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The Self-Paced Student

A high school math teacher dares to let students take control of their own learning—and raises student achievement in the process.

Angela L. Vaughan

This section on using quadratic functions is easier than I expected," said Susan as she walked up to my desk. "I had asked to take the exam next Monday, but could I take it this Friday instead?"

This may seem like a strange conversation between a student and her math teacher. But it was typical of the conversations that I had with my students

every day—once I made self-paced learning and student autonomy integral to my instruction.

When I first started teaching high school, I noticed two prevalent themes. First, teenagers want to be treated like adults and make decisions for themselves. Second, teachers often want to control these same teenagers and limit their decision making. Recognizing these conflicting goals was a first step in

changing the dynamics of my classroom.

As a first-year teacher, I taught Algebra I in a high school that served more than 3,000 students. Seventy percent of the students were from minority groups: 35 percent were African American, 25 percent were Hispanic, and 10 percent were Asian American. My classes included students who had not passed a math class since

elementary school, students who were learning disabled, and students who had average to above-average abilities in math. Because my teaching experiences were limited, I relied heavily on other teachers for materials and advice. For the most part, I found myself starting each class by presenting several problems and having the students try to solve one on their own. I would assign and grade homework and give pop quizzes and exams.

An Unmotivated Classroom

I encountered several problems with this teaching style. There was no time to explore concepts beyond the minimum course objectives or to reteach material that the students didn't understand. I found myself repeating examples five or six times because the students simply stopped listening after the first 10 minutes of class. Many students were bored or frustrated, so discipline was a continual problem. When students started off a semester with failing grades, they assumed that they had no chance of passing the class and just stopped trying. Providing individualized instruction to students who had widely varying skill sets was also a real challenge.

As far as homework was concerned, students rarely completed it because once they were home and on their own, they didn't understand the problems. Many would copy another student's work. Students saw homework as a means of getting an acceptable grade rather than a means of practicing new concepts.

Students also didn't know how to prepare for exams because the lectures focused on mathematical concepts and not on test-taking skills. They rarely made the connection between completing homework, practicing skills, and doing well on assessments. Few



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students were able to pass a math test. Typically, they would receive a passing course grade because homework grades improved their average. Students were particularly at a disadvantage when they were absent because they missed lectures, and although extra help and tutoring were available, few students took advantage of these opportunities. As a result, they fell behind.

I now realize that I could have incorporated other instructional practices into these classes. At the time, however, my teacher tool bag was practically empty. Yet I knew something had to change if I wanted my students to be successful. A staff professional development course during my first year of teaching touched on the concept of self-paced classroom instruction. The idea of students mastering each concept before tackling subsequent ones struck a chord with me. In addition, I was convinced that these students, who were on the

brink of adulthood and who desperately wanted to make decisions for themselves, would be more motivated if I gave them responsibility for their own learning.

A New Kind of Classroom

Before restructuring my class, I reflected on my goals for my students. I wanted them to *understand* algebra, not just pass an exam or even pass the class. Algebra I is the foundation for high school and college math; without algebra skills, students would continue to struggle in math. I also wanted my students to be autonomous and take responsibility. The professors and employers with whom these adolescents would work in the future would not hold their hands. Moreover, I did not want to be the keeper of knowledge. Instead, I wanted students to discover and learn concepts for themselves.

Because algebra is sequential, students needed to master one concept before continuing to the next. Students also had to improve their time management skills and understand what they needed to do to succeed at learning math. I wanted my learning disabled students to have one-on-one time with me if needed and my advanced students to have freedom to explore.

I designed the following year's course on the basis of these goals. The course established overarching expectations and objectives but gave students a large role in deciding how best to achieve those objectives. Students would reflect on the following questions and decide for themselves how they might best learn the material:

- What resources are available, and which ones should I use to learn this information?
- How much information do I already know about this topic, and where are the gaps in my understanding?

- How much and what type of practice should I engage in?
- When should I complete this work?
- Do I want to work alone, or would it be more helpful to work with a classmate?
- When should I take an exam?

My role in the classroom changed from lecturer and grader to facilitator and guide.

Before I could ask students to work in this environment, however, I needed to teach them the skills necessary to become successful, autonomous learners. Most students were not prepared to learn for themselves or make these kinds of decisions. I spent the first several weeks teaching them how to take notes, how to use available resources to learn concepts independently, how to decide which activities would be the most helpful, and how to plan their work to achieve their goals.

A Typical Day in Class

After completing these preparatory lessons, the students set their own course, with guidance from me as needed. During the first 10 minutes of class, students attempted a warm-up problem or wrote a reflection in their math journal. During the next 10-15 minutes, I gave minilectures, presented real-world applications of math concepts, demonstrated technology, discussed relevant books or articles, and pointed out Internet links to various concepts and graphic organizers. Because this was the only time I used direct teaching with the entire class, students took advantage of the opportunity to improve their note-taking and listening skills.

During the next 60 minutes, students planned their learning, completed projects, worked together in tutoring groups, went to the computer lab, took exams, and read books related to their topic. I observed students' work, answered questions, and provided one-on-one tutorials. I also administered, graded, and reviewed exams. During the

last 5-10 minutes of class, I checked students' planning sheets to see what they had accomplished and whether they were on schedule with their work. If they were behind or had not accomplished what they intended to, I asked them what their solution was for getting back on track.

Setting Their Own Pace

Class coursework consisted of broad concept modules (for example, graphs) that were broken down into smaller sections (for example, writing equations in slope-intercept form). I structured the coursework so that students could easily

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identify gaps in their knowledge and skills and then focus their efforts on these gaps.

