AN EVALUATION OF VERMONT'S EDUCATION FINANCE SYSTEM

Colchester High School
Case Study

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COLCHESTER HIGH SCHOOL

Colchester, Vermont

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Colchester High School is located on a fifty-acre campus in Colchester, Vermont, a growing and diverse town of 17,000+ people with an active business community. Located on the scenic shore of Lake Champlain, thirty-five miles from the Canadian border and in close proximity to Burlington, the state's largest city, and Interstate Highway 89, Colchester enjoys access to a wealth of recreational, cultural, social and educational resources. Since 1960, the population of Colchester has more than tripled. Colchester is the fourth largest municipality in Vermont behind Burlington, Rutland and Essex.

For the 2011-2012 school year, Colchester High School enrolled about 770 students. The school has experienced declining enrollment from a high of about 800 students. Enrollments are predicted to decline to about 750 students over the next couple of years and then level off. About 25% of students qualify for free and reduced price lunch, though the number could be depressed as most said many students who would quality did not apply. The school has a very small ESL population. About 95 students, approximately 12 percent, have been identified as needing special education services. The graduation rate varies from 97 to 100 percent. For the 2009 school year (the last year for which we have data for all districts), Colchester School District, which includes the high school, spent $12,246 per student for current instructional expenditures minus transportation, below the state wide average of $13,923.

The school draws its students from a community with three socio-economic levels: a very wealthy population with old money, a lower income population who live in four manufactured housing parks, and a small middle class who mainly work in the area at a nearby IBM plant, General Dynamics, a local hospital or a large software company. The school has actively recruited students from the islands in Lake Champlain near Burlington, many of whom bring with them significant educational challenges. The average wage in Colchester in 2008 was $67,069, and the percentage of people living above the poverty level at that time was 93.7%, significantly higher than the percent of students eligible for free and reduced price lunch might suggest.

Colchester High School uses a block schedule for which students meet in each class every other day for approximately 86 minutes. Most classes for ninth and tenth graders last the full-year; classes are a mix between full year and semester courses for eleventh and twelfth graders. The average student has one study hall per semester. As a result, the average amount of instruction time is 5 hours 41 minutes, plus 27 minutes for lunch each day. School starts at 7:45 a.m. and ends at 2:20 p.m. On average each teacher provides instruction for 3 blocks every day and has pupil free time for the other block. Many teachers meet in collaborative teams every other day during their pupil free period.

Improvements in school performance at Colchester High School have been impressive, especially in reading, writing and mathematics, as shown in Table 1. The percent of Grade 11 students performing at the Proficient or above levels in mathematics more than doubled from 2007 to 2010, rising from just 22% to 54%.

In reading, the percent of Grade 11 students scoring at the Proficient and above levels also rose significantly, from 67%in 2007 to 85% in 2010. Even more impressive

was the near tripling of the percent scoring at the Proficient with Distinction level in reading, rising from 17% in 2007 to 46% in 2010. For reading, the percent scoring at the Proficient with Distinction level (46%) exceeds those scoring at just the proficient level (39% = 85% – 46%).

Gains also were produced in writing, with the percent of Grade 11 students scoring at the Proficient or higher level rising from 42% in 2007 to 60% in 2010, an increase of nearly 50% in the number of students reaching this level.

Scores in grade 11 science have not been that high, as will be explained below, but were expected to rise in 2011. The principal stated that science scores did rise by 15 percentage points at the Proficient and above levels.

Except for reading, though, improvements did not occur for the portion of students performing at the Proficient with Distinction level.

Table 1
NECAP Scores for Colchester High School, 2007-2010

Subject and Performance	**2007 NECAP**	**2008 NECAP**	**2009 NECAP**	**2010 NECAP**
Mathematics	**Grades 11**			
Proficient and Above	22%	32%	40%	54%
Proficient with Distinction	2%	2%	4%	7%
Reading	**Grades 11**			
Proficient and Above	67%	74%	73%	85%
Proficient with Distinction	17%	25%	38%	46%
Writing	**Grade 11**			
Proficient	42%	30%	56%	60%

and Above				
Proficient with Distinction	3%	1%	11%	3%
Science	**Grade 11**			
Proficient and Above	--	24%	29%	29%
Proficient with Distinction	--	1%	2%	3%

This case tells the story about how Colchester High School produced these impressive results. It was not from high spending, as the district spends below the state average. It was not from high teacher salaries, as salaries are also below the state average. And it was not from any change in school governance. As is the case around the country with nearly all schools that

produce large, measurable and valued gains in student learning over a 4-6 year time frame, these results emerged from the hard and smart work of teachers. The school implemented a solid curriculum program, established multiple strategies linked to that curriculum designed to help all students perform at proficient levels and above, and created a strong collaborative school culture. Creating a collaborative environment is one of the hardest cultural elements for high schools to establish, but we noted a strong element of collaboration in the school's culture, one where teachers in the school work on everything collaboratively and collectively, are expected to do so, and say they love working in this kind of environment.

The case is based on a review of written documents, including a recent self-study that was part of an accreditation visit, as well as interviews with the principal and nearly all certified staff in the humanities, math and science departments in mid-October. The case is part of a study of the Vermont school funding system being conducted for the

legislature by Lawrence O. Picus and Associates. The case is organized into the following eight sections: staff and class sizes, goals, curriculum, assessments, extra help for struggling students, organization of teacher work into collaborative work groups, professional development, and a summary.

