare for their virtual AP STEM course(s) with the Expanding Access initiative. (*Eval 1A, 2C, 3*) (2 minutes)

This was not available during the summer.

This was available during the summer, but my child did **not** use it.

This was available during the summer, and my child **did** use it.

I don’t know if this was available during the summer.

1. Meetings with counselors or teachers
2. Reading list
3. Library access
4. Virtual learning opportunities (such as lectures or courses)
5. Tutoring
6. VHS Summer Orientation
7. Summer coursework
8. Other (please specify):
9. What resources does your child **currently** utilize when they need help with their virtual AP STEM course through the Expanding Access initiative? (Please select all that apply) (*Eval 1A; 3*) (30 seconds)
   1. Study skills
   2. The internet (such as Google or YouTube)
   3. Tutoring
   4. Course content from a previous year
   5. Virtual AP teacher-provided office hours
   6. Individualized meetings with their virtual teacher
   7. Virtual study group with their virtual AP classmates
   8. In-person study groups with other students at their school
   9. Support from Site Coordinator
   10. Support from faculty or staff at their high school
   11. School-provided summer resources
   12. VHS Learning-provided summer resources
   13. Other (please specify):
   14. I don’t know

## Course Experience [5 minute 30 seconds]

1. To what extent do you agree that your child is receiving enough support from their: (*Eval 3*) (45 seconds)

Strongly disagree Disagree Agree Strongly agree No basis for opinion

* 1. Virtual AP teacher
  2. Virtual AP classmates
  3. AP Site Coordinator

1. What **additional** resources or supports (provided by either the school or VHS Learning) would your child benefit from in their virtual AP course through the Expanding Access initiative? If you are not sure, please write “I don’t know.” (*Eval 3*) (Short answer) (2 minutes)
2. Does your child receive educational support from an IEP? *Individualized Education Plans (IEP) provide special learning accommodations or supports to students*. (15 seconds)
   1. Yes
   2. No
   3. I don’t know
3. Does your child receive educational support from a 504 plan? *504 Plans provide special learning accommodations or supports to students*. (15 seconds)
   1. Yes
   2. No
   3. I don’t know
4. **Display logic if yes to Q7 or Q8** To what extent do you believe that your child’s learning needs, as outlined in their IEP or 504 plan, are being met? (15 seconds)
   1. All of their needs are being met
   2. Some of their needs are being met
   3. Few of their needs are being met
   4. None of their needs are being met
5. Please describe a memorable experience that your child has shared with you about their virtual AP STEM course through the Expanding Access initiative. This might include, for example, comments on their course, their teacher, interactions with classmates, or another component of their virtual AP STEM class. (Short answer) (*Eval 1A*) (2 minutes)

## AP Exam Intent [30 seconds]

1. Prompt: An important component of many students’ experiences in advance placement (AP) courses is taking an AP exam. One benefit of taking this exam is that students may receive a qualifying score which could make them eligible for college credit. Please review and respond to the questions below. (*Eval 3A*) (30 seconds)

Yes No I don’t know

* 1. Has your child talked to you about taking the AP exam(s) associated with their virtual AP course(s)?
  2. Does your child plan to take the AP exam(s) associated with their virtual AP course(s)?

## Demographics [1 minute 30 seconds]

1. What school does your child attend? (Drop down list) (15 seconds)
2. What Expanding Access initiative course(s) is your child enrolled in? (Please select all that apply) (30 seconds)
   1. AP Biology
   2. AP Calculus AB
   3. AP Chemistry
   4. AP Computer Science Principles
   5. AP Environmental Science
   6. AP Physics 1
   7. AP Statistics
   8. I don’t know
3. What is your child’s age? (15 seconds)

(Drop down list)

1. Which of the following best describes your child’s gender? (15 seconds)
   1. Female
   2. Male
   3. Non-binary
   4. Other (please describe if you like):
   5. I choose not to respond
2. What is your child’s race or ethnicity? (Please select all that apply) (15 seconds)
   1. Hispanic or Latino/a/x
   2. Not Hispanic or Latino/a/x
   3. American Indian or Alaskan Native
   4. Asian
   5. Black or African American
   6. Native Hawaiian or Other Pacific Islander
   7. I choose not to respond

# Appendix K: School survey protocol

## Introduction and Consent [2 minutes]

Thank you for taking the time to complete this survey. You are being invited to participate in an evaluation of the Expanding Access initiative, also known as “SAPAO,” because your school is offering at least one virtual Advanced Placement (AP) course through this initiative with VHS Learning. This evaluation is being conducted by the UMass Donahue Institute (UMDI)—an independent third-party evaluator working with the Massachusetts Department of Elementary and Secondary Education (DESE).

**Who is being asked to complete this survey?**

We ask that your school’s VHS Learning Site Coordinator and one school administrator collaborate to complete this survey. The responses you provide should represent the perspective/experience of your school (rather than your individual perspective).

**Why are we doing this survey?**

The purpose of this survey is to learn more about how the initiative works, and how to improve participants’ experiences with the initiative.

**What will I be asked to do and how much time will it take?**

If you agree to participate, you will be asked to complete a survey about your school’s experience so far in the Expanding Access initiative. The survey will take approximately 25 minutes to complete**.**

**Will completing this survey help me in any way?**

While there are limited direct benefits, the information you provide will be used to improve the Expanding Access initiative for students. You may also benefit by reflecting on your experience in the initiative.

**How will my personal information be protected?**

To the best of our ability, your answers will remain confidential. To protect your confidentiality, only members of the UMDI team will have access to the survey data. Survey findings will only be reported to DESE as aggregate data, which combines responses from all respondents. Your individual responses will not be shared, and will not impact your school’s participation in the initiative.

**Will I be given any money or other compensation for completing this survey?**

We do not offer participation incentives for your involvement in this survey.

**What happens if I say yes, but I change my mind later?**You do not have to participate in this survey if you do not want to. If you agree to participate, but later change your mind, you may stop taking the survey at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

**Who can I talk to if I have questions?**You can ask any questions that you may have about this survey or the program evaluation. If you have a question, you can call Hanni Thoma at [hanni@donahue.umass.edu](mailto:hanni@donahue.umass.edu) or Jeremiah Johnson at jeremiah@donahue.umass.edu.

By clicking “I agree” below you are indicating that you have read this consent form and agree to participate in this survey. You are free to skip any question that you choose.

Please print a copy of this page for your records.

## School Participation [4 minutes 30 seconds – 6 minutes 15 seconds]

1. Did your school participate in the Expanding Access initiative (also known as SAPAO) last year? (15 seconds)
   1. Yes
   2. No
2. **If no to 1A:** What influenced your school’s decision to participate in the Expanding Access initiative this school year? Please select all that apply. (Multiple choice, 15 seconds) (*Eval 5*)
   1. Low financial cost
   2. Students have wanted a wider selection of AP STEM courses offered
   3. Teachers have wanted a wider selection of AP STEM courses offered
   4. Parents/guardians have wanted a wider selection of AP STEM courses offered
   5. Our school administration wanted to offer a wider selection of AP STEM courses
   6. Other (please specify):
3. **If 1A is selected (prior Expanding Access experience):** What influenced your school’s decision to continue to participate in the Expanding Access initiative this year? (Short answer, 2 minutes) (*Eval 5)*
4. **If 1B is selected (no prior Expanding Access experience):** What were the previous barriers to your school offering AP STEM courses? Please select all that apply. (Multiple choice, 15 seconds)
   1. Limited student interest
   2. Limited number of students adequately prepared to participate
   3. Limited teacher interest
   4. Limited teacher capacity due to high demand for other classes
   5. Lack of, or no, qualified teachers
   6. Did not fit within our existing curriculum/schedule
   7. Other (please specify):
5. Please rate the extent to which you agree or disagree with the statements below. (3 minutes 45 seconds)

Strongly Disagree Disagree Agree Strongly Agree

* 1. Our school is excited to partner with DESE for the Expanding Access initiative.
  2. Our school is excited to partner with VHS Learning for the Expanding Access initiative.
  3. The benefits of the Expanding Access initiative (to the school or to students) outweigh the financial costs to the school or students. (*Eval 5*)
  4. The benefits of the Expanding Access initiative (to the school or to students) outweighs the time required to support the implementation of the initiative.
  5. The Expanding Access initiative provides a valuable expansion to our school’s existing AP STEM course offerings.
  6. The Expanding Access initiative meets a need at our school that is not met by any other course or program.
  7. The Expanding Access initiative compliments and builds upon courses we currently offer. (*Eval 1A*)
  8. The Expanding Access initiative courses fit easily within our schools’ existing schedule. (*Eval 1A*)
  9. Most students (75% or more) meet (in-person or virtually) with their Site Coordinator at least once per week. (*Eval 7*)
  10. Students participating in the Expanding Access initiative are well-supported by VHS Learning. (*Eval 1A*)
  11. Prior to participation, students selected to participate in the Expanding Access initiative were academically well-prepared to succeed in the virtual AP STEM courses offered through the initiative.
  12. Our school has the resources necessary to fully support students in their Expanding Access initiative course(s). (*Eval 7B*)
  13. Our school wants students to have long-term access to AP STEM courses beyond the life of the Expanding Access initiative. (*Eval 7C*)
  14. Our school has the staffing capacity necessary to offer (in person) the same AP STEM courses that our students are currently participating in through the Expanding Access Initiative. (*Eval 7B*)
  15. **Display logic if 3N is ‘Disagree’ or ‘Strongly Disagree:’** Our school wants to develop the staffing capacity necessary to offer (in person) the same AP STEM courses that our students are currently participating in through the Expanding Access initiative. (*Eval 7B*)

## Site Coordinator [2 minutes]

1. Please describe your school’s process for selecting a Site Coordinator for the Expanding Access Initiative. (Short answer, 2 minutes)

## Student Recruitment and Selection [3 minutes 30 seconds]

1. Please describe the ways in which your school prioritized recruitment of students for participation in courses offered through the Expanding Access Initiative, including whether and how any particular group (e.g., students who are English learners and/or former English language learners, those receiving special education services, economically disadvantaged students, and/or members of traditionally underserved racial and ethnic minority groups ) was intentionally targeted for the Expanding Access initiative. (Short answer, 2 minutes)
2. What types of information did you use to select students to participate in the Expanding Access initiative? Please select all that apply. (Multiple choice, 15 seconds) (*Eval 1B*)
   1. Student expressed interest in enrolling in a virtual AP STEM course
   2. Student met specific academic criteria (e.g., MCAS scores, GPA, course history)
   3. Students exhibited non-academic personal qualifications (such as time management skills)
   4. Teacher or guidance counselor recommendations/nominations
   5. Other (please describe):
3. **If 7B is selected:** What data did your school use to select students? Please select all that apply. (Multiple choice, 15 seconds) (*Eval 1B*)
   1. MCAS scores
   2. PSAT scores
   3. GPA
   4. Student’s course history
   5. Student’s past course or academic performance
   6. Other (please specify):
4. VHS Learning lists pre-requisites for students before enrolling in a virtual AP STEM course ([Online Advanced Placement® | VHS Learning](https://vhslearning.org/advanced-placement)).

Approximately what portion of students at your school enrolled in one or more courses through the Expanding Access initiative met the course’s pre-requisites as outlined by VHS Learning’s AP course descriptions?(Multiple choice; 1 minute) (*Eval 1B*)

* 1. All participating students
  2. Most participating students (more than half)
  3. Some participating students (less than half)
  4. No participating students
  5. Unsure

## School Supports [3 minutes 15 seconds - 5 minutes 15 seconds]

1. Do any students currently enrolled in the Expanding Access initiative at your school have an IEP? (15 seconds)
2. Yes
3. No
4. Unsure
5. Do any students currently enrolled in the Expanding Access initiative at your school have a 504 plan? (15 seconds)
6. Yes
7. No
8. Unsure
9. **If yes to Q13 or Q14**: Please describe the ways in which students’ (with either an IEP or 504 plan) learning needs are being met. (Short answer response, 2 minutes)
10. What, if any, summer supports offered by **VHS Learning** did your students use? Please select all that apply. (15 seconds) (*Eval 2B*)
    1. Meeting with a virtual teacher
    2. Reading list
    3. Office hours
    4. Summer coursework
    5. None
    6. Other (please specify):
11. What, if any, summer supports did **your school offer** to Expanding Access initiative-enrolled students? Please select all that apply. (15 seconds) (*Eval 2B*)
    1. Meeting with a counselor or teacher
    2. Reading list
    3. Library access
    4. In-school tutoring
    5. Summer coursework
    6. None

Other (please specify):

1. What kinds of supports does your school currently offer to Expanding Access initiative-enrolled students? Please select all that apply. (15 seconds) (*Eval 3*)
   1. Meeting with a counselor or teacher
   2. Meetings with the Site Coordinator
   3. In-school tutoring
   4. Support for lab exercises
   5. Cohorting (grouping of students to provide peer academic support)
   6. Technology support
   7. Other (please specify):
2. What additional support does your school want or need to improve student success in virtual AP STEM courses offered through the Expanding Access initiative? (Short answer; 2 minutes) (*Eval 7; 7B*)

## Student Experience [30 seconds]

1. \*Does your school build time into students’ regular schedules to complete their Expanding Access initiative coursework? (15 seconds)
2. Yes
3. No
4. Do students have access to a quiet space where they can complete their Expanding Access initiative coursework during the school day? (15 seconds)
   1. Yes
   2. No

## Student Experience - Withdrawals [2 minutes 30 seconds]

1. Have any students at your school decided to withdraw from their Expanding Access initiative virtual STEM AP course(s)? (15 seconds)
2. Yes
3. No
4. **If yes to Q18**: Are these withdrawals recorded in any way on a student’s transcript, such as ‘Incomplete’ or ‘Fail’? (15 seconds)
5. Yes
6. No
7. Unsure
8. **If yes to Q19:** What factor(s) do you believe most contributed to students’ decision to withdraw from their Expanding Access virtual STEM AP course(s)? Please describe below. (Short answer, 2 minutes)

## AP Exam Intent [30 seconds]

1. Approximately how many students enrolled in a course through the Expanding Access initiative are registered to take the AP exam associated with their Expanding Access initiative course(s)? (15 seconds) (*Eval 3A*)
   1. All students
   2. Most students (More than half)
   3. Some students (Less than half)
   4. No students
2. What supports, if any, are being offered by the school for students to take the AP exam associated with their Expanding Access initiative course(s)? Please select all that apply. (Multiple choice, 15 seconds) (*Eval 3A*)
   1. Tutoring
   2. Study groups
   3. Meetings with virtual AP teacher(s)
   4. Meetings with school-based teacher(s)
   5. Other (please specify):

## Next Year [30 seconds]

1. Does your school intend to offer STEM AP courses though the Expanding Access initiative next year? (15 seconds) (*Eval 7A*)
2. Yes
3. No
4. Unsure
5. Does your school have interest in expanding student enrollment in the initiative? (15 seconds) (*Eval 7A*)
6. Yes
7. No
8. Unsure

## Wrap Up [2 minutes]

1. How can the Expanding Access initiative be improved? (Short answer response, 2 minutes) (*Eval 1A*)

# Appendix L: Summary of student survey responses

|  |  |  |
| --- | --- | --- |
| Introduction and Consent | Number of responses (n=93) | Percentage of responses |
| I Agree | 93 | 100% |
| I Do Not Agree | 0 | 0% |

|  |  |  |
| --- | --- | --- |
| Question 1: How did you first learn about the Expanding Access initiative? Please select all that apply. | Number of responses (n=89) | Percentage of responses |
| My school notified me (either via email, phone, face-to-face, or through a virtual meeting) that I was eligible to participate. | 53 | 60% |
| A teacher or guidance counselor told me about the initiative. | 49 | 55% |
| A classmate or friend told me about the initiative. | 6 | 7% |
| A family member told me about the initiative. | 4 | 4% |
| Other (please specify)\* | 4 | 4% |

\*Responses to ‘other’ are provided in Question 1a

**Question 1a:** How did you first learn about the Expanding Access initiative? Please select all that apply - Other (please specify)

Total Respondents: 4

Four students selected ‘other.’ Among these students, one shared that they were notified of the initiative via email, one shared that they were informed about the initiative after already selecting their AP STEM course, and another noted that they were told about the initiative after their AP STEM course was not going to be run in-house due to lack of student interest. The fourth student added that they don’t know what the Expanding Access initiative is.

