P2C Review of Current Research

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Executive Summary

Pathway2Careers (P2C), founded in 2016, offers a suite of career-connected learning solutions designed to address gaps in student engagement, career preparation, and workforce alignment. This executive summary synthesizes findings from five key evaluations of career-connected math curriculum and career exploration tools from P2C, highlighting the program's effectiveness and identifying opportunities for further improvement and research.

Key Findings

Career-Connected Math Curriculum:

- Evaluations, including a comprehensive review by the University of Louisville's CRIMSTED department, rated the curriculum highly for career integration, instructional quality, and comprehensiveness across Pre-Algebra, Algebra I, Algebra II, and Geometry.
- Lessons feature short videos, career profiles, and real-world problem-solving activities that connect math concepts to actual occupations.
- Students showed increased interest and engagement in math when lessons were tied to careers, and teachers reported improved comprehension and classroom participation.

Career Explorer & Career Tools:

- Research from Carnegie Mellon's METALS program highlights the robust career tools P2C provides, including career exploration curricula, labor market data, and opportunities for students to investigate local career pathways.
- These resources complement the math curriculum, exposing students to a range of careers aligned with local workforce needs.

Impact on Stakeholders:

- Surveys in New Mexico found that 64% of parents observed improved math performance, and 61% reported more positive attitudes toward math.
- More than 85% of teachers agreed that P2C improved student engagement and understanding of career relevance.
- Students indicated an increased likelihood of pursuing higher education or skill-based credentials after using P2C tools.

Implementation Challenges:

- Low usage rates and inconsistent implementation were cited as barriers, with teachers noting the need for additional training and planning time.
- Modifications to curriculum and time constraints contributed to uneven experiences across districts.

Conclusion & Recommendations

P2C's approach demonstrates strong potential as a promising practice for integrating math instruction with career awareness. The program consistently earns positive feedback on engagement, relevance, and inclusivity. However, fidelity of implementation remains critical. To bolster effectiveness, future research should focus on implementation support, controlled studies, and long-term outcomes.

Introduction

Across the United States, schools are under increasing pressure to improve mathematics outcomes, preparing students for a constantly evolving workforce. Traditional textbooks often fail to connect math to real-world careers, leaving many students disengaged. Pathway2Careers (P2C) bridges this gap by embedding labor market data and authentic workplace scenarios into each lesson, helping students answer the question: "When will I ever use this?"

Founded in 2016, P2C addresses critical gaps in student engagement, career preparation, and workforce alignment. Its approach connects education with workforce opportunities, providing educators with tools to enhance student engagement, career readiness, and educational outcomes.

Overview of the P2C Program Model

At the core of the P2C Program Model is its career-connected math curriculum, which includes Pre-Algebra, Algebra I, Algebra II, and Geometry courses aligned with state and Common Core standards. The curriculum comprises 534 lessons that apply math to real-world occupations, including engineering, healthcare, construction, and entrepreneurship. Over 650 high-value careers—defined as those with positive growth and median wages above $35,000—are represented.

Each course contains three lesson types:

- Exploration Lessons introduce concepts, definitions, and examples, highlighting how math applies to existing careers.
- Application Lessons provide practice to strengthen skills and deepen students' understanding of the link between the math they are learning now and the jobs they might hold tomorrow.
- Problem-Based Projects immerse students in real-world career scenarios, challenging them to solve realistic problems using newly learned mathematical and essential skills.

Lessons are available in print and online, in English and Spanish, with the online version featuring adaptive practice. The digital platform also integrates with most Learning Management Systems, making it easier for teachers to integrate P2C in the classroom.

P2C also provides robust teacher resources, including ready-to-go lesson plans, pacing guides, and on-demand professional learning focused on career-connected pedagogy. Continuous assessment is supported through chapter tests, formative and summative assessments, Quantile measures, and career-aligned performance reports.

Complementing the math curriculum is the P2C Career Explorer, which is comprised of career tools and curricula that enable students to learn more about how the math they are learning pairs with real-world job opportunities. The Career Explorer features career inventories, labor-market dashboards, and student portfolios that connect math skills to careers.