The Staff and Class Sizes

Colchester High School has close to 69certified staff positions that include:

- 1 Principal
- 2 Assistant principals
- 1 Director of student support services (who oversees section 504 compliance, the Education Support team, Guidance Counselors and Special Education)
- 34.4 core subject teachers including 7.2 math teachers, 7.2 science teachers, 15.2 humanities (English and social studies) teachers, and 4.8 world language teachers
- 10.75 elective teachers including 1.2 business, 1.0 health, 3.0 physical education, 1.25 athletics, 0.5 driver's education 1.8 music, and 2.0 art
- 5.95 pupil support staff including 3.0 guidance counselors, 1.75 social workers, 1.2 nurses, and a 35 hour a week nurse aide
- 1.75 library staff
- 0.5 ESL teacher and 1 32 hour ESL aide,
- 1.0 teacher for pupil support in the "time out" room,
- 10.5 special education and section 504 teachers, plus 15 32 hour aides (excluding and addition 8 additional aide positions for more severe disabilities: three for visually impaired students, one for autism, and four for students with IQs below 80)

- 5.0 40 hour a week administrative support/secretarial staff, four who are year round and one who is school year only

In sum, the school has 4 administrators, 34.4 core subject teachers, 10.75 elective teachers, 5.95 pupil support teachers, 1.5 teachers for extra help, 10.5 special education teachers and 15 32 hour special education aides (for mild and moderate disabilities), 1.75 library staff and 5 administrative/secretarial assistants. This amounts to 4 administrators, 64.85 FTE certified teacher positions, 17 FTE aide positions, and 5 administrative support/secretaries. In addition, the school has an alternative school fully staffed and a special program, called Crossroads, for students with very low cognitive abilities. Put differently, there are 9 students for every special education teacher and 12.4 students for every non-special education certified positions.

If each teacher provides instruction for three blocks a day, a school needs 1.33 teachers for every four block period – a core teacher instruction for 3 blocks and then another 0.33 teacher for the fourth block, usually for an elective class. The 10.75 elective teachers are 31% of core teachers, which is slightly lower than 33% and a lower ratio than found in many high schools across the country, which usually have a higher percentage of elective teachers. However, few of those schools have pupil/teacher ratios as low as CHS. CHS's teacher allocations imply the school has put a priority on staffing core classes. This priority is reflected in the school's formal class size policies, which specify class sizes of between 20 and 22 for the core math, science and humanities classes, and higher for other subjects.

Though discussed more below, the School is organized into two "houses," one (Green) for students in grades 9 and 10, and the other (Blue) for students in grades 11 and

12. The goal is to have smaller classes for the younger (Green) and slighter larger classes for the older (Blue) students. Class sizes are moderate in size averaging the following:

Math: Green House 20 and Blue House 22

Science: Green House 20 and Blue House 22

Humanities: Green House 20 and Blue House 22

World Language: 24

Art: 24

Music: varies depending on type of class including band and choir

Business: 25.

Goals

The school has high expectations for all students, coupled with multiple opportunities for all students to perform well. The school expects all students to learn at least to proficiency in is Essential Expectations (described below) for every subject, but anticipates even higher performance because of its focus on problem solving and lifelong learning habits.

The school has lofty but general goals for its students. The mission of the school is to produce students who have expertise in reading, writing, problem solving and good learning habits. The faculty seeks to produce this expertise through differentiated instruction that caters to four different student learning styles – mastery, understanding, self-expressive and interpersonal – based on the work of Silver Stronge and Associates. This year the school has adopted an additional strategy, in their words, of going deeper in differentiated instruction by emphasizing instruction that stresses Rigor, Relevance and Relationships, all designed to produce Life, Career, and Work Ready Students (LCWRS),

arguing that it is the product of rigor, relevance and relationships (R x R x R) that produces LCWRS. Faculty further noted that if any of the Rs are low, the result for LCWRS also is low. They began this "deeper" approach to differentiated instruction by bringing in a Derek Cabrerra from Cornell University, with his Distinctions, Systems, Relationships, Perspectives (DSRP) approach to thinking and problem solving. This deepening of differentiated instruction has become the focus on ongoing professional development and staff meetings.

Complementing these cross-subject elements of effective instruction are essential expectations (EE) for all curriculum content areas. EEs are specific content and concept curriculum objectives for each content area. The strategy is to use rigorous, relevant, differentiated and personalized instruction to teach science, math and the humanities. Together with multiple extra help programs the strategy is designed to help ensure all students learn to high standards. And the school believes that if it successful in these more general efforts, students will score well on the NECAP tests – as long as the school's curriculum is aligned with the content assessed in NECAP (discussed below).

In sum, the school has a "point of view" about good instructional practice, as described above, and has many structures, activities and programs designed to produce a culture of learning that includes a systemic approach to instruction. Further, the school is quite "intentional" about everything it does, including the systems and structures designed to produce its collaborative and personalized learning culture. All this results from a clear goal to have Colchester High School reflect a "culture of learning" for both students and teachers.

Curriculum

This section draws both from interviews and material the school wrote about its instructional program in a recent accreditation review, nearly all points of which were reinforced by commentary during the interviews.

Curriculum generally. CHS is divided into two houses. The Green House/Blue House model recognizes that, in many cases, freshmen and sophomores have different needs than juniors and seniors. Green House students are challenged by a common and integrated curriculum. Both ninth and tenth grade years introduce students to the rigor of high school work within a supportive, collaborative, differentiated setting, while preparing students for the independence they will encounter in the Blue House.

In humanities, students in grades 9 and 10 receive their English/social studies curriculum through an interdisciplinary team taught model. All freshmen are enrolled in *Thinkers and Revolutionaries*, a required grade 9 humanities course that meets daily all year long for 2.0 credits. Each class includes two teachers – one English and one social studies – and has no more than 46 students. In grade 10 students are required to take *American Experience* a two credit course that meets daily. This course meets every day, has two teachers and no more than 46 students. Beginning in 2007, students in the Green House could earn Honors distinction through high achievement on the Habits of Learning Rubrics used in many Green House courses.

Courses in grades 11 and 12 – the Blue House – are more typical subject area courses. Advanced students can earn "honors" in many of these courses by fulfilling the honors contract for that course. Several AP classes are offered as well.