* *Email*
* *I chose the class first, and then was informed about the initiative.*
* *I don't know what "Expanding Access initiative" is.*
* *When the original class I had signed up for wasn't able to run due to the lack of students who requested it, I was told that this was an option that made it possible for me to still take the course.*

|  |  |  |
| --- | --- | --- |
| Question 2: What influenced your decision to enroll in an AP STEM course with the Expanding Access initiative? Please select all that apply. | Number of responses (n=84) | Percentage of responses |
| I wanted to challenge myself academically. | 67 | 80% |
| I was interested in the subject. | 61 | 73% |
| I thought it would help me get into a good college or university. | 41 | 49% |
| I wanted to earn college credit.\* (Note: College credit may be offered by some colleges if a student earns a high enough score on the AP exam.) | 41 | 49% |
| I thought it would improve my GPA. | 35 | 42% |
| My school encouraged me to enroll. | 21 | 25% |
| My family encouraged me to enroll. | 10 | 12% |
| I wanted to continue taking virtual learning courses. | 6 | 7% |
| My friends encouraged me to enroll. | 2 | 2% |
| Other (please specify)\* | 7 | 8% |

\*Responses to ‘other’ are provided in Question 2a

**Question 2a:** What influenced your decision to enroll in an AP STEM course with the Expanding Access initiative? Please select all that apply - Other (please specify)

Total Respondents: 7

Seven students selected ‘other.’ Among these students, six indicated that they enrolled in the Expanding Access initiative because they were unable to take their AP STEM courses at their brick-and-mortar schools, while one shared that their participation was linked to their career ambitions.

* *I did not have room to take the class in my schedule in-person at my high school.*
* *I didn't get into the course at my school.*
* *I wanted to take the class but couldn't in person.*
* *I wanted to take the course, but the class at my school was full so virtual was the only option.*
* *Not available at my school.*
* *This particular AP (environmental science) is not offered as an in-person class at my high school.*
* *Needed it for my future career.*

|  |  |  |
| --- | --- | --- |
| Question 3: Who encouraged you to enroll in an AP STEM course through the Expanding Access initiative? Please select all that apply. | Number of responses (n=82) | Percentage of responses |
| My teacher/counselor/coach/principal or other school staff member encouraged me to enroll. | 45 | 55% |
| No one encouraged me to enroll in a virtual AP course. | 27 | 33% |
| My parents or a family member encouraged me to enroll. | 17 | 21% |
| My friend(s) encouraged me to enroll. | 9 | 11% |
| Other (please specify)\* | 2 | 2% |

\*Responses to ‘other’ are provided in Question 3a

**Question 3a:** Who encouraged you to enroll in an AP STEM course through the Expanding Access initiative? Please select all that apply - Other (please specify)

Total Respondents: 2

Two students selected ‘other,’ with both indicating that they elected to enroll in the Expanding Access initiative on their own. One student noted that they are self-motivated and thrive in independent learning environments, while the other shared that the courses they were interested in taking were only available virtually.

* *I encouraged myself, I like self-learning it is in my opinion the best ways to learn. A guided self-learning environment.*
* *My school did not have in-person classes for the AP courses I wanted to take, so taking them online was my only option.*

|  |  |  |
| --- | --- | --- |
| Question 4: How prepared did you feel when you began your virtual AP STEM course(s)? | Number of responses (n=83) | Percentage of responses |
| Well prepared | 17 | 20% |
| Somewhat prepared | 37 | 45% |
| Somewhat unprepared | 18 | 22% |
| Unprepared | 11 | 13% |

|  |  |  |
| --- | --- | --- |
| Question 5: What most contributed to your preparedness? Please select all that apply. | Number of responses (n=53) | Percentage of responses |
| Course content from a previous year | 28 | 53% |
| Rigor or difficulty of course from a previous year | 24 | 45% |
| Study skills | 24 | 45% |
| Independent study | 23 | 43% |
| VHS Learning-provided summer resources | 20 | 38% |
| A previous virtual learning experience | 15 | 28% |
| School-provided summer resources | 3 | 6% |
| Tutoring | 0 | 0% |
| Summer school | 0 | 0% |
| Other (please specify) | 2 | 4% |

\*Responses to ‘other’ are provided in Question 5a

**Question 5a:** What most contributed to your preparedness? Please select all that apply - Other (please specify)

Total Respondents: 2

Two students selected ‘other.’ One student shared that their parent teaches the subject, while the other noted that their medical assistant training helped them prepare for their course.

* *parent taught the subject*
* *medical assisting training*

|  |  |  |  |
| --- | --- | --- | --- |
| **Question 6: While there was no requirement for students to do any preparation over the summer, please share whether the supports listed below were available to you.** | | **Number of responses** | **Percentage of responses** |
| Summer coursework | This was available. | 73 | 91% |
| This was not available. | 3 | 4% |
| I do not know whether this was available or not. | 4 | 5% |
| Total | 80 | 100% |
| VHS Learning summer orientation | This was available. | 62 | 78% |
| This was not available. | 5 | 6% |
| I do not know whether this was available or not. | 13 | 16% |
| Total | 80 | 100% |
| Virtual learning opportunities (such as lectures or courses) | This was available. | 50 | 63% |
| This was not available. | 6 | 8% |
| I do not know whether this was available or not. | 24 | 30% |
| Total | 80 | 100% |
| Meeting with a counselor or teacher | This was available. | 42 | 53% |
| This was not available. | 12 | 15% |
| I do not know whether this was available or not. | 26 | 33% |
| Total | 80 | 100% |
| Library access | This was available. | 39 | 49% |
| This was not available. | 12 | 15% |
| I do not know whether this was available or not. | 28 | 35% |
| Total | 79 | 100% |
| Tutoring | This was available. | 21 | 26% |
| This was not available. | 27 | 34% |
| I do not know whether this was available or not. | 32 | 40% |
| Total | 80 | 100% |
| Reading list | This was available. | 12 | 15% |
| This was not available. | 23 | 29% |
| I do not know whether this was available or not. | 43 | 55% |
| Total | 78 | 100% |
| Other (please specify): No write-in provided/specified | This was available. | 1 | 9% |
| This was not available. | 1 | 9% |
| I do not know whether this was available or not. | 9 | 82% |
| Total | 11 | 100% |

|  |  |  |  |
| --- | --- | --- | --- |
| **Question 7: Which of these available resources, if any, did you utilize?** | | **Number of responses** | **Percentage of responses** |
| Summer coursework | I did utilize this resource. | 67 | 88% |
| I did not utilize this resource. | 9 | 12% |
| Total | 76 | 100% |
| VHS Learning summer orientation | I did utilize this resource. | 49 | 64% |
| I did not utilize this resource. | 28 | 36% |
| Total | 77 | 100% |
| Virtual learning opportunities (such as lectures or courses) | I did utilize this resource. | 34 | 45% |
| I did not utilize this resource. | 42 | 55% |
| Total | 76 | 100% |
| Meeting with a counselor or teacher | I did utilize this resource. | 30 | 40% |
| I did not utilize this resource. | 45 | 60% |
| Total | 75 | 100% |
| Library access | I did utilize this resource. | 17 | 23% |
| I did not utilize this resource. | 57 | 77% |
| Total | 74 | 100% |
| Reading list | I did utilize this resource. | 5 | 7% |
| I did not utilize this resource. | 69 | 93% |
| Total | 74 | 100% |
| Tutoring | I did utilize this resource. | 4 | 5% |
| I did not utilize this resource. | 69 | 95% |
| Total | 73 | 100% |

| **Question 8: Please rate the extent to which you agree or disagree with the statements below:** | | **Number of responses** | **Percentage of responses** |
| --- | --- | --- | --- |
| This course(s) requires significantly more time (studying and completing course assignments) than the other courses I’m currently taking. | Strongly Agree | 44 | 57% |
| Agree | 26 | 34% |
| Disagree | 4 | 5% |
| Strongly Disagree | 3 | 4% |
| Total | 77 | 100% |
| This course(s) is more difficult than I expected when I enrolled. | Strongly Agree | 20 | 26% |
| Agree | 26 | 34% |
| Disagree | 28 | 36% |
| Strongly Disagree | 3 | 4% |
| Total | 77 | 100% |
| My virtual AP course(s) has increased my interest in pursuing a STEM major or a career in STEM. | Strongly Agree | 15 | 20% |
| Agree | 35 | 46% |
| Disagree | 16 | 21% |
| Strongly Disagree | 10 | 13% |
| Total | 76 | 100% |
| My participation in this course(s) has positively impacted my performance in other courses. | Strongly Agree | 7 | 9% |
| Agree | 29 | 38% |
| Disagree | 30 | 39% |
| Strongly Disagree | 10 | 13% |
| Total | 76 | 100% |
| My academic courseload this year has been manageable. | Strongly Agree | 4 | 5% |
| Agree | 39 | 51% |
| Disagree | 23 | 30% |
| Strongly Disagree | 11 | 14% |
| Total | 77 | 100% |

|  |  |  |
| --- | --- | --- |
| Question 9: How much time do you spend each week completing the asynchronous assignments for your course(s)? | Number of responses (n=76) | Percentage of responses |
| Less than 3 hours | 5 | 7% |
| Between 3 and 6 hours | 21 | 28% |
| Between 7 and 12 hours | 35 | 46% |
| Over 12 hours | 15 | 20% |

| **Question 10: How much do you interact (such as over the telephone, online, or through face-to-face communications) with the following individuals?** | | **Number of responses** | **Percentage of responses** |
| --- | --- | --- | --- |
| My virtual AP classmates | Every day | 6 | 8% |
| Nearly every day | 10 | 13% |
| A few times a week | 35 | 46% |
| A few times a month | 9 | 12% |
| Never | 16 | 21% |
| Total | 76 | 100% |
| My AP Site Coordinator | Every day | 5 | 7% |
| Nearly every day | 12 | 16% |
| A few times a week | 10 | 13% |
| A few times a month | 21 | 28% |
| Never | 28 | 37% |
| Total | 76 | 100% |
| My virtual AP teacher | Every day | 0 | 0% |
| Nearly every day | 2 | 3% |
| A few times a week | 14 | 18% |
| A few times a month | 44 | 58% |
| Never | 16 | 21% |
| Total | 76 | 100% |

|  |  |  |
| --- | --- | --- |
| Question 11: Who do you seek out when you need help with your AP course(s)? Please select all that apply. | Number of responses (n=73) | Percentage of responses |
| My virtual AP teacher | 47 | 64% |
| My virtual AP classmates | 32 | 44% |
| A teacher at my school | 30 | 41% |
| My Site Coordinator | 11 | 15% |
| Other (please specify)\* | 14 | 19% |

\*Responses to ‘other’ are provided in Question 11a

**Question 11a:** Who do you seek out when you need help with your AP course(s)? Please select all that apply - Other (please specify)

Total Respondents: 14

14 students selected ‘other.’ These students shared that when they need additional assistance with their AP course, they utilize online resources such as YouTube (n=6), consult with their brick-and-mortar classmates (n=4), and in-house teachers or tutors (n=2). Two students indicated that there is no one available to provide guidance on their AP coursework, while one student shared that they are very independent and enjoy challenging themselves academically.

