

Formative Evaluation of the Virtual High School, 2008–09

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Executive Summary

Learning Point Associates provided an independent evaluation of the Virtual High School (VHS) program for the 2008–09 school year. The following evaluation questions guided this effort:

1. What is the effectiveness of student support services, how does it vary across sites, and what should be added?
2. What are the course components and teacher performance correlates of student performance and satisfaction?
 - a. To what extent is teacher satisfaction associated with student satisfaction and with the online student's observed persistence and assessed academic performance?

This brief summarizes findings based on the analysis of spring 2009 student registration and grades data, as well as survey data from students, site coordinators, and teachers. An interim report was submitted in June 2009 summarizing analyses from fall 2008 grades and student survey data. These findings are reviewed briefly in the report as well.

The VHS Model of Online Learning

The theory of action for the VHS program includes three main components: student support, primarily in local school settings; the online VHS program; and outcomes of student participation.

The individual schools and districts participating in the VHS program provide the support for online learning. Each school provides a site coordinator whose duties typically include supervising students, providing technical assistance, and helping students communicate with their teachers. Schools typically provide an online work period and computer resources as well. The VHS online program provides student support services in the form of an orientation course and technical support.

VHS offers teacher-led online courses in nine curriculum areas and at four different levels. VHS courses adhere to standards for teacher facilitation, course content, and student interactions.

- **Teacher Facilitation.** Teachers are expected to answer student questions, provide feedback, facilitate discussion, and organize group work.
- **Course Content.** The course content standards concern the curriculum and curriculum materials, difficulty of assignments, and opportunities for student autonomy.
- **Student Interactions.** Students are expected to participate in regular online discussions, small-group activities, and collaborative team projects.

Student support and adherence to online learning standards were measured with surveys administered to students, teachers, and site coordinators. Student learning outcomes were measured with student survey responses, as well as with course completion and passing data.

What Is the Effectiveness of Student Support Services, How Does It Vary Across Sites, and What Should Be Added?

School-Based Student Support

Schools provide several types of support, some of which have a clear influence on student outcomes. Site coordinators typically use the online readiness survey not as a screening device but rather as a means to communicate about the requirements of online learning. Most schools are providing students with computer access and scheduled time for online coursework; direct academic support from schools is uncommon. Most students agreed that their site coordinator provided them with the expected technical support and supervision, with the exception of regularly informing them of their current grade average (where a large minority disagreed). Most site coordinators agreed that they provided the expected types of support and supervision, although few regularly checked on a student's level of course activity.

Schools in which students rated the level of site coordinator support as high also tended to have higher student ratings of the amount learned and level of motivation and engagement. There also is some evidence that schools with high ratings of site coordinator support had higher passing rates.

VHS Student Support Services

VHS provided two types of support services directly to students: a student orientation course and access to the Contact Center for technical support. In response to a survey question, about 70 percent of students indicated that the student orientation was effective or very effective (about evenly split). However, many students suggested that the orientation should be more explicit, interactive, and shorter. Although fewer than 30 percent of students expressed an opinion about technical support provided by the VHS Contact Center, more than 80 percent who did were very satisfied (44 percent) or moderately satisfied (37 percent).

Despite the high levels of satisfaction with existing VHS support services, students desire additional support services. In particular, many students indicated an interest in real-time chat with instructors and fellow students and more immediate access to academic support (e.g., a homework helpline, online tutoring, or procedures for improving access to their instructor).

What Are the Course Components and Teacher Performance Correlates of Student Performance and Satisfaction?

The course characteristics that were rated by students and teachers—course content, student interactions, and teacher facilitation—were not associated with any coursewide student performance outcomes (e.g., passing rates or perceived learning). Likewise, teacher experience and number of students per class also were not associated with student performance. The withdrawal rate in semester-length courses in the fall semester did not predict the withdrawal rate for the teacher's same course the following semester, suggesting that withdrawals are not a stable characteristic of teachers. Similarly, there was no consistency in withdrawal rates across courses within disciplines from one semester to the next. According to teacher interviews and site

coordinator surveys, the predominant reason for student withdrawals is the student's difficulty with time management.

Perceptions of course characteristics were clearly associated with ratings of satisfaction with course quality. In particular, courses with high average ratings of course content, teacher facilitation, and student interactions had high ratings of student satisfaction with course quality. Teacher perceptions of these course characteristics also were associated with their satisfaction with course quality, but to a lesser degree.

To What Extent Is Teacher Satisfaction Associated With Student Satisfaction and With the Online Student's Persistence and Academic Performance?

Teacher satisfaction course quality was modestly associated with coursewide student satisfaction with course quality, but not with course passing or withdrawal rates.

Recommendations

Improve Access to Academic Support

Students expressed interest in improved access to academic support (e.g., a homework helpline, online tutoring, procedures for improving access to their instructor). VHS should offer some of these services on a small scale and study their impact on student performance outcomes and satisfaction.

Improve the VHS Student Orientation

The orientation should be shorter and provide a more explicit demonstration for how to accomplish certain tasks.

Work With Schools to Improve Local Support

VHS should track average student ratings of site coordinator support in order to identify schools that may need assistance or encouragement in supporting students.

Track Coursewide Perceptions of Course Characteristics

Student perceptions of course content, teacher facilitation, and student interactions are strongly correlated with course satisfaction. These three scale scores should be calculated per course section on a regular basis and monitored for quality assurance.

Link Student Survey and Course Performance Data With Student Grades

Establishing these linkages among data elements would enhance VHS's capacity to understand how better to promote student success.

Virtual High School Formative Evaluation Report for 2008–09

The Virtual High School Global Consortium (VHS) is a nonprofit collaborative of high schools that offers full-semester, year-long, and summer school courses online to high school students. These courses can supplement school offerings, providing the opportunity for students to take classes that are not offered in their school or for which student demand exceeds the number of openings. For the 2008–09 school year, VHS contracted with Learning Point Associates to provide an independent evaluation of the program. The purpose of this evaluation was to provide formative feedback that can help improve the quality of online instruction and increase the level of service to customers. The following evaluation questions guided this effort:

1. What is the effectiveness of student support services, how does it vary across sites, and what should be added?
2. What are the course components and teacher performance correlates of student performance and satisfaction?
 - a. To what extent is teacher satisfaction associated with student satisfaction and with the online student's academic performance?