When Vermont adopted the NECAP assessments, the Colchester math, science, and humanities departments began to align the school's curriculum to ensure that the skills assessed on the NECAP were being taught in the school. The social studies curriculum revision process began during the 2010-2011 school year, math in 2009-10 and science more strongly this year. These initiatives were a result of what was perceived as unacceptably low statewide test scores.

In addition to addressing curriculum content specifically, Colchester High School places an even stronger focus on instructional practice per se, as discussed above in the goals section. Generally, the phrases the school uses to describe the instructional practices it wants teachers to use are: personalization, differentiation, active engagement, higher order thinking, application, problem solving, and continuous instructional improvement. These pedagogical emphases are expected to encourage students and teachers to develop strong "Learning Habits." For many years, the school has stressed and honored habits that promote learning in various forms. The structure of these habits evolved from "Habits of Mind" (based on Costa and Kallick's work) to "Habits of Learning" to "Learning Habits."

CHS implements *differentiated instruction* in terms of "learning styles," based on the work of Silver Stronge and Associates. Teachers of all subjects are expected to "personalize" and "differentiate" instruction for all students. Differentiation is defined as addressing four different learning styles: mastery, comprehension, interpersonal and expressive. And in recent years, differentiation has included a focus on rigor, relevance, and problem solving. As shown below, teachers use these frames to personalize

instruction by allowing many assignments to be addressed by students according to their various learning styles.

Further, according to the school's recent self study,

> Teachers are to use instructional strategies that in the first instance engage students as active learners at CHS. Throughout the school and across all disciplines, students are actively involved in their learning process and teachers act as coaches supporting students. Teachers use a variety of instructional strategies to engage students, such as Socratic seminars, chalk-talks, partner interviews, think-pairshare, investigations, laboratory experiments, examination of primary sources, student presentations, and skits. Specific projects that are student centered include the Energy Project, Essential Topics projects, Art Show, the school store, and the Heritage Project and Gallery.
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> Teachers also use instructional strategies designed to involve all students in higher-order thinking to promote depth of understanding. Course curricula are developed using the backwards design model and are planned using the Know Understand and Do model. The understanding category of the KUDs and the essential questions that courses pose promote depth of understanding. In Humanities courses, students practice a method of questioning the text where they pose, answer, and find evidence to support their analysis and interpretation. In Green House Humanities courses, students work on summarizing, analyzing, interpreting and evaluating transactional, poetic, and narrative texts. Students are engaged in current events assignments and persuasive writing in a variety of courses. In science classes, students are often given a question or problem and asked to design their own approach to investigate further or solve the problem.
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> In addition, teachers use instructional strategies that provide opportunities for students to apply knowledge or skills through large-scale projects such as Senior Seminar, Science Essential Topics Night, math projects, Heritage Project, and through opportunities such as Options credit, internships, pen pal letters, and art shows. Almost all teachers (95 percent) say their lessons provide opportunities to apply learned concepts in new situations. (The above is an edited version of the self study report).

Moreover, teachers are supposed to use instructional strategies that provide opportunities for students to self-assess and self-reflect. The faculty promotes student self-assessment and self-reflection, and students often have the option of assessing their own achievement.

In CHS, personalizing instruction also includes knowing students academically before many courses are taught, including getting to know the students when they

transition into the school from the junior high school. The faculty conducts a learning styles inventory for each incoming student and most grade 9 teachers conduct some sort of pre-assessment at the beginning of the year to understand each students' current academic knowledge base.

Personalizing instruction also includes students' access to teachers and to opportunities for one-on-one help. Teachers want students to feel comfortable going to their teacher for help and surveys indicate that students do feel that way. In addition to making appointments with teachers for individual help after school or during study halls, students at CHS are able to access the Writers' Workshop, Math Center and Homework Club to get individualized instruction, each of which (discussed more below) was historically covered all day long by a retired teacher. Teacher Advisory, Senior Forum, Special Education, ELL, Strategic Study, Strategic Reader, and Strategic Math, Colchester Alternative Program, Target Graduation, college connections, and alternate senior year are all designed to support and individualize instruction. Some are designed to meet the individual needs of students whose needs have not been met through traditional coursework or through the traditional school setting.

Finally, teachers are involved continuously in a process of improving their instructional practice. Teachers regularly use feedback from other teachers as a means of improving instruction, and teachers sometimes use feedback from students, supervisors and parents as a means of improving instruction. Teachers garner feedback via Collaborative Work Groups (discussed more below), department meetings, the Colleague Consultation teacher evaluation component, the shared drive, peer teacher observations, new teacher mentoring, and more. In some departments, teachers are able to receive and

give feedback and to discuss improvements to instruction via team teaching, common planning time, and paid curriculum hours.

And last, the discussion of instructional strategies and their improvement are significant parts of the professional culture of the school. These discussions often support the philosophy and practice of differentiated instruction, research on brain development, and research on best practices in teaching. Faculty implement the model of professional learning communities called Collaborative Work Groups (CWGs) by forming small groups that closely examine the effectiveness of particular instructional strategies on student learning. Faculty and department meetings and in-service days are often devoted to the discussion of instructional strategies. Most teachers use the shared drive to develop, share, and access common materials for courses. This fosters conversations about instructional strategies. The agreement to share materials and strategies across the entire faculty, such as the Style Manual and reading strategies, promotes further discussion of instruction.

More specifics on curriculum/instructional changes behind the school's success. Teacher interviews reinforced the above descriptions of the school's instructional approach and also provided more detail on subject matter curriculum change teachers believed also were important factors in the student performance gains. One key curriculum initiative was that the school actively aligned its curriculum not only to the concepts and standards assessed in the NECAP tests to insure that every student was exposed to the content in the test, but also to the various ways the NECAP assessed student achievement in various content area.