* *Classmates that take the course and are in the same room/building as me*
* *Friends also in the course*
* *I’m very independent so that I can try to challenge myself and learn I try learn on myself to challenge myself*
* *Look for book or YouTube lectures that are on the same topic. Or I ask a fellow student for help.*
* *My friends that take the same coarse at our school*
* *no one*
* *Not really anyone, I sort of just look for it online since response rates from my virtual teacher are really slow*
* *Online help*
* *Online resources, such as CrashCourse videos or Cllegeboard AP provided resources*
* *Other teacher at school but it's not really helpful*
* *The internet*
* *There is no one*
* *Tutor at my school*
* *Youtube/Google*

| **Question 12: The following questions pertain to your experiences with your virtual AP teacher(s), classmates, and Site Coordinator. Please indicate how frequently you agree with the statements below.** | | **Number of responses** | **Percentage of responses** |
| --- | --- | --- | --- |
| I feel I am treated fairly by my virtual AP teacher. | All the time | 42 | 58% |
| Most of the time | 24 | 33% |
| Some of the time | 4 | 5% |
| Never | 0 | 0% |
| Not applicable | 3 | 4% |
| Total | 73 | 100% |
| I feel I am treated fairly by my Site Coordinator. | All the time | 40 | 56% |
| Most of the time | 16 | 23% |
| Some of the time | 2 | 3% |
| Never | 1 | 1% |
| Not applicable | 12 | 17% |
| Total | 71 | 100% |
| I feel supported by my Site Coordinator. | All the time | 39 | 55% |
| Most of the time | 12 | 17% |
| Some of the time | 8 | 11% |
| Never | 4 | 6% |
| Not applicable | 8 | 11% |
| Total | 71 | 100% |
| I feel I can be my authentic self with my Site Coordinator. | All the time | 38 | 54% |
| Most of the time | 15 | 21% |
| Some of the time | 4 | 6% |
| Never | 2 | 3% |
| Not applicable | 12 | 17% |
| Total | 71 | 100% |
| I feel I am treated fairly by my virtual AP classmates. | All the time | 37 | 52% |
| Most of the time | 19 | 27% |
| Some of the time | 4 | 6% |
| Never | 1 | 1% |
| Not applicable | 10 | 14% |
| Total | 71 | 100% |
| I feel I can be my authentic self with my virtual AP classmates. | All the time | 31 | 44% |
| Most of the time | 22 | 31% |
| Some of the time | 6 | 8% |
| Never | 1 | 1% |
| Not applicable | 11 | 15% |
| Total | 71 | 100% |
| I feel I belong in this virtual AP course. | All the time | 31 | 43% |
| Most of the time | 27 | 38% |
| Some of the time | 5 | 7% |
| Never | 6 | 8% |
| Not applicable | 3 | 4% |
| Total | 72 | 100% |
| I feel supported by my virtual AP classmates. | All the time | 29 | 41% |
| Most of the time | 23 | 33% |
| Some of the time | 7 | 10% |
| Never | 4 | 6% |
| Not applicable | 7 | 10% |
| Total | 70 | 100% |
| I feel I can be my authentic self with my virtual AP teacher. | All the time | 28 | 39% |
| Most of the time | 20 | 28% |
| Some of the time | 12 | 17% |
| Never | 1 | 1% |
| Not applicable | 11 | 15% |
| Total | 72 | 100% |
| I feel supported by my virtual AP teacher. | All the time | 25 | 34% |
| Most of the time | 26 | 36% |
| Some of the time | 17 | 23% |
| Never | 5 | 7% |
| Not applicable | 0 | 0% |
| Total | 73 | 100% |

| **Question 13: Please indicate the extent to which you have improved the skills listed below as a result of your participation in the Expanding Access initiative.** | | **Number of responses** | **Percentage of responses** |
| --- | --- | --- | --- |
| Ability to work on my own | Significant improvement | 31 | 43% |
| Moderate improvement | 22 | 31% |
| Small improvement | 9 | 13% |
| Neutral (no change) | 10 | 14% |
| Total | 72 | 100% |
| Confidence using technology | Significant improvement | 24 | 33% |
| Moderate improvement | 17 | 24% |
| Small improvement | 12 | 17% |
| Neutral (no change) | 19 | 26% |
| Total | 72 | 100% |
| Ability to generate solutions to complex problems | Significant improvement | 21 | 29% |
| Moderate improvement | 23 | 32% |
| Small improvement | 16 | 22% |
| Neutral (no change) | 12 | 17% |
| Total | 72 | 100% |
| Time management skills | Significant improvement | 17 | 24% |
| Moderate improvement | 22 | 31% |
| Small improvement | 16 | 22% |
| Neutral (no change) | 17 | 24% |
| Total | 72 | 100% |
| Critical thinking skills | Significant improvement | 11 | 15% |
| Moderate improvement | 33 | 46% |
| Small improvement | 14 | 19% |
| Neutral (no change) | 14 | 19% |
| Total | 72 | 100% |
| Communication skills | Significant improvement | 10 | 14% |
| Moderate improvement | 25 | 35% |
| Small improvement | 18 | 25% |
| Neutral (no change) | 19 | 26% |
| Total | 72 | 100% |
| Creativity | Significant improvement | 8 | 11% |
| Moderate improvement | 25 | 35% |
| Small improvement | 16 | 23% |
| Neutral (no change) | 22 | 31% |
| Total | 71 | 100% |
| Other (Please Specify and Rate): No write-in provided/specified | Significant improvement | 2 | 18% |
| Moderate improvement | 1 | 9% |
| Small improvement | 0 | 0% |
| Neutral (no change) | 8 | 73% |
| Total | 11 | 100% |
| Other (Please Specify and Rate): *I’m now terrible at time management* | Significant improvement | 0 | 0% |
| Moderate improvement | 0 | 0% |
| Small improvement | 0 | 0% |
| Neutral (no change) | 0 | 0% |
| Total | 0 | 0% |

**Question 13a:** Please indicate the extent to which you have improved the skills listed below as a result of your participation in the Expanding Access initiative. – Other (please specify)

Total Respondents: 12

12 respondents selected ‘other.’ Among these respondents, 11 rated the extent to which they have improved certain skills, but they did not provide write-in responses describing those skills. Conversely, one respondent indicated “I’m now terrible at time management,” but they did not rate the extent to which their skill level had changed.

|  |  |  |
| --- | --- | --- |
| Question 14: Do you intend to take the AP exam(s) associated with the virtual AP STEM course(s) you are taking through the Expanding Access initiative? | Number of responses (n=72) | Percentage of responses |
| Yes | 58 | 81% |
| No | 5 | 7% |
| Not Sure | 9 | 13% |

|  |  |  |
| --- | --- | --- |
| Question 15: What virtual AP STEM course(s) are you currently enrolled in through the Expanding Access initiative? Please select all that apply. | Number of responses (n=71) | Percentage of responses |
| AP Computer Science Principles | 24 | 34% |
| AP Biology | 10 | 14% |
| AP Physics 1: Algebra-Based | 10 | 14% |
| AP Environmental Science | 8 | 11% |
| AP Physics C | 8 | 11% |
| AP Chemistry | 7 | 10% |
| AP Statistics | 6 | 8% |
| AP Calculus AB | 2 | 3% |

| Question 15: What school do you attend? Please choose from list. | Number of responses (n=70) | Percentage of responses |
| --- | --- | --- |
| Whittier Regional Vocational Technical High School | 12 | 17% |
| Quabbin Regional High School | 7 | 10% |
| Westborough High School | 4 | 6% |
| Bishop Stang High School | 3 | 4% |
| Ludlow High School | 3 | 4% |
| Notre Dame Cristo Rey High School | 3 | 4% |
| Georgetown Middle/High School | 2 | 3% |
| Lowell Catholic High School | 2 | 3% |
| Medway High School | 2 | 3% |
| Murdock High School | 2 | 3% |
| Saint Paul Diocesan Jr. Sr. High School | 2 | 3% |
| St. Mary's High School | 2 | 3% |
| The Academy at Charlemont | 2 | 3% |
| The Springfield Renaissance School | 2 | 3% |
| Waltham High School | 2 | 3% |
| Worcester Technical High School | 2 | 3% |
| Barnstable High School | 1 | 1% |
| Berkshire Arts & Technology Charter Public School | 1 | 1% |
| Concord-Carlisle High School | 1 | 1% |
| Excel High School | 1 | 1% |
| Francis W. Parker Charter Essential School | 1 | 1% |
| Hopedale Jr Sr High School | 1 | 1% |
| Hopkins Academy | 1 | 1% |
| Hull High School | 1 | 1% |
| Littleton High School | 1 | 1% |
| Mashpee High School | 1 | 1% |
| Mount Alvernia High School | 1 | 1% |
| Nipmuc Regional High School | 1 | 1% |
| Northbridge High School | 1 | 1% |
| Pope Francis Preparatory School | 1 | 1% |
| Rockland High School | 1 | 1% |
| St. John Paul II High School | 1 | 1% |
| Taunton High School | 1 | 1% |
| Wellesley High School | 1 | 1% |

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Number of responses** | **Percentage of responses** |
| **Question 16: Have you previously taken an AP course?** | Yes | 45 | 61% |
| No | 28 | 39% |
| Total | 72 | 100% |
| **Question 17: Have you previously taken an AP course through the Expanding Access (SAPAO) initiative?** | Yes | 2 | 3% |
| No | 70 | 97% |
| Total | 72 | 100% |
| **Question 18: Have you previously taken a virtual course through VHS Learning that was not part of the Expanding Access (SAPAO) initiative?** | Yes | 10 | 14% |
| No | 62 | 86% |
| Total | 72 | 100% |

**Question 19:** Which of the following best describes your gender? Please select all that apply.

Total Respondents: 73

|  |  |  |
| --- | --- | --- |
| Question 19: Which of the following best describes your gender? Please select all that apply. | Number of responses (n=72) | Percentage of responses |
| Female | 36 | 49% |
| Male | 34 | 47% |
| Non-binary | 0 | 0% |
| I choose not to respond | 2 | 3% |
| Other (please specify) | 0 | 0% |

|  |  |  |
| --- | --- | --- |
| Question 19: What is your race or ethnicity? Please select all that apply. | Number of responses (n=72) | Percentage of responses |
| White | 48 | 67% |
| Asian | 15 | 21% |
| Black or African American | 11 | 15% |
| Not Hispanic or Latino/a/x | 6 | 8% |
| Hispanic or Latino/a/x | 5 | 7% |
| American Indian or Alaskan Native | 0 | 0% |
| Native Hawaiian or Other Pacific Islander | 0 | 0% |
| I choose not to respond | 2 | 3% |

**Question 20:** Do you have any additional feedback or reflections on your experience with the Expanding Access initiative that might help improve experiences for other students?

Total Respondents: 29

29 respondents provided feedback on their experiences with the Expanding Access initiative. Respondents most commonly shared positive reflections on the initiative (n=9), with several noting the long-term benefits of engaging in advanced, self-paced coursework. One respondent specifically expressed that the no-cost aspect of the initiative was pivotal to their participation. Respondents also acknowledged that the amount of work associated with their Expanding Access courses was greater than they anticipated prior to the start of the school year (n=8). Several respondents added that time-management was challenging (n=5), particularly in terms of maintaining a balance between in-house courses, Expanding Access courses, and extracurricular activities. However, among these respondents, some did note that the demands of their Expanding Access courses have encouraged them to engage in better planning practices. Other common reflections included respondents’ discontent related to communication with virtual teachers (n=3), course instruction (n=3), course structure (n=3), and content level (n=3). Several other responses included references to challenges with lab work (n=2), self-motivation (n=2), the course website (n=1), and limited access to office hours (n=1). Another respondent noted that the initiative should be advertised more widely within schools to maximize student benefit.

* None/NA (n=5)
* *I would recommend publicizing this program more. I only found out about it through my counselor and sight coordinator. This grant was extremely helpful for me to afford taking another AP course. I don’t know if I could without this program. I want other students to benefit from this opportunity as well.*
* *It is a great program however this VHS Learning course was much more work than what I had expected.*
* *It takes a long time for me to put my thoughts into words and there is a lot of writing in the course and it was a factor in me falling behind on my school work*
* *Sometimes it takes 24 hours or more to have private messages responded to, and a few times this has resulted in me sending a message for help on a Monday and not getting a response until Wednesday. Since work is due on Tuesdays, this made me submit wrong or half-complete work, as I had difficulty and limited help on those assignments.*
* *Definitely make sure to prioritize this class because deadlines come quickly and its very difficult to catch up what you miss. I am currently falling behind due to the fact that I started a [redacted] job and could not balance it enough.*
* *I want to say that this coarse requires a lot of work and self motivation. This coarse is not for everybody and anyone who wants to do it have to be some what prepared mentally for what’s coming to them.*
* *I thought it was nice! It was a good opportunity to learn material that isn't offered at my school.*
* *The ability to access teachers at times that works for you is a bit difficult. Especially when you have extracurricular activities. If you have a teacher who is willing to work times with your class or who is in the same timezone as you, take advantage of that as it doesn't happen very often.*
* *I can say, I am very thankful for having the opportunity to learn in these courses at no expense to me besides the hard work. I was a little disappointed not being able to take Calculus BC so I guess having that option would've been nice. I still really like AB but that's my piece. I've been struggling more with time management than I thought I would with the courses but it's helping me to work on myself more to better work against procrastination.*
* *The website for VHS could be simplified and updated a lot more.*
* *This experience is greatly beneficial to schools when they cannot run a course. I think this improves the educational journeys of many students who cannot access a desired course at their school. I am grateful for the opportunity to take this course online than not at all.*
* *Far too much work, could use more support from my teacher with the complicated material.*
* *Overall I feel like taking an virtual AP class has prepared me well for future classes that I will take in college.*
* *As a senior with multiple extra-curriculars and college applications, it's difficult to find time to get work done for VHS. Labs are the most difficult. I'm currently trying to turn it around this term and do better.*
* *Work could be less demanding, as in breaks should be given for 1 week after a unit or quarter is completed*
* *It is definitely a challenge but a great one. This virtual class really makes you step up your game whether you want to or not. It pushes you towards becoming more independent and responsible. Which is great if you plan on going to college. It gives you a sense of how you will have to be when you go to college. Which is working on your own, finding your own study method, collaborating with peers you don't know etc.. DO NOT PROCRASTINATE!! Procrastination is you biggest enemy if you have other classes and extracurricular activities or a job you will be finding yourself getting 0 or staying up till the crack of dawn doing missing or late homework. Lastly choose the topic that u have more interest in and or want to do. I had a friend who choose what others where doing and she ended up being miserable because she had 0 interest in the subject. So please choose what you like/interest, come in with great motivation and stay on top of work and dont procrastinate*
* *Not really good method for learning STEM subjects. Barely no lectures and hard to communicate since the only way is through private discussions. Do not recommend people to take this if they really want to get ready for college courses.*
* *Some of my answers I am in the middle or unsure of.*
* *I think it would help to improve the workload and assistance of the course. There is an unnecessary amount of work that I believe doesn’t help improve my understanding of material. The workload also doesn’t take into account other obligations students may have with school and extracurricular activities. The office hours are very limited, and I often find that it occurs at times I can’t attend. I believe that increasing the office hours and virtual teaching, and giving students more time to learn the materials rather than stress over loosely related assignments would greatly help.*
* *I don't really have much to add, I just wish my virtual teacher could respond faster instead of a few days after an initial question*
* *Nope, I am actually fully enjoying the AP class I’m in*
* *This course has an insane workload compared to other AP courses I've taken, and even factoring in in-class time, I spend far more time on this course than my peers who take AP Environmental Science in person. Submitting all the assignments on time is nearly impossible, especially if I'm trying to get 6 or more hours of sleep a night (I usually get about 5, even when I'm not doing extracurricular activities). A large portion of the assignments just feel like busy work that could be easily reduced; assignments can take hours, and they often provide just little nuggets of information buried inside extensive activities. For example, there was a lab where we had to blow 150 soap bubbles and time each one's lifespan in order to learn about survivorship trends. This took over two hours just to collect data, and we have 8-10 assignments a week! I could have just as easily written a report on a description of the lab without the (ridiculous, in my opinion) bubble-blowing. I have never been so stressed about a single class in my life - it is exhausting, overwhelming, and feels pointless most of the time (and I am a very positive person! I'm interested in environmental science!). I am really, really lucky to have a backyard and live next to a river, because I cannot imagine how students who live in cities and/or cannot drive complete the frequent assignments that require you to visit a body of water or dig in the dirt outside. I want to emphasize that my teacher has been very understanding and kind, and I have zero complaints about him; the format of the course makes it difficult to reach him, but that's not his fault at all. I'm sorry if this is harsh, but it's just been an outstandingly negative experience and I regretted signing up for the course as soon as it began. I think it's fantastic that you're giving people this learning opportunity, but I believe it needs serious reform.*
* *I was very excited to start this class this year. I have only been disappointed. The teaching is poor as are the assignments. I am barely motivated to do any other assignments. The first quarter I got an 94, the second I got in the 50s. This quarter I have a 0 and am truly considering dropping it. Most of the projects are either incredibly easy and don't relate to what is actually being taught or require knowledge that we have not been shown how to do.*
* *Although it is a struggle, I can see that it will benefit me later down the road*