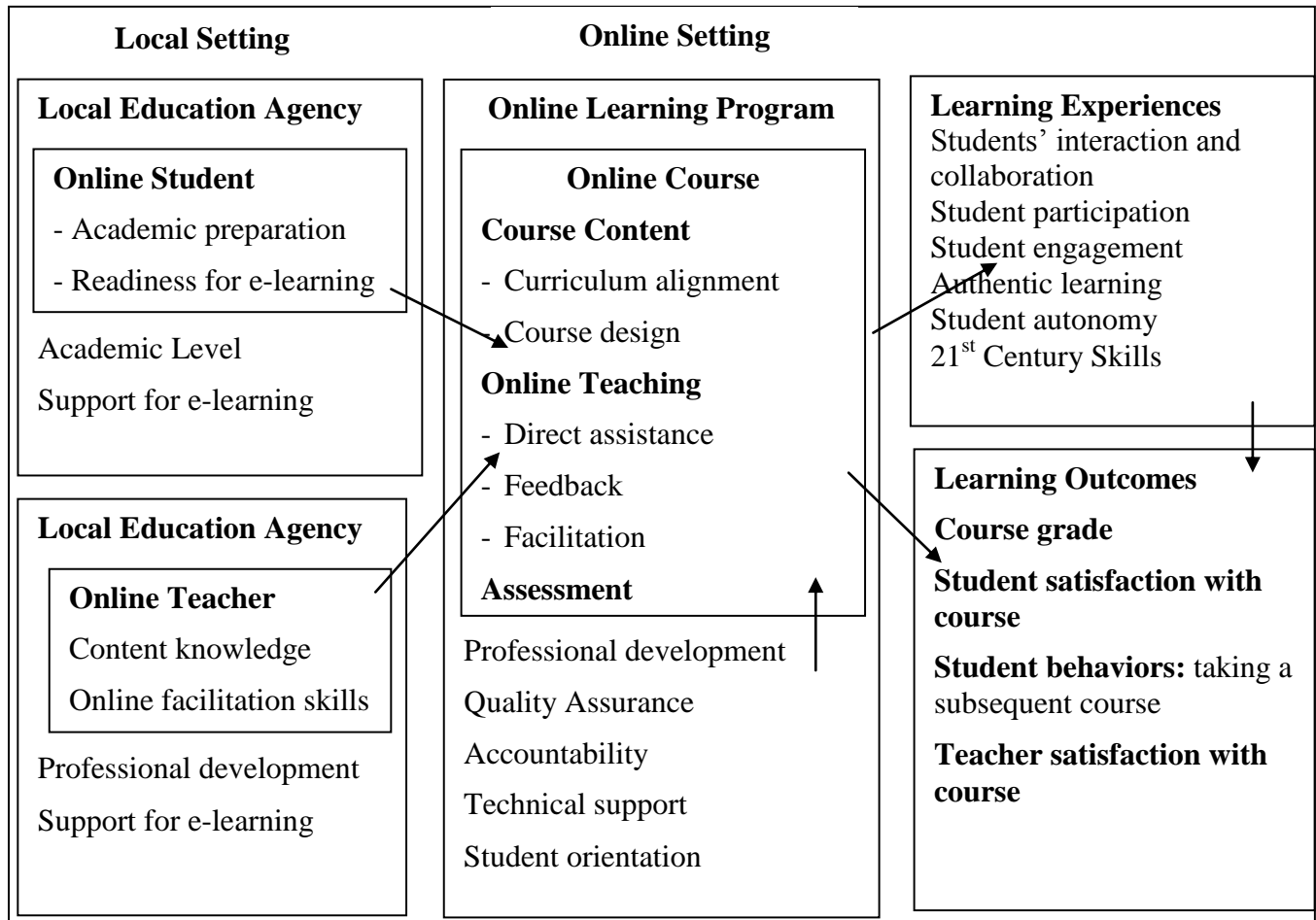
The purpose of this brief is to summarize findings in alignment with these research questions. The findings are based on the analysis of spring 2009 student registration and grades data, as well as on survey data from site coordinators and teachers. A previous interim report was submitted in June 2009 summarizing analyses from fall 2008 grades and student survey data. The analyses reported here extend these previous findings by incorporating the viewpoints of teachers and site coordinators (as expressed through year-end surveys). A brief summary of the findings from the previous report will be integrated with the new findings reported here in order to indicate whether the findings from fall 2008 have been replicated.

An Overview of Online Learning With VHS

The theory of action for the VHS program includes three main components: the local setting of the online student, the online setting of the program, and the student learning outcomes. To understand this theory of action, which is depicted in Figure 1, some background information is necessary.

VHS provides teacher-led online courses. Students who participate in these courses most typically are enrolled in traditional school settings and take a VHS class to supplement their school's course offerings. Schools typically pay a fee to become a member of the VHS consortium; membership entitles a school to a certain number of seats (i.e., enrollments of students in courses). The teachers of VHS courses typically are from the member schools themselves; schools barter the time of their teacher for a certain number of seats. The following sections provide further detail about student support in local and online settings, course and teacher quality, and learning outcomes.

Figure 1. Logic Model of Online Learning



Student Support in Local and Online Settings

The individual schools and districts participating in the VHS program (labeled “Local Education Agency” in Figure 1) provide the support for online learning. As depicted in the logic model, they are responsible for supporting e-learning for both the student and the teacher. Each school provides a site coordinator who is responsible for registering and dropping students, providing technical support and troubleshooting to online learners, serving as a liaison between student and online teacher, and supervising a student’s participation. In most cases, the school is responsible for providing students with the time, computer resources, supervision, and technical support necessary to foster a successful learning experience. In some cases, schools may provide academic support, such as assistance from a content-area teacher. The level of site coordinator support and the presence of resources for online learning are two constructs examined in relation to Evaluation Question 1.

The VHS online program provides student support services in two ways. First, all students take an orientation course designed to help them navigate the online learning environment (referred to as the learning management system). Second, VHS provides technical support for students.

Students may contact technical support staff directly when they are experiencing a problem with access to the course or other technical problems.

Course and Teacher Quality

Student performance and satisfaction (Question 2) primarily concerns the part of the logic model under the Online Setting heading in Figure 1. This refers mainly to the characteristics of online courses themselves. VHS offers courses in nine curriculum areas: arts, business, foreign language, language arts, life skills/health, mathematics, science, social studies, and technology. VHS staff regularly monitor these courses to ensure their adherence to the National Education Association's (NEA) recommended course guidelines (Virtual High School, n.d.). Courses are offered on four different levels: middle school, regular high school, honors, and advanced placement (AP). The courses on the first three levels are one semester in duration; AP courses are year-long. The evaluation examines three main themes expressed in these standards: teacher facilitation, course content, and student interactions.

- **Teacher Facilitation.** VHS courses are not self-paced; rather, they are led by instructors. The VHS online pedagogy standards call for clear and consistent teacher presence as part of the online course delivery. Specific assignments are due at the end of each week, and teachers are expected to answer questions that students send through e-mail or post to a private discussion thread. Teachers are not in contact by telephone or through live chat. The effectiveness of teacher facilitation of courses is therefore examined in relation to Evaluation Question 2.
- **Course Content.** The course content refers to the curriculum and curriculum materials. This is expressed as the level of difficulty of the course, the educational value of the topics, and the quality of materials, among other aspects. The quality of course content also is examined in relation to Evaluation Question 2.
- **Student Interactions.** Student discussion and collaboration are expected to be part of every course. Students are expected to participate in regular, content-focused online discussions, and teachers are expected to monitor and facilitate these discussions. All VHS courses contain small-group activities and team projects for which students must collaborate to foster an online community of learners. The extent of student interactions and collaboration is the third construct examined in relation to Evaluation Question 2.

Learning Outcomes

Objective learning outcomes include course withdrawal and course passing. The withdrawal rate is a valuable indicator of student outcomes in a particular course because the decision to withdraw is out of the control of the instructor (unlike the student's final grade). Subjective learning outcomes include the perceived amount learned and depth of learning. These measures are important because a student's perceptions of the amount learned would seem to be an important factor in his or her decision to take additional online courses (or additional courses in the same topic area).

This study examines both objective and subjective learning outcomes, as well as two types of learning experiences that theoretically underlie them: motivation to succeed and engaged

learning. For the sake of brevity, these variables are referred to simply as motivation or motivational factors.

Methodology

This section summarizes the overall approach to answering the two evaluation questions. A survey methodology was used to measure *constructs* of site coordinator support, course content, student interactions, and teacher facilitation. A construct is a quality or characteristic that is too complex to be directly observable. To measure these, the surveys asked several questions related to each construct, which were statistically combined to form a single measure called a scale score. Survey data were collected from students, teachers, and site coordinators. By making the items on the student survey parallel to items on the teacher and site coordinator surveys, different perspectives on the same construct could be taken into consideration. Scale scores, along with some individual survey items, were entered into a statistical model to predict student learning outcomes. This was the main approach to measuring the impact of student support, course characteristics, and teacher performance on student outcomes. The outcomes included student ratings of their learning and motivation, as well as the passing rate. Because individual students could not be linked to their grades, this analysis was conducted on the course or school level. That means that coursewide or schoolwide average student ratings were examined for each of the constructs and the ways in which these average ratings were related to the coursewide or schoolwide average outcomes were observed. The application of this approach, and additional methodologies, are described in relation to each evaluation question.

Evaluation Question 1. *What is the effectiveness of student support services, how does it vary across sites (with what effect), and what should be added?*

A descriptive quantitative approach was used to depict the prevalence of school resources of online learning and the level of site coordinator support, as rated by students and site coordinators. The student survey also included items asking students to rate the helpfulness of support services provided directly to them by VHS. These descriptive data were reported in the 2008–09 VHS program evaluation; they also are included in this report because they align directly with the present evaluation question.

As described in the introduction to this section, the impact of school-based student supports on student performance was examined using a statistical modeling approach. This analysis was conducted on the school level; a schoolwide average was calculated for ratings of site coordinator support (as scale score), and the presence of resources (individual items, not scaled) and their relation to student performance was observed. It was expected that schools with higher levels of these supports would have higher student outcomes.

Interviews with a small number of site coordinators were conducted to understand whether and how they use a screening questionnaire to assess the readiness for online learning of prospective VHS students.

Evaluation Question 2. *What are the course components and teacher performance correlates of student performance and satisfaction?*

Using the statistical approach outlined in the introduction, we examined the impact of teacher facilitation, student interactions, and course content (all scale scores) on student performance. We expected that courses with higher average ratings of these constructs would have higher student outcomes; as will be described, this expectation was not realized. Additional detail about this model is provided in the Analysis of Survey Data section.

A less complex statistical approach was used to observe how course components and teacher performance are related to teacher and student satisfaction with courses. Because satisfaction is an individual's subjective perception, the evaluation focused on how it is related to other individual perceptions of the course. To this end, nonparametric correlation (i.e., Spearman's *rho*) was used to examine the association of individual ratings of course experiences (namely, the scale scores of course content, student interactions, and teacher facilitation) and satisfaction with course quality. These correlations were performed separately for student and teacher ratings of course satisfaction.

The study also looked at whether withdrawal rate varies among individual teachers or discipline areas. Regarding the former, the study examined whether the proportion of students withdrawing from a teacher's course is similar from one semester to the next. We reasoned that if a teacher's facilitation style is responsible for the number of withdrawals, then there should be stability from one semester to the next in the proportion of withdrawals. Different disciplines varied in their proportion of course withdrawals during fall 2008. In particular, foreign language and mathematics had rates of withdrawals nearly double the remaining seven disciplines. The study examined whether this pattern would remain the same from one semester to the next. In doing both of these analyses, year-long courses were excluded because their withdrawal rates are not comparable across semesters of the same year.

Some analyses from the Interim Report were not replicated for the spring 2009 semester.¹ These include an analysis of the reasons given by site coordinators for student withdrawals. For fall 2008, the prevalence of withdrawals was broken out by discipline and by course sections that were designated as high-withdrawal or low-withdrawal courses. The Interim Report also included analysis of interviews conducted with teachers of high- and low-withdrawal courses; this analysis suggested some ways in which teachers from these two groups differ from each other. The findings from these analyses are briefly summarized in this report along with the new data in order to summarize the findings from the entire evaluation.

Question 2a. *To what extent is teacher satisfaction associated with student satisfaction and with the online student's assessed academic performance?*

To answer this question, teacher ratings of course satisfaction were correlated with student ratings. These analyses are based on 128 course sections for which both students and teachers responded to their respective surveys. For each course section, the average student rating was

¹ The information to be gained by replicating these analysis was judged as not worth the cost. In particular, certain limitations of the "drop survey" were addressed by revising this instrument for the 2009–10 school year.

correlated with the teacher's rating of the parallel item. Teacher satisfaction also was correlated with the coursewide student withdrawal rate.

Data Sources

Student Survey. All 5,167 students enrolled in VHS courses at the end of the spring 2009 semester were invited to complete an online survey. Of these, 1,024 students responded, for a response rate of nearly 20 percent. This survey addressed several topics aligned with VHS's annual program evaluation; the subset of these items that are aligned with the present evaluation questions are as follows²:

- **Local Support.** Students indicated the presence or absence of five specific resources for online learning provided by the school, including computer access, time to work on the course, and onsite tutoring. Students also rated agreement with six statements about support provided by the site coordinator (e.g., communication, assistance, monitoring). This set of items comprised the construct of site coordinator support; these items were combined into a single survey scale score using a psychometric procedure.
- **Course Experiences.** Students rated their agreement with groups of statements corresponding to the constructs of course content, course facilitation, and student interactions. Each of these three groups was comprised of seven items that were combined into a scale score corresponding to each construct.
- **Learning Outcomes and Satisfaction.** Students rated their agreement with four statements referring to amount learned, depth of understanding attained, level of engagement, and level of motivation. They also rated their level of satisfaction with course quality.

Teacher Surveys. At the end of the spring 2009 semester, 206 of 341 teachers completed a survey about their course experiences (response rate of 60 percent). The survey included items parallel to those on the student survey addressing the constructs of course content, course facilitation, and student interactions (as with the student survey, these constructs were represented as scale scores). The teacher survey also contained items parallel to the student survey addressing coursewide student learning outcomes, as well as the teacher's satisfaction with course quality.

Site Coordinator Surveys. At the end of the spring 2009 semester, 348 of 744 site coordinators (response rate of 47 percent) completed a survey with items parallel to those on the student survey addressing local support. This survey included five items about the presence of resources for online learning and six statements about the ways in which they supported online students (as with the student survey, these items corresponded to a construct that was scaled).

Student Passing and Withdrawal Data. The student outcomes regarding course completion and passing in 2008–09 come from extant data provided by the VHS registrar. The data included the grades for all 5,167 students enrolled past the no-penalty drop date. These data were used to

² A full summary of the items on the student, teacher, and site coordinator surveys is beyond the scope of this report. Interested readers will find full descriptions of these instruments and full summaries of responses in the *Virtual High School Program Evaluation 2008–09* report.

calculate the coursewide and schoolwide passing rates that were used as outcome variables for the statistical modeling. The withdrawal rate was calculated on the course level and discipline level.³ The withdrawal rate within each discipline is an average of course section withdrawal rates within that discipline.

Site Coordinator Interviews. We attempted to recruit site coordinators from six matched pairs of schools, where each pair was comprised of similar schools that differed strongly in their withdrawal rate.⁴ However, no matched pairs could be formed because only five site coordinators responded to the interview request. Interviews with these five individuals were conducted during April 2009. Interview questions addressed several topics related to the recruitment and support provided for participants in online learning at the site coordinator’s school.

Previously Reported Data Sources. The Interim Report summarized findings from two additional data sources: interviews with interviews with six pairs of teachers, matched by discipline area but differing in withdrawal rates and site coordinator responses to the “drop survey,” completed for each student who dropped a course, in which they selected the reason for the student’s withdrawal.

Analysis of Survey Data

Using a psychometric analysis⁵, the ratings of individual items aligned with the constructs of course content, course facilitation, and student interactions were combined into separate scale scores, both for teachers and students. The same procedure was used to create a scale score of site coordinator support, both for site coordinators and students. Statistical modeling procedures were used to examine the relationship between course experiences and student outcomes and between local support and student outcomes. This involved a cross-classified hierarchical linear model to account for course-level and school-level factors. The analytic approach was as follows:

- **Course-Level Factors.** Within each course section, the average student scale score was calculated for each of the three scales aligned with a construct of online learning (i.e., course content, course facilitation, and student interactions). The relationship between these average ratings of the online setting and coursewide student outcomes (the passing rate and average ratings of student learning and motivation) was examined. In the same manner, the relationship of the teacher’s ratings of these three aspects of the online setting and coursewide student outcomes was examined. Also included were additional variables related to the course and the teacher: teacher’s number of semesters of

³ For the analyses describing the consistency in withdrawal rates across semesters, a student was considered as having dropped a course if he or she was assigned a WF or WP as a grade (withdraw while failing and withdraw while passing, respectively). This was the same approach used for the Interim Report, and it is replicated here. However, for the analysis correlating teacher satisfaction with the withdrawal rate (i.e., Question 2a), we used a somewhat new approach. We considered students with a grade average under 15 and who completed no assignments during the second half of the course as having withdrew.

⁴ The pool of potential schools was limited to those whose site coordinator expressed willingness to be interviewed in response to an item on the Site Coordinator survey.

⁵ We used the Rasch model for ordered categories (Rasch, 1980) as the primary method used for survey item analyses, implemented with WINSTEPS (Linacre, 2004), a statistical software program.

experience with online teaching (from the survey), number of students in the course, discipline area, and course level (all from extant VHS data).

- **School-Level Factors.** Within each school, we examined whether the average student rating of site coordinator support was related to schoolwide outcomes such as passing rates and ratings of student learning and motivation. We also examined the relationship of the site coordinator’s self-ratings of support with the schoolwide passing rate. A similar approach was taken to observe the relationship between the availability of school resources for online learning (as rated by students and site coordinator) and student outcomes. Because these ratings were binary (i.e., present or absent), the average score for each resource was the proportion of students who said it was present in the school.⁶

What Is the Effectiveness of Student Support Services, How Does It Vary Across Sites, and What Should Be Added?

This section summarizes student support provided locally by school staff and directly to the student by VHS. It also summarizes site coordinator opinions on VHS resources and processes that are integral to local support efforts.

School-Based Student Support

Schools Use Online Readiness Survey to Communicate Requirements. Of the five site coordinators who were interviewed, two indicated that they regularly used the online readiness survey. Two others occasionally used it. Among these four, no one excluded students from participation based solely on the results of the survey. Rather, they used it as a tool for communicating the requirements of online learning to the students.

Technical and Logistic Resources Are Prevalent. Most students and site coordinators indicated that their schools provide them with the technological and logistic resources to participate in their VHS course (see Figure 2). For example, 97 percent of students indicated that they have a suitable computer available at their school to use when they need it, and 93 percent of students reported that they have class time during the school day for their VHS course. Few students (11 percent) reported being provided with a laptop computer. As with the fall 2008 data, the statistical model indicated that the presence of these resources was not positively correlated with schoolwide student success in VHS courses, ratings of amount learned, or motivation.