Math. Typically, the math curriculum provides Algebra I in Grade 9, Geometry in Grade 10, Algebra 2 in Grade 11, and then various more advanced math classes, including Calculus and AP math. About 20-30 percent of incoming freshmen have taken Algebra in the eighth grade, so about 20-25 percent of freshmen are in Geometry classes. Nearly all students have completed Geometry by the end of Grade 10, so generally are prepared for the NECAP which is given in the fall of students' junior year.

The math department believes that one reason student scores doubled in mathematics was because it worked hard to align the math curriculum with the NECAP assessment. Though basically covering Algebra I and Geometry, the Grade 11 math NECAP also includes some elements of Algebra 2 such as quadratic equations. Further, the geometry portion of NECAP includes substantial algebra as well; for example, when comparing two angles, the problem will not just have whole numbers but could have an algebraic form , like 3x +7, as the size of the angle, so requires algebraic equation solving to make a correct conclusion. Further, the NECAP includes more data and statistics than the school had included in its Algebra 1 and Geometry courses. So the department took seriously the curriculum scope embedded in NECAP and altered the school's curriculum so all students who took Algebra 1 and Geometry would have covered all content tested by NECAP.

The math faculty also modified approaches to testing during the teaching of Algebra 1 and Geometry to give students experience with the various ways NECAP structured test items – not the same items, but the same form as NECAP items. For example, the "do now" problems teachers use to start each class are often a NECAP-type problem, at least in most 9^{th} and 10^{th} grade classes. Educators in Vermont have access to

previous NECAP items and NECAP sample problems, so these are incorporated into the opening of many classes. The department also organizes the practice problems so they cover the four major mathematical strands assessed in NECAP – numbers and operations, geometry, statistics and probability, functions and algebra.

The math faculty do not see this practice as a problem; these are warm up problems, typically used in all math classrooms, so do not reduce core instructional time. Further, after NECAP practice items are covered, math classes then focus on practice ACT and SAT problems for juniors and seniors getting ready to take these college admission exams. So the math faculty seamlessly integrated NECAP practice into the ongoing instructional program, thus providing practice but not by diminishing instructional time.

During the alignment process, which occurred in Collaborative Work Groups (CWGs), discussed below as another strategic element of the school, the teachers who taught the same subjects – Algebra 1, Geometry, Algebra 2 – decided that all instructors of the same course should teach the same units, generally at the same time, using a set of core instructional activities, lesson plans, formative assessments, and projects for each curriculum unit, as well as the same end-of-unit assessments, the same end-of-semester and the same end-of-year final exams. As one math teacher said, "Math teachers no longer work by themselves; everything is coordinated and developed with other teachers." And another added, "There is no single math class taught individualistically."

The intent of this collaboration and consistency was twofold: 1) to ensure that all students taking the same math course would be exposed to and taught the same material, and 2) to ensure that students, who for whatever reason needed to change teacher during

the school year, did not lose time or content when the change was made. Producing this consistency in math courses also provided a specific focus for teachers collaborative work on math curriculum and instructional issues.

Beyond the specifics of the content in math courses, math teachers also attempt to provide applied problem solving activities in all math classes. For example, as the school is close to a ski area, one problem set, which required solving a system of equations, posed the question of which is cheaper per day of skiing: purchasing a package of X days at a certain price, paying the daily rate, or buying a season pass. In trigonometry, the teachers asked students to pick something like tidal waves or the predator-prey cycle, and plot the curve that represents that phenomenon.

Further, in an effort to provide multiple opportunities for Freshmen and Sophomores to do well in math classes, the department identified all the core math concepts in Algebra 1, 2 and Geometry and developed mid-week as well as end-of-week tests, in addition to end-of-unit tests. If students score low on the mid-week or weekly exams, the teacher provides time for the student to retake the lessons for the concept (e.g.. during study hall, or before and after school), with the point being to have the students learn the concept before taking end-of-unit and other more consequential tests. This initiative provided a mechanism for students to "double up" on instructional time for math concepts that provided learning challenges, with the goal of improving understanding and subsequent performance on school course exams as well as NECAP.

Finally, the math department has operated a Math Center for several years. The Math Center is a room where students can go any time during the day for extra math help. The Math Center has been particularly helpful for students struggling with specific math

concepts. Until this year, the Math Center was staffed by a 32 hour retired teacher paid at the rate of an instructional aide. Those dollars were cut this year, so math teachers cover the Math Center as one of their "duty" assignments, but there is concern that this is not a sustainable long term approach and loss of the Math Center would jeopardize student performance in math. It is a major way the math department provides extra help for struggling math students.

In short, the math department aligned the Algebra 1 and Geometry to insure it covered all content in the NECAP, gave students practice in the types of items that would appear on NECAP, extended the collaborative approach to aligning the curriculum to create a set of common curriculum units for both Algebra 1 and Geometry to insure all students were taught the same material in with a core set of activities and instructional strategies, incorporated applied problems solving activities in all math classes, created a set of "math concept" exams that supplemented the regular curriculum and provided students extra opportunities to learn the concepts if they did not know them, and created the Math Center to provide students extra help in math during the entire school day.

Science. About ten years ago, Colchester High School adopted a strong, "constructivist," inquiry-based approach to science. Students would do a laboratory experiment, collect the data, make graphs, analyze and interpret the data, come to conclusions, present the project to students in the class, and write a report. There was a concerted effort to minimize direct instruction to provide more opportunities for students to engage in learning just like a scientist. At various times during the year, the teacher might show how student work related to actual science theories. This approach was incorporated into the non-AP classes of "essentials of physics" and "essentials" of other

science areas such as chemistry and biology. AP classes were more structured. Science teachers were very satisfied with this approach and believed it was teaching students to understand what science actually was – a process of inquiry not just a lot of memorized names, formulas and procedures.

This approach produced significant challenges when Vermont adopted the NECAP test for three reasons: 1) NECAP was about half multiple choice questions on science content, 2) NECAP did include constructed response but it was on specific scientific processes, and 3) NECAP sequenced the science content – earth science, biology, chemistry, physics – differently than the school had structured its science curriculum. The result was very low student NECAP scores in science.

