

A pilot project that removed the Carnegie unit as the measure of learning gave 16 schools the opportunity to rethink what school looks like.

The whole school not only changed the schedule but also changed the culture of teaching and learning.

The story of the initially reluctant math department illustrates how it, like all the other departments, reinvigorated the curriculum, pedagogy, and student and teacher engagement.

Imagine There's No Carnegie Unit

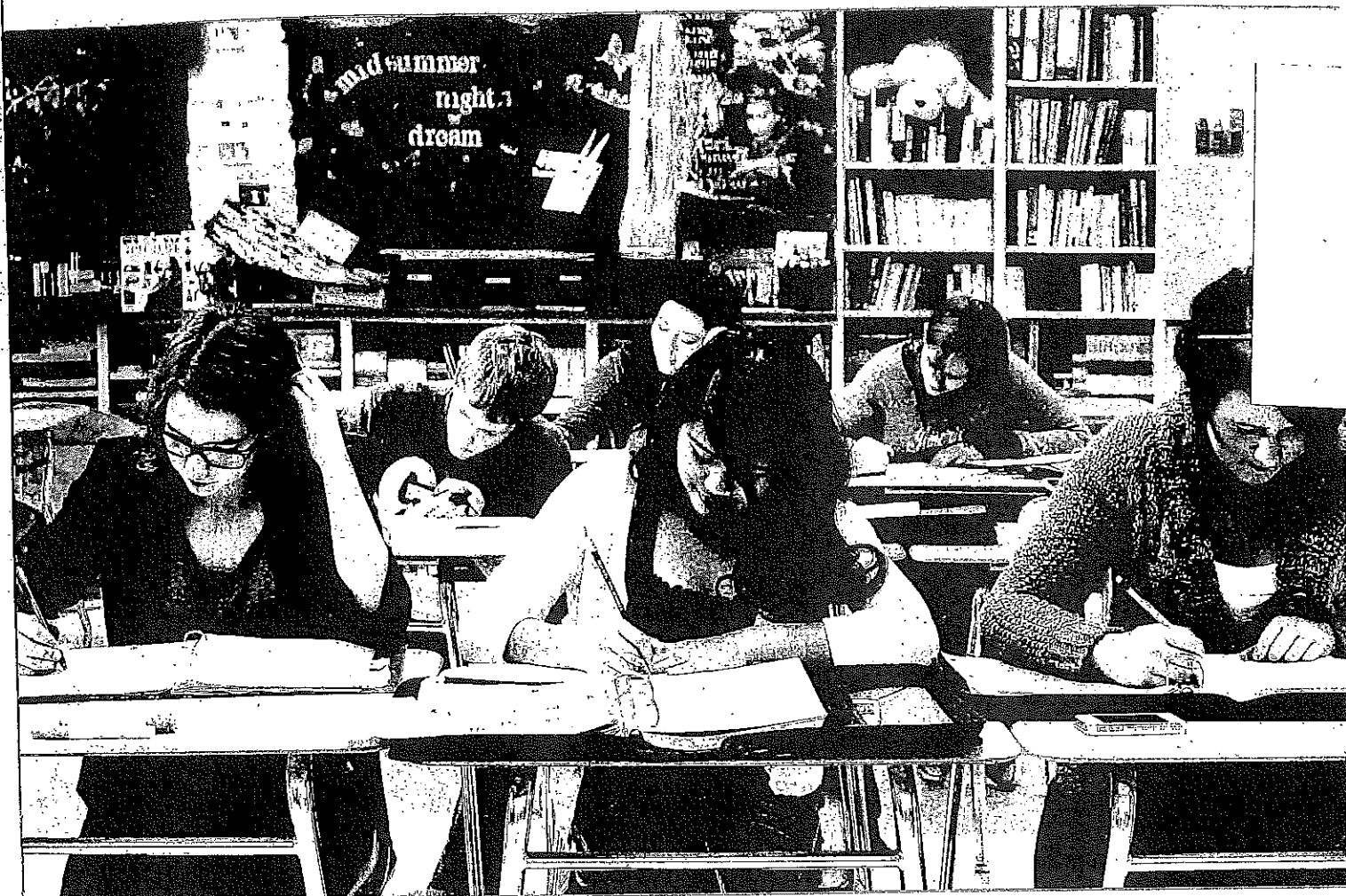
Imagine what high schools could look like if the traditional structures were removed. Imagine a learning community empowered and engaged and the learning that would take place if educators and students were free to think creatively. Imagine administrators being given the freedom to make decisions on the basis of what is in the best interest of each student.

The reality is that the established norms, traditions, and customary structures of high schools often keep educators from those goals. Most educators experience an internal tension between what they can imagine and believe would be best and what they practice. Deep down, they know that something must change.