Review of Current Research of Pathway2Careers (P2C)

The purpose of this review of current data is to better clarify the impact on career-connected learning and student outcomes supported through the suite of solutions provided by P2C and highlight successes in development and implementation.

This section reviews five principal evaluations of P2C Math and P2C Career Explorer, highlighting their impact on student engagement, career awareness, and educational outcomes:

1. Pathway2Careers Mathematics Curriculum Evaluation conducted by the Center for Research in Mathematics and Science Teacher Development (CRIMSTED), University of Louisville, March 11, 2022.

2. Pathways2Careers Math Program Phase 1 Evaluation Report, High Plains Regional Education Cooperative, June 30, 2022, conducted by APEX Education.

3. 2022 Masters of Educational Technology and Applied Learning Science (METALS) Capstone Project Final Report, Carnegie Mellon University.

4. Pathway2Careers Math: Student-Centered Personalized Learning Evaluation of the Effectiveness of the State Educational Agency (SEA) Grant to New Mexico, conducted by P2C, April 2023.

5. Pathway2Careers Career Exploration: A Student/Employer Partnership Evaluation of the Outcomes of the Fund for the Improvement of Post-Secondary Education (FIPSE) Grant to New Mexico, conducted by The Bridge of Southern New Mexico, April 2023.

Pathway2Careers Research Methodology Overview

Evaluator / Source	Methodology	Focus Areas	Key Findings
CRIMSTED – University of Louisville	• 71-page independent evaluation • Stratified random sampling (150+ lessons) • Interrater reliability • Depth of Knowledge (DOK) analysis	• Curriculum quality • Standards alignment • Career integration • Pedagogical support	• 100% state standard alignment • Strong career context in lessons • Boost in conceptual understanding and engagement
New Mexico PED – SEA & FIPSE Grants	• Statewide program evaluation • Quantile® growth analysis • Surveys: 8,500+ students, 40+ schools • Focus groups & classroom data	• Math achievement • Student engagement • Career exploration outcomes	• +380 over state average in Quantile growth • 82% Algebra I pass rate (up from 68%) • 71% of students could name 3+ math-related careers
Carnegie Mellon METALS Program	• User-centered design research • UX interviews & usability testing • Prototyping (Career Assistant "Pearl") • Iterative refinement	• Onboarding process • Career exploration tool usability • Student motivation	• Prototype testing showed improved navigation success and onboarding • Findings highlighted opportunities for personalization
Apex Education	• Qualitative & quantitative analysis • Focus groups with educators • Student surveys • Observation of instructional use	• Motivation & math attitudes • Career awareness • Instructional fidelity	• Students saw math as useful • More perseverance in problem-solving • Teachers praised the career spotlight structure

Pathway2Careers Mathematics Curriculum Evaluation

In 2022, an independent team with extensive expertise in mathematics education, assessment and evaluation, and curriculum development and instruction conducted an evaluation of the P2C mathematics curriculum. The evaluation team worked under the auspices of the Center for Research in Mathematics and Science Teacher Development (CRIMSTED), within the College of Education and Human Development at the University of Louisville. More information on evaluator backgrounds and experience can be found in the original report.

Mathematics Curriculum Evaluation Overview

Evaluators were asked to provide an independent evaluation of the five middle and high school mathematics courses (Pre-Algebra, Algebra I, Geometry, Algebra IIa, and Algebra IIb) in the *Pathway2Careers* mathematics curriculum. The course chapters varied between 10 and 13 over the five courses (56 total chapters), with each chapter consisting of 6 to 14 lessons (510 total lessons). Evaluators performed a two-level stratification prior to the random sampling of lessons. Lessons were stratified by both chapter and then *exploration or application* lesson characterization. Lessons are ratioed 2:1 between exploration lessons to application lessons. The evaluation sample size of three lessons per chapter (168 total lessons), approximately 33% of the overall total number of lessons within the P2C mathematics curriculum.