Responding to the challenges posed by NECAP was difficult for the science department, many of whom had real issues with the multiple choice part of NECAP, and all of whom knew that major change would be required to revise the science curriculum so that it aligned better with NECAP.

The major content sequencing problem was that the NECAP test, given at the end of the junior year, covered earth science and biology as well as both chemistry and physics, though the typical student took earth science in grade 9, biology in grade 10, either chemistry or physics in grade 11 and the other in grade 12. This meant that all juniors would score low on NECAP because they had missed either a chemistry or a physics class. Remedying this sequencing issue was not easy. The final strategy was to have students either double up on science in their junior year, taking a full year of both chemistry and physics, or take a yearlong class in either and a semester class of "essentials" in the other subject. The department would have been less challenged if the

science NECAP was given at the end of the senior year, after all four yearlong courses could be taken, but that was not the state approach.

The science department also struggled with becoming comfortable with the NECAP format, both because it interfered with a curriculum and the assessment systems that had been developed over several years and felt to be effective by the science faculty, and because of its focus on so much subject matter content knowledge. Nevertheless, the science curriculum has been adjusted to more fully align with the content sequencing of science and now many juniors take two kinds of science courses to insure that they are taught all the science content that is included in the NECAP assessment. Making these changes took considerable time and full alignment was not possible until the 2010-2011 school year, and that year the school's science scores rose by 13 percentage points, according to the principal.

Because of its focus on pedagogy in designing the initial science curriculum, the science department has taken differentiated instruction quite seriously. Indeed, the science department has been quite inventive in incorporating differentiated instruction into its courses. Some students are required to do work using all four learning styles – mastering the requirements of worksheet, reading an article and demonstrating understanding of its content, creating their own "substance" and a phase diagram for it for expressive students, and for interpersonal approaches working with another person and using role playing for explaining a scientific process. Lab reports cover both the mastery and understanding learning styles; some teachers allow expressive students to write a newspaper article on the data rather than write a formal lab report, and others allow interpersonal oriented students to do team lab reports. The point: even a "hard"

subject department such as science has found multiple ways to integrate the school's approach to differentiated instruction into its practice.

Humanities. The social studies and English teachers, i.e., the humanities teachers in this school, also have worked to align their curriculum to the concepts and skills covered in the NECAP reading and writing tests, but did not have a great deal of realignment to do. Humanities teachers also provide for some NECAP test practice throughout the year, but many of the tasks were already included in the curriculum, such as the ability to write a persuasive essay. Though such essays are part of the NECAP test and practice for it is part of the curriculum, the department believes that the ability to write good persuasive essays is an important academic skill and that focus has been part of CHS' curriculum for a long time.

There is heavy emphasis in all courses on writing and practice writing as well. During the six weeks before the grade 11 NECAP writing test, the department has something called the Big Game. Students are assigned writing in each of the six writing types on the test, students peer edit, evaluate other writing examples, and receive editing feedback from their teacher. The process is structured in part so students understand what a 4, 3 and 2 score on writing means. Student practice in making judgments about the writing of other students helps them to understand overall writing expectations and to improve their own writing. The program has a considerable amount of writing, feedback on writing, and student reflection about their own writing – all three activities that lead to better writing. Furthermore, if during these activities the teacher discovers systemic problems, the humanities teachers weave the missing skills into the ongoing curriculum.

A few years ago both the faculty and students viewed standardized testing as an "intrusion" into the instructional program. However, over the past several years the perspective has changed as humanities teachers viewed the skills on the reading and writing NECAP tests as skills students need to be successful. This has led both faculty and students had to take the test seriously. With this perspective, the test results could be and are now actually viewed as a reflection of what students have achieved as a result of the quality of the instruction in reading and in writing skills.

In addition, the humanities department takes seriously the school's emphasis on personalizing instruction for all students. Through inventories of learning styles, pre-assessments at the beginning of curriculum units and formative assessments during the teaching of units, the humanities teachers get to know the academic strengths and shortcomings of each student, including their preferred learning styles. They then tailor instruction for each student, expect every student to achieve at high levels, and provide extra help to aid students in doing so. Further, in the Green House (grades 9 and 10), humanities teachers instruct their students every day (as compared to most other courses which meet every other day) so have more exposure to their students, get to know them more quickly and so can tailor instruction more quickly, and get to know each student's academic struggles so can address them quickly and "work them" out sooner rather than later.

In addition to the continuous emphasis on writing, the humanities curriculum is also focused intensively on reading skills in all courses, and reading and writing are inextricably linked. The strategy is to have students write about something they have read. In grade 9, the department focuses on something called "strategic reading," which

focuses on students' struggling in reading and emphasizes vocabulary needed and reading strategies. Students are given extra practice in summarizing, analyzing and interpreting reading materials. Every night students are assigned something to read and then asked to write something about the book or reading materials that represents an element of fiction reading – something about the character, the setting, rhetorical style, symbols, etc. .

In grade 10 the department has a set of core reading books that all students must read, and writing assignments are linked to each book. And various writing assignments are designed to reinforce various reading skills, both for fiction reading and information texts, the latter focusing on such issues as subject, objective, audience, speaker, and tone. Further, across various subjects, the activities include having students questioning the text with three levels of questions:

a. Level 1 concerning the content of the text
b. Level 2 requiring some interpretation, having to think about the selection and at times reading "between the lines,"
c. Level 3 relating the text to broader world, and larger themes and ideas not explicitly embedded in the text but linked to it.

In sum the department's strategies are to teach English and social studies through integrated curriculum units, all of which stress multiple elements of good reading and writing. Put simply, the department takes reading and writing across the content areas seriously and sophisticatedly.