The Alberta Education High School Flexibility Enhancement Pilot Project allowed 16 high schools in Alberta, Canada, to remove the restrictions of the Carnegie unit, the seat time per credit requirement that has been widely used since 1906. The two purposes of the project were to determine whether the Carnegie unit should be removed or maintained for all schools in the province and to study the change process among that group of schools over a four-year period from 2009 to 2013. Wm. E. Hay Composite High School in Stettler, AB, was one of those schools.

Initially, the project was primarily about schedules, timetables, and organizational practices. As it evolved, however, the school community engaged in an in-depth critical analysis of its pedagogical practice and a collective rethinking of the various integrated elements of schooling in high schools. Investigating the merits of the Carnegie unit was the catalyst for that change in focus. Serious discussions about pedagogy transformed every aspect of teaching. Teachers were challenged to no longer accept doing things because "that's the way we've always done it." Staff members were empowered and energized.

As a result of their investigation, teachers created such programs as Teacher Advisory and Flex Time. Gradually, they became comfortable with self-directed student time and started to think differently about programming and the courses that were being taught. Restorative programs (e.g., credit recovery) and combined courses were designed.



Teachers engaged in conversations about best practices and instruction, which naturally led to discussions about assessment. What became clear was that when seat time is no longer assumed to equal learning, then learning itself becomes the focus and educators are finally able to align their beliefs with their practices.

The Mathematics Department Story

Time is the constant that teachers start with, whether they are planning courses, delivering lessons, administering assessments, or participating in professional development activities and collaborative pedagogical discussions, so eliminating the Carnegie unit had a far-reaching ripple effect throughout the math department. Removing the Carnegie unit meant that changes in seat-time structures and requirements would alter everything in our teaching practices.

Initially, material on the Carnegie unit was presented to staff members through two different venues. One was *Personalizing the High School Experience for Each Student* by Joe DiMartino; the other was Alberta Education's *High School Flexibility Enhancement: A Literature Review*. Administrators invited reactions to and ideas about this new initiative and philosophy. As the head of the math department, my initial reaction—although I did not share it with anyone at the time—was, What? No! I don't think so. After a few discussions, the mathematics department staff members decided that, for the time being, we did not care to investigate the effects of removing the Carnegie unit from our educational structures. An e-mail stating our view was sent to the principal on behalf of the math department.

No one realized at that time that the idea was not going to go away. Soon we received the articles, the schedule for school visitations, and the professional development presentations that the administrators planned for our entire staff so that we could learn more about eliminating time constraints in our teaching practice.

Alberta Education High School Flexibility Enhancement Pilot Project

A number of measures were used to track the progress in each of the 16 participating schools to assist in the final recommendation to Alberta Education. In June 2013, the pilot phase of this project ended, and it is very encouraging that Alberta Education has decided to move forward with the second phase of this project: *Moving Forward With High School Redesign*. There are now 120 high schools in Alberta that will be operating without the restriction of the Carnegie unit.

While researching how to start rethinking our structure, we soon discovered that we were not the only math teachers who thought this way. Every school we visited and each speaker we heard had wonderful stories to tell about what the career and technology teachers, the physical education teachers, the English teachers, the science teachers, and the social studies teachers were doing. When they were asked to supply any tidbits about the math teachers, they didn't have any because the math teachers were not buying the idea.

As the math department team leader, I participated in many professional development opportunities that allowed me to take notes about what other disciplines had tried. Armed with 16 pages of collected ideas, the math teachers started discussions about how to start the process for ourselves. Over time, we found ourselves focusing on competency-based curriculum and assessment, supporting students, and collaborating to improve instruction.

Focus on Competency CURRICULUM

We decided to start by looking at the mathematics curriculum; we were all familiar with various pieces of it because we all had taught portions of it.

The Alberta government sets out several general and specific outcomes for math courses. We deconstructed the mathematics curriculum for grades 9–12 and reassembled it from the perspective of a student rather than a teacher. From that perspective, we determined the scope and sequence that would be essential to ensure success in a high school math program. We identified the big ideas by focusing on the continuous and repetitive threads that are carried throughout all

of the high school math courses. We then mapped those threads into the individual math courses and determined how much instructional focus should be dedicated to each competency. Out of that came our master competency document that we now use for everything. One example is "Using Trigonometry to Solve Problems." Because students will encounter that requirement in each of their sophomore, junior, and senior years, the math department determined it to be one of the more important competencies. (A link to this competency document can be found on our schools' website under Flexibility Project at <http://wmehay.clearview.ab.ca/>.)

One aspect of successful high school redesign that cannot be underestimated is the importance of collaboration. The pilot has been an ongoing, four-year process, and not everyone agrees all of the time. We continually revise and update our competency document to fit our changing needs, which requires a lot of collaborative time. That time has been made available through changes in our master timetable to allow for department-based shutdowns and early dismissal days twice a month that we use for professional development.