Students began each module with a pre-test to determine concepts that they had previously mastered and could omit. Students omitted more sections at the beginning of the year, when much of the material served as a review. Students then gathered a planning sheet and a student packet, which contained information about such resources as the textbook, specific trade books, and relevant Web sites. They also picked up a set of practice activities and projects, an answer key, and a calendar that showed what they needed to accomplish by when.

Before beginning work on a module, students planned when they would complete each section and when they wanted to take the exam on that module. They based their decisions on the minimum curriculum goals that I

had set for the class. When students were on schedule, they completed approximately two modules every six weeks. Students knew, however, that overall credit did not depend solely on their completion of six-week goals but also on their completion of semester goals. I did not want students to think that doing poorly in one grading period could put them so far behind that they would fail the whole semester.

Students completed each module by reading a book of their choice about the topic and/or reading their class notes; by completing practice problems and/or a project; and by checking their own work. Students could work together, work by themselves, or go to the computer lab. As students completed work on particular concepts, they checked off that section on their planning sheet.

When students believed that they were ready to take an exam, they filled out an exam request. They could cancel and reschedule these requests at any time. Once a student took an exam, we reviewed it one-on-one, identifying any weak areas and deciding whether the student needed to retake the exam. If a student scored below 70 percent, he or she was required to spend additional time with the material and take a different version of the exam. Sometimes students passed the exam but missed a vital concept. In such instances, I had them revisit the concept and strengthen that skill before continuing to another module.

Students who had been absent could adjust their own planning; they did not need to wait for me to give them makeup work. This was a big time-saver for all of us. Once students had completed the minimum course requirements, we discussed additional needs and interests.

Exceeding Expectations

When I first announced my new class structure, teachers, administrators, and parents said that freshmen would not be

able to handle the responsibility. They insisted that my students would accomplish nothing and that they wouldn't prepare for exams, much less request to take one. My experience proved the doubters wrong. I taught this self-paced structure for two years, and in both years the freshmen far exceeded my expectations.

At first, most of my students hated the idea. The notion of learning something on their own, without the teacher explaining it step-by-step, was frightening to them. Reading a math textbook on their own was also intimidating. By the end of the first semester, however, all the students began to say, "I wish all my classes were like this," or "I learn better self-paced." I never once heard a student say, "Why should I do these problems?" or "Will I get a grade for it?"

The students enjoyed their new

autonomy. They decided how much work to complete and when to complete it. They chose between doing a project and presenting a real-life application. If they didn't want homework over the weekend, they got it done earlier.

I noted some big differences between these two years and my previous year of teaching. Students assigned themselves more homework than I ever did. They often scheduled exams on Mondays or on the day after a holiday. They paid close attention to lectures and explanations. Because I did not explain every detail, they valued the time dedicated to direct teaching.

Discipline problems were rare, with referrals usually confined to dress code violations or tardiness. Defiance and other similar behaviors simply did not exist. Students engaged in lively discussions—sometimes even in arguments—

about math. They came in for extra help when they needed it and worked together in groups, tutoring one another.

Students also made the connection between learning and practicing concepts and their exam-taking ability. Because I didn't require them to turn in homework, students saw no reason to copy someone else's work. Because students needed to pass exams before they could continue to a different module, they began to link their effort on various activities and projects with doing well on the exam. This significantly diminished test anxiety. Exams became a means to evaluate progress, not something to dread and fail. Ninety-five percent of my self-paced students passed 12 math exams during the year. In my first year of teaching, few students passed *any* math exams.



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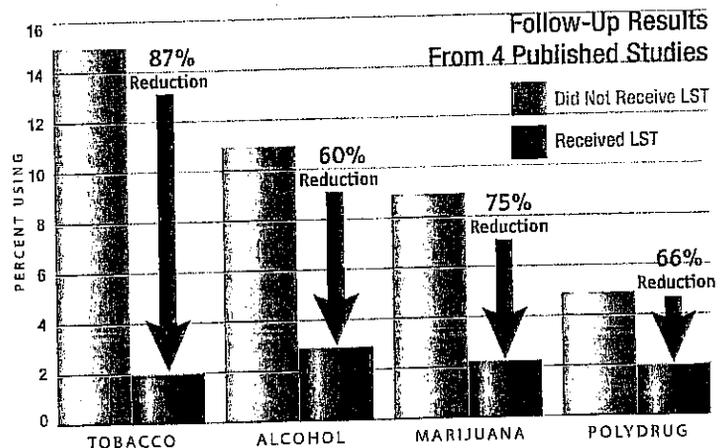


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What pleased me most was that the students' focus shifted from "getting a grade" to learning math. Nevertheless, this shift resulted in higher grades for a majority of the students. In fact, 73 percent of students who had failed math in previous years earned passing grades for both semesters. For many, it was the first time they were successful in math. In addition, students scored higher, on average, on the standardized end-of-course algebra exam than students in other math classes did.

Time to Teach

Before teachers implement this kind of structure or incorporate some of these strategies, they should explain to parents what they are trying to accomplish and how this new classroom structure will benefit students. The first time a student tells a parent, "My teacher

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doesn't assign homework" or "I get to pick my test date," parents will have concerns.

Teachers do not need to revamp an entire course to successfully incorporate some of these strategies in their classrooms. By providing opportunities for students to discover and practice concepts without worrying about a grade and by giving students choices about how they would like to learn—

individually or in a group—teachers can help shift the focus in a more traditional classroom from getting a grade to mastering a concept.

Developing this kind of classroom structure takes time. Teachers should allow themselves at least a summer to prepare materials. However, once they have established the structure and prepared the materials, educators will find that they have more time available to teach. Instead of spending time grading large stacks of homework and exams, they will be able to focus on working more closely with students, parents, and others within the school, and doing what teachers do best—helping their students succeed. ■

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