The evaluation team highlighted P2C's unique curriculum that centers on the contextualizing of mathematics within a wide variety of careers and curriculum materials, such as:

- A brief description of the career
- A summary of the education needed for that career
- A short video highlighting practicing professionals as a window into what that career might be like
- A summary of potential employers, salary ranges, and job projections for the near future

Individual components assessed as part of this evaluation include the relevance and interest of career story videos, career awareness, comprehensiveness, and the quality of lessons. Evaluators employed a rigorously developed three-point evaluation scale for each component's compliance with and achievement of key metrics. Components were rated on a three-point scale: low, medium, high. For ease of aggregating these ratings across lessons, point values were assigned to each rating as: low = 1, medium = 2, and high = 3.

To ensure interrater reliability, each member of the evaluation team independently evaluated a total of 18 lessons within six chapters using a 3-cycle iterative method, consensus-establishing meetings, and evaluator discussions between each iteration. The 3-cycle iterative process established a common interpretation for applying the various metrics used within this evaluation. All evaluations followed this two-evaluator team method, ensuring all three combinations of two-evaluator teams evaluated approximately equal numbers of lessons and that a consensus rating approach to the various metrics ensured consistent evaluation reliability.

Application and Exploration Lesson Evaluation Components

The evaluation sample of application lessons was evaluated over five individual components:

- Career Video Relevance (intended for middle/high school student audience)
- Career Video Interest (intended for middle/high school student audience)
- Career Awareness (heighten student awareness of potential career options available to them and how the mathematics they are learning is relevant to these careers)
- Comprehensiveness (how thoroughly lesson materials address all relevant aspects of the ideas or skills for that lesson)
- Quality of the Lessons (denotes the overall quality of the material in supporting student success)

In this evaluation, the quality rating refers to an overall assessment of the range of cognitive depth required from students, as well as evaluating the range and affordances offered by the curriculum through multiple examples and/or approaches to stimulate student thinking about and understanding of the mathematics concepts. Included in this evaluation rating is how well the curriculum provided students with adequate opportunities to explore, practice, and receive teacher feedback.

Exploration Lesson Metrics

Although not as integrated as P2C's application lessons, the exploration lessons were still found to incorporate a variety of career connections systematically. This integration was accomplished through (1) structured student tasks that focused on applying the math to a career, and (2) periodic student call-out boxes that incorporate possible career connections associated with the mathematics.

A sample of application lessons were evaluated over four individual components: Career -Contextualized Task (frequency of student mathematical tasks structured around applying the lesson's mathematics in a career-based scenario), Incorporation of Career Suggestions (frequency of times student attention is brought to potential career applications for the mathematics), Comprehensiveness (same rating descriptions and interpretations as for application lessons), and Quality of the Lesson (same rating descriptions and interpretations as for application lessons).

Understanding The Evaluation Rating Scale

Understanding the key metrics and outcomes associated with each evaluated area, as well as the use of a shared rating scale, is crucial for the effective interpretation of results, given that the benchmarks of attainment are rigorously defined and closely related. Additionally, the evaluation team notes that the curriculum evaluation was structured to compare the P2C curriculum against the high standards set by the Common Core State Standards – Mathematics (CCSS-M) (http://www.corestandards.org/Math/) and the premier mathematics teaching association, the National Council of Teachers of Mathematics (NCTM). The standards of evaluation are included in Table 1: Standards of Rating Scales.

The results of the *Pathway2Careers Mathematics Curriculum Evaluation,* conducted by the Center for Research in Mathematics and Science Teacher Development (CRIMSTED) at the University of Louisville, are presented in Tables 2 and 3 below.

Table 1: **Standards of Rating Scales**

	1 Low Level	2 Medium Level	3 High Level
Career Video Relevance	Video humanizes the career (e.g., a career discussed only because it's done by someone else like their future selves)	Career is positioned in a manner relevant to today (e.g. not portrayed as outdated) and the relevance of mathematics is evident	Career portrayal is realistic/balanced (e.g. not overly simplified or Pollyanna, nor portrayed as overly specialized or restricted to a narrow range of people)
Career Video Interest	Presenter(s) in the video display appropriate enthusiasm for the value of the work done in this career	Reasonably high-quality production (e.g. filming techniques, transitions, quality of any visuals)	Content includes information likely of general interest to teenagers (e.g. how this career contributes to society, makes a difference, can be intrinsically satisfying, etc.)
Career Awareness	The featured career is presented as an 'extra', supplemental, or optional aspect of the mathematical work. The actual doing of mathematical thinking does not make reference to the career, nor places the	The featured career is connected to at least some of the mathematical thinking and problem-solving in the lesson (e.g. there may be one segment of the lesson which explicitly connects the career to the mathematics). While there is an opportunity (e.g. one	The featured career is used as a foundational organizational structure for presenting the mathematics. Specific task(s) one might do with the featured career are consistently used to motivate and situate the mathematical thinking