# Appendix M: Summary of parent/guardian survey responses

|  |  |  |
| --- | --- | --- |
| Introduction and Consent | Number of responses (n=32) | Percentage of responses |
| I Agree | 32 | 100% |
| I Do Not Agree | 0 | 0% |

|  |  |  |
| --- | --- | --- |
| Question 1: How involved were you in your child’s decision to enroll in a virtual AP STEM course through the Expanding Access initiative? | Number of responses  (n= 32) | Percentage of responses |
| Extremely involved | 6 | 19% |
| Moderately involved | 10 | 31% |
| Slightly involved | 14 | 44% |
| Not at all involved | 2 | 6% |

|  |  |  |
| --- | --- | --- |
| Question 2: How motivated do you believe your child is to succeed in their virtual AP course through the Expanding Access initiative? | Number of responses (n=32) | Percentage of responses |
| Extremely motivated | 22 | 69% |
| Moderately motivated | 8 | 25% |
| Slightly motivated | 1 | 3% |
| Not at all motivated | 1 | 3% |

|  |  |  |
| --- | --- | --- |
| Question 3: Has your child previously participated in the Expanding Access initiative? | Number of responses (n=32) | Percentage of responses |
| Yes | 4 | 13% |
| No | 27 | 84% |
| Unsure | 1 | 3% |

|  |  |  |  |
| --- | --- | --- | --- |
| **Question 4: While there was no requirement for students to do any preparation during the summer, please share whether the supports listed below were available to your child, and what supports they utilized, if any, to prepare for their virtual AP STEM course(s) with the Expanding Access initiative:** | | **Number of responses** | **Percentage of responses** |
| Meetings with counselors or teachers | This was not available during the summer. | 5 | 17% |
| This was available during the summer, but my child did not use it. | 7 | 23% |
| This was available during the summer, and my child did use it. | 8 | 27% |
| I do not know if this was available during the summer. | 10 | 33% |
| Total | 30 | 100% |
| Reading list | This was not available during the summer. | 6 | 21% |
| This was available during the summer, but my child did not use it. | 3 | 10% |
| This was available during the summer, and my child did use it. | 4 | 14% |
| I do not know if this was available during the summer. | 16 | 55% |
| Total | 29 | 100% |
| Library access | This was not available during the summer. | 5 | 16% |
| This was available during the summer, but my child did not use it. | 5 | 16% |
| This was available during the summer, and my child did use it. | 4 | 13% |
| I do not know if this was available during the summer. | 17 | 55% |
| Total | 31 | 100% |
| Virtual learning opportunities (such as lectures or courses) | This was not available during the summer. | 4 | 14% |
| This was available during the summer, but my child did not use it. | 4 | 14% |
| This was available during the summer, and my child did use it. | 8 | 28% |
| I do not know if this was available during the summer. | 13 | 45% |
| Total | 29 | 100% |
| Tutoring | This was not available during the summer. | 6 | 20% |
| This was available during the summer, but my child did not use it. | 4 | 13% |
| This was available during the summer, and my child did use it. | 3 | 10% |
| I do not know if this was available during the summer. | 17 | 57% |
| Total | 30 | 100% |
| VHS Summer Orientation | This was not available during the summer. | 2 | 7% |
| This was available during the summer, but my child did not use it. | 4 | 13% |
| This was available during the summer, and my child did use it. | 11 | 37% |
| I do not know if this was available during the summer. | 13 | 43% |
| Total | 30 | 100% |
| Summer coursework | This was not available during the summer. | 2 | 7% |
| This was available during the summer, but my child did not use it. | 3 | 10% |
| This was available during the summer, and my child did use it. | 14 | 48% |
| I do not know if this was available during the summer. | 10 | 34% |
| Total | 29 | 100% |
| Other (please specify): No write-in provided/specified | This was not available during the summer. | 0 | 0% |
| This was available during the summer, but my child did not use it. | 0 | 0% |
| This was available during the summer, and my child did use it. | 1 | 10% |
| I do not know if this was available during the summer. | 9 | 90% |
| Total | 10 | 100% |

|  |  |  |
| --- | --- | --- |
| Question 5: What resources does your child currently utilize when they need help with their virtual AP STEM course through the Expanding Access initiative? (Please select all that apply) | Number of responses (n=31) | Percentage of responses |
| The internet (such as Google or YouTube) | 25 | 81% |
| Study skills | 16 | 52% |
| In-person study groups with other students at their school | 9 | 29% |
| Virtual AP teacher-provide office hours | 8 | 26% |
| Support from faculty or staff at their high school | 8 | 26% |
| Support from Site Coordinator | 6 | 19% |
| Virtual study group with their virtual AP classmates | 5 | 16% |
| Individualized meetings with their virtual teacher | 4 | 13% |
| VHS Learning-provided summer resources | 3 | 10% |
| I don’t know | 3 | 10% |
| Tutoring | 1 | 3% |
| Course content from a previous year | 1 | 3% |
| School-provided summer resources | 0 | 0% |
| Other (please specify): | 3 | 10% |

\*Responses to ‘other’ are provided in Question 5a

**Question 5a:** What resources does your child **currently** utilize when they need help with their virtual AP STEM course through the Expanding Access initiative? (Please select all that apply) – Other (please specify)

Total Respondents: 3

Three respondents selected ‘other.’ These respondents described the resources their child currently utilizes when they need help with their Expanding Access coursework:

* I am a MA licensed physics teacher. I provide at-home instruction.
* Khan acao (i.e., Khan Academy)
* We had very poor support. Other students at school cheated together, so my daughter could not be part of that study group. There was not adequate instruction. We have had to hire a private tutor.

| **Question 6: To what extent do you agree that your child is receiving enough support from their:** | | **Number of responses** | **Percentage of responses** |
| --- | --- | --- | --- |
| Virtual AP teacher | Strongly agree | 7 | 24% |
| Agree | 8 | 28% |
| Disagree | 4 | 14% |
| Strongly disagree | 8 | 28% |
| No basis for opinion | 2 | 7% |
| Total | 29 | 100% |
| AP Site Coordinator | Strongly agree | 4 | 14% |
| Agree | 12 | 43% |
| Disagree | 4 | 14% |
| Strongly disagree | 3 | 11% |
| No basis for opinion | 5 | 18% |
| Total | 28 | 100% |
| Virtual AP classmates | Strongly agree | 2 | 7% |
| Agree | 8 | 29% |
| Disagree | 6 | 21% |
| Strongly disagree | 5 | 18% |
| No basis for opinion | 7 | 25% |
| Total | 28 | 100% |

**Question 7:** What **additional** resources or supports (provided by either the school or VHS Learning) would your child benefit from in their virtual AP course through the Expanding Access initiative? If you are not sure, please write “I don’t know.”

Total Respondents: 20

19 respondents provided open-ended feedback related to additional resources or supports that would benefit their child in their Expanding Access course. Responses were largely reflective of the desire for more frequent communication with virtual instructors, synchronous learning hours, and in-house content experts.

* *I don’t know* (n=12)
* *A teacher who could help answer questions at school.*
* *Collaboration with classmates at current high school participating in the same VHS AP courses*
* *I have asked for help and have only been told to review my child’s progress online*
* *More live instruction, more office hours, tutoring*
* *More one on one instruction*
* *Our student is fiercely independent and rarely says anything about her work unless there is a real roadblock. The online lab write ups are frequently confusing.*
* *the virtual teacher will only allow for communication via the web/chat. i requested time, an email address, or a phone number. was denied all three as not being available in this AP course. my son has had various back and forth with the teacher and yet needs to follow up with the teacher each time due to the teacher failing to proactively do what was agreed upon (i.e.- agree to pass in an assignment a few days late due to a school trip. follow up from student due to teacher submitting a zero grade and not updating for weeks).*
* *There needs to be actual office hours, recorded sessions, quick response time for communication to virtual teacher. There was NO contact with the teacher beyond delayed responses to my daughter's questions/concerns. There was no way for me to contact the teacher. The site coordinators were brand new to VHS and had no expertise in the content or the knowledge of how to adequately navigate this platform and website design. At least one site coordinator should be a science teacher who can assist the students with questions and/or concerns, especially when the online teacher is not engaged in the education process. Parents should have access to the teachers so they can bring concerns directly to them rather than going through the site coordinator who would take the issue to the site's VHS contact, not the teacher.*

*VHS needs a much better thought-out online platform. They need someone with a human factors background to redesign and test the usability of the platform. It is extremely user unfriendly, cumbersome, and confusing. Students should not have to spend over an hour a week trying to find the embedded assignments and expectations for the week. Students shouldn't be expected to let their grades suffer the first few weeks because they don't understand how the platform works and aren't used to it yet.*

|  |  |  |
| --- | --- | --- |
| Question 8: Does your child receive educational support from an IEP? *Individualized Education Plans (IEP) provide special learning accommodations or supports to students.* | Number of responses (n=29) | Percentage of responses |
| Yes | 1 | 3% |
| No | 26 | 90% |
| I don’t know | 2 | 7% |

|  |  |  |
| --- | --- | --- |
| Question 9: Does your child receive educational support from a 504 plan? *504 Plans provide special learning accommodations or supports to students.* | Number of responses (n=29) | Percentage of responses |
| Yes | 0 | 0% |
| No | 28 | 97% |
| I don’t know | 1 | 3% |

*Question 10 displayed only if respondent selected “Yes” for Question 7 or Question 8.*

|  |  |  |
| --- | --- | --- |
| Question 10: To what extent do you believe that your child’s learning needs, as outlined in their IEP or 504 plan, are being met? | Number of responses (n=1) | Percentage of responses |
| All of their needs are being met | 1 | 100% |
| Some of their needs are being met | 0 | 0% |
| Few of their needs are being met | 0 | 0% |
| None of their needs are being met | 0 | 0% |

**Question 11:** Please describe a memorable experience that your child has shared with you about their virtual AP STEM course through the Expanding Access initiative. This might include, for example, comments on their course, their teacher, interactions with classmates, or another component of their virtual AP STEM class.

Total Respondents: 21

21 respondents described memorable experiences that their children shared related to their Expanding Access courses. Feedback varied significantly across responses:

* *Estuvo muy interesante* (Translation: *It was very interesting*)
* *All experiences were terrible.*
* *Building an eco-column was memorable for us. She had to plan her course of action and where to collect the elements needed and it was nice to see her problem solve to figure out how to independently finish this project.*
* *challenging course material*
* *Extremely positive feedback from teacher that was very motivating*
* *Has had the opportunity to meet other students randomly (sports games, dance competitions etc) that are not in her school but that she knows through online interactions*
* *He has had some frustrations with the go motion measurement sensor while doing labs at home.*
* *He says he hasn’t learned anything new yet. It’s the same material as his prior Honors Physics course.*
* *I don't think there has been anything impactful. He has found it a bit repetitive.*
* *In the event that you are asking about positive memorable experiences, there might be one: she was very excited about the growth of her bean sprout that had been planted in tap water.*
* *It seems that the grade fluctuates wildly and has to do with extensions on deadlines. It seems difficult for my child to stick to deadlines. That's his responsibility. In my experience as a teacher at the school where my child takes AP Physics, it seems everyone is leaving a lot of the work until the last minute.*
* *miscommunication between teacher and program lead at school. student was behind on a few assignements. he met with counselor and coordinator in school. communication with teacher and parent occurred. plan was for student to do the late work and pass in. student did all work over a weekend and passed in. teacher only accepted work from prior week and discarded anything older. when raised with the school and counselors, the outcome was not what was discussed previously. teacher did not state they would not accept work from prior to that week. the entire point was to support the student.*
* *My child is an excellent student, especially in math and is failing this class. I do not believe the program is set up properly*
* *My son has 1 other student at his HS enrolled in his class - they often facetime and ask each other questions - He has basically had to teach himself the coursework - on his own time*
* *None*
* *Outdoor activities & experiments*
* *Panic on Tuesday evenings… Massive help sessions or lab help through the first half of the course somewhat due to procrastination…better in 2nd half of year…*
* *She enjoys the challenge of completing labs. Sometimes the other student at her school in the same class will work on labs with her.*
* *She loves to show me the experiments she’s doing !*
* *They can do course work when it fits in weekly schedule*
* *Too much work to do during the week and it take lots of time to complete it by himself.*

|  |  |  |  |
| --- | --- | --- | --- |
| **Question 12: An important component of many students’ experiences in advance placement (AP) courses is taking an AP exam. One benefit of taking this exam is that students may receive a qualifying score which could make them eligible for college credit. Please review and respond to the questions below.** | | **Number of responses** | **Percentage of responses** |
| Has your child talked to you about taking the AP exam(s) associated with their virtual AP course(s)? | Yes | 25 | 89% |
| No | 3 | 11% |
| Total | 28 | 100% |
| Does your child plan to take the AP exam(s) associated with their virtual AP course(s)? | Yes | 22 | 81% |
| No | 4 | 15% |
| Total | 27 | 100% |

