Effects of a New Mastery Math Program on Northern Cheyenne College Student Attitudes and Performance: A Case Study of Northern Cheyenne Women

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Introduction

The new National Science Foundation-funded math instruction program offered at Chief Dull Knife College, the tribal college of the Northern Cheyenne Nation, is designed to prevent students from dropping out of math classes. The new program provides students–most of whom are women–remedial and other support services to improve their scholastic performance and give them with the opportunity for continuing their post-secondary education. The project targets students who score below college-level math skills on math placement tests administered in the first semester they enroll.

A substantial number of CDKC students enter the college with remedial needs. For example, Test of Basic Education (TABE) scores for students enrolling in 2004-05 show that almost half of the students had reading and language skills of 9th grade or below, and more than 90% of students enrolling had below-college math skills. Ideally, the pre-college math courses quickly prepare students for college-level work. However, after reviewing students' math performance in the 2003-2004 academic year, for example, it was evident that these pre-college courses were not functioning as stepping stones to college-level courses. Of those enrolled in the pre-college math courses about 65% withdrew or failed (Ward and Widdison Jones, 2005). In fact, it was quite common for students to attempt each of the pre-college courses several times. In general, the pre-college courses failed to provide students with the skills needed to succeed in higher-level math and science courses, which led many to give up their college goals.

CDKC is in the last year of a Tribal Colleges and University Project (TCUP) for which reforming the pre-college math courses is one of the primary objectives. Those enrolling in pre-college math courses must master the skills needed to succeed in the subsequent college courses and, ultimately, in their chosen field of study. In this paper, we briefly describe our efforts to revise the pre-college math courses and offer some preliminary evidence about the impact of these efforts. We believe that we are changing the pre-college math courses from a cycle of failure to one of opportunity.

Chief Dull Knife College (CDKC) is a two-year institution, fully accredited by the Northwest Commission on Colleges and Universities. It is a community-based, tribally-controlled college and land-grant institution located on the Northern Cheyenne Indian Reservation in southeastern Montana. Its open-admission policy offers to Cheyennes and their neighbors in the region opportunities for liberal arts and career education. Like most tribal colleges, CDKC offers a wide variety of pre-college and college-level math courses. Three courses – Basic Algebra, Introductory Algebra, and Intermediate Algebra – address the needs of students that enroll without college-level skills. After demonstrating proficiency with the content in these courses (by completing the courses or via placement testing), CDKC students must complete at least one college-level course to obtain an associate degree.

The purpose of this research is to identify the impacts of participation in the new math instructional program on student performance and progress. Using data from fifteen in-depth interviews and student performance data, we explore how students with a wide range of skill levels and attitudes toward math experience this program. We examine students' assessments of their performance in the math program following at least one semester of participation. Our research questions include: how do students with different math skill levels and attitudes experience the new math program and assess its effectiveness; and how effective is the program at facilitating greater success in math?

Literature Review

Curricular reform efforts, especially those focusing on introductory mathematics, generally have examined both the concepts students are to learn and the methods by which they are taught. For example, recent reform projects in college algebra (Andersen and Swenson, 2005; Crauder, Evans, and Noell, 2002; Herriot, 2005; Small, 2004) have reduced the traditional emphasis on mathematical procedures and increased the focus on conceptual understanding, applications, and cooperative learning. While we do not dispute the value of applications, conceptual understanding, and cooperative learning, research (e.g., Hiebert, et al. 1997) shows that conceptual understanding develops along with

procedural competence. Thus, CDKC's new math program continues its focus on procedures.

Failure in school is often due to a variety of factors. Schooling research demonstrates the important influence of cognitive, background and school experiences on school participation and completion. Numerous studies have indicated the higher incidence among both lower class and ethnic minority students–especially Blacks, Latinos, and American Indians–of poor school experiences which contribute to dropping out (Wagenaar 1987; deMarrais and LeCompte 1995). Specific factors correlated with dropping out of high school generally are poor academic performance (as measured by grades, test scores, and grade retention) and behavioral problems such as absenteeism, truancy, and discipline problems (Wehlage and Rutter 1986; Ekstrom et al. 1986). Studies of American Indian higher education show that American Indian students have a particularly low college completion rate (estimated at 37%) (Knapp, et al. 2002). Ewen (1997) reports that American Indian students indicate they leave college before graduation for both academic and socio-cultural reasons. Experiences with math and science have been especially problematic for academic success and graduation. Female students who have tended to take fewer math and science courses have often had lower performance in these subjects (Brint 1998).