Teachers are busy; therefore, we needed to be creative when determining how to find more time in our timetable for collaboration. We decided to use Flex Periods (open periods for student support) to shut down a department each week so that staff members have an additional two hours for collaboration. Departments are on a rotating five-week schedule, so they are in "collaborative shutdown" and therefore unavailable to their students during Flex Time for one out of every five weeks. Although this may seem like an insignificant amount of time, our staff members value the time they have together to discuss topics specific to their own department's needs. One measure of the success of those collaborative discussions is that every teacher in our math department is now familiar with the content in every course of our grades 9–12 curriculum whether they have been given the opportunity to teach it or not.

Our collaborative conversations have become much more effective. We have cultivated an atmosphere of trust among ourselves. Everyone has had

to step out of their comfort zones and be willing to offer their opinions (which are not always embraced by all). It became evident that some math courses require more time than others, so we were quick to speak up in favor of the varied and larger blocks of instructional time that are now available. Our new timetable is made up of variable time slots for instruction. This means the math teachers are unlikely to have one of those larger blocks of time for preparation during the school year, but the teachers agreed it was a worthwhile sacrifice.

ASSESSMENT

After addressing the curriculum, we examined our assessment practices and embraced the idea that new learning replaces old. As students progress through the semester they should, theoretically, become better at the concepts they have practiced. If a student retakes an assignment or an exam—we use a different document each time—the teacher records the new and improved mark and deletes the previous one. We now evaluate students on the basis of a competency rather than on a topic or unit. We still deliver the curriculum by units, but exams, assignments, quizzes, and projects are constructed by competencies. We also do both formative and summative assessments. Formative assessments carry a weight of 0% and are shown in a letter grade that indicates students' understanding, effort, attitude, and attendance, creating a risk-free environment for students. Summative assessments make up 100% of the student's mark and carry a percentage grade.

The assessment weightings for each course competency can be found in our master document, which leads to consistency across the department because our course outlines are all constructed from our competency document. As a result, our students understand their own strengths and weaknesses more thoroughly. They are better advocates for themselves and can describe specifically what they need to be successful in their math classes. In addition, parents are better able to track assessment reporting procedures. All of our marking books are structured the same, so parents do not need to relearn a marking system every time their children have new teachers

or new math courses.

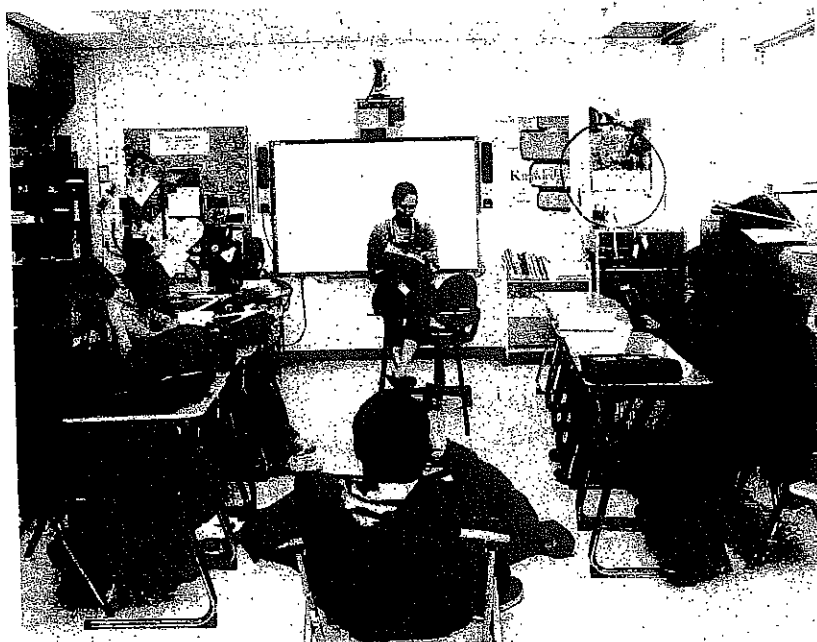
To further facilitate consistency within the department, we created a shared folder on our e-mail server that contains lessons, projects, quizzes, worksheets, handouts, exams, recommendation procedures, restorative course procedures, our competency document, and anything else we want to share with one another. This required a shift in both our individual and collective thinking; now no one "owns" any one course. We truly do function as a team.

Supporting Students

Providing students with a variety of supports to facilitate all of the changes has been a major focus for the math department.