As implied in the above discussion, the humanities teachers have worked collaboratively over the last several years to have common curriculum units, common

approaches to rubrics used to score student work, and consistency throughout the entire humanities instructional program. Such common elements include:

- the vocabulary embedded in the writing and reading strategies taught to students
- formative assessments, which this faculty defines as low stakes assignments to give students early feedback on an academic task, such as writing a persuasive essay. Humanities teachers are give common formative assessments at various times during the teaching of a curriculum unit to determine whether any student is not learning.
- developing and using common rubrics for grading, especially during the junior year when the rubrics are aligned with NECAP test areas
- showing students teacher examples of student assignment, so having teachers do specific assignments and then using them as examples for students
- devoting portions of faculty and department to the work of CWGs, which has including persuasive writing for the 10th grade team, reading strategies such as graphic organizers and how to read texts closely for all teams, and using such common approaches to reading across all curriculum units
- using CWGs for several years to develop new team approaches to instructional strategies. Teachers select a group to work with, work to develop the new instructional approach during the school year, report it out at the end of the year to all faculty, and assess impacts in terms of student performance gains. Indeed, this approach helps insure the high achievement of the school's students. Through all the CWG and PD work done in the school, the conclusion of whether the initiative was effective is determined by the quality of student work it produced.

As several teachers noted with others nodding, “The question is: did the instructional initiative improve student work; the way to put students in a position to perform well is by making the “test” of all instructional change efforts be the quality of the student work that resulted.”

- putting all their products on the share drive for everyone to access; the humanities faculty are totally open with classroom instructional activities and pedagogical practices; the goal is for every teacher to have access to everything each other teacher does

The humanities department approach to providing extra help for struggling students include:

- In the first instance, differentiation that seeks to personalize instruction for all students. And as the above documents, all teachers take this instructional approach seriously, comprehensively and sophisticatedly. There are multiple mechanisms that help teachers to know the strengths and weaknesses of each student and to tailor instruction to maximize student learning.
- Strategic reading and strategic math in grade 9, which are a separate classes for students not on in IEP, created to provide students with reading and math struggles the expertise needed to do well in all subjects. The departments would like a grade 10 strategic reading and math class but the budget cannot support them at this point.
- Writing workshop which is a center open all day; students can go there on their own or be referred by their teacher to get extra help in writing. Though covered by a retired teacher in the past, coverage is now an official “duty” during the day.

- Homework club
- An education support team of "volunteer" teachers who focus on students "starting to fall through the cracks" and provide them extra help outside of the regular classroom
- A strong, comprehensive, robust and large approach to special education, for students with IEPs.

But nearly everyone interviewed stated that the major approach to helping struggling students is for all teachers to know their students really well; if the student is struggling, then teacher should provide extra help – after school, before school, or during seat work. The foundation of the school's approach to extra help is providing individualized attention for all students and having teachers making themselves available for providing extra help outside regular class time. This approach both reduces the need for specific extra help and insures that core instruction and the work of "regular" teachers are as effective as possible.

Assessments

In addition to the above curriculum and instructional approaches, when NECAP was adopted the school decided to do nothing the first year and to see what the test scores showed. The scores were low, and the school was not happy. So in the second year, the faculty looked at individual student scores – who scored 2, 3 or 4 on the NECAP, and concluded that their students could score much higher and decided to make some changes. First, as noted in the above department discussions, the school studied alignment between the school's curriculum and the content on the NECAP assessment. It

found many gaps and began to modify the school's curriculum to align it more with the content standards embedded in the NECAP test

The next year scores rose some but not much. That year the principal surveyed every member of the senior class who took the NECAP examination; the survey asked the students about the test: were they prepared, did they try hard to do well, were they motivated, what could CHS do to motivate them on the NECAP, and so on. And they found that many students blew off the test, did not try to do well, and did not use all the time allowed. The students also said the state test had no meaning for them, did not impact their life, their classes or their life after high school, and that colleges did not care about NECAP scores. So another factor producing low NECAP scores was low student motivation to take them seriously and do well. The students also gave suggestions via the survey to school officials on what they could do to help the students to take the NECAP seriously and to motivate them.

The school decided it needed to incent the students to take the test seriously, and to help the school show through NECAP results just how high performing its students were. The principal became the leader of a very serious effort to have the students in grade 11 take the NECAP seriously and score as high as possible on it.

Every year the principal goes into every grade 11 English class; this insures that she is in front of every student in the high school who will take NECAP tests. During this time, she goes through a 15 minute PowerPoint that states why the NECAP is important – some key reasons being that parents and non-parents in the community want the school scores to be high, view the scores as reflecting the quality of the school, and are crucial in raising tax dollars for the schools budget. She also informs students that

NECAP scores are now placed on their high school transcripts as another indicator of overall performance. She shares historical data on school performance, beginning with 2007, showing how the initial scores were low and embarrassing. To encourage every student to do well on the tests, she identifies the incentives the school has developed which are that over the two weeks during which the tests are given the school will:

a. Lighten up on homework
b. Have no assignments due on test days
c. Provide an exemption from the final exam in a tested class subject, if the student earns a 3 or 4 on the NECAP, requiring a 3 or 4 in both reading and writing to earn the exemption in English
d. Provide a pizza party if this year's students do better or at least as well as last year's students
e. Informs this year's junior class that doing well on this year's NECAP will be hard because last year's junior class, now seniors, did so well, so the principal challenges each junior class to do better than the previous junior class (which hopefully provides additional motivation to do better)

The last slide in the PowerPoint presentation shows the NECAP scores for Colchester's strongest rival school, and the principal ends by asking the juniors if they can do better than that rival school – and of course, the chorus response is, "Yes we can!"

Finally, on the day before the first test begins, the principal brings all juniors into the gym and gives a motivating speech; at that convocation, the English head discusses the logistics for all the tests, including the provision that every student will be in a small classroom with their proctor being a teacher with whom they had a class. This latter

strategy was designed to help students be as comfortable as possible in the test taking situation, with a familiar adult in the classroom.