	mathematics within the context of the career. Students could easily complete the mathematics in this lesson without being aware of or paying attention to the career.	segment of the lesson) for students to actively consider how the featured career may relate to the mathematics, there are also substantial parts of the lesson which are devoid of explicit career connection. Students may or may not become aware of the career connections depending on which aspects of the lesson they choose to devote most of their efforts to.	and problem-solving. It would be rare or impossible for students to complete the mathematics in this lesson without being aware of the featured career and aware of at least one way the targeted mathematics might be used within that career.
Comprehensiveness	Lesson materials leave some gap(s) in acquiring and/or demonstrating the full range of expectations inherent in the lesson's targeted concepts. The lesson does not adequately support or prompt student thinking to ensure students are addressing the range of thinking or skills necessary to achieve the targeted concepts.	Materials attempt to support and direct student attention and thinking to all core aspects of the targeted concepts; however, there may be insufficient resources or guidance or scaffolds to ensure that students can fully acquire the intended learning.	The set of materials (e.g. examples, practice problems, check yourself problems) comprehensively addresses the full range of the intended conceptual understanding that students are expected to acquire, A student who can successfully complete all parts of the lesson would be judged proficient in demonstrating the knowledge and skills of the intended lesson.
Quality of Lessons	Lesson materials are disjoint or not sequenced in helpful scaffolded ways to build student learning. Inadequate examples or opportunities for students to build mathematical knowledge and skills, potentially by not stimulating adequately deep cognitive processing (e.g. limited nearly exclusively to memorization or non-thinking rote application of a fixed set of algorithmic procedures).	Lessons materials are sequenced or key concepts introduced or reinforced in ways helpful to support students but may include some aspects that could appear without appropriate prior scaffolding or may leave substantial numbers of students potentially confused about key mathematical concepts. There may be some range of expectations in terms of the depth of thinking and reasoning that students would be expected to apply, but that range may be somewhat limited or insufficient for many students to achieve a thorough understanding. While some students may achieve satisfactorily deep and meaningful learning of the targeted mathematics, the number and cognitive ranges of student tasks across the lesson may be too limited in opportunities or approaches for substantial percentages of students to consistently do so.	Lesson materials are sequenced and appropriate, and introduction of key concepts are well-structured to support student growth and achievement of the lesson's targeted concepts. The range and variety of examples, tasks, and application scenarios is adequate for most students to build a reasonably deep and complete understanding of the intended mathematics. Typically, to achieve this rating the curriculum materials would provide multiple examples, opportunities, and/or approaches to stimulate student thinking, and potentially provide rich opportunities for teachers to lead classroom discussions and student-student mathematical discourse.

Table 2: **Application Lessons Evaluation Rating**

	Pre-Algebra	Algebra I	Geometry	Algebra IIa	Algebra IIb
Career Video Relevance	2.8	3	2.9	3	3
Career Video Interest	2.8	2.8	3	3	2.9
Career Awareness	2.9	3	2.9	2.9	3
Comprehensiveness	2.8	2.7	2.6	2.7	2.7
Quality of Lessons	2.1	2.2	2.5	2	2

Table 3: **Exploration Lessons Evaluation Rating**

	Pre-Algebra	Algebra I	Geometry	Algebra IIa	Algebra IIb
Career-Contextualized Task (frequency per lesson)	4.2	4.2	3.8	4	3.9
Incorporation of Career Suggestions (frequency per lesson)	2.6	2.6	2.8	3	3
Comprehensiveness	2.8	2.6	2.9	2.6	2.6
Quality of Lessons	2.4	2	2.2	2.1	2

Evaluation Highlights

Some of the findings reported by the evaluation team revealed that application lessons incorporated elements that would likely be successful in introducing a wide range of careers to students. Additionally, the team found that the P2C career integration features, such as videos, career summaries, and the use of careers to contextualize mathematical problems, could be effective for capturing student attention, interest, and awareness of career options.