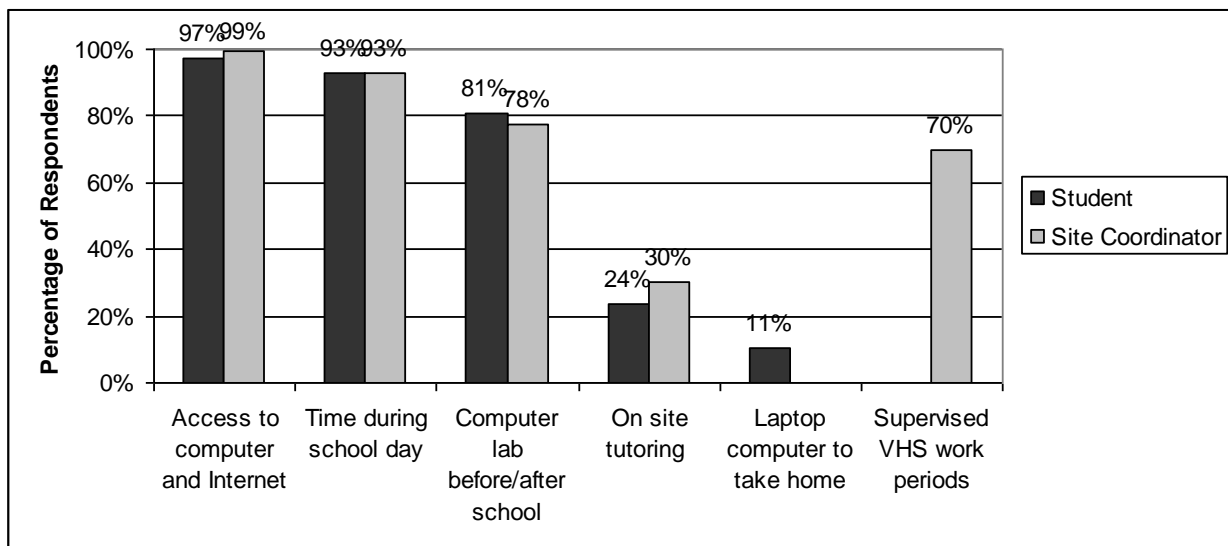
Academic Resources Are Not Prevalent. Few students or site coordinators (24 percent and 30 percent, respectively) indicated that their school provided onsite tutoring from a teacher in the same subject area as their VHS course. These survey findings are displayed in Figure 2. As reported for fall 2008, academic support of this type was not significantly associated with schoolwide passing rates, ratings of amount learned, or motivation.

⁶ Three of the resources referred to access to a computer. Of these, only one was included in the model (“Access to a suitable computer and Internet connection when you needed to work on your VHS course”) because it was deemed to be the most general. Descriptive statistics for all resources, however, are provided in Figure 2.

Site Coordinators Typically Provide Most Types of Support, and Their Support Is Associated With Student Learning Outcomes. Most students agreed that site coordinators provide most of the expected types of support, with the exception of providing the current grade average every two weeks. Most site coordinators agreed that they provided the expected types of support, except for checking on the level of course activity of individual students. The combined frequency of agreement to each item is displayed in Figure 2.

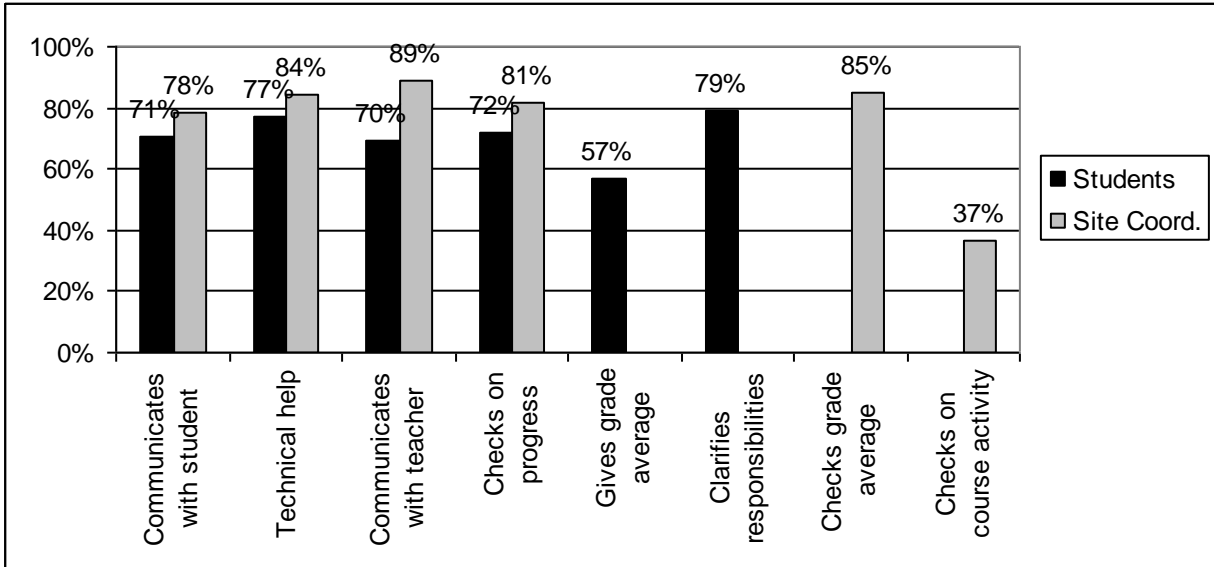
The school’s average scale score for site coordinator support (as rated by students) was positively related to the perceived amount learned and to student motivation. Although site coordinator support was significantly related to schoolwide passing rates for the fall semester, no association was observed during the spring semester (see the Appendix for a full summary). This might indicate that such support is more important for the outcome of passing in the fall rather than in the spring semester, perhaps because there are more incoming online students early in the year.

Figure 2. Proportion of Students and Site Coordinators Indicating the Presence of Different Resources for Online Learning



Note: Responses of “Not Applicable” were excluded from denominator. Student $N = 2,021$; site coordinator $N = 330$. Missing bars indicate that the particular item was not included on that survey.

Figure 3. Proportion of Students and Site Coordinators Indicating the Presence of Different Types of Site Coordinator Support



Note: Bar represent the sum of proportions of respondents selecting Agree or Strongly Agree. Student $N = 2,110$; site coordinator $N = 341$. Missing bars indicate that the particular item was not included on that survey.

VHS-Provided Student Support

VHS provided two types of support services directly to students: a student orientation course and access to the Contact Center for technical support.

Student Orientation Was Effective. On the student survey, students were asked, “How effective was the VHS Student Orientation in preparing you to navigate within your VHS course?” As shown in Table 1, nearly 70 percent of students indicated that the support was moderately effective (34 percent) or very effective (35 percent). Few students indicated that the orientation was slightly or not effective (6 percent). In summary, the student orientation course appears to be effective, at least in regard to preparing students to navigate in their courses.

Table 1. Student Ratings of Effectiveness of VHS Student Orientation for Preparing to Navigate VHS Course.