Research on math anxiety suggests that this phenomenon is one of the most prevalent emotional problems associated with mathematics. Gender and age are important factors correlated with math anxiety (Baloglu 2006) with women experiencing more test anxiety and men more anxiety about math tasks. Instruction plays a role as well: Julie Turner's research shows that students reported they were afraid to ask for help when teachers were even slightly negative (Perina 2002).

The Mastery Approach

The mastery learning approach can be traced to Benjamin Bloom (1976) who hypothesized that if a normally distributed group of students with respect to aptitude are given identical instruction the measured achievement of those students will also be normally distributed. However, if a normally

distributed group of students with respect to aptitude is given instruction that is appropriate to each individual's needs then the majority of the group will achieve mastery of the subject matter. Bloom believed that quality of instruction and time allowed for learning to be the determining factors relating to mastery. This theory was tested in many studies conducted throughout the 1970's and 1980's producing considerable evidence that mastery learning procedures do work. Typically, 80% of students were able to achieve mastery levels of learning (Bloom 1976, 5). Bloom stressed the importance of assessment and feedback mechanisms which serves as a corrective loop that helps students and teachers to monitor progress and make adjustments as necessary. The quality of instruction includes four dimensions: cues or directions provided to the learner, participation of the learner in the learning activity, reinforcement relating to learning objectives, and feedback or correction.

An important aspect of cues is that not every student responds to each cue in the same manner. If a class is taught using primarily verbal cues then the students who respond well to verbal cues will excel while others may flounder. To be most effective, teachers should know how their students respond best, and tailor instruction to reach as many students as possible.

Cues must be acted upon in order for learning to occur. Bloom (1976) suggests that some form of involvement of the learner is required if learning is to take place. Teachers are faced with the task of delivering instruction (cues) in a manner that encourages student participation. In small settings teachers can set aside time to spend with each student individually. Collecting oral and/or written assignments is a method often used to ensure student participation in learning activities. Like most learning theories the mastery approach utilizes reinforcement schemes. "Reinforcements are likely to be differently perceived by students and … the teacher who operates with a limited amount and variety of reinforcements may not be adequately reinforcing some of the students in the class" (Bloom 1976, 120). As the amount of interaction between student and teacher increases, teachers are better equipped to reinforce students in the manner they best respond to. Teachers give students feedback in order to

help students focus their efforts in the area(s) where they need additional instruction and practice. The amount of time and practice needed to develop mastery level of specific subject matter varies greatly from student to student. Feedback helps identify which students need additional time and coaching to attain achievement goals.

Several studies (e.g., Bergin 1995; Ross and McBean 1995; and Senemoglu and Fogelman 1995) support the effectiveness of the mastery approach although others (e.g., Thompson 1980) show little advantage to this method. Recent research also shows that the need (estimated at 60-75%) to improve math skill levels among new community college students has led to greater use of computerized, mastery-based instruction (Boggs 2004) which has facilitated greater success in the completion of developmental (pre-college) math classes.

CDKC's New Math Program Using Mastery

Using the mastery approach, the CDKC math course revision process was designed to identify those factors that (1) impact student performance, and (2) the college can affect. Important factors contributing to the low success rates in the pre-college math courses include inadequate high school preparation for college-level math, poor student placement, poor out of-class support, social promotion (as opposed to promotion based upon mastery) and culturally incompatible instruction. To address the problems, the college began by developing a comprehensive math placement test to identify the skill levels of each student in basic mathematics, introductory algebra, and intermediate algebra. In order to bypass the basic math course, a student must correctly answer at least 80% of the basic math questions on the placement exam. Similarly, to skip introductory algebra, the student must correctly answer at least 80% of the questions on the second section of the exam. Only after *demonstrating* mastery of the content of each course can a student bypass the pre-college math courses. Using the math skill assessments allows CDKC Academic Advisors to place students in the appropriate course.