|  |  |  |
| --- | --- | --- |
| **What school does your child attend? - Please scroll to select your child's school.** | **Number of responses (n=28)** | **Percentage of responses** |
| Arlington Catholic High School | 1 | 4% |
| Ashland High School | 2 | 7% |
| Barnstable High School | 1 | 4% |
| Bishop Stang High School | 1 | 4% |
| Cardinal Spellman High School | 1 | 4% |
| Concord-Carlisle High School | 1 | 4% |
| Dighton-Rehoboth Regional High School | 1 | 4% |
| Excel High School | 2 | 7% |
| Gateway Regional Middle & High School | 1 | 4% |
| Georgetown Middle/High School | 1 | 4% |
| Hopkins Academy | 1 | 4% |
| Leominster High School | 1 | 4% |
| Lexington Christian Academy | 5 | 18% |
| Mt. Everett Regional High School | 1 | 4% |
| Sizer: A North Central Charter Essential School | 1 | 4% |
| St. John Paul II High School | 1 | 4% |
| The Learning Center for the Deaf | 1 | 4% |
| Uxbridge High School | 1 | 4% |
| Westborough High School | 1 | 4% |
| Whitinsville Christian School | 1 | 4% |
| Whittier Regional Vocational Technical High School | 2 | 7% |

|  |  |  |
| --- | --- | --- |
| Question 14: What Expanding Access initiative course(s) is your child enrolled in? (Please select all that apply) | Number of responses (n=28) | Percentage of responses |
| AP Computer Science Principles | 6 | 21% |
| AP Physics 1: Algebra-Based | 6 | 21% |
| AP Biology | 5 | 18% |
| AP Environmental Science | 5 | 18% |
| AP Physics C | 4 | 14% |
| AP Statistics | 1 | 4% |
| AP Calculus AB | 1 | 4% |
| AP Chemistry | 0 | 0% |
| I don’t know | 1 | 4% |

|  |  |  |
| --- | --- | --- |
| Question 15: What is your child’s age? | Number of responses (n=28) | Percentage of responses |
| 15 | 1 | 4% |
| 16 | 7 | 25% |
| 17 | 13 | 46% |
| 18 | 7 | 25% |

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| --- | --- | --- |
| Question 16: Which of the following best describes your child’s gender? | Number of responses (n=28) | Percentage of responses |
| Female | 15 | 54% |
| Male | 13 | 46% |
| Non-binary | 0 | 0% |
| I choose not to respond | 0 | 0% |
| Other (please specify) | 0 | 0% |

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| --- | --- | --- |
| Question 17: What is your child’s race or ethnicity? (Please select all that apply) | Number of responses (n=28) | Percentage of responses |
| Not Hispanic or Latino/a/x | 23 | 82% |
| Asian | 4 | 14% |
| Black or African American | 2 | 7% |
| Hispanic or Latino/a/x | 0 | 0% |
| American Indian or Alaskan Native | 0 | 0% |
| Native Hawaiian or Other Pacific Islander | 0 | 0% |
| I choose not to respond | 0 | 0% |

# Appendix N: Summary of school survey responses

|  |  |  |
| --- | --- | --- |
| Introduction and Consent | Number of responses (n=64) | Percentage of responses |
| Agree | 64 | 100% |
| Disagree | 0 | 0% |

|  |  |  |
| --- | --- | --- |
| Question 1: How many people, including yourself, are collaborating to complete this survey? | Number of responses (n=64) | Percentage of responses |
| 1 person | 43 | 67% |
| 2 people | 19 | 29% |
| 3 people | 2 | 3% |

|  |  |  |
| --- | --- | --- |
| Question 2: What are the primary roles of the individuals who are completing this survey? Please select all that apply. | Number of responses (n=64) | Percentage of responses |
| VHS Learning Site Coordinator | 55 | 85% |
| Principal | 20 | 31% |
| Guidance Counselor | 18 | 28% |
| Vice Principal | 12 | 18% |
| Teacher | 9 | 14% |
| Superintendent | 1 | 2% |
| Other (please describe): | 8 | 12% |

\*Responses to ‘other’ are provided in Question 2a

**Question 2a:** What are the primary roles of the individuals who are completing this survey? Please select all that apply. - Other (please describe)

Total Responses: 8

* Director of Science, 6-12
* Director, Academic Advising
* Academic Dean
* Library Media Specialist
* Curriculum Director
* Assessment Specialist
* Academic Success Coordinator
* Co-Head of School for Academics

|  |  |  |
| --- | --- | --- |
| Question 3: Did your school participate in the Expanding Access (SAPAO) initiative last year? | Number of responses (n=64) | Percentage of responses |
| Yes | 28 | 44% |
| No | 36 | 56% |

*Question 4 displayed only if respondent selected “No” for Question 3.*

|  |  |  |
| --- | --- | --- |
| Question 4: What influenced your school’s decision to participate in the Expanding Access initiative this school year? Please select all that apply. | Number of responses (n=36) | Percentage of responses |
| Students have wanted a wider selection of AP STEM courses offered | 25 | 69% |
| Low financial cost | 26 | 72% |
| Our school administration wanted to offer a wider selection of AP STEM courses | 18 | 50% |
| Parents/guardians have wanted a wider selection of AP STEM courses offered | 10 | 28% |
| Teachers have wanted a wider selection of AP STEM courses offered | 7 | 19% |
| Other (please specify)\* | 4 | 11% |

\*Responses to ‘other’ are provided in Question 4a

**Question 4a:** What influenced your school’s decision to participate in the Expanding Access initiative this school year? Please select all that apply. - Other (please specify)

Total Responses: 3

The three respondents who selected “other” indicated that their decisions to participate in the initiative this year were based on a combination of student interest and in-house scheduling conflicts.

* *Master scheduling concerns - we often had interest for classes that we could not run due to low enrollment*
* *We were offered the opportunity and a couple students wanted to take advantage of it.*
* *student wanted to take an AP that did not fit in her schedule*

*Question 5 displayed only if respondent selected “Yes” for Question 3.*

**Question 5:** What influenced your school’s decision to continue to participate in the Expanding Access initiative this year?

Total Responses: 27

27 respondents selected ‘other.’ These respondents indicated that the following factors influenced their schools’ decisions to participate in the initiative this year[[36]](#footnote-37):

* Expanded course options for students (n=21)
* Funding for AP exam fees (n=6)
* Insufficient resources to offer AP STEM courses in-house (n=4)
* Previous experience with the Expanding Access initiative (n=3)
* Low interest for AP STEM courses offered in-house (n=2)
* Lack of teacher bandwidth (n=1)
* Communications from DESE (n=1)
* Communications from VHS Learning (n=1)
* Opportunity was a good fit for the school (n=1)

|  |  |  |
| --- | --- | --- |
| Question 6: What were the previous barriers to your school offering AP STEM courses? Please select all that apply. | Number of responses (n=35) | Percentage of responses |
| Limited teacher capacity due to high demand for other classes | 19 | 54% |
| Did not fit within our existing curriculum/schedule | 19 | 54% |
| Lack of, or no, qualified teachers | 14 | 40% |
| Limited student interest | 12 | 34% |
| Limited number of students adequately prepared to participate | 10 | 29% |
| Limited teacher interest | 2 | 6% |
| Other (please specify)\* | 4 | 11% |

\*Responses to ‘other’ are provided in Question 6a

**Question 6a:** What were the previous barriers to your school offering AP STEM courses? Please select all that apply. - Other (please specify)

Total Responses: 4

Four respondents selected ‘other.’ These respondents shared that previous barriers to offering in-house AP STEM courses include challenges related to student scheduling, costs associated with VHS Learning enrollment, and not having adequate background information on the initiative. One other respondent indicated that their school’s principal is not planning to continue their partnership with VHS Learning.

* *In the case of VHS courses, cost. We've partnered for years with VHS but it is cost prohibitive for some of our students.*
* *My principal wants to get rid of VHS at our school, though I do not know why.*
* *not informed enough*
* *Students do not have enough room in their schedules*

| **Question 7: Please rate the extent to which you agree or disagree with the statements below:** | | **Number of responses** | **Percentage of responses** |
| --- | --- | --- | --- |
| Our school is excited to partner with DESE for the Expanding Access initiative. | Strongly Agree | 30 | 48% |
| Agree | 31 | 49% |
| Disagree | 1 | 2% |
| Strongly Disagree | 1 | 2% |
| Total | 63 | 100% |
| Our school is excited to partner with VHS Learning for the Expanding Access initiative. | Strongly Agree | 37 | 59% |
| Agree | 24 | 38% |
| Disagree | 1 | 2% |
| Strongly Disagree | 1 | 2% |
| Total | 63 | 100% |
| The benefits of the Expanding Access initiative (to the school or to students) outweigh the financial costs to the school or students. | Strongly Agree | 24 | 38% |
| Agree | 36 | 57% |
| Disagree | 2 | 3% |
| Strongly Disagree | 1 | 2% |
| Total | 63 | 100% |
| The benefits of the Expanding Access initiative (to the school or to students) outweigh the time required to support the implementation of the initiative. | Strongly Agree | 27 | 43% |
| Agree | 32 | 51% |
| Disagree | 3 | 5% |
| Strongly Disagree | 1 | 2% |
| Total | 63 | 100% |
| The Expanding Access initiative provides a valuable expansion to our school’s existing AP STEM course offerings. | Strongly Agree | 36 | 58% |
| Agree | 21 | 34% |
| Disagree | 3 | 5% |
| Strongly Disagree | 2 | 3% |
| Total | 62 | 100% |
| The Expanding Access initiative meets a need at our school that is not met by any other course or program. | Strongly Agree | 28 | 45% |
| Agree | 26 | 42% |
| Disagree | 7 | 11% |
| Strongly Disagree | 1 | 2% |
| Total | 62 | 100% |
| The Expanding Access initiative complements and builds upon courses we currently offer. | Strongly Agree | 30 | 49% |
| Agree | 27 | 44% |
| Disagree | 3 | 5% |
| Strongly Disagree | 1 | 2% |
| Total | 61 | 100% |
| The Expanding Access initiative courses fit easily within our school’s existing schedule. | Strongly Agree | 28 | 46% |
| Agree | 26 | 43% |
| Disagree | 6 | 10% |
| Strongly Disagree | 1 | 2% |
| Total | 61 | 100% |
| Most students (75% or more) meet (in-person or virtually) with their Site Coordinator at least once per week. | Strongly Agree | 12 | 20% |
| Agree | 11 | 18% |
| Disagree | 28 | 46% |
| Strongly Disagree | 10 | 16% |
| Total | 61 | 100% |
| Students participating in the Expanding Access initiative are well-supported by VHS Learning. | Strongly Agree | 25 | 40% |
| Agree | 31 | 50% |
| Disagree | 5 | 8% |
| Strongly Disagree | 1 | 2% |
| Total | 62 | 100% |
| Prior to participation, students selected to participate in the Expanding Access initiative were academically well-prepared to succeed in the virtual AP STEM courses offered through the initiative. | Strongly Agree | 28 | 45% |
| Agree | 27 | 44% |
| Disagree | 6 | 10% |
| Strongly Disagree | 1 | 2% |
| Total | 62 | 100% |
| Our school has the resources necessary to fully support students in their Expanding Access initiative course(s). | Strongly Agree | 13 | 21% |
| Agree | 35 | 56% |
| Disagree | 12 | 19% |
| Strongly Disagree | 2 | 3% |
| Total | 62 | 100% |
| Our school wants students to have long-term access to AP STEM courses beyond the life of the Expanding Access initiative. | Strongly Agree | 32 | 52% |
| Agree | 25 | 40% |
| Disagree | 4 | 6% |
| Strongly Disagree | 1 | 2% |
| Total | 62 | 100% |
| Our school has the staffing capacity necessary to offer (in person) the same AP STEM courses that our students are currently participating in through the Expanding Access Initiative. | Strongly Agree | 2 | 3% |
| Agree | 11 | 18% |
| Disagree | 26 | 43% |
| Strongly Disagree | 22 | 36% |
| Total | 61 | 100% |

*Question 8 displayed only if respondent* disagreed *or* strongly disagreed *with “our school has the staffing capacity necessary to offer (in person) the same AP STEM courses that students are currently participating in through the Expanding Access Initiative” for Q7.*

|  |  |  |
| --- | --- | --- |
| Question 8: Please indicate the extent to which you agree or disagree with the following statement: Our school wants to develop the staffing capacity necessary to offer (in person) the same AP STEM courses that our students are currently participating in through the Expanding Access initiative. | Number of responses (n=48) | Percentage of responses |
| Strongly Agree | 7 | 15% |
| Agree | 30 | 63% |
| Disagree | 9 | 19% |
| Strongly Disagree | 2 | 4% |

**Question 9:** Please describe your school’s process for selecting a Site Coordinator for the Expanding Access Initiative.

Total Responses: 57

57 respondents described their schools’ processes for selecting a Site Coordinator for the Expanding Access initiative. These respondents indicated the following[[37]](#footnote-38):

* Current Site Coordinator has prior experience in a comparable role (n=25)
  + Among these responses, 18 respondents specified that their school’s Site Coordinator has experience in a non-teaching role (e.g., academic coordinator), while 5 specified that the Site Coordinator has relevant teaching experience.
* Current Site Coordinator has prior experience as a VHS Learning Site Coordinator (n=20)
* Site Coordinator was selected based on staff bandwidth (n=3)
* School facilitated an application and interview process (n=2)
* Other (n=5)
  + Several respondents shared that their school’s Site Coordinator either volunteered for the position, were assigned the role, or absorbed the responsibilities of Site Coordinator as part of their existing position.

**Question 10:** Please describe the ways in which your school prioritized recruitment of students for participation in courses offered through the Expanding Access Initiative, including whether and how any particular group (e.g., students who are English learners and/or former English language learners, those receiving special education services, economically disadvantaged students, and/or members of traditionally underserved racial and ethnic minority groups) was intentionally targeted for the Expanding Access initiative.