How effective was the VHS Student Orientation in preparing you to navigate within your VHS course?	Frequency	Percent
Very effective	692	35%
Moderately effective	672	34%
Somewhat effective	354	18%
Slightly or Not effective	125	6%
Not applicable/Don't know	152	8%
Total	1,995	100%

Students Suggested That the Orientation Should Be More Explicit, Interactive, and Shorter. Students were asked to describe, in open-ended fashion, how the student orientation should be improved to better prepare students. More than half of respondents (1,199 students) left some comment. To analyze these comments, a random sample of slightly more than 10 percent of the comments (127 responses) was extracted and categorized along major themes. About one third of the comments indicated that no change was necessary. Students made the following suggestions for improvement:

- The most frequent suggestion, expressed by about 25 percent of respondents, was that orientation should provide clearer and more explicit demonstrations and explanations. Some of these comments suggested that the orientation offer a virtual demonstration of the course, such as a video tutorial, live walk-through (e.g., with a site coordinator), or screen shots depicting each step. A typical comment was, “Give the students a more graphic layout of how to navigate through the site.” A related comment was that the orientation should provide clearer explanations or provide hands-on practice. A typical comment was, “[Provide] an interactive section would aid the students to actually navigate through the site.”
- The next most frequent suggestion, expressed by about 18 percent of respondents, was to make it shorter, more manageable, and more engaging. Typical comments were, “Be more brief and to the point” and “Make it a little more interesting, more concise.”
- One suggestion, expressed by about 7 percent of respondents, was to provide information tailored for specific courses. These students noted that courses vary somewhat in the way the learning management system is implemented.
- A final suggestion, expressed by about 6 percent of respondents, was that the orientation should prepare students for nontechnical aspects of online learning, such as how many hours to spend on a course or how to handle certain problems that arise (e.g., making up late work, losing computer access).

Students Are Satisfied With VHS Technical Support. Although fewer than 30 percent of students expressed an opinion about technical support provided by the VHS Contact Center, more than 80 percent who did were very satisfied (44 percent) or moderately satisfied (37 percent).

Students Desire Additional Support Services. Students were asked to indicate from a list of options which academic support services not currently offered would have been helpful to them. The most frequently selected support service student was real-time discussions with an instructor (44 percent). About one third of students selected 24-hour access to a homework helpline, one quarter selected online tutoring, and one fifth selected 24-hour access to a technical support representative (see Table 2).

Table 2. Proportion of Students Indicating That Additional Support Services Would Have Been Helpful

Based on your experience in this course, which of the following academic support services would have been helpful to you?	Frequency	Percent Selecting
Real-time discussions with instructor (via Internet chat or phone)	965	44.1%
24-hour access to a homework helpline (to answer questions about homework)	735	33.6%
Online tutoring (additional review of concepts from class)	525	24.0%
24-hour access to technical support representative	449	20.5%
Other	107	4.9%

Of the 107 students who selected “Other,” 60 made substantive suggestions (the remaining comments simply indicated that none of the other options would have been useful). The major themes among the 60 comments on courses or services are:

- **Real-Time Chat With Fellow Students.** Mentioned by 30 students (50 percent of comments). Several of these comments pointed out the importance of live chat for group projects. One student requested the ability “to do a live discussion with the class on a group activity, like a chat room for discussing [the project].”
- **More Immediate Access to the Teacher.** Suggested by 10 students (17 percent). Some students wanted to know the specific times their teacher would be online, so they could get immediate answers to their questions. Other students simply wanted more feedback and participation from their teacher.

What Are the Course Components and Teacher Performance Correlates of Student Performance and Satisfaction?

Also examined was how teacher and student ratings of course components were related to student learning outcomes, as measured by course passing and rated by students themselves. The study also looked at whether particular curriculum areas or teachers had withdrawal rates that were persistently high or low across semesters.

Course Characteristics and Student Performance

Course Characteristics Were Not Associated With Student Performance Outcomes. Neither student nor teacher ratings of course content, student interactions, or teacher facilitation were associated with coursewide passing rates, perceived learning outcomes, or perceived motivation. These constructs were not significantly correlated with any of those outcomes during the fall 2008 semester, either.

Withdrawal Rates Were Not Consistent Across Semesters. For teachers of semester-length courses who taught the same course in both semesters, the withdrawal rates from the fall and spring semesters were uncorrelated. Moreover, disciplinewide withdrawal rates did not appear to be consistent from one semester to the next, as shown in Table 3.

Table 3. Withdrawal Rates According to Discipline Area, Fall 2008

Discipline Area	Fall 2008		Spring 2009	
	Withdrawal Rate	# of Sections	Withdrawal Rate	# of Sections
Arts	9.8%	12	6.9%	13
Business	6.0%	27	10.5%	26
Foreign Language	10.1%	8	7.3%	7
Language Arts	6.3%	42	6.5%	44
Life Skills/Health	7.2%	16	8.0%	14
Mathematics	7.0%	19	9.4%	22
Science	7.8%	43	9.0%	49
Social Studies	5.4%	50	7.8%	61
Technology/Tech Ed	8.0%	26	11.8%	24
Programwide	6.9%	243	8.5%	260

Note: AP courses are excluded from this table. Discipline withdrawal rates are averages of course section withdrawal rates.

This suggests that variations in withdrawal rates have more to do with factors external to the teacher, course, or discipline, such as the characteristics of the learners assigned to the course.

Regarding withdrawal rates, a finding reported in the Interim Report bears mentioning. In the opinions of teachers and site coordinators (expressed in interviews and on the drop survey, respectively), the most prevalent reason that students withdraw from their classes is problems with time management. By contrast, academic performance and teacher-specific reasons were among the least prevalent.

Course Characteristics and Course Satisfaction

Teacher perceptions of course characteristics (facilitation, content, and student interactions) were somewhat associated with their satisfaction with course quality, whereas student perceptions of course characteristics were strongly associated with satisfaction.⁷

Teacher Perceptions of Course Characteristics Were somewhat Associated With Their Satisfaction With Course Quality. In particular, teacher satisfaction was:

- Moderately correlated with teacher ratings of teacher facilitation; Spearman's $\rho(182) = .38$. In other words, the more strongly teachers perceived they were teaching according to VHS standards, the more highly satisfied they were with course quality.

⁷ Correlations are reported only where they achieve conventional levels of statistical significance (i.e., $p < .05$).

- Modestly correlated to perceptions of course content (i.e., adherence of course content to VHS standards) and student interactions; Spearman's ρ (182) = .28 and .21, respectively.

Student Perceptions of Course Characteristics Were Strongly Associated With Satisfaction With Course Quality. Courses with high average ratings of course content, teacher facilitation, and student interactions had high ratings of student satisfaction with course quality; Spearman's ρ (219) = .40, .59, and .64, respectively.

To What Extent Is Teacher Satisfaction Associated With Student Satisfaction and With the Online Student's Academic Performance?