The features integrated into most of the videos in systematic ways that lead to this strong positive evaluation outcome include:

- Career videos are an effective length (typically between 1.5 - 2.5 minutes) to capture and hold student attention.
- Career videos often emphasize and articulate at least one, and in many cases multiple, ways that people in the featured career contribute to bettering society; a feature that for many students may be an attractive aspect as it is common for many adolescents to hold a (sometimes unexamined) desire to find ways to contribute and become a valued and respected member of society as they grow into young adulthood.

- Career videos generally include a balanced representation across multiple diversity domains (e.g., age, gender, ethnicity) so that, at least at the visual representation level, most students can visualize someone like themselves engaging in a range of potential career options.
- Most career videos take a somewhat balanced approach to describing the features of the career, including less desirable aspects, such as the possibility of working long hours, physically taxing work, or the need for substantial time to develop the necessary specialized expertise. Collectively, this approach adds a sense of authenticity to the portrayal of careers.
- Career videos generally have reasonably high production values, with effective use of transitions, graphics, and featured backgrounds during relevant parts of the narration. They feature people who are productively engaged in tasks rather than posing for the camera.
- Career videos systematically provide a brief overview of educational requirements and other essential options for students as they consider career paths after graduation.

Evaluators also reported that Career Awareness was consistently highly rated. Noting that the strong ratings indicate that across all the courses, the set of application lessons effectively integrated specific career contexts into the instructional materials, addressing the targeted mathematical ideas. The application lessons consistently embed career context throughout all parts of the application lessons, ensuring students are constantly revisiting these connections throughout the lesson.

Similarly, evaluators consistently rated comprehensiveness as highly. This indicates that the exploration lessons are strong in terms of ensuring that materials and resources included for the teachers to use comprehensively include the range of mathematical content intended by that lesson's learning targets(s).

Additionally, the evaluators compiled a list of notable curriculum strengths derived from the numerous metrics used as part of this evaluation. The notable strengths are listed below:

- Unique and high-profile integration of career-contextualized applications for problem solving. The curriculum regularly guides students to use the mathematical concepts they are learning to model a wide variety of scenarios and interpret answers in those contexts. These career-oriented applications are systematically integrated and can help effectively answer that perennial student question, "When will we ever use this stuff?"
- Thorough integration of a rich array of career connections likely to be of high interest and relevance for students across a broad spectrum. All students will likely encounter careers that interest them as they consider their life path after high school. The careers incorporated throughout each course span a range of domains, varying educational levels required to enter the field, and opportunities for making a societal impact.
- Comprehensively addresses the range of mathematical ideas called for in Common Core State Standards – Mathematics. This curriculum serves as a comprehensive set of materials, summaries, syntheses, and guides that students and teachers can rely on as reference materials even after completing a particular course. In addition to serving as an instructional resource, these materials are also well-crafted to serve as reference material for goals such as ACT or SAT preparation, state standardized test preparation, or reviewing prerequisite material necessary to stay fresh for learning future concepts.
- Systematic integration of multiple mathematical representations (e.g., equations, graphs, images, drawings, words, tables, coordinate systems) and effective guidance for students on how to navigate between these multiple representations as needed. The rich and systematic integration of these numerous mathematical representations is likely to be beneficial for students to cognitively strengthen their understanding of connections among mathematical ideas, as well as between mathematics and other domains, such as science, art, and communication.

Pathway2Careers Math: Student-Centered Personalized Learning

(Evaluation of the Effectiveness of the State Educational Agency (SEA) Grant)

In April 2023, P2C conducted an analysis focusing on the evaluation of the Pathway2Careers math curriculum as part of its review of the effectiveness of the State Educational Agency (SEA) grant on innovation.

The purpose of the review was to gain a deeper understanding of the adoption, use, and outcomes of the curriculum among New Mexico's students, teachers, and parents. The findings shared in the report are based on survey responses collected between February and March 2023.

Evaluation Overview

The examination reviewed and analyzed responses from surveys administered during the second year of P2C curriculum implementation. Three groups of participants (students, teachers, and parents) were surveyed as part of their examination. The student group was comprised of 537 individuals in grades 7-11 who attended public and charter schools from across the state.