Total Responses: 56

56 respondents described the ways in which their schools prioritized the recruitment of students for the Expanding Access initiative. These respondents indicated the following[[38]](#footnote-39):

* Participation in the Expanding Access initiative was offered to all students, with recruitment mainly driven by student interest and the school’s efforts to promote equitable access to advanced coursework (n=37)
* School officials advertised the initiative to students who met VHS Learning’s academic prerequisites (n=9)
* School officials advertised the initiative to students who were unable to enroll in their preferred in-house AP courses (n=6)
* Students were selected based on academic history and performance (n=4)
* There was no specific recruitment strategy (n=4)
* School officials specifically targeted disadvantaged students for participation (n=2)
* School officials advertised the initiative to students already enrolled in VHS Learning courses (n=1)
* Other (n=3)
  + One respondent indicated that their school was unable to specifically target underserved populations, while another shared that the initiative was offered to a transfer student. A third respondent reported that their guidance department discussed the initiative with students during course scheduling, but they did not disclose whether enrollment was opened to the entire student body.

|  |  |  |
| --- | --- | --- |
| Question 11: What types of information did you use to select students to participate in the Expanding Access initiative? Please select all that apply. | Number of responses (n=62) | Percentage of responses |
| Students expressed interest in enrolling in a virtual AP STEM course | 59 | 95% |
| Teacher or guidance counselor recommendations/nominations | 42 | 68% |
| Students met specific academic criteria (e.g., MCAS scores, GPA, course history) | 35 | 56% |
| Students exhibited non-academic personal qualifications (such as time management skills) | 21 | 34% |
| Other (please describe)\* | 7 | 11% |

\*Responses to ‘other’ are provided in Question 11a

**Question 11a:** What types of information did you use to select students to participate in the Expanding Access initiative? Please select all that apply. - Other (please describe):

Total Responses: 7

Seven respondents selected ‘other.’ These respondents reported that they used the following types of information to select students for the Expanding Access initiative:

* *Course Survey*
* *Innovation Pathways*
* *it was advertised to all students.*
* *Parent conference/consultation*
* *Students expressed interest.*
* *Students that didn’t have room in their physical schedule. Also students that wanted to add more AP courses to their transcript.*
* *We promoted it to students on our caseload.*

*Question 12 displayed only if respondent selected “Students met specific academic criteria (e.g., MCAS scores, GPA, course history)” for Q10.*

|  |  |  |
| --- | --- | --- |
| Question 12: What data did your school use to select students? Please select all that apply. | Number of responses (n=35) | Percentage of responses |
| Student's past course or academic performance | 32 | 91% |
| Student's course history | 29 | 83% |
| GPA | 17 | 49% |
| PSAT scores | 4 | 11% |
| MCAS scores | 3 | 9% |
| Other (please specify)\* | 7 | 20% |

\*Responses to ‘other’ are provided in Question 12a

**Question 12a:** What data did your school use to select students? Please select all that apply. - Other (please specify):

Total Responses: 7

Seven respondents selected ‘other.’ These respondents indicated that their school utilized the following data sources as part of the student selection process[[39]](#footnote-40):

* Teacher recommendations (n=3)
* Soft skills, e.g., time-management and ability to work independently (n=2)
* Student interest (n=1)
* Scheduling (n=1)

|  |  |  |
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| Question 13: VHS Learning lists pre-requisites for students before enrolling in a virtual AP STEM course (Online Advanced Placement® | VHS Learning). Approximately what portion of students at your school enrolled in one or more courses through the Expanding Access initiative met the course’s pre-requisites as outlined by VHS Learning’s AP course descriptions? | Number of responses (n=62) | Percentage of responses |
| All participating students | 49 | 79% |
| Most participating students (more than half) | 5 | 8% |
| Some participating students (less than half) | 4 | 6% |
| No participating students | 0 | 0% |
| Unsure | 4 | 6% |

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Number of responses** | **Percentage of responses** |
| **Question 14: Do any students currently enrolled in the Expanding Access initiative at your school have an IEP?** | Yes | 8 | 13% |
| No | 50 | 81% |
| Unsure | 4 | 6% |
| Total | 62 | 100% |
| **Question 15: Do any students currently enrolled in the Expanding Access initiative at your school have a 504 plan?** | Yes | 24 | 39% |
| No | 35 | 56% |
| Unsure | 3 | 5% |
| Total | 62 | 100% |

*Question 16 displayed if respondent selected “Yes” for Question 14 or Question 15*.

**Question 16:** You've indicated that there are students currently enrolled in the Expanding Access initiative with either an IEP or 504 plan. Please describe the ways in which students’ learning needs are being met.

Total Responses: 23

23 respondents described the ways in which students’ needs are being met relative to IEP or 504 plans. These respondents shared that their school and/or VHS Learning provide the following[[40]](#footnote-41):

* Extra time on assignments (n=11)
* VHS Learning-provided supports, e.g., check-ins with virtual instructor (n=6)
* School-provided supports, e.g., academic support staff (n=5)
* Quiet space in school to complete coursework (n=3)
* Other (n=2)
  + Two respondents described physical accommodations for students that do not impact performance in an asynchronous learning environment.

|  |  |  |
| --- | --- | --- |
| Question 17: What, if any, summer supports offered by VHS Learning did your students use? Please select all that apply. | Number of responses (n=61) | Percentage of responses |
| Summer coursework | 27 | 44% |
| None | 13 | 21% |
| Office hours | 8 | 13% |
| Meeting with a virtual teacher | 1 | 2% |
| Reading list | 1 | 2% |
| Other (please specify) | 11 | 18% |

\*Responses to ‘other’ are provided in Question 17a

**Question 17a:** What, if any, summer supports offered by VHS Learning did your students use? Other (please specify).

Total Response: 11

11 respondents selected ‘other.’ These respondents shared that their students utilized the following VHS Learning-provided summer supports:

* Unsure (n=6)
* Survey instrument only allowed one response (n=3)
  + One respondent specified that students utilized all resources listed, another shared that students utilized almost all of the resources, while a third added that students had access to a reading list, summer work, and summer office hours.
* In-school study hall (n=1)
* N/A (n=1)

|  |  |  |
| --- | --- | --- |
| Question 18: What summer supports did your school offer to Expanding Access initiative-enrolled students? Please select all that apply. | Number of responses (n=49) | Percentage of responses |
| Meeting with a counselor or teacher | 27 | 55% |
| Summer coursework | 21 | 43% |
| Library access | 4 | 8% |
| Reading list | 1 | 2% |
| In-school tutoring | 1 | 2% |
| Other (please specify)\* | 12 | 24% |

\*Responses to ‘other’ are provided in Question 18a

**Question 18a:** What summer supports did your school offer to Expanding Access initiative-enrolled students? Please select all that apply. - Other (please specify)

Total Responses: 12

12 respondents selected ‘other.’ These respondents shared that their school offered the following summer supports[[41]](#footnote-42):

* None (n=4)
* Unsure (n=3)
* Electronic communication with Site Coordinator/school staff (n=3)
* Meetings with Site Coordinator (n=2)

|  |  |  |
| --- | --- | --- |
| Question 19: What kinds of supports does your school currently offer to Expanding Access initiative-enrolled students? Please select all that apply. | Number of responses (n=60) | Percentage of responses |
| Meetings with the Site Coordinator | 53 | 88% |
| Meeting with a counselor or teacher | 41 | 68% |
| Technology support | 34 | 57% |
| Cohorting (grouping of students to provide peer academic support) | 25 | 42% |
| Support for lab exercises | 16 | 27% |
| In-school tutoring | 11 | 18% |
| Other (please specify): | 9 | 15% |

\*Responses to ‘other’ are provided in Question 19a

**Question 19a:** What kinds of supports does your school currently offer to Expanding Access

initiative-enrolled students? Please select all that apply. - Other (please specify)

Total Responses: 9

Nine respondents selected ‘other.’ These respondents indicated that their schools currently offer the following supports to Expanding Access-enrolled students[[42]](#footnote-43):

* Allocated time in school to complete coursework (n=3)
* None (n=3)
* Tutoring services (n=2)
* Access to Site Coordinator (n=2)
* Weekly email reminders from Site Coordinator (n=1)
* Brick-and-mortar classmates (n=1)

**Question 20:** What additional supports does your school want or need to improve student success in virtual AP STEM courses offered through the Expanding Access initiative?

Total Responses: 30

30 respondents described additional supports that their school wants or needs to improve student success in the Expanding Access initiative. These respondents shared the following:

* None (n=9)
* Support with lab activities (n=4)
* Technology support (n=3)
* Tutoring services (n=3)
* Allocated time and space for students to complete coursework (n=2)
* Increased Site Coordinator bandwidth (2)
* Increased staffing (n=2)
* Access to content experts (n=1)
* Improved communications with VHS Learning, specifically in terms of early intervention with students and parents/guardians (n=1)
* Continued funding for the initiative (n=1)
* Additional VHS Learning-provided office hours (n=1)
* Additional synchronous learning opportunities (n=1)
* Bilingual liaison (n=1)
* Testimonial materials (n=1)
* Increased flexibility for students with 504 plans and IEPs (n=1)
* Additional information about the initiative to inform future participation (n=1)
* Other (n=4)
  + Other responses included a reference to occasions where VHS Learning instructors were unfamiliar with course materials, as well as a request for field trips to university labs. One respondent also mentioned that it would be helpful if students had introductory summer work to help them prepare for the rigors of an advanced course. Another respondent indicated “all” supports would be helpful.

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Number of responses** | **Percentage of responses** |
| **Question 21: Does your school build time into students’ regular schedules to complete their Expanding Access initiative coursework?** | Yes | 57 | 95% |
| No | 3 | 5% |
| Total | 60 | 100% |
| **Question 22: Do students have access to a quiet space where they can complete their Expanding Access initiative coursework during the school day?** | Yes | 59 | 98% |
| No | 1 | 2% |
| Total | 60 | 100% |

|  |  |  |
| --- | --- | --- |
| Questions 23: Have any students at your school decided to withdraw from their Expanding Access initiative virtual STEM AP course(s)? | Number of responses (n=60) | Percentage of responses |
| Yes | 39 | 65% |
| No | 21 | 35% |

|  |  |  |
| --- | --- | --- |
| Questions 24 Are these withdrawals recorded in any way on a student’s transcript, such as ‘Incomplete’ or ‘Fail’? | Number of responses (n=38) | Percentage of responses |
| Yes | 7 | 18% |
| No | 23 | 61% |
| Unsure | 8 | 21% |

*Question 25 displayed only if respondent selected “Yes” for Question 24.*

**Question 25:** What factor(s) do you believe most contributed to students’ decision to withdraw from their Expanding Access virtual STEM AP course(s)?

Total Responses: 38

38 respondents described factors that they believe most contributed to student withdrawals. These respondents shared the following[[43]](#footnote-44):

* Challenges related to time-management and the paced, asynchronous course structure (n=17)
* Expanding Access courseload (n=10)
* Preference for in-person learning (n=10)
* Non-Expanding Access courseload (n=8)
* Expanding Access course rigor (n=5)
* Lack of school/VHS Learning-provided support (n=4)
* Personal reasons (n=3)
* Extracurricular commitments (n=2)
* Lack of student preparedness (n=2)
* Other (n=3)
  + Other responses included references to students not taking advantage of available supports, lack of space to complete lab activities, and students being unaware that they signed up for their Expanding Access courses.

|  |  |  |
| --- | --- | --- |
| Question 26: Approximately how many students enrolled in a course through the Expanding Access initiative are registered to take the AP exam associated with their Expanding Access initiative course(s)? | Number of responses (n=59) | Percentage of responses |
| All students | 51 | 86% |
| Most students (more than half) | 3 | 5% |
| Some students (less than half) | 1 | 2% |
| No students | 4 | 7% |

|  |  |  |
| --- | --- | --- |
| Question 27: What supports, if any, are being offered by the school for students to take the AP exam associated with their Expanding Access initiative course(s)? Please select all that apply. | Number of responses (n=47) | Percentage of responses |
| Meetings with school-based teacher(s) | 25 | 18% |
| Meetings with virtual AP teacher(s) | 18 | 38% |
| Study groups | 13 | 28% |
| Tutoring | 5 | 11% |
| Other (please specify)\* | 7 | 15% |

\*Responses to ‘other’ are provided in Question 26a

**Question 27a:** What supports, if any, are being offered by the school for students to take the AP exam associated with their Expanding Access initiative course(s)? Please select all that apply. - Other (please specify):

Total Responses: 7

Seven respondents selected ‘other.’ Each of these respondents indicated that their school is not providing students with additional supports for students who take the AP exams associated with their Expanding Access courses.

|  |  |  |  |
| --- | --- | --- | --- |
|  | | **Number of responses** | **Percentage of responses** |
| **Question 28: Does your school intend to offer STEM AP courses though the Expanding Access initiative next year?** | Yes | 40 | 67% |
| No | 3 | 5% |
| Unsure | 17 | 28% |
| Total | 60 | 100% |
| **Question 29: Does your school have interest in expanding student enrollment in the initiative?** | Yes | 36 | 60% |
| No | 2 | 3% |
| Unsure | 22 | 37% |
| Total | 60 | 100% |

**Question 30**: How can the Expanding Access initiative be improved? This is the final survey question. You will not be able to go back after submitting this response.

Total Responses: 35

35 respondents described ways in which the Expanding Access initiative can be improved. These respondents shared the following[[44]](#footnote-45):

* None (n=14)
* Additional student supports (n=5)
  + Among respondents who suggested improvements related to student supports, four referenced school-provided supports such as content experts and tutors, while one specified that additional VHS office hours would be helpful. One respondent also added that students don’t always take advantage of available resources.
* Advertising and marketing (n=4)
  + Four responses referenced initiative-level advertisement and marketing. Two respondents noted that the initiative should be advertised more broadly to students, with one respondent specifically adding that schools would benefit from marketing materials such as posters. One respondent echoed this sentiment from the school-level, indicating that more schools should be offering this initiative. Another respondent shared that VHS informed their school about the initiative, and they were wondering if there was another “information hub” that schools should monitor for similar notices.
* Revised enrollment timeline (n=3)
  + Several respondents suggested that the Expanding Access enrollment deadline be extended, with one specifically requesting that a comprehensive course offerings list be provided to schools prior to the close of enrollment.
* Disseminate more informational materials to students and parents/guardians regarding the initiative and course structure (n=2)
  + These respondents indicated that parents and guardians at their schools did not have an accurate understanding of the initiative, and that they would benefit from additional reading materials and/or informational sessions prior to the start of the school year.
* Improved communication (n=2)
  + One respondent who suggested improvements related to communication indicated the need for more consistent communication between VHS Learning, Site Coordinators, and students. The other respondent added that students would benefit from VHS Learning intervening sooner in terms of contacting parents and guardians regarding academic concerns so students can receive the necessary support before falling behind.
* Continued funding for initiative implementation (n=1)
* Increase student enrollment (n=1)
* Improve student-virtual instructor connection (n=1)
* Mandate completion of VHS Learning summer work (n=1)
* Lessen the rigidity of assignment deadlines (n=1)
* Incorporate real-world connections to courses, e.g., career-building opportunities or visiting a university lab (n=1)
* Other (2)
  + Other responses included a reference to challenges related to completing lab work in an online learning environment. Another respondent added that students should be meeting with a licensed teacher once per week, and that the Site Coordinator role should be limited to handling administrative duties.