While the school takes NECAP seriously, it uses assessments far beyond those in NECAP. In fact, teachers at CHS use a wide variety of assessment types and strategies that reflect the school's commitment to differentiated instruction. Assessments range from traditional tests, quizzes and homework to projects, writing pieces, portfolios and presentations. They are frequently differentiated based on student readiness, interest and learning profile and require students to think critically and creatively. Assessments reflect the Essential Expectations (EEs) through course-specific and school-wide rubrics. The EEs were developed and approved by the CHS faculty with the support of the district and School Board. These EEs reflect the skills at the "heart of all learning," the skills students need to be "fulfilled, responsible and involved citizens."

As discussed above, some departments have grade-level common assessments and assess student work directly with EE rubrics or with rubrics that include EE language. Most teachers are able to provide examples of how EEs are addressed and assessed in their courses using course-specific rubrics. In sum, assessments at Colchester High School include:

- Clearly articulated Essential Expectations for student performance that are used in courses throughout the school.
- A wide variety of formative and summative assessment strategies and technique including writing across the curriculum, portfolios and presentations outside of school hours that incorporate artistic and technological skills and peer and self-reflection.

- An innovative and collaborative faculty who routinely use data to inform instruction and creatively use time provided to develop new assessments and revise current ones.
- A commitment to differentiated instruction with assessments routinely differentiated by process, product, learning style and readiness.
- Time for faculty to work on continuously improve its battery of assessments often through specific work of CWGs.

Extra Help for Struggling Students

For each department, Colchester High School has a sequence of elements designed to provide extra help for struggling students, beginning with accommodations within classes, sometimes specific courses for freshmen to get them prepared to do high school work (e.g., strategic reading in humanities), sometimes "extra" curriculum emphases (like math concepts in mathematics), systemic exposure to the content and form of NECAP testing, and other activities spanning the range from one-to-one help to special education that include:

- Differentiation that seeks to personalize instruction for all students
- Strategic reading in grade 9, which is a separate class, was created to provide students struggling in reading with the expertise needed to do well in all subjects. The department would like a grade 10 strategic reading class but the budget cannot support one at this point.
- Writing Workshop and the Math Center both of which are open all day; students can go there on their own or be referred by their teacher to get extra help in writing and math. Though covered by a retired teacher in the past, coverage is now an official "duty" during the day.

- An education support team of "volunteer" teachers who focus on students "starting to fall through the cracks" and provide them extra help outside of the regular classroom
- Homework club, but the late bus for students in this program might be cut from the budget
- IEPs for students with identified disabilities, but
- The major approach to helping struggling students is for all teachers to know their students really well; if the student is struggling, then the regular course teacher should provide extra help – after school, before school, or during seat work. So the foundation of the department's approach to extra help is providing individualized attention for all students and having teachers making themselves available for providing extra help outside regular class time

The department also noted that Colchester has an alternative school, staff separately, that now enrolls about 20 students, but there always is a waiting list of students desiring to get into this different environment.

Organization of Teacher Work into Collaborative Work Groups (CWG)

It would not be an overstatement to say that this school is infused with the Collaborative Work Group (CWG) approach to teaching and learning. Though not true for all classes, nearly all teachers who teach the same course – algebra 1, Spanish 1, Thinkers and Revolutionaries, American Experience, biology – have significant common planning time. During these times, teachers plan curriculum units together, the lesson plans and instructional activities, the projects, formative and summative tests, mid-term and final exams, etc. Since every teacher has 86 minutes daily for planning time, there is

ample time over the week for teachers to meet in collaborative groups as well as have time for their own work.

All teachers at CHS are required to grow professionally and take risks in their classroom. Each faculty member is required to be a part of a Collaborative Work Group (CWG) each semester. Collaborative Work Groups meet twice monthly afterschool and each CWG has their own goal with the purpose of improving their instruction. At the end of each semester each Collaborative Work Group presents a summary of their work to the faculty as a means of showing the rest of the faculty new tips or strategies that they can use to improve their own instruction.

Multiple school initiatives focused on improving instruction are funneled through CWGs. Though in the past, the CWGs had wide freedom to address any issue, the school concluded that the multiple individual CWG initiatives did not add up to a systemic approach on anything: there was lots of action but little forward movement. Thus, several years ago, the principal required that CWGs focus on differentiated instruction; some CWGs could be cross subject; and others within a subject or the same class. But all had to address specific new ways to implement a differentiated approach to instruction.

Last year the theme for CWGs was on formative assessment, and how to incorporate them into ongoing instructional practice; the math concepts discussed above were one result of this work. CWGs generally developed the new approach during the fall semester, and then implemented it during the spring semester. The "test" of whether the new approach worked was whether student performance improved; it was not effort or intention, but whether the initiative boosted student performance that determined if it was an effective initiative. At the end of the year, each CWG reports their instructional

innovation to the full faculty, describing the degree to which it worked, and if it did, implications for better instructional practice in other subjects. In the future, some CWGs will focus on peer instructional review, as some teachers were recently trained in peer review evaluations. In all these ways as one teacher said, CWGs produce a "deprivatization" of instruction; instruction is open, collegial and meant to be systemic and consistent across the entire school.

Products of CWGs are multiple and include:

- Pre-assessments in many courses, including assessments that identify misconceptions in science
- Formative assessments, like the math concepts tests, which are meant to give formative feedback to both teachers and students, to help improve performance on end of unit of final tests
- Rubrics for assessing student work, including rubrics for laboratory reports in science that have "slimmed" such reports to their essential elements
- Do Now problems for starting classes that both cover core concepts and provide NECAP practice
- Multiple ways to differentiate instruction and student projects in all subjects.