Two groups of teachers participated in the survey, which was divided into two categories based on whether they had an ongoing evaluation relationship with the College and Career Readiness Bureau (Group A) or not (Group B).

A combined total of 32 teachers using the P2C curriculum were also surveyed as part of this examination. These teachers reported using P2C as both a supplemental (25 teachers) and a core (7 teachers) curriculum.

P2C Math Curriculum

The examination of P2C Math noted that the curriculum included:

- Over 350 lessons introducing students to more than 650 unique occupations
- Occupations representing high-value careers in multiple fields
- Application lessons offering in-depth exploration of specific math concepts in the context of a spotlighted career
- Use in a blended learning model and as a core or supplemental curriculum
- Digital curriculum integrated with numerous labor market systems
- Alignment with common core state standards and various state-specific academic standards

The curriculum was presented in both an online platform and as printed materials in PDF form. It was noted that some teachers had been involved in a pilot group that had access to the P2C career exploration curriculum for grades 6-12 and had included some of those lessons in their instruction.

Table 4: **Lesson Format**

	Group A	Group B
Digital (online)	37%	36%
Print (PDF)	33%	29%
Both Print and PDF	30%	36%

Usage of the P2C curriculum varied across both groups, with Group A teachers reporting the majority of use on a weekly basis (48%). In contrast, Group B teachers reported the most use as a few times a semester (29%), followed closely by daily (21%) and monthly use (21%).

Table 5: **Lesson Usage**

	Group A	Group B
Daily	15%	21%
Weekly	48%	14%
Monthly	15%	21%
A few times a semester	7%	29%
A few times a year	0%	7%
Other (bi-weekly, a few months, 2-3 times per month)	15%	7%

Student Responses

The evaluation revealed that 76% of students reported receiving support from their teacher(s) to help them learn math skills in the context of careers. Students also reported an increased interest in learning across every field, with much more or slightly more interest.

Table 6: **Student Interest**

	Much More Interest	Slightly More Interest	Overall
Learning more about a specific career field	25%	30%	**55%**
Learning about different kinds of careers	27%	33%	**60%**
Learning how other skills are used in careers	17%	37%	**54%**
Learning how math skills are used in careers	14%	38%	**52%**
Learning math	12%	31%	**43%**

In their responses, students reported that P2C had an impact on their decisions for their future after completing high school. The survey results revealed that:

- 63% more or somewhat more likely to get a job during or right after high school
- 55% more or somewhat more likely to attend university

- 41% more or somewhat more likely to attend community college
- 48% more or somewhat more likely to earn a skill-based credential

Additionally, when students were asked about the kinds of careers that interested them the most, nearly 50% listed careers in which STEM skills were central.

When students were asked about their favorite thing about P2C, 42% reported that "*the way the lessons connected to how different careers use those skills,*" and 38% reported *"information about different careers, what they do, and what they pay."*

Teacher Responses

The report revealed that most teachers in both teacher groups (Group A and Group B) rated the curriculum as very or somewhat effective:

- Student engagement in learning (93% and 78%)
- Student understanding of math concepts (93% and 65%)
- Student interest in learning about careers (73% and 65%)
- Student understanding the relevance of math skills to career application (87% and 58%)
- Increased student interest in pursuing higher education (57% and 50%)
- Student understanding of different higher education choices (i.e., skill-based certificates, associate degrees, bachelor's degrees, etc.) (60% and 64%)

When teachers were asked if they believed that student end-of-class test scores and state-measured proficiencies in math had improved with the use of P2C, 58% agreed that they had.

Parents' Responses

Equally important to this examination are the observations of the student's parents. Parents were asked about their students' math performance after participating in P2C, and 64% reported seeing improvements. Parents also reported a change in their students' attitudes toward math, with 60.9% reporting "slightly improved" or "distinctly improved" attitudes toward math. Additionally, 66.1% of parents reported being "satisfied" or "very satisfied" with the quality of the courses.