# Appendix O: Public schools enrollment data

**Table 1. Summary of total public-school students enrolled in Expanding Access relative to the number of students enrolled in each school**

|  |  |  |  |
| --- | --- | --- | --- |
| **FY23 VHS Learning Public Schools** | **Total Students Enrolled in Expanding Access Initiative** | **School Total Enrollment** | **Percentage of Students Enrolled in Expanding Access** |
| Ashland High School | 11 | 840 | 1.3% |
| Attleboro High School | 2 | 1,844 | 0.1% |
| Barnstable High School | 3 | 1,763 | 0.2% |
| Bellingham High School | 6 | 747 | 0.8% |
| Excel High School | 16 | 434 | 3.7% |
| Bourne High School | 1 | 351 | 0.3% |
| Carver Public Schools | 2 | 752 | 0.3% |
| Cohasset High School | 3 | 431 | 0.7% |
| Easthampton High School | 3 | 370 | 0.8% |
| Everett High School | 5 | 2,231 | 0.2% |
| Fairhaven High School | 5 | 633 | 0.8% |
| Georgetown Middle/High School | 10 | 299 | 3.3% |
| Hopkins Academy | 1 | 223 | 0.4% |
| Hanover High School | 2 | 667 | 0.3% |
| Hopedale Jr Sr High School | 8 | 436 | 1.8% |
| Hull High School | 4 | 241 | 1.7% |
| Leicester High School | 3 | 414 | 0.7% |
| Leominster High School | 4 | 1,034 | 0.4% |
| Littleton High School | 6 | 480 | 1.3% |
| Ludlow High School | 5 | 795 | 0.6% |
| Mashpee High School | 12 | 655 | 1.8% |
| Medfield High School | 2 | 740 | 0.3% |
| Medway High School | 4 | 613 | 0.7% |
| Millbury Jr./Sr. High School | 2 | 740 | 0.3% |
| Newburyport High School | 2 | 820 | 0.2% |
| Drury High School | 6 | 493 | 1.2% |
| Northbridge High School | 2 | 513 | 0.4% |
| Norwood High School | 5 | 941 | 0.5% |
| Rockland High School | 1 | 641 | 0.2% |
| Shrewsbury High School | 5 | 1,823 | 0.3% |
| The Springfield Renaissance School | 38 | 631 | 6.0% |
| Springfield Honors Academy\* | 14 | 1,103 | 1.3% |
| Springfield High School of Science and Technology | 7 | 1,087 | 0.6% |
| Taunton High School | 1 | 2,760 | 0.0% |
| Uxbridge High School | 3 | 590 | 0.5% |
| Waltham High School | 4 | 1,751 | 0.2% |
| Ware High School | 2 | 497 | 0.4% |
| Wellesley High School | 3 | 1,412 | 0.2% |
| Westborough High School | 15 | 1,178 | 1.3% |
| Murdock High School | 3 | 263 | 1.1% |
| Worcester Technical High School | 8 | 1,469 | 0.5% |
| Berkshire Arts & Technology Charter Public School | 5 | 316 | 1.6% |
| Non-Member - Edward M Kennedy Student | 1 | 364 | 0.3% |
| Sizer: A North Central Charter Essential School | 3 | 344 | 0.9% |
| Francis W. Parker Charter Essential School | 2 | 388 | 0.5% |
| South Shore Charter Public School | 25 | 1,054 | 2.4% |
| Global Learning Charter Public School | 1 | 499 | 0.2% |
| Hoosac Valley High School | 1 | 324 | 0.3% |
| Athol High School | 3 | 404 | 0.7% |
| Blackstone Millville Regional High School | 1 | 396 | 0.3% |
| Concord-Carlisle High School | 10 | 1,306 | 0.8% |
| Dighton-Rehoboth Regional High School | 4 | 687 | 0.6% |
| Gateway Regional Middle & High School | 1 | 163 | 0.6% |
| Hamilton Wenham Regional High School | 7 | 450 | 1.6% |
| Hampshire Regional High School | 4 | 662 | 0.6% |
| Nipmuc Regional High School | 3 | 599 | 0.5% |
| Monomoy Regional High School | 5 | 702 | 0.7% |
| Algonquin Regional High School | 1 | 1,213 | 0.1% |
| Pioneer Valley Regional School District | 1 | 256 | 0.4% |
| Quabbin Regional High School | 14 | 566 | 2.5% |
| Ralph C. Mahar Regional School District | 1 | 523 | 0.2% |
| Mt. Everett Regional High School | 2 | 294 | 0.7% |
| Whittier Regional Vocational Technical High School | 33 | 1,277 | 2.6% |
| Phoenix Charter Academy - Springfield | 6 | 166 | 3.6% |
| Libertas Academy Charter School | 3 | 411 | 0.7% |
| **Total** | **376** | **49,069** | **0.8%** |

Note: UMDI used public data from the DESE school and district profile webpage to generate the total school enrollment column.

\*With DESE’s approval enrollment data for High School of Commerce was used as a comparison for this analysis.

**Figure 1. Race/ethnicity of Expanding Access-enrolled public-school students compared to students from all participating public schools**

# Appendix P: School geographic location

**Table 1. Number of participating schools by Priority Zone, Local Designation and Region**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Zone** | **Local Designation** | | | | **Region** | | |
|  | Gateway City | Non-Urban/Non-Gateway City | Urban | Urban/Gateway City | CENTRAL | EASTERN | WESTERN |
| Non-Priority Zone | 7 | 51 | 5 | 6 | 14 | 39 | 16 |
| Priority Zone | 5 | 3 | 3 | 2 | 4 | 6 | 3 |
| Total | 12 | 54 | 8 | 8 | 18 | 45 | 19 |

Note: A total of 69 (84%) participating schools were in the non-priority zone, and 13 (16%) schools were in the priority zone. The majority of the schools were in Eastern Massachusetts at 45 (55%), followed by Western Massachusetts at 19 (23%) and Central Massachusetts at 18 (22%). Most of the schools were in non-urban/non-gateway cities at 54 (66%), followed by gateway cities at 12 (15%). The highest number of schools in priority zones were in gateway cities at 5 (42%) and the highest number of schools in non-priority zones were in non-urban/non-gateway cities at 51 (94%).

# Appendix Q: Persistence rate by gender and race and ethnicity

Figure 1. Overall persistence

**Figure 2. Summary of student enrollment and persistence rate by gender**

Note: The missing bar represents the missing values from private schools that did not submit SIMS data for the variable that was used to identify students by gender.

**Figure 3. Summary of student enrollment and persistence rate by race and ethnicity**

Note: The missing bar represents the missing values from private schools that did not submit SIMS data for the variable that was used to identify students by race and ethnicity.

# Appendix R: Performance by course subject

**Figure 1. Average performance by course subject**

# Appendix S: Site Coordinator demographic information

Figure 1. Site Coordinator demographic information, gender by school type

Figure removed due to small sample size.

Figure 2. Site Coordinator demographic information, race, and ethnicity by school type

Figure removed due to small sample size.

Figure 3. Site Coordinator job classification

Figure 4. Site Coordinator job classification by school type

# Appendix T: Computer Science - Advanced Placement Access Expansion Opportunity (CS-APAO) RFP

 DESE Logo



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Attachment A

Alternate ID #:23CCTJG2

COMMBUYS Bid #:BD-23-1026-DOE02-DOE01-82898

Background:

In Massachusetts there are many students who do not currently have access to Advanced Placement (AP) coursework in Science, Technology, Engineering and Mathematics (STEM), and particularly Computer Science. At the same time, it is critical that more students participate in rigorous courses, realize their potential, pursue postsecondary education, and ultimately go on to STEM professions that are vital to the Massachusetts economy.

[Research done by the College Board](https://onlinelibrary.wiley.com/doi/abs/10.1111/emip.12295) shows that after controlling for achievement, demographic characteristics, and other factors, we find that the biggest predicted boost in first-year grades and on-time Bachelor’s degree attainment are associated with AP participation changing from zero to one AP exam and from one to two AP exams.Students who complete their first AP course are 3 percentage points more likely to graduate from college within four years. Students taking an AP exam and scoring a 3 or higher are 6 percentage points more likely to graduate from college within four years and 8 percentage points more likely if they score 3 or higher on two AP exams.

Additionally, the ability to effectively use and create technology to solve complex problems is the new and essential literacy skill of the twenty-first century. This is the vision of the 2016 Digital Literacy and Computer Science K-12 Framework.

These are essential literacy skills for ALL students but we’re not reaching ALL students.  Our data shows:

* Elementary and middle school students have less access to digital literacy and computer science (DLCS) courses than high school students. 45% of rural, 37% of suburban, and 35% of urban elementary or middle schools do not offer DLCS courses. (Figure 1)
* Urban high schools were less likely to offer DLCS than suburban and rural high schools.  98% of suburban and 90% of rural high schools offer a DLCS course compared to 75% of urban high schools. (Figure 1)
* Overall, more white students attended schools likely to offer DLCS than students of color. (Figures 2 and 3)
* In elementary or middle schools that offer DLCS course(s), student enrollment varies across student demographic and special populations from 67% of African American students to 100% of white students.  Student enrollment in high school drops to 24% - 37% across all student demographic and special populations. (Figure 4)
* In all schools where a DLCS course is available, fewer English learners, students with disabilities, and economically disadvantaged students were enrolled in the course(s); regardless of the student representation in the school. (Figures 5 & 6)

To provide equitable opportunities in technology education we need to increase district capabilities, increase student access, and improve student participation and success in digital literacy and computer science skills and practices across Massachusetts.

Figure 1: Massachusetts schools that offer at least 1 DLCS Course by Region.



Figure 1: Massachusetts schools that offer at least 1 DLCS Course by Region.

To examine the equity of access we must also look at the schools that offer at least one DLCS course compared to those that do not. Overall, more white students attended schools likely to offer DLCS than students of color, as shown in Figures 2 and 3.

Figure 2: Differences in enrollment in Elementary and Middle School

Distribution of students in Elementary and Middle Schools Offering or not offering DLCS by Race and Ethnicity, 2019-2020
Figure 3: Differences in enrollment in High School

Distribution of students in High Schools Offering or not offering DLCS by Race and Ethnicity, 2019-2020

Figure 2: Differences in enrollment in Figure 3: Differences in enrollment in High School

Elementary and Middle School

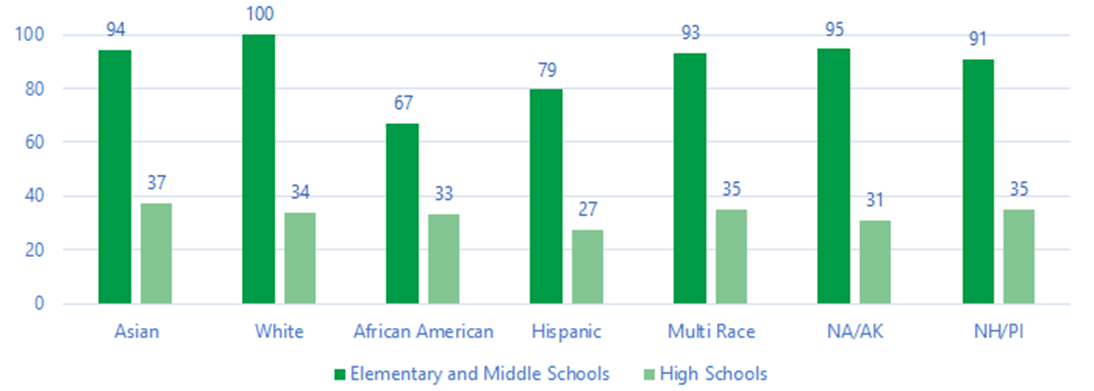


Figure 4: Percent of Students that take DLCS course offered by their School

Figure 5: Percent of Males/Females that take DLCS course offered by their School
           Figure 6: Percent of Special Populations that take DLCS course offered by their School


Figure 5: Percent of Males/Females that Figure 6: Percent of Special Populations that take

take DLCS course offered by their School DLCS course offered by their School

In September 2020 DESE was awarded a five-year grant totaling $9,127,691 from the U.S. Education Department (ED), through the Expanding Access to Well-Rounded Courses Demonstration Grants Program. The funding from ED supports the following elements of our plan: Virtual AP STEM Coursework to Students, Professional Development for Educators, and Grant Evaluation.

DESE seeks to work with a vendor or vendors to support high quality access to AP STEM coursework, with a specific focus on Computer Science coursework, to address these existing inequities.

Scope of Service:

Working with DESE, school districts, and other stakeholders, the contractor(s) will complete the following deliverables, during the specified fiscal years, with FY23 contract supporting planning, outreach, and preparation for each deliverable.