To address the issue of social promotion and cultural context, the college initiated a

fundamental restructuring of the teaching in each course. Prior to the TCUP project, the pre-college courses were "typical" math courses in which the content was delivered through lectures and students were required to obtain an average of 60% to pass. Lectures were progressive, each building on the material of the preceding lectures, and course grades were drawn from a variety of sources (e.g., homework, quizzes, tests, and projects). While this course organization generally is reasonable, we found that it was not effective for CDKC students. For example, missing one or more classes–a problem for many students–creates a disadvantage since the student must master the content missed in order to fully understand the new material presented next. Because students without strong math skills find it difficult to learn the content they missed, they often experience frustration, more absenteeism and even failure.

After reflecting on the needs of CDKC students, the tribal college adopted a self-paced, computer-intensive approach to its pre-college math classes. Key features include the following:

- Each course is now divided into nine chapters, each consisting of several sections.
- The content of each section is presented through both a course text and interactive, computer-based activities, both of which are published by Hawkes Learning System (Wright 2006).
- Students read the material in the text or corresponding material on the computer and then work through sequences of problems on the computer.
- If a student works a problem correctly, the software poses progressively more challenging ones until the goals of the section are met.
- If the student has difficulty with the problem, however, he or she can consult hints, view video tutorials and worked examples, or return to the relevant section of the test.
- The software then presents parallel practice problems to prepare the student to proceed.
- At the end of each section, the student must pass a computer-based assessment at the 80% level.
- If the student does so, he or she is certified on the section. If he or she fails to demonstrate mastery, the student returns to the section for additional instruction or practice.
- After demonstrating 80% mastery on each section, the student must pass a computer-based test at the 80% level in order to pass the chapter. If the student is unable to do so, he or she reviews the sections that provoked difficulties, which the software identifies, completes additional activities and problems (if necessary), and retakes the chapter test.
- Students must complete each chapter of the course to receive credit for the course.
- Course content is divided into sections that are assigned credits; when students pass one credit, they can enroll in the next one until they have completed all the material for the class.

Monitoring the implementation of this new structure of courses helped to identify some

additional problems that required attention. These additional changes involved the following actions:

- Analysis of the transcripts for students in these classes showed that placement of students in math classes for which they were not eligible (due to poor grades in the prerequisite courses) also contributed to poor performance. Thus, improvements in the placement process were necessary to increase the math course completion rate.
- Reorganization of the tutoring program intensified the support services available to students, and the math class size was capped at twelve students.
- Development of a Learning Center was designed to increase the amount of time students could work on the computerized math assignments as well as provide a place to study and do other course assignments.
- Additionally, tutors were assigned to both the new pre-college math classes and the Learning Center, and math instructors were encouraged to work with students in the Learning Center during their office hours.
- Analysis of the withdrawals and failures in introductory courses indicated that about half of the students would not have withdrawn or failed if the work they had completed using the computerized math program had been accepted for partial credit. Thus, enrollment in one credit at a time allowed for greater success in course completion.

Since the new math instructional program was initiated in 2003-04, data on its effectiveness are now available. The purpose of this paper, therefore, is to provide some preliminary qualitative and quantitative evidence of the impact of this program on student attitudes and performance.

The Research Population

The Northern Cheyenne Nation was established on a reservation in southeastern Montana in 1884. The Northern Cheyenne Nation includes about 6,000 members, about 4,500 of whom live on the reservation. Custer's cavalry ultimately did less violence to the Cheyenne people than has a hundred years of poverty. Nearly 40% of Cheyenne families have incomes below the poverty level (Bureau of Census 2000), which is important to consider in light of today's gas prices and the remoteness of the Cheyenne homeland (about a hundred miles from an urban center). Unemployment fluctuates between 60 and 85% since jobs are scarce on the Northern Cheyenne Reservation.

Almost 42% of the reservation's people are under the age of eighteen, and another 50% are between the ages of eighteen and sixty-four (Bureau of the Census 2000). This means that the reservation population is unusually young, but the figures also imply that young Cheyennes can find

few elders, who are the keepers of Cheyenne knowledge, to learn from. Yet research on the reservation has shown that traditionality and knowledge of the Cheyenne ways are correlated with educational success (Ward 2005). Like other tribal colleges, CDKC maintains a cultural heritage center which sponsors programs in Cheyenne language, history, and culture from the Cheyenne perspective (Simonelli 2003). Still, support is needed to strengthen the tribal college's efforts to reach out to impoverished and under-served young people who, as a group, experience a high school dropout rate of 40-60% across four local K-12 schools (Ward 2005). Only 10% of adults have college degrees. The persistence of low educational achievement, poverty, unemployment and underemployment across several generations, presents strong challenges to the academic institutions on the reservation.