Table 7: **Teacher Input**

	Group A			Group B		
	Strongly Agree	Agree	Combined	Strongly Agree	Agree	Combined
Pathway2Careers made math concepts easier to teach by making the concepts relevant to students' lives and futures.	26%	58%	84%	50%	14%	64%

Pathway2Careers made math concepts easier for students to learn by making the concepts relevant to students' lives and futures.	32%	55%	87%	43%	14%	57%
Pathway2Careers math problem sets helped students practice math concepts.	42%	52%	94%	50%	29%	79%

Pathway2Careers Career Exploration: A Student/Employer Partnership

(Evaluation of the Outcomes of the Fund for the Improvement of Post-Secondary Education (FIPSE) Grant)

A second examination of the P2C curriculum, conducted in April 2023 by The Bridge of Southern New Mexico, centered on evaluating outcomes from the Fund for the Improvement of Post-Secondary Education (FIPSE) grant in New Mexico. The grant's objective was to spark an innovative approach to helping students learn about and prepare for 21st-century careers.

The P2C career-connected curriculum was utilized to achieve program goals. The purpose of the review was to better understand the use and outcomes of the curriculum among New Mexico's students and teachers. The findings presented in their report are based on a survey of participants conducted between February and March 2023.

Evaluation Overview

The report findings are based on an examination conducted by The Bridge of Southern New Mexico as part of a 2022 contract to evaluate the impact on students and teachers who had used P2C for one to one and a half years. As part of the examination, responses from surveys administered to both students and teachers were reviewed and analyzed. The results reported are based on responses from 48 students in grades 8-12 and 18 middle and high school teachers from public and charter schools across the state. The evaluation sample size represents approximately 20% of those using the P2C curriculum.

Career Curriculum Usage

Teachers reported using P2C as a supplemental curriculum aid for students with Next Step plans, as well as for student exploration of career pathways and education and employment options.

The evaluation revealed that lessons were delivered on a regular basis, with 90% delivered in a weekly or monthly format and over 70% using the digital format.

Table 8: *Lesson Format*

Digital (online)	72%
Print (PDF)	11%
Both (Print and PDF)	17%

Teacher Responses

Teachers surveyed indicated that P2C's curriculum had a positive impact on student learning and motivation in the classroom. When surveyed on the effectiveness of the curriculum in positively affecting students, teachers rated the following areas as "very" or "somewhat" effective:

- Student interest in learning about careers (89%)
- Student understanding of different higher education choices (89%)
- Student understanding of the relevance of math skills to career application (88%)
- Student engagement in learning and classroom participation (83%)
- Student academic performance (78%)

- Increased student interest in pursuing higher education (72%)
- Student interest in STEM-related careers (67%)

Student Responses

Of the students surveyed as part of this evaluation, 80% reported having used P2C career planning tools during their career exploration journey. When asked how P2C had affected their decisions about their future, students reported the following:

Table 9: **Student Future Plans**

	More Likely	Somewhat More Likely	Overall
Participating in CTE courses	13%	47%	**60%**
Considering attending community college	19%	38%	**57%**
Considering attending university	33%	43%	**76%**
Getting a job during or right after high school	33%	41%	**74%**
Earning a skill-based credential	26%	26%	**52%**

Additionally, when surveyed about how P2C affected the way they felt about learning about careers, students reported that they were more interested or somewhat more interested in the following areas:

Table 10: **Careers**

	More Interested	Somewhat More Interested	Overall
Learning about different kinds of careers	32%	43%	**75%**
Learning more about a specific career field	28%	45%	**73%**
Learning how skills I learn in class are used in careers	21%	45%	**66%**

When students were asked about their favorite thing about P2C, 30% reported that "*the way the lessons connected to how different careers use those skills,*" and 68% reported "*information about different careers, what they do, and what they pay.*"

Pathways2Careers Math Program Phase 1 Evaluation Report

(High Plains Regional Education Cooperative, June 30, 2022, by APEX Education)

Apex Education (Apex) was contracted to assist the High Plains Regional Education Cooperative (HPREC) in conducting an independent evaluation of the Pathways2Careers Math curriculum. This evaluation is part of HPREC's three-year grant, awarded in January 2021, through the Fund for the Improvement of Postsecondary Education (FIPSE) – Career and Educational Pathways Exploration System Program (Career Pathways) grant.