This section examines whether teacher ratings of course quality are associated with other objective and subjective measures of the same construct. To this end, this section presents findings comparing teacher satisfaction with course quality with student satisfaction. It also compares teacher and student perceptions of student learning outcomes. The overall pattern indicates that the teacher satisfaction is weakly associated with student satisfaction and not associated with student academic success (as measured by student withdrawals).

Student Satisfaction With Their Course Somewhat Reflected Teacher Satisfaction. Students and teachers each reported their level of satisfaction with course quality ("Overall, how satisfied are you with the quality of the VHS course you taught/took this year?"). Coursewide average student ratings of satisfaction were modestly correlated with teacher ratings for the same course; Spearman's ρ (131) = .20.

Student Perceptions of Their Learning Outcomes Did Not Closely Reflect Those of Their Teachers. Coursewide average student ratings of amount learned and student motivation were not correlated with teacher ratings of student learning and motivation in the same course.

Teacher Satisfaction Was Not correlated With Course Passing or Withdrawal Rates.

Teachers who were highly satisfied with their courses did not have higher completion or passing rates than teachers who were highly dissatisfied with their courses.

Conclusions and Recommendations

The evaluation has answered some questions and raised others. Although course characteristics were associated with course satisfaction, they were not associated with student outcomes. This runs counter to the assumption that these characteristics (e.g., facilitation practices, student interactions) are important for student learning. It is, of course, possible that they have no measurable effect on student outcomes; if VHS courses are fairly similar to each other, it would be difficult to observe their impact on student outcomes. However, the ability to detect the effect may have been limited by the inability to link survey data to individual student outcomes (the present analysis linked survey data aggregated to the class level to the class passing rate). On this basis, it is recommended that VHS link student survey data, as well as other course performance data (e.g., time online), to student grades. This would enhance the ability to study the factors that influence student success.

Regarding the question about the effectiveness of student supports, the findings demonstrate the importance of the site coordinator for promoting student success. The findings also highlight areas for improvement of VHS student support services. In this vein, several recommendations are offered for improving and expanding student support services: improve access to academic support, improve the VHS student orientation, work with schools to improve local support, and track coursewide perceptions of course characteristics.

Improve Access to Academic Support

Students expressed interest in improved access to academic support. In particular, many students would like real-time chat with instructors and fellow students and more immediate access to academic support (e.g., a homework helpline, online tutoring, procedures for improving access to their instructor). VHS should offer some of these services on a small scale and study their impact on student performance outcomes and satisfaction. In deciding what to offer, VHS should conduct a competitive analysis of other online learning programs as a means of prioritizing options.

Improve the VHS Student Orientation

Although most students believe the existing orientation is effective, only a minority rated it as very effective. Moreover, student suggestions for how it should be improved were consistent; these suggestions appear to be feasible and inexpensive. The important point appears to be that the orientation should be shorter and provide a more explicit demonstration for how to accomplish certain tasks.

Work With Schools to Improve Local Support

VHS should track average student ratings of site coordinator support in order to identify schools that may need assistance or encouragement in supporting students. There would be a number of challenges to collecting and acting on this data, but they are not insurmountable. The important consideration is that VHS should understand how local schools are supporting their students. Acting on this information not only would promote student success, but also may strengthen VHS's partnerships with its customers.

Track Coursewide Perceptions of Course Characteristics

Student perceptions of course content, teacher facilitation, and student interactions are strongly correlated with course satisfaction. These three scale scores should be calculated per course section on a regular basis and monitored for quality assurance.

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Appendix. Statistical Modeling Method and Output

The following output tables summarize the findings of the statistical modeling of survey responses. A cross-classified hierarchical linear model was used to examine the effect of course-level student perceptions of course characteristics on course-level student outcomes and school-level student perceptions of site coordinator support and provision of resources on student-level student outcomes. The tables in this appendix describe the strength of the relationship of different predictor variables to an outcome variable. The predictor variables are listed in the tables in the Fixed Effects columns. Most of the predictor variables were collected from students and teachers in the spring 2009 surveys. Each table corresponds to a different outcome variable. One outcome variable (modeled in Table A1) was the course-level passing rate; the remaining four outcome variables were course-level student perceptions of the amount learned and level of motivation (as expressed in four separate survey items). Some predictors are listed twice, corresponding to the average student ratings for a particular course or school and the corresponding teacher or site coordinator rating. They are designated with “SS,” “TS,” and “SC” for student survey, teacher survey, and site coordinator survey, respectively.

Table A1. Hierarchical Linear Model Predicting Coursewide Passing Rates

Fixed Effects	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
INTERCEPT,theta0	2.056	0.114	18.111	1181	0
NO. STUDENTS, G01	-0.002	0.027	-0.057	1181	0.955
COURSE LEVEL, G02	0.136	0.159	0.857	1181	0.392
ELA, G03	-0.412	0.322	-1.279	1181	0.201
MATH, G04	0.213	0.625	0.341	1181	0.733
SCIENCE, G05	0.047	0.361	0.131	1181	0.897
SOCIAL, G06	-0.200	0.317	-0.631	1181	0.528
TECHNOLOGY, G07	-0.686	0.395	-1.738	1181	0.082
TEACHER EXPERIENCE, G08	-0.001	0.035	-0.024	1181	0.981
STUDENT INTERACTIONS (TS), G09	-0.002	0.006	-0.36	1181	0.719
TEACHER FACILITATION (TS), G010	-0.009	0.008	-1.109	1181	0.268
COURSE CONTENT (TS), G011	0.005	0.005	0.854	1181	0.394
STUDENT INTERACTIONS (SS) G12	0.003	0.007	0.5	1181	0.616
TEACHER FACILITATION (SS), G13	0.001	0.010	0.079	1181	0.937
COURSE CONTENT (SS), G14	-0.002	0.009	-0.176	1181	0.861
COMPUTER ACCESS (SS), B01	0.084	0.441	0.19	1181	0.85
SCHEDULED TIME (SS), B02	-0.008	0.313	-0.026	1181	0.98
TUTORING (SS), B03	-0.152	0.272	-0.56	1181	0.575
SITE COORD. SUPPORT (SS), B04	0.009	0.006	1.409	1181	0.159
SITE COORD. SUPPORT (SC), B05	-0.003	0.005	-0.684	1181	0.494

Table A2. Hierarchical Linear Model Predicting Perceived Amount Learned

Fixed Effects	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
INTERCEPT,theta0	3.193631	0.039003	81.881	569	0
NO. STUDENTS, G01	0.008483	0.00929	0.913	569	0.362
COURSE LEVEL, G02	0.113678	0.063442	1.792	569	0.073
ELA, G03	-0.21581	0.106728	-2.022	569	0.043
MATH, G04	-0.30569	0.186333	-1.641	569	0.101
SCIENCE, G05	-0.19364	0.135177	-1.432	569	0.153
SOCIAL, G06	-0.31557	0.115796	-2.725	569	0.007
TECHNOLOGY, G07	-0.05764	0.160248	-0.36	569	0.719
TEACHER EXPERIENCE, G08	0.016587	0.012906	1.285	569	0.199
STUDENT INTERACTIONS (TS) G09	-0.00258	0.002074	-1.245	569	0.214
TEACHER FACILITATION (TS), G010	-0.00461	0.002747	-1.677	569	0.094
COURSE CONTENT (TS), G011	0.001891	0.001963	0.963	569	0.336
COURSE CONTENT (SS) G12	-0.00031	0.002491	-0.125	569	0.901
TEACHER FACILITATION (SS), G13	-0.00418	0.003636	-1.149	569	0.252
STUDENT INTERACTIONS (SS), G14	0.004676	0.003543	1.32	569	0.188
COMPUTER ACCESS (SS), B01	-0.18112	0.138185	-1.311	569	0.191
SCHEDULED TIME (SS), B02	0.136158	0.111824	1.218	569	0.224
TUTORING (SS), B03	0.073765	0.090831	0.812	569	0.417
SITE COORD. SUPPORT (SS), B04	0.0059	0.00196	3.01	569	0.003

Table A3. Hierarchical Linear Model Predicting Perceived Depth of Learning

Fixed Effects	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
INTERCEPT,theta0	3.208563	0.039242	81.765	569	0
NO. STUDENTS, G01	0.004623	0.009466	0.488	569	0.625
COURSE LEVEL, G02	0.090689	0.064323	1.41	569	0.159
ELA, G03	-0.19248	0.110464	-1.742	569	0.082
MATH, G04	-0.15231	0.190647	-0.799	569	0.425
SCIENCE, G05	-0.05057	0.13748	-0.368	569	0.713
SOCIAL, G06	-0.31807	0.119801	-2.655	569	0.009
TECHNOLOGY, G07	0.086761	0.165535	0.524	569	0.6
TEACHER EXPERIENCE, G08	0.007864	0.013223	0.595	569	0.552
STUDENT INTERACTIONS (TS) G09	-0.00253	0.002112	-1.197	569	0.232
TEACHER FACILITATION (TS), G010	-0.0034	0.002818	-1.205	569	0.229
COURSE CONTENT (TS), G011	0.002389	0.002014	1.186	569	0.236
COURSE CONTENT (SS) G12	0.000051	0.002531	0.02	569	0.984
TEACHER FACILITATION (SS), G13	-0.00413	0.003699	-1.117	569	0.265
STUDENT INTERACTIONS (SS), G14	0.00646	0.003581	1.804	569	0.071
COMPUTER ACCESS (SS), B01	-0.06051	0.132761	-0.456	569	0.648
SCHEDULED TIME (SS), B02	0.152348	0.107604	1.416	569	0.157
TUTORING (SS), B03	0.033607	0.086978	0.386	569	0.699
SITE COORD. SUPPORT (SS), B04	0.006247	0.001872	3.337	569	0.001

Table A4. Hierarchical Linear Model Predicting Perceived Level of Motivation

Fixed Effects	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
INTERCEPT,theta0	2.981509	0.037388	79.746	569	0
NO. STUDENTS, G01	0.006002	0.009303	0.645	569	0.519
COURSE LEVEL, G02	0.046472	0.063791	0.729	569	0.467
ELA, G03	-0.02819	0.102868	-0.274	569	0.784
MATH, G04	-0.00962	0.185376	-0.052	569	0.959
SCIENCE, G05	0.035051	0.135793	0.258	569	0.796
SOCIAL, G06	-0.15021	0.111924	-1.342	569	0.18
TECHNOLOGY, G07	0.00843	0.154719	0.054	569	0.957
TEACHER EXPERIENCE, G08	0.003283	0.012816	0.256	569	0.798
STUDENT INTERACTIONS (TS) G09	-0.00368	0.002038	-1.803	569	0.071
TEACHER FACILITATION (TS), G010	-0.00169	0.002714	-0.622	569	0.534
COURSE CONTENT (TS), G011	0.002863	0.001931	1.483	569	0.139
COURSE CONTENT (SS) G12	-0.00188	0.002528	-0.743	569	0.458
TEACHER FACILITATION (SS), G13	-0.00254	0.003671	-0.692	569	0.489
STUDENT INTERACTIONS (SS), G14	0.006765	0.003624	1.867	569	0.062
COMPUTER ACCESS (SS), B01	-0.12742	0.149288	-0.854	569	0.394
SCHEDULED TIME (SS), B02	0.089999	0.121641	0.74	569	0.46
TUTORING (SS), B03	0.126066	0.094838	1.329	569	0.184
SITE COORD. SUPPORT (SS), B04	0.007738	0.0021	3.685	569	0

Table A5. Hierarchical Linear Model Predicting Perceived Student Engagement

Fixed Effects	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
INTERCEPT,theta0	2.940813	0.040076	73.381	569	0
NO. STUDENTS, G01	0.01107	0.009256	1.196	569	0.233
COURSE LEVEL, G02	0.075867	0.063732	1.19	569	0.235
ELA, G03	0.015955	0.102643	0.155	569	0.877
MATH, G04	0.044424	0.185087	0.24	569	0.811
SCIENCE, G05	-0.018	0.135683	-0.133	569	0.895
SOCIAL, G06	-0.14332	0.110995	-1.291	569	0.197
TECHNOLOGY, G07	0.153785	0.15373	1	569	0.318
TEACHER EXPERIENCE, G08	-0.00079	0.012712	-0.062	569	0.951
STUDENT INTERACTIONS (TS) G09	-0.0015	0.002063	-0.725	569	0.469
TEACHER FACILITATION (TS), G010	-0.00225	0.002711	-0.829	569	0.408
COURSE CONTENT (TS), G011	0.000773	0.001928	0.401	569	0.688
COURSE CONTENT (SS) G12	-0.00301	0.002509	-1.198	569	0.232
TEACHER FACILITATION (SS), G13	-0.0034	0.003657	-0.929	569	0.354
STUDENT INTERACTIONS (SS), G14	0.005724	0.003605	1.588	569	0.113
COMPUTER ACCESS (SS), B01	-0.11409	0.15447	-0.739	569	0.46
SCHEDULED TIME (SS), B02	0.029525	0.124869	0.236	569	0.813
TUTORING (SS), B03	0.08606	0.1022	0.842	569	0.4
SITE COORD. SUPPORT (SS), B04	0.008981	0.002212	4.059	569	0