CWGs are also quite structured. This year teachers choose to join a CWG; teams cannot exceed 4 teachers. They must meet six times a semester and some meet more often, and then share their idea at a full faculty meeting. To insure that all CWGs actually meet and work, the principal assigned "sister" CWGs to every CWG, and required each CWG to meet with its sister and report progress twice during the semester. This placed

accountability for CWG work at the peer level, because it was embarrassing to report no work to a group of peer teachers.

Professional Development

The school's approach to professional development is structured and quite specific. Initially issues are identified, both from weekly administrator "instructional walk throughs" as well as from ongoing CWG work and department requests. Once identified, experts are invited to address the issue at all faculty sessions. Following the expert address, ongoing work on various aspects of the issues is devolved to CWGs, which is the school's way to address specifics that need to be addressed and to get new elements into ongoing instructional practice.

For 2011, the school created a professional development committee to work with them to identify professional development needs for the faculty and to determine how to address them.

Summary

Colchester High School has produced significant gains in student performance in math, reading and writing and hopefully set the foundation for a gain in science scores. In math, the percent of grade 11 students performing at the proficient and above more than doubled from 2007 to 2010, rising from just 22% to 54%. In reading, the percent of grade 11 students scoring at the proficient and above rose from 67% in 2007 to 85% in 2010; even more impressively, the percent scoring at the proficient with distinction level almost tripled over that time period, rising from 17% in 2007 to 46% in 2010. Gains also were produced in writing, with the percent of grade 11 students scoring at the proficient or higher level rising from 42% in 2007 to 60% in 20120, close to a change of 50%. And

the science scores at or above proficient rose by 15 percentile points to 44 % in 2011, according to the principal.

There are eight key factors behind these impressive student performance gains:

- **First**, the school has high expectations for student learning. It expects students to meet or exceed all Vermont standards, and be able to apply academic concepts to applied problems and analyses in new contexts. It expects students – and teachers – to develop solid "learning habits" and be strong readers, writers, and thinkers.
- **Second**, the school takes NECAP testing seriously and in all tested subjects has aligned its curriculum to the content in the NECAP tests as well as the form of testing used by NECAP. It incorporates "practice" NECAP testing into its curriculum in seamless ways and provides incentives and motivation for students to do well.
- **Third,** CHS has high expectations for faculty work; it expects teachers to "model" behavior in a learning community, to take academic learning seriously, to continuously improve their instructional practice and to work hard every hour of every day as part of developing culture of "effort.
- **Fourth,** CHS expects all teachers to personalize instruction for all students, not only during regular classroom hours by administering learning styles inventories and using common formative assessments but also by being available outside of regular classroom hours to provide extra help to any student needing it.
- **Fifth,** CHS has a particular view of effective instructional practice that gives teachers strategies for personalizing instruction. It expects all teachers to differentiate instruction according to four student learning styles – mastery,

comprehensive, expressive and interpersonal. It is going deeper into this instructional array with a specific approach to problem solving called DSR: distinction, systems, relationship and perspectives. It also has multiple approaches to involve all students in higher-order thinking to promote depth of understanding. The school's point-of-view about effective instruction also provide opportunities for students to apply knowledge and skills through multiple applied projects. Teachers also use instructional strategies that provide opportunities for students to self-assess and self-reflect. And it enhances this impressive array of instructional strategies each year by having groups of teachers create new specific strategies in all subject areas through focused work in Collaborate Work Groups (CWGs).

- **Sixth,** CHS faculty provide all students with consistency of instruction and exposure to academic content in all topics by having each department collaboratively create common curriculum unit for all major classes, including common formative assessments, lesson plans, instructional activities, end-of-unit and end-of-course examinations. Teachers at this school teach only collaboratively developed classes; no one teaches individualistically.
- **Seventh,** CHS has created a strong and cohesive collaborative and professional school culture through the creation and hard work of teacher collaborative groups. Collaborative groups can meet every other day for up to 86 minutes, have assignments to create new elements to their instructional repertoire, share those new strategies with all teachers, and test every new strategy as to whether it boosts student learning. Through the CWGs, which at various times operate

within and across departments, CHS has created common high expectations for all students, "deprivatized" instructional practice, made effective instructional practices public, "enforces" deployment of effective instruction through both peer pressure within departments as well as periodic "walk throughs" by the school's administrative team, and assumes accountability for student achievement results – including NECAP scores. In this school's culture, collaborate effort and hard work produce results.

- **Eighth,** the school provides a series of linked strategies to provide as many students as possible with "extra helps" so they can meet or exceed academic performance standards, including:
    - A strategic reading class for freshmen who need to strengthen reading skills.
    - A math concepts addendum for all freshmen math classes that ensures that all students know a core of foundational math concepts by the end of their freshmen year.
    - Writer's Workshop and Math Center, which are open all day long for students to get extra help in either writing or mathematics. Formerly these classes were covered by a retired teacher but are now covered by teachers as a "duty."
    - A Homework Club, for academic help after school.
    - An education support team of teachers who seek to find students at-risk of "falling through the cracks" and insuring they receive extra help.

- A robust special education program providing a final intensive set of instructional helps, including a special program for academically challenged students.
- An Alternative School for students who have difficulties performing in the regular school culture.

But the prime factor making all these extra help strategies work is a strong foundation of having all teachers know each of their students really well so that if any student is struggling, the regular teacher is the first to provide them extra help, before school, during school or after school. Students who need it receive significant extra and personalized help before they take advantage of the additional multiple help systems the school has created.

CHS is a strongly collaborative culture with high expectations for teacher and student work, a point of view about good instructional practice, a relentless focus on continuous improvement, an "intellectual" environment of continuous learning, and a belief that effort and work produce results – better teaching for the faculty and better performance for students, including continuously increasing scores on NECAP, not only at the proficient but now at the proficient with distinction level as well.

Finally, the school is well organized and managed, with systems and structures that help facilitate all the collaborate work and teaching that is done. Put differently, this is an "intentional school; things don't just happen at this school; they are planned, worked on and implemented school wide, with everyone having to participate – teachers and students.