CDKC's response to these conditions is reflected in its history. Chief Dull Knife College was originally chartered in 1975 by tribal ordinance as the Northern Cheyenne Indian Action Program, Incorporated and granted funding under the Bureau of Indian Affairs. The original curriculum, reflecting the West's coal boom during the energy crisis years of the 1970s, consisted of training programs in mining and construction. Tribal leaders, program staff, and the board of trustees soon recognized the need for additional vocational programs, as well as general education and liberal arts. The first academic courses were offered in1978, and since that time the curriculum has expanded to include Associate of Arts and Associate of Applied Science programs, and certificates in several skills.

CDKC's enrollment increased from 408 in 2004-05 to 424 in 2005-06: 167 women and 59 men enrolled in the Fall, and 144 women and 54 men enrolled in the Spring term. Total enrollment averages about 200 students per term. In 2006, there were 105 freshmen and 121 sophomores enrolled in the Fall term and 93 freshmen and 105 sophomores enrolled in the Spring term. More than 90% of the students enrolled were Native American each term. In May, 2006, 27 students graduated (compared to 25 in 2005, 27 in 2004 and 24 in 2003) receiving Associates of Arts or Applied Sciences degrees. Twenty graduates were female and 7 male (compared to 20 females and 5 males in 2005; 20 females and 7

males in 2004; and 18 females and 6 males in 2003). Of the 2006 graduates, 85% were Native American and 15% White (compared to 68% Native American in 2005 and 81% Native American in 2004). Additionally, 63% of the graduates were in the 18-30 age group, and 37% were 31 or older. Comparing these graduates with the 2005 graduates, 76% of whom were 18-30 years old and 24% were 31 years or older, this year's graduating class was substantially older. A larger percentage of graduates were full-time students in 2006 (78%) compared to 72% in 2005. Sixteen of the 2006 graduates (59%) are planning to transfer to higher education programs compared to 9 graduates (36%) in 2005 and 13 graduates (48%) in 2004.

A survey of new students enrolling in 2005 provides additional student information:

- **Age:** More than half (63%) were between 20 and 29 years old, 12% were 18 and 19 years of age, and 24% were 30 years of age or older.
- **Children:** Almost half (43%) of the students have one or more children.
- **Tribal Membership:** A majority (74%) of the students reported being Northern Cheyenne, 6% Crow, and 6% from other tribes.
- **Language:** 34% of the students reported "Northern Cheyenne" as one of their languages, and about 2% reported "Crow" as their language.
- **Transportation:** 86% of students have access to a car.
- **Communication**: 44% of students have access to a computer, about 25% have access to the internet, and 83% of students have a phone in their own home.
- **Financial Aid:** 57% of students received a PELL grant, 14% of students received support from the Tribal Education department, 14% received scholarships and 2% were involved in Work Study. About 25% of the students reported they received no financial aid at all.
- **Child Care:** More than a quarter of students (28%) need a babysitter on a daily basis.
- **Major:** Almost half (44%) the students are pursuing an "AA in general studies," 10% were pursuing an "AAS in business," 5% in "Early childhood education," and 22% in Allied Health or Biology/Pre-med.
- **Future plans:** After graduation, 58% of students plan to complete a 4-year degree. Among these students, about 43% plan to go to a Montana state school, Rocky Mountain or Salish Kootenai College while about 15% want to go to another 4-year program. About 7% plan to work, and 2% plan to continue on at CDKC.

Research Methods and Data Sources

Fifteen in-depth interviews conducted during 2006 with students participating in the math program will be analyzed. Interview questions were developed through a collaboration of CDKC and BYU research team members. Topics addressed in the interviews include students' attitudes toward

math, experiences with the math program and related resources, sources of support for schooling, interactions with peers, family and teachers that influence school experiences, and aspirations for future schooling. The interview guide was pre-tested and interviews began in April, 2006. Interviewing was conducted at the tribal college in locations that would allow for privacy during the interviews. The research purpose was explained to students in the math classes and they were invited to make an appointment with a member of the research team. Pseudonyms were assigned to the interviews.

Research team members transcribed the tapes, coded the transcripts and did a preliminary analysis of the interview data. Substantive analyses are designed to address research questions concerning student participation, and their effects on school experiences, attitudes, school performance and plans for completing a 2-year degree and transferring to a four-year college or university.

We use data on student math course grades for the 2004-2006 academic years to indicate student performance completion rates. We also use student background data to identify patterns in overall student performance and math course performance and completions.

Learning Center and Math Course Data: Evidence of Effectiveness

In addition to the delivery of the self-paced, computerized math courses, the Learning Center provided additional opportunities for students to work on their math courses outside of the classroom. Data from the Student Retention Survey administered at the end of the Spring 2005 semester indicate that 58% of students reported they used the Learning Center compared to 38% the previous year. About 40% used the Learning Center once a week or more. The two most frequently reported reasons for using the Learning Center were to get math help (15%) and to do homework or study (11%). Benefits of the Learning Center include both having a quiet place to study (26%) and having a place to get help (tutoring) (13%). Almost 40% agreed that they can get the help they need at the Learning Center; 25% agreed that the Learning Center helped them successfully complete math homework; 20% agreed that the tutors in the helped them understand math; and more than 50% said they would like to

see the Learning Center continue in the future.

Additionally, records for the 2005-06 academic year show that the average use of the Learning Center increased from 393 students in Fall, 2005 to 832 students in Spring, 2006.

Learning Center Use: 2005-06

Fall Semester, 2005	**Total students**
August, 2005	464
September, 2005	500
October, 2005	338
December 2006	270
Average for Fall, 2005	**393**
Spring Semester, 2006	**Total students**
January, 2006	829
February, 2006	941
March, 2006	806
April, 2006	753
Average for Spring, 2006	**832**

The CDKC Math Class Survey responses from 2006 showed important gains in student experiences with the new math program. For example, 30% of respondents said that their math class was less difficult than they expected, and 94% said they feel somewhat to very comfortable with math. Among the largest gains in positive responses from students were questions about homework assignments, computer assignments and quizzes and exams. As a result of these positive experiences, much larger proportions of students this year reported that they were confident in discussing math with others (72%), helping family and friends (68%), understanding (75%) and doing math equations (77%), solving word problems (60%), and completing homework assignments (70%) and tests (81%) on time.

Almost all (98%) of the respondents reported they used the Learning Center, and the vast majority (81%) felt it was helpful. Increased percentages also feel confident in majoring in math related fields, exploring math careers, attending graduate programs in math and teaching math. The majority of students again this year reported that math classes contributed to their college success by building their

skills in using computers, solving problems, working with instructors and tutors and studying for tests.

Data for 167 students enrolled in the basic math class for 2004-2006 show that students have been enrolled an average of 103 days in the program, with an average of 7 days between lessons. They completed an average of 20 lessons each, representing an average of about 39% of the required lessons. These data show that rates of progress through the program vary considerably. However, the figures show in the table below, reveal that the math course completion increased substantially during 2005-06, from 58% in 2005 to 79% in 2006. Completion rates for math now more closely resemble completion rates for science courses. These data indicate that the recent math curriculum changes have substantially improved student experiences in math classes and confidence in their skills. Decreases in withdrawals and failures in math provide additional evidence of the positive impact of these changes.

CDKC Math Courses Enrollment and Completion Rates by Semester and Academic Year

Academic Year	Enrollment in Fall Courses	Completion for Fall Courses	Enrollment in Spring Courses	Completion for Spring Courses	Enrollment for Academic Year	Completion for Academic Year
2003-2004	64	30 47%	67	28 42%	131	**58** **44%**
2004-2005	94	58 62%	90	48 53%	184	**106** **58%**
2005-2006	116	95 82%	95	72 76%	211	**167** **79%**

Student Responses to the New Math Program

The following responses to interview questions reveal the range of responses of CDKC students to the new math program. Of particular interest are comments related to the ways that Northern Cheyenne students perceive the new program, its benefits and its relationship to their previous experiences with math. Because the majority of CDKC students are women, most of the quotes are from women who also discuss how the math program relates to their lives – their responsibilities as students, mothers and their preferred ways of learning. In the first set of quotes, students talk about the

way the new program works with how they were brought up to learn in the Cheyenne context:

- "[The new math system] fits in well with the way I was brought up to learn."(Student 1)
- "Yeah, I feel like it's [math and science] emphasized because my dad hunts and talks about earth science. I wanted to go into earth science when I was younger. But I don't think math is emphasized enough and it probably should be. The stereotype of math people is they are nerds in high school, but when they get to college, this changes. I think that math is the hardest subject, but I like the challenge. (Student 2)
- "The Northern Cheyenne are good listeners and good story tellers and that this is how we learn. We work as a group and don't leave people behind. In high school, we would all work on math together and help those who weren't getting it, and when everyone got it together we would move on." (Student 3)

In the following quotes, students discuss how the new math program has helped to increase confidence in their math skills.

- "In the past, I didn't like math because it was so confusing. But now I like it because I can understand it. It took my math confidence up."(Student 1)
- "Math's fun. I really hated it in high school, but now I like it." (Student 1)
- "I love the new math system here, and that's coming from someone who used to hate math." (Student 4)
- "I love cooking and crafts, and anyone who does those things already has to do math—realizing that helped me see that math isn't something scary from a distant universe. It's not separate or unnatural for us to understand. Hard, but very doable." (Student 4)
- "I wouldn't want to change the math program here—I like it just like this!" (Student 4)
- "Until I got my GED at CDKC, I didn't think there was even a chance of these goals, even though I was interested. But I finished my GED, and my friend dragged me into college and said that anyone who reads as well as I do would do great in journalism." (Student 4)
- "This is the first math program I've done in 30 years—I'm coming back to school after raising children and everything. This time, I'm coming to learn and doing this for *me*… I really enjoy the self-paced system" (Student 5)
- When I started math 30 years, we put our answers on cards and our teachers let us work at own pace." (Student 5)

In these quotes, women relate their math skills to their interests, plans and community needs.

- "I came from a dysfunctional family – my grandma raised me while I was young and hadn't learned to speak yet. So math was a lot easier to learn than English." (Student 5)
- "Math is not a huge priority in Lame Deer …working as a cashier in the depot, there are so many who can't count money! We NEED to emphasize math more if we want to develop an economic system here and let people prosper, for jobs!" (Student 5)
- "I'm very involved in community and interested in local government." (Student 5)
- "I came back to school for me—not my family or anyone else—I always wanted to be a scientist. I had an Associate's in accounting and business with two babies. I did that for an

income, but now I'm back with the support of my family to become scientist. I want to go for a Master's in CO or MN in Ethnobotany." (Student 5)

- "This college experience is the greatest miracle of my life. After 12 years of meth, to be functioning and doing good. I thought my life was over because of how far down I went." (Student 6)
- "I think that math could be more enjoyable for everyone if we had moments like that [working with a tutor, and having things explained to me in *my own* terms]." (Student 6)
- "I like solving problems on my own and didn't like asking for help. But after working with Bertha I have an easier time with that. Now I go at lunch time when I can. Yeah, I think working with Bertha opened the door for me to ask for help more and get it." (Student 7)

Conclusions

The preliminary performance and interview data indicate that the new math program has helped to address some issue related to poor math performance among the students, especially women, attending Chief Dull Knife College. Among the problems addressed are the poor preparation they received in K-12 schooling, the lack of support for developing math skills, and the anxiety surrounding starting college with poor experiences in math. The re-organization of the math program to include a self-paced program that involves visual cues from a text and computer program provides the flexibility for students to work on math in class as well as outside of class. Outside the classroom, they get support from CDKC advisors, from their instructors and tutors in a way that is consistent with traditional teaching practices to offer students both guidance and practice of new skills. The Learning Center provides an environment in which students can focus on their math coursework and get assistance as they need it. The Academic Advisors also believe the program is addressing an important issue: "a 'cultural inhibition' that prevents many students from asking for help even when they really need it in math." Math faculty observations of student progress tells the story of the program:

> Under this system [computerized math], even if it's not faster, I have a very good feeling for what it's doing to make math stick and to raise student confidence in math and change their attitude toward math. Student attitudes are changing from 'I'm not good at math—I can't do this!' to 'If it's not right, why isn't it right? Why is the computer saying 'no'? This is an improved attitude. (Math faculty member).

And a female student confirms how many feel: "I like the self-paced system of math computer

courses—I do better at my own pace. It takes the pressure off." (Student 4)

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