FLEX PERIODS

During the 40-minute flex periods that are built into our timetable on Tuesday, Wednesday, and Thursday, students work in areas where they need help under the guidance of their teacher adviser and are free to go to any teacher for help, work with other students on group projects, and access computers. That was a big step out of our comfort zone. We no longer have sole access to a student's learning in our classroom. A student may have





School Reform Components

Teacher advisory program. Teacher Advisory is one of the fundamental pillars of change implemented at Wm. E. Hay as part of the pilot project. Our goal as a staff was to allocate larger amounts of time to work on personalization and relationships between staff members and students and also build enhanced student supports into our school. Each student is placed into a Teacher Advisory class that consists of 14–17 students in grades 9–12. Students remain with their teacher adviser throughout high school. The teacher adviser serves as a mentor and facilitator who provides academic guidance, personal supports, and anything else that a student may need to be successful.

Variable timetable. A variable timetable means that each block is a different length of time and that classes are scheduled into those blocks on the basis of how long students need to master the outcomes in that course. We surveyed students and teachers to assess how much time students need to master the materials in a course. Overwhelmingly, students declared that they needed more time in math and science courses and less time in option courses and the humanities. Therefore, administrators build the timetable to place math and science courses, specifically higher-level courses, in the larger time blocks.

made a good connection with a math teacher in the past and can learn more readily from that teacher's methodology. Students also can realize their increased potential for learning by hearing the same concept from more than one math teacher.

Individualizing instruction for our students also made us realize that a door has been opened for teachers to embrace our individual passions in the classroom. We offer and continue to develop new combinations of disciplines for our students. Our students have the opportunity to take a grade 10 math and physical education course and a grade 11 math and English combination.

MATH ENHANCEMENT

Students voluntarily enroll in Math Enhancement courses concurrently with their required math courses to gain extra time to successfully complete their math courses. It also gives the students exposure to another instructor, who may be more effective for them than their regular classroom instructor. Math Enhancement started out as a support period, but parental pressure to have their children's time recognized with credits led us to incorporate learning strategies and have students analyze the reasons for their successes or failures. Students are awarded credits for developing personal time management strategies, keeping a journal, learning how to deal with exam stress, examining personal strengths and weaknesses, and peer teaching across the grades. All of those requirements are done with a math focus.

The classes include students across the grades and are offered in every block of the timetable, so they fit into any student's schedule, and class sizes are kept small so that individual programming can be achieved. The class is always oversubscribed because once a student takes it, he or she almost always requests to be registered in it the next time he or she takes math. This course is offered at the sophomore, junior, and senior levels. Students encounter increased demands at each grade level. This course allows a student to manage these demands so that they may experience continued success in their math journeys.

Wm. E. Hay Composite High School

STETTLER, AB, CANADA

GRADES: 9–12

ENROLLMENT: 530

COMMUNITY: Rural

DEMOGRAPHICS: 97% white; 3% other

ADMINISTRATIVE TEAM: 1 principal & 2 vice principals

RESTORATIVE PROGRAM

William E. Hay has three restorative coordinators for math and the other disciplines. Students are recommended to the Restorative Program because they were not successful in all of their competencies in their courses once the learning time has expired. If accepted into the math program, for example, students work with a coach to restore the parts of the course they were not successful in to obtain their credits, rather than repeating the entire course in another semester. The amount of time a student is in the Restorative Program varies with the individual student.

Collaboration

Although I have been describing the many ripples that occurred as a result of eliminating the Carnegie unit, a description of our math journey would not be complete if I did not describe the wonderful opportunities it provided for networking with colleagues. The math educators took many ideas from other disciplines and modified them to work for mathematics, but teaching practices are never fully validated if teachers do not take the time to see how those practices are applied in one another's classrooms.

It was a powerful experience for the entire school staff to learn how teachers in different departments were changing their approaches to teaching. We were all experiencing many new things at our own pace, so it made everyone realize that they were not alone in the process of change. After we shared our experiences as a staff, our administrators provided numerous opportunities for us to talk to teachers in other schools who are also in various stages in their own schools' redesign efforts. We have also been given a chance to present our ideas to Alberta Education and the Alberta Assessment Consortium.

Education transformation was the end result in a project that simply asked educators to investigate the merits of standardizing time. Now all we have to do when making decisions is ask, What is in the best interest of the student?

Imagination Realized

This has been an incredible journey of change. It has been unique in the fact that most of the changes have occurred because teachers felt empowered to make them benefit their students. Very few directives came down from administrators to teachers. Those that did were grassroots ideas and requests from the teachers themselves. Those changes have affected absolutely everything we do for the students who enter our school every day. We have learned to see individuals who have specific needs, not just students who must progress through the proper succession of standardized hoops that certify they are now educated.

The integrity has been put back into our professional judgment. This journey of change has helped us gain new respect for one another and what we do each day to enhance the lives of the students with whom we teach. The intricacies of our journey could not have been fully anticipated as one change influenced another—with intended and unintended consequences—but those changes have brought a new way of life for students and educators. The changes deserve to be sustained. **PL**

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Authors' note: For more information about the project, visit <http://wmehay.clearview.ab.ca/flex>.