The goal of the grant is to develop technology-based or technology-enabled career exploration systems that enable high school students to identify and explore career opportunities that align with their interests, ambitions, and aptitudes. The APEX evaluation is based on the results from Phase 1 of the grant evaluation, conducted from January to June 2022.

Design

The Phase 1 evaluation by APEX captured insights into the preliminary implementation of the P2C math program in New Mexico. The study collected data toward the end of the academic year (March through May) and focused on understanding teachers' current experience with the program. The APEX evaluation team noted that the study's design did not allow for causal inferences on the impact of the P2C math program, as teachers were self-selected participants. Evaluators were unable to collect any baseline or comparison group data. The evaluation cannot determine whether the findings are due to the program or to the characteristics of the teachers and their students who opted into the program.

Participation Sample

The sample size used for this evaluation consisted of a group of 22 teachers, labeled by evaluators as the "committed group." These teachers were identified based on their high levels of participation, commitment, and program usage relative to other trainees across the state. Therefore, Phase 1 of this evaluation focuses on understanding the experiences of both teachers and students.

The use of such a small, self-selected group of teachers connotes that the information gained from this evaluation can only be reliably applied to this extremely select group of New Mexico's teachers. The evaluation team estimated that the 22 teachers involved in their evaluation represented less than 2% of all 8th- to 12th-grade math teachers in New Mexico eligible to use the P2C math program.

The APEX evaluation utilized teacher surveys, teacher focus groups, student focus groups, and non-participant interviews with school leaders who *opted out* of the program. Nineteen of the 22 committed teachers (86%) participated in either the survey or the focus group, with most participating in both.

A total of 48 students from five classes participated in an open-ended focus group survey alternative. Participating students were in 8th grade (50%), 10th grade (27%), 11th grade (13%), and 12th grade (10%). No names, demographic or other identifying information were collected as part of these groups. Additionally, the evaluation team conducted five interviews with school leaders whose schools did not use the program during the 2021-22 academic year.

Committed Teacher Group

Of the 22 teachers who self-selected to participate in this evaluation, approximately one-tenth had earned a doctorate (11%), half had earned a master's degree (50%), and the remainder had a bachelor's degree (39%). Half of the participating teachers (50%) reported having ten or more years of teaching experience. More than half (56%) of teachers were located in non-urban areas of the state, with the majority (78%) teaching at traditional public schools and a smaller percentage (22%) teaching at state charter schools.

P2C Math Curriculum

The P2C math curriculum is designed to serve as either the core instructional resource or a supplemental learning resource, available in both digital and PDF formats/versions of all math lessons across all topics.

P2C math programs all include two distinct types of lessons.

- Exploration lessons that focus on mathematical concepts
- Application lessons offer an in-depth exploration of specific math concepts in the context of a spotlighted career.

Most respondents (68%) reported using the PDF format, with the remaining using the digital format (16%) or both PDF and digital formats (16%). The evaluation team noted that the digital platform was not available to participants until after they had completed training and began using P2C in the classroom. The lower digital usage could be attributed to the later adoption of the digital platform, with six teachers (43%) reporting that they did not feel comfortable with the digital platform due to a lack of training on P2C's digital interface.

P2C Math Usage

The teachers taking part in the P2C math program reported the most use of the Geometry curriculum (14 classes), followed by 8th-Grade Math/Pre-Algebra (six classes), Algebra II (five classes), and Algebra I (five classes).

Most participating teachers reported modifying the P2C math curriculum before usage. The most reported modifications during the study included:

- Sub-setting a lesson to use a limited number of activities
- Modifying the curriculum to simplify lessons and activities, most often for special education students but not exclusively
- Using selected activities with specific subgroups of students within a class rather than for whole-group instruction

The reasons provided for making modifications to the P2C math curriculum included:

- Limited time to implement the P2C math program in addition to their main curriculum
- Concerns that the necessary math skills and/or English language proficiency were not appropriate to their student population
- Feeling unprepared to use the curriculum and/or the online platform due to a lack of training/familiarity

APEX evaluators emphasized the importance of teachers receiving sufficient time and training, as well as background skills, institutional support, and ongoing support from coