



GEAR UP
A federally funded program

in partnership with
VERMONT
AGENCY OF EDUCATION



Essential Math for College and Careers (EMC²): Findings from Student and Teacher Surveys

For more information or to offer EMC² at your school, contact:

Anita Long, EdD; Academic Support Coordinator; Vermont GEAR UP; VSAC long@vsac.org;

www.vsac.org/emc2

Essential Math for College and Careers (EMC²) is a course designed by the GEARUP program at Vermont Student Assistance Corporation (VSAC) in collaboration with the Vermont State College System (VSCS) and the Vermont Agency of Education (AOE). The course aims to meet the needs of students who might otherwise graduate high school without the skills or confidence to succeed in college level math courses. Students who leave high school unable to meet entrance requirements for credit-bearing college level math courses must spend time and money to overcome those entrance barriers. Studies show mixed results for students who leave high school without strong math proficiencies. This course emphasizes understanding math concepts over learning procedures. This is done through actively engaging students in real-life problem-solving and critical thinking tasks in which they work together to solve problems and communicate solutions.

The EMC² course was first piloted during the 2019-2020 school year. Starting in spring 2020, student and teacher surveys have been administered at the end of each school year to assess what has gone well and identify areas in need of improvement. Results from the pilot year (spring 2020) are discussed in a separate report. This report summarizes the results of all surveys taken between 2021-2024.

Summary of key findings

- Survey response rates were high, at 84% among EMC² teachers and 88% among students across participating schools. These strong participation rates suggest students and teachers felt invested in the course.
- A large proportion of students reported positive outcomes following the course. For example:
 - 69% of students reported feeling better about math after taking the course compared to before taking it. 29% of students said their feelings did not change, and under 3% (3 students) reported feeling worse about math after the course.
 - 74% of students reported improved math skills after taking the course compared to before taking it. Less than 2% (2 students) said they felt a little worse. The remainder said their skills did not change.
 - 64% of students reported improved confidence in their math ability after taking the course compared to before taking it. Only 4% (5 students) reported worse confidence. The remainder said their confidence did not change.
- When asked if they would recommend EMC² to other students, 62% of students answered “yes” and 32% answered “maybe.” Only 6% (7 students) said they would not recommend the course.
- Results suggested the perceived impact of EMC² on students’ futures ranged from neutral to positive:
 - 41% said EMC² made them feel better about passing postsecondary math courses, 4% (5 students) said they were more concerned about passing postsecondary math courses, and the rest said the course had no effect.
 - 65% said the course did not impact their plans for after high school, 19% said EMC² was helpful for their existing plans, 9% said the course improved their confidence about fulfilling their plans, and 4% said the course encouraged them to expand their options for their future.
- All but one teacher felt the course fully or partially met its stated goal, and feedback about the course was largely positive. Teachers offered constructive feedback about various aspects of the course, including suggestions for ongoing improvement of the materials and discussion of challenges around course enrollment and scheduling practices (number of students, length of class meetings, etc.) at various schools.



GEAR UP
A federally funded program

in partnership with
 **VERMONT**
AGENCY OF EDUCATION


VERMONT
STATE COLLEGES SYSTEM

Student Survey Results

About the students

Between spring 2021 and spring 2024, 134 students enrolled in EMC² were invited to take the survey. A total of 118 students responded for a survey participation rate of 88%.

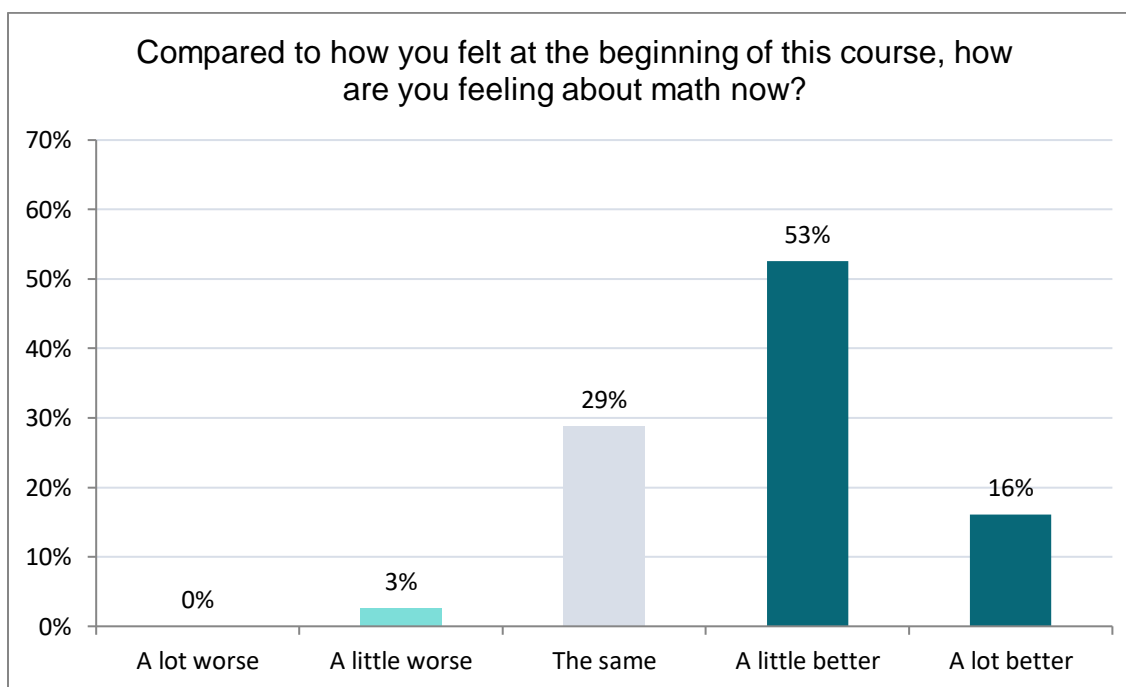
Among participating students:

- 68% of participating students were seniors, 31% were in grade 11, and 1% were in grade 10. 78% had taken Algebra 2 or equivalent and 17% had taken Pre-Calculus.
- 47% identified as male, 49% as female, 1% as nonbinary.
- 62% said at least one parent/guardian had formal education or training after high school, 26% said their parents/guardians did not have any formal education/training after high school, and 12% did not know.

Student-reported outcomes after taking EMC²

Positive responses from students overwhelmingly outnumbered negative responses, and frequency of neutral responses varied by question.

- 69% of students reported improved attitudes toward math (60% in 2020):

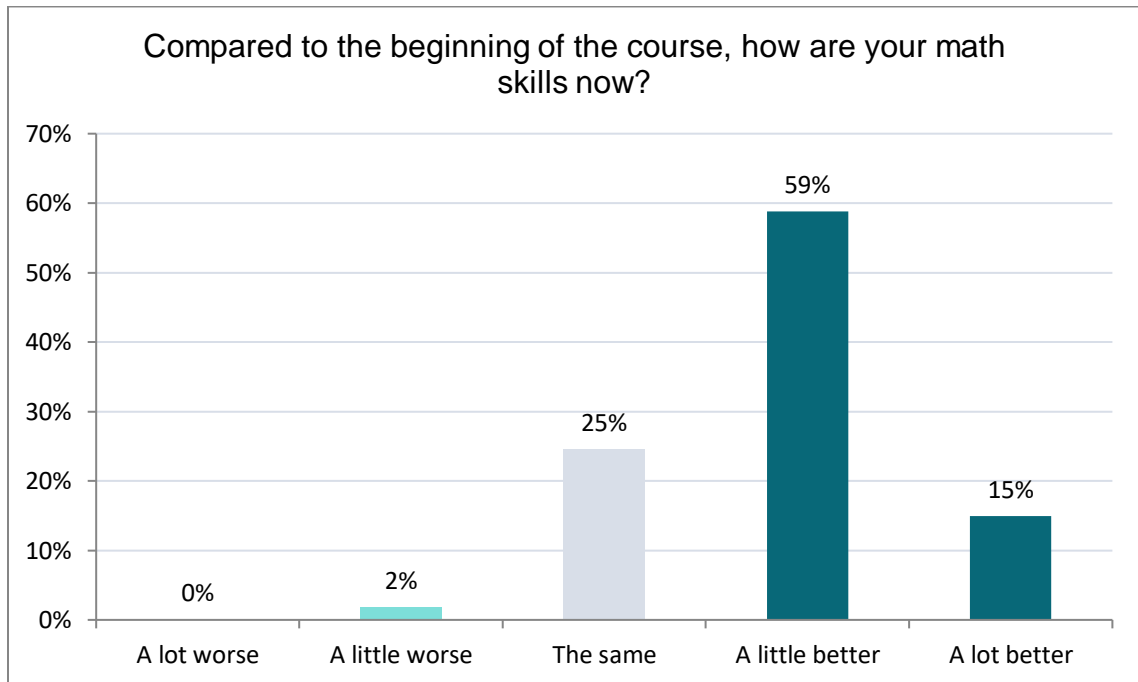


GEAR UP
A federally funded program

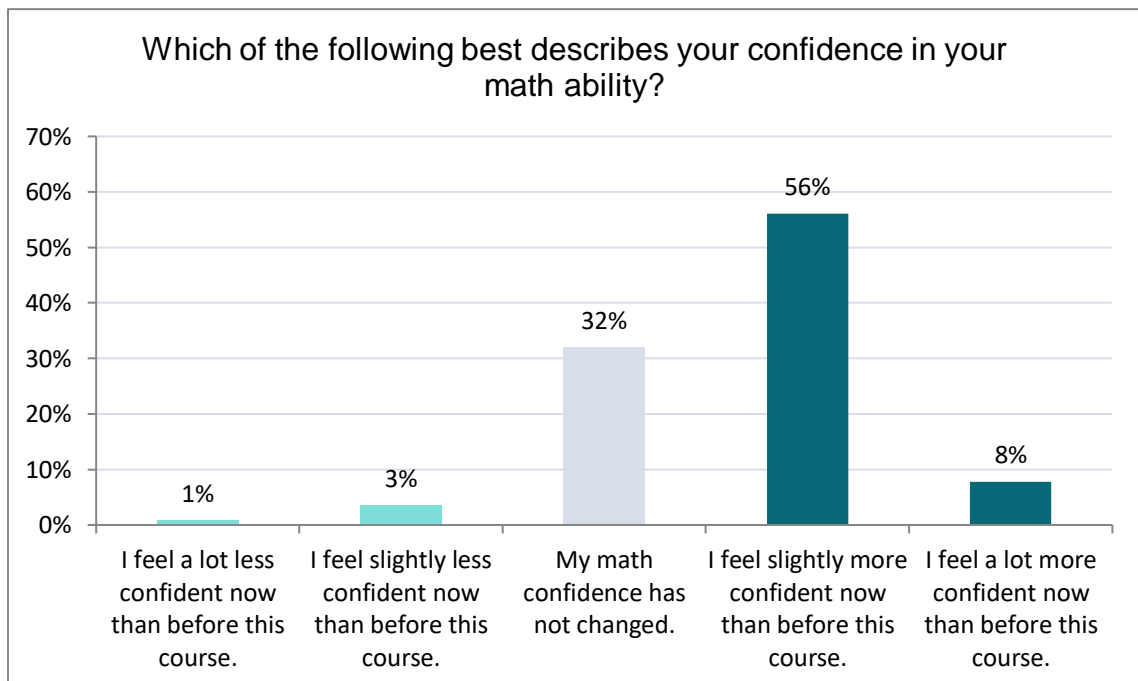
in partnership with
VERMONT
AGENCY OF EDUCATION

VERMONT
STATE COLLEGES SYSTEM

- 74% believe their math skills improved (73% in 2020):



- 64% reported increased confidence in their math ability (45% in 2020):

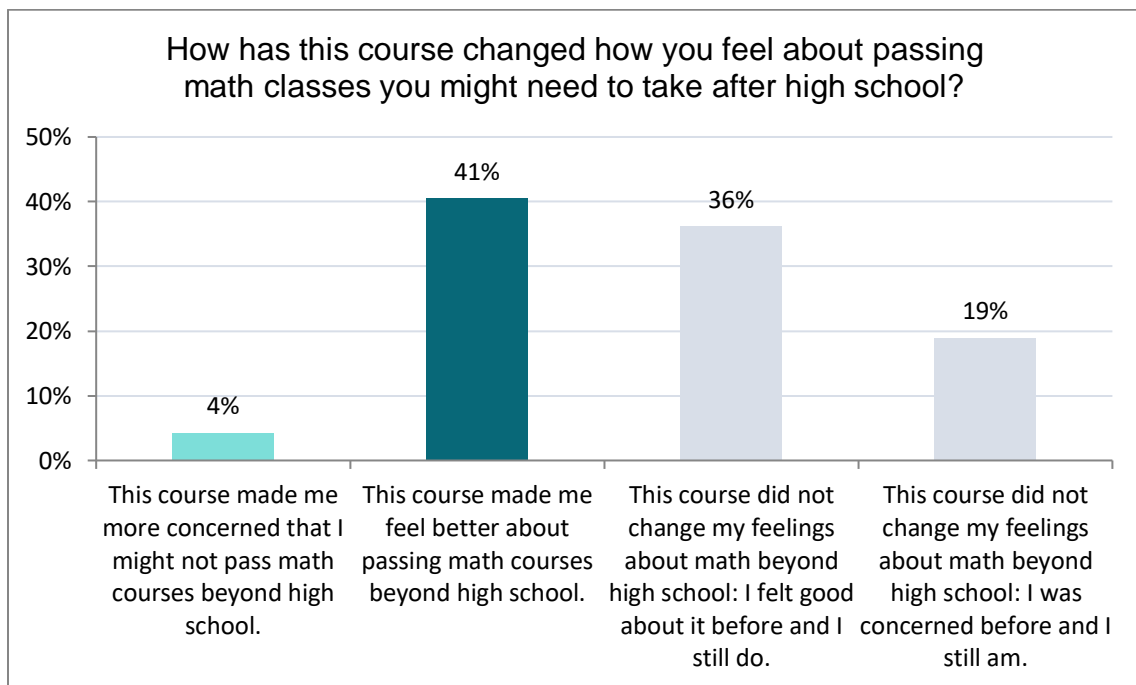


Impact of EMC² on students' futures

The majority of students reported having plans to pursue postsecondary education or training: 57% planned to attend a college or university and 11% planned to attend trade school, an apprenticeship, or other training program. An additional 6% planned to enter the military or pursue careers that require formal education or training but did not mention education plans as part of that path. 12% of students were undecided about what to do after high school. The remaining 14% included students who planned to work, to pursue a career that may not require formal education/training (e.g., business owner), or to take time off with no mention of subsequent education plans.

Although EMC² rarely changed students' postsecondary plans, it appeared to positively impact students' confidence and helped students prepare for their futures.

- When asked how the EMC² course changed or influenced their plans for the future, 4% described ways the course expanded their options, for example by making them “want to reach out and do more” or consider online classes. An additional 19% said the course didn't change their plans but supported existing plans (e.g., by reviewing content they will need or by filling in missing credits), and 9% said the course improved their confidence about being able to use math in the future.
- 41% said EMC² made them feel better about passing postsecondary math courses (33% in 2020) and only 4% (five students) said it made them feel worse:



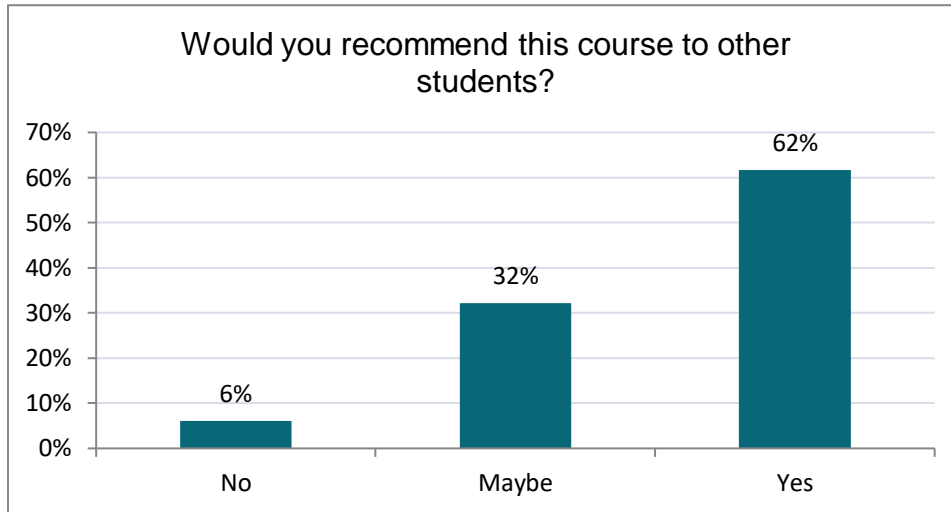
GEAR UP
A federally funded program

in partnership with
VERMONT
AGENCY OF EDUCATION



Student feedback about who should take EMC²

Student responses indicated strong support for the EMC² course, with 62% of students saying they would recommend the course to other students. Only 6% (seven students) would not recommend the course and the remaining 32% answered “maybe.”



Students were given the option of explaining why they would or would not recommend the course.

Among students who would recommend the course:

- Many described the course as a good review of material they had forgotten or never fully understood. For example, “I would recommend this course to other kids in my school because it was helpful for me on the things I forgot over the years” and “It helped me understand certain topics that I didn’t understand at all but now I do.”
- Some described how it improved their understanding of math concepts and their skills in math overall. One said the course helps students build “basic math concepts important to any functional adult in the world, even if math is not a vital part of future career plans.”
- Several students described the positive effect the course had on their confidence. One described it as “a safe environment to learn for someone who isn’t confident.”
- Some students based their recommendation on their enjoyment of the course, describing it as fun, easy, or good. Others mentioned the teacher.
- Some students mentioned details about the course such as the focus on real-life applications and the pace.
- Others said the course helped them meet proficiency requirements for graduation, for example, “It’s the only reason I am on track to graduate right now.”



Among the 37 students who answered “Maybe,” 26 shared their reasoning, including the following examples:

- Twelve students said, “it depends,” for example on the teacher, on their credit needs, on a student’s skill set, on whether the student needs extra help in math, etc.
- Three students said it’s good for college-bound students but maybe not for others.
- Three said the pacing or difficulty level was not good for them but could be for other students.
- Three used the space for positive feedback only, for example “it was much more real life applications of math concepts, which is very useful.”
- Three cited issues with organization or materials.
- Two cited the course’s role as a review or refresher but did not specify whether they perceived that as helpful.

Among the seven students who would not recommend the course:

- Four said math is boring or the course was too difficult.
- One thought the material was too basic, but concluded “I felt that my placement in the course wasn’t right.”
- One thought the course was too long and should be a half-year instead.
- One praised how their teacher “always explains things very well and always keeps the class interesting,” which suggests the student may have clicked “No” by accident.

Students also gave feedback about what type of student is a good fit for the course.

Common themes included the following:

- Students who struggle with math, dislike math, or lack confidence
- Students who want to review math concepts
- Students who are interested in the unique content or style of the course, such as “learners who prefer to know why we use math for different things.”
- College-going students
- Students who are willing to put in hard work
- Students who are smart or good at math
- 14% of students said any kind of student would be a good fit for this course.

Student perceptions of the course recruitment process

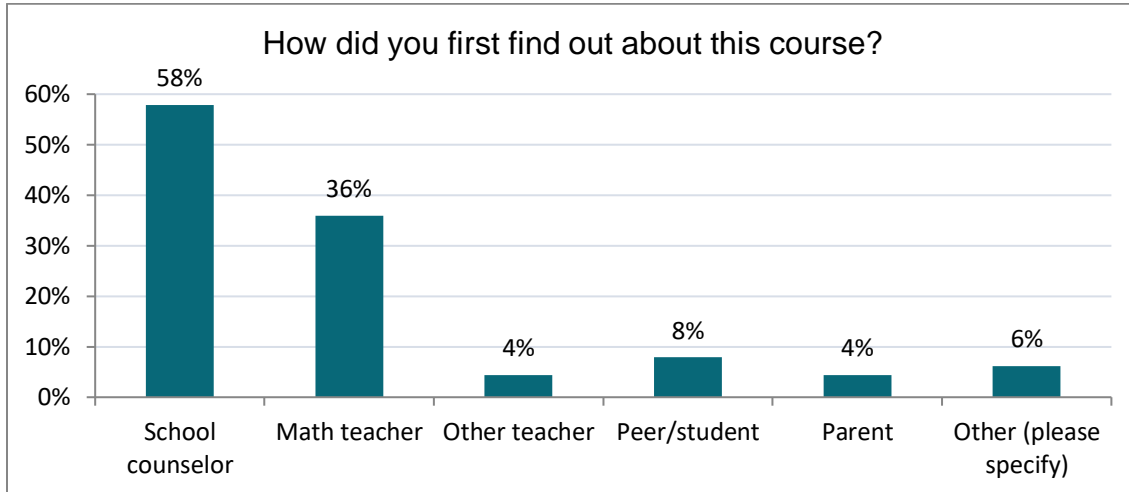
To gain a better understanding of how students were recruited into EMC², we asked two questions that focused on the course enrollment process.

First, we asked students how they first heard about the course. The majority reported first hearing about EMC² from their school counselors (58%) and/or math teachers (36%).

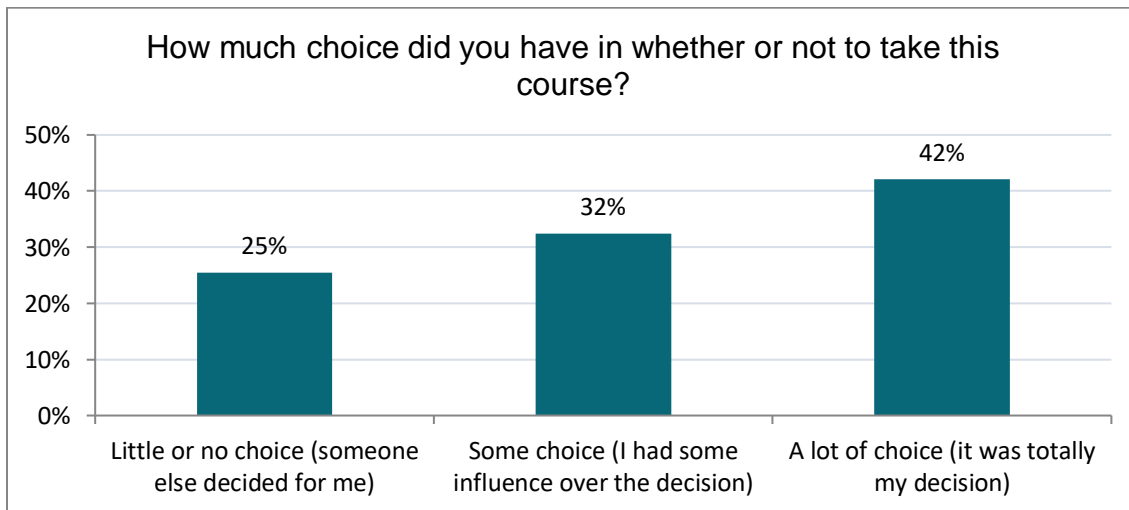
Smaller proportions reported hearing about the course from other teachers (4%), students



(8%), and parents (4%). These results confirm that, as expected, most students are being recruited for the course by school counselors and math teachers at their school. However, the fact that some first heard about the course from their peers suggests that news of the course also spreads by word of mouth.



We also asked students how much choice they had in whether to take the course. Most students (75%) believed they had at least some influence over the decision. The remaining 25% of respondents felt they had “little or no choice” in whether to take the course. There was some evidence of a link between the amount of choice students felt in taking the course and their responses to other questions: Students who felt they had “little or no choice” in whether to take the course appeared more likely to report feeling the same or worse about math, less confident in their math ability, and more concerned about passing postsecondary math, and were less likely to say they would recommend the course to other students. They also appeared less likely to have taken Algebra II or equivalent, or pre-Calculus and more likely to have taken Statistics.



Student feedback about the course overall

The survey included two open-answer questions focused on students' (a) favorite thing about the course (what should we keep doing) and (b) "least favorite thing about the course (what needs to be improved or changed). A surprisingly high proportion of students not only answered these questions but provided thoughtful and constructive feedback. Response rates on these questions (excluding "I don't know" answers) were 77% and 76%, respectively.

Responses about what went well focused on the following themes:

- Specific activities or topics covered, such as the Bucky the Badger unit, scale picture drawing, learning about loans, financial math, quadratics
- Aspects of the course approach or design such as "hands on", use of unit packets, real world examples, teamwork, "the way the units fit together," "going over and knowing what went wrong," "being able to have space to figure the work out" and how it is "up to the student to learn the material and decide when they're ready to test on it"
- Aspects of the classroom environment such as the teacher, "being able to ask questions," "engaging the class and getting a laugh," and "doing connections in the start of class"
- Pace of the course, depth, level of detail

When asked what did not go well or needs improvement, 22 students (24% of those who gave an answer) used the space to say they could not think of anything to improve (one even said, "It is a perfect course."). The remaining responses focused on the following themes:

- Aspects of the materials used for the course, such as worksheets, confusing wording on class materials/tests, formatting of handouts
- Specifics related to the course format, such as the group work, one on one time, and pacing, online work, group projects
- Amount of work; difficulty
- Interpersonal issues (e.g. other students or teacher)
- Course content, such as fractions, graphs, word problems



GEAR UP
A federally funded program

in partnership with
 **VERMONT**
AGENCY OF EDUCATION


VERMONT
STATE COLLEGES SYSTEM

Conclusions from the student survey

Across all years students were surveyed, the detailed quality of their individual comments was notable, especially for a voluntary student survey about a math course. Although not every school participated in the student survey, responses showed evidence of the positive impact this course had on many students, such as increased confidence about their math ability and improved attitudes toward future math courses and math in general. For students taking the course in person, responses overall have been increasingly positive each year since the course was first offered. Importantly, there has been no evidence that the course had a negative impact on students: In each survey year, the vast majority would consider recommending the course to others, and any negative feedback students gave was remarkably constructive in nature.



GEAR UP
A federally funded program

in partnership with
 **VERMONT**
AGENCY OF EDUCATION


VERMONT
STATE COLLEGES SYSTEM

Teacher Survey Results

About the teachers and their courses

Sixteen EMC² teachers participated in the end-of-year survey between spring 2021 and spring 2024 (note that 5 of these were repeats from teachers who took the survey in more than one year). The EMC² teachers were highly experienced, with 88% having taught math for 10 or more years and only one teacher having taught math for less than 4 years.

EMC² was taught during the full year at 50% of the time and during one semester 50% of the time. Four teachers (25%) reported completing all 8 Units of the EMC² course, and thirteen (81%) completed at least 4 units.

The extent to which the course met its goal

The stated goal of the course was to *strengthen students' foundational math skills and conceptual understanding, making them better prepared for post-secondary career and learning opportunities*. Over the past four years, only one teacher (from the 2020-2021 school year) thought the course did not meet its goal. The remaining 94% thought the course met or partially met its goal. Of the seven teachers who thought the course only partially met its goal, six thought it could meet its goal if refined and one thought "maybe" it could.

Feedback about whether the course reached the intended student population

When we asked teachers what kind of students are the best fit for EMC², their answers included the following:

- Nine focused on the preparation level of the students, with seven saying they needed Algebra 2 exposure to be successful.
- Three described students who are interested in college but are (or feel) underprepared mathematically.
- Four focused on student motivation, describing students who are "self-directed" or "choose to enroll with a personal goal to grow math skills and knowledge."
- One said students who need to complete proficiencies they missed earlier.

We also asked if the course reached the intended students. Over two-thirds of the teachers said yes. The remainder said some or most of their students did not fit the description, with half of those attributing this to students being placed into the course for misguided reasons.



GEAR UP
A federally funded program

in partnership with
VERMONT
AGENCY OF EDUCATION



Feedback about the course overall

Like the student survey, the teacher survey included two open-answer questions requesting feedback on what went well this year and what needs to be changed or improved. Their feedback is summarized below:

- The top themes for feedback about what went well included the small class size and the course materials. Additional comments praised the sequence and choice of topics covered in the course. Others mentioned the applied and deep-thinking tasks used.
- In terms of areas of improvement, the most common theme focused on improving assessments used, followed by organization of the materials provided. Other comments included feedback about a specific activity, about the sequence of the course, and about challenges related to how students were placed into the course. One comment focused on challenges unique to the new fully-online format piloted through VTVLC during the 2022-2023 school year.

Conclusions from the teacher survey

Across all years, responses on the teacher survey were largely positive with helpful and constructive feedback. Responses have focused on issues related to course materials less over time, indicating that improvements to the materials have been successful. As schools returned to fully in-person instruction after COVID we saw fewer comments focused on the challenges of hybrid instruction, but recent responses suggest teachers continue to struggle with challenges related to how the course is filled and scheduled in some schools.



GEAR UP
A federally funded program

in partnership with
 **VERMONT**
AGENCY OF EDUCATION