Deliverables by Fiscal Year

|  |  |  |  |
| --- | --- | --- | --- |
|  | Deliverable 1 | Deliverable 2 | Deliverable 3 |
| FY23 | Recruitment, Platform set up, Promotion, Enrollment Support | Recruitment, Platform set up, Promotion, School identification | Enrollment Support. Student recruitment |
| FY24 | For schools that will engage with CS PD (Deliverable 2), offer online coursework for courses listed above. | For participating schools, provide above outlined Computer Science professional development | For schools previously participating in MA DESE STEM AP Access Expansion Opportunity program, approximately 800 enrollments in above listed courses |
| FY25 | For same FY24 schools, offer progressive CS courses for students enrolled in FY24, and introductory courses for a new group of students from these schools. | For same schools as FY24, offer similar professional development that builds on FY24 and prepares participating schools to provide pre-AP and AP courses by FY25 (post-program.) | For same schools as FY24, approximately 800 enrollments in above listed courses with increased focus on future avenues to sustainably offer high instance AP courses of interest. |

**Deliverable 1:**

**FY2023 (Approval – June 30, 2023):** Recruitment, Platform set up and Promotion Enrollment support.

**Renewal Years: FY2024 (July 1, 2023 – June 30, 2024) and FY2025 (July 1, 2024 – June 30, 2025):** **Short-term student access to high quality Computer Science coursework**

To increase short-term student access, the Computer Science - Advanced Placement Access Expansion Opportunity (CS-APAO) should provide a statewide virtual platform that will enable students in these districts to engage in the coursework at no additional cost to the student, family, or school district. Additionally, CS-APAO should provide all course materials and will cover AP test fees for students. The virtual courses to be provided will be:

* AP Computer Science Principles
* AP Mobile Computer Science Principles
* AP Computer Science A
* Exploring Computer Science
* Computational Thinking and Problem Solving

Districts that participate in this option will be expected to address long-term student access to courses and program sustainability in their implementation plan. The vendor will support districts in introducing the Computer Science field which is necessary to increase student participation and success in the AP Computer Science courses. Students need to be introduced to the CS field and engaged in CS content and practices in grades prior to the AP course. In the same way a student would not be expected to be successful in AP Calculus without having prior math experience, CS-APAO long term planning and implementation should provide foundational CS courses to engage, inspire, and prepare students for AP CS courses. The following high school courses have been evaluated, align with MassCORE, and would provide the needed foundational skills for the AP CS Principles and the AP Mobile CS Principles courses:

* Exploring Computer Science
* Computational Thinking and Problem Solving
* The AP CS Principles or the AP Mobile CS Principles courses would provide preparation for the AP CS A course.

We estimate 60 students participating in entry level/pre-AP course work in year 1. In year 2, the first cohort would continue into AP coursework, while a new cohort begins AP. Schools participating should be prepared to continue the AP coursework for the second cohort through their implementation plans.

**Deliverable 2:**

**FY2023:** Recruitment, Platform set up, Promotion and School identification

**Renewal Years (FY2024 and FY2025) :** Increase district capacity to offer high quality Computer Science coursework.

To increase district capabilities and ensure long term sustainability, the contractor should:

* Support Districts in establishing a [DLCS Implementation Plan](https://www.doe.mass.edu/stem/dlcs/) to include five key areas: Leadership, Teacher Capacity and Development, Curriculum and Materials Selection and Refinement, Partners, and Community
  + 2-day SCRIPT Workshop
  + 1-day Achieving Equity in AP Workshop
* Provide AP CS Principles, AP Mobile CS Principles, AP CS A, Exploring Computer Science, and/or Computational Thinking and Problem-Solving professional development to the prospective Computer Science teacher for these online computer science courses.
  + 5-day Workshops + PLC (each)
* Provide Administrator DLCS professional development
  + 2-day Workshop
* Provide Counselor DLCS professional development
  + 1-day Workshop

All deliverables are expected to be completed in FY24. FY25 should offer similar professional development that builds on FY24 and prepares participating schools to provide pre-AP and AP courses by FY25 (post-program.)

**Deliverable 3:**

**FY2023:** Enrollment Support. Student recruitment

**Renewal Years (FY2024 and FY2025) :** Support districts accessing the previous STEM AP Expansion Opportunity (SAPAO) with short-term course access and long-term implementation plans.

DESE began the SAPAO initiative offering a broad range of AP STEM courses. For districts that have engaged with that offering, the contractor will:

* Provide short term access to high instance AP courses for approximately 800 students per year, specifically:
  + Environmental Science
  + Physics 1: Algebra-Based
  + Calculus AB
  + Statistics
  + Biology
  + Chemistry
  + Physics C
  + Computer Science\*

*\* Participating schools may be encouraged/moved into Deliverable A courses*.

* Support districts in identifying and implementing action plans to enable sustainable access to the high instance courses accessed through the virtual platform.
* Provide local site liaison training, along with site liaison stipends.
* Cover the full cost of lab kit and required course materials for courses, free of fee to students.
* Cover the full cost of students’ AP examination fees.
* Ensure content is relevant across cultures and supports teachers in delivering lessons in a culturally responsive manner.

FY25 should have an increased focus on future avenues to sustainably offer high instance AP courses of interest.

For each deliverable, the vendor will provide at least monthly reporting to DESE that outline progress of each deliverable.

**Budget:**

The Department will award a contract from approval to June 30, 2023 for planning and implementation, with the option to renew for fiscal year FY24 (July 1, 2023 – June 30, 2024) and FY25 (July 1, 2024 – June 30, 2025).

Prospective vendor may apply for up to $4,473,151.00 with the following approximate breakdown by Deliverable:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Approximate totals by Deliverable across Fiscal Years | | | |
|  | FY23 | FY24 | FY25 |  |
| Deliverable 1 | $ 33,972.00 | $ 152,874.00 | $ 152,874.00 | $ 339,720.00 |
| Deliverable 2 | $ 36,520.00 | $ 164,340.00 | $ 164,340.00 | $ 365,200.00 |
| Deliverable 3 | $ 376,823.10 | $ 2,038,320.00 | $ 1,353,087.90 | $ 3,768,231.00 |
|  |  |  |  |  |
|  |  |  |  | $ 4,473,151.00 |

The FY23 budget can be used for planning and preparation for FY24 and FY25. All deliverables must be completed by the end of each fiscal they are assigned (FY23, FY24 and again in FY25). The budget breakdown above is for the total across all fiscal years.

## Required Qualifications:

Vendor:

* Deliverable 1 & 3:
  + Must be an authorized AP Course provider by the College Board for all proposed courses;
  + A verifiable history of successfully educating students in online AP STEM courses and working with schools to diversify their course offerings and expand capacity;
* Deliverable 2:
  + Must be an authorized AP Course Professional Development provider by the College Board for all proposed courses;
  + Prior demonstrable experience providing professional development to support districts and educators, as outlined above, in introducing the Computer Science field.

System (Deliverable 1 & 3):

* A fully accessible learning management system and content, such that all students (including students with disabilities, who may be using assistive technologies) will be able to access the general education curriculum, both online and offline components;
* A system for providing technical support to students, including an orientation for taking an online course before starting the coursework;
* A service center that will be available from within the course if a student encounters technical issues;
* A system for ensuring cyber safety and security;
* A system for monitoring student attendance, including how it will verify that each student is participating in classes;
* Capacity to support and store all critical student, program, and staff data for expedient retrieval and analysis in compliance with federal and state laws;
* Platform and all third party applications must be registered with the SDPC Resource Registry.

## Preferred Qualifications:

Vendor:

* Is located in Massachusetts and works with Massachusetts-based and licensed educators;
* Is a non-profit organization;
* Has prior demonstrable experience working with the Massachusetts Department of Elementary and Secondary Education to deliver STEM AP courses to students.
* Has demonstrated commitment to the use of culturally responsive instructional materials and training that promotes culturally responsive pedagogy.

Deliverable 2:

* Is familiar with Massachusetts DLCS initiative and has prior experience helping districts develop long-term Computer Science implementation plans.

System (Deliverable 1 & 3):

* Supports interoperability with district student information systems (please specify which are supported), so students, administrators, and parents/guardians can monitor progress;
* Allows the teacher to enhance a course within the platform with additional content and assessments;
* Specifies compliance with interoperability standards that might allow future licensed integration with other platforms;
* Provides courses that are designed based on learning science to enable multi-sensory engagement, retrieval and spaced practice, connections to prior knowledge, and feedback-driven metacognition.

## Submission Requirements:

The submission should provide all information succinctly with sufficient detail to permit the Department to evaluate the response’s merits.

* For Deliverables 1 and 3, evidence that the vendor is an authorized AP Course provider by the College Board for all proposed courses.
* For Deliverable 2, evidence that the vendor is an authorized AP Course Professional Development provider by the College Board for all proposed courses.
* Describe the prospective bidder’s responses for accomplishing the activities outlined in the Scope of Services by deliverable.
* A narrative describing the bidder’s commitment to and actions taken to ensure equity and racial equity, which is aligned with one of DESE’s foremost goals which is to address inequities in education that exist in Massachusetts. This should include efforts within the bidder’s own organization to support equity and efforts when providing services to clients, as applicable. In addition, please share your organization’s current challenges with and ongoing efforts to ensure your organization is working towards building the mindsets, practices, and skills to support this initiative.
* Budgets:  The bidder must provide an FY23 budget by deliverable and budget by deliverable for each fiscal year for potential renewal (FY24, FY25).
* Bidder Qualifications, References and Implementation Timeline:   This section must include a list of tasks/activities; the implementation timeline for all fiscal years; the key personnel responsible for implementation of the project, along with their resumes; and contact information for two references who can attest to the bidder’s qualifications for the project. The bidder must provide a project management plan showing the key tasks for each of the major program activities in the Scope of Services, implementation dates/timelines, and personnel responsible.

Responses MUST be uploaded COMMBUYS. Responses not posted to COMMBUYS will not be considered for evaluation. Do not Email and/or mail responses to the department. In order to respond to this bid, please register on the COMMBUYS website. If you need assistance with registering, please contact the COMMBUYS helpdesk at [COMMBUYS@state.ma.us](mailto:COMMBUYS@state.ma.us?Subject=COMMBUYS%20Question) or (888) 627-8283 or (617) 720-3197.

1. As agreed in FY22 and outlined in the year 2 year-end report, due to low participation among students, parents/guardians, and schools during FY22, UMDI, in collaboration with DESE, revised the data collection methods for FY23. [↑](#footnote-ref-2)
2. In consultation with DESE, evaluation question 2a and 2b were deprioritized for FY23. [↑](#footnote-ref-3)
3. In this report, the label ‘school type’ refers to whether participating school is public or private. [↑](#footnote-ref-4)
4. See Appendix P, Table 1 for additional analysis regarding the participating school’s geographic location. [↑](#footnote-ref-5)
5. Appendix O, Figure 1 provides the proportion of students enrolled in the Expanding Access initiative for the participating public schools based on the total public-school population by race and ethnicity. [↑](#footnote-ref-6)
6. For additional information on this demographic variable, please refer to the DESE Handbook: <https://www.doe.mass.edu/infoservices/data/sims/sims-datahandbook.docx>. [↑](#footnote-ref-7)
7. For this report, UMDI utilized the SIMS variables, ‘LOW\_INCOME.’ We recognize DESE also collects supplemental low-income data, recorded as SIMS DOE056, which was not included in this report. [↑](#footnote-ref-8)
8. UMDI will investigate best practices used by participating schools in relation to student persistence during school site visits in FY24. [↑](#footnote-ref-9)
9. See Appendix Q for additional analyses regarding persistence by select demographics. [↑](#footnote-ref-10)
10. The A average category includes students who received an A-, A or A+; B average includes B-, B and B+; C average includes C-, C and C+; D average includes D-, D and D+; and F for student who did not pass the course. [↑](#footnote-ref-11)
11. Appendix O, Table 1 provides the proportion of students enrolled in the Expanding Access initiative for the participating public schools based on the total public school population. [↑](#footnote-ref-12)
12. The recruitment process encountered a delay in FY24 due to the launch of the CS-APAO initiative and reallocation of the Expanding Access resources. [↑](#footnote-ref-13)
13. Having an in-person content instructor is not a requirement for the schools participating in the Expanding Access initiative. However, some participating schools made that resource available for their participating students. [↑](#footnote-ref-14)
14. In this report, participating schools where student focus group participants mentioned not having access to adequate technology, or lab materials were identified as limited resource environments. Students from high resource environments might be better prepared academically and might have more support for adaptation relative to students from limited resource environments. [↑](#footnote-ref-15)
15. See Appendix F for complete school focus group responses. [↑](#footnote-ref-16)
16. See Appendix N for summary of school survey responses. [↑](#footnote-ref-17)
17. See Appendix T for CS-APAO RFP. [↑](#footnote-ref-18)
18. See Question 5n in Appendix K. [↑](#footnote-ref-19)
19. See Question 5o in Appendix K. [↑](#footnote-ref-20)
20. UMDI will provide technical support to DESE in understanding barriers in relation to retention of schools in FY24. [↑](#footnote-ref-21)
21. In consultation with DESE, parent/guardian group interview was deprioritized for FY23. [↑](#footnote-ref-22)
22. Protocols for students, schools, DESE, and VHS Learning are in Appendixes C, E, G, and H, respectively. Evaluation questions are indicated within each protocol question among each Appendix item. [↑](#footnote-ref-23)
23. See Appendix D for the complete summary of student focus group responses. [↑](#footnote-ref-24)
24. See Appendix I for the school survey protocol. [↑](#footnote-ref-25)
25. See Appendix F for the complete summary of school focus group responses. [↑](#footnote-ref-26)
26. See Appendix G for the DESE group interview protocol and integrated evaluation questions. [↑](#footnote-ref-27)
27. See Appendix H or the DESE group interview protocol and integrated evaluation questions. [↑](#footnote-ref-28)
28. Staff in schools were asked to submit a single joint survey representative of their schools’ perspectives/experiences. [↑](#footnote-ref-29)
29. See Appendix J for parents/guardian survey protocol. [↑](#footnote-ref-30)
30. See Appendix L for summary of student survey responses. [↑](#footnote-ref-31)
31. See Appendix N for summary of school survey responses. [↑](#footnote-ref-32)
32. See Appendix M for summary of parent/guardian survey responses [↑](#footnote-ref-33)
33. The parent/guardian survey was translated with support from the UMass Translation Center into Puerto Rican Spanish, Chinese, and Portuguese. [↑](#footnote-ref-34)
34. Questions designated with (\*) are considered priority questions. [↑](#footnote-ref-35)
35. Questions designated with (\*) are considered priority questions. [↑](#footnote-ref-36)
36. Responses to Question 5 have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-37)
37. Responses to Question 9 have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-38)
38. Responses to Question 10 have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-39)
39. Responses to Question 5 have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-40)
40. Responses to Question 16 and 17a have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-41)
41. Responses to Question 18a have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-42)
42. Responses to Question 19a and 20 have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-43)
43. Responses to Question 25 have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-44)
44. Responses to Question 30 have been clustered into broader categories for brevity. For this question, the number of categories listed does not match the number of total responses, as more substantive responses have been partitioned into multiple categories. [↑](#footnote-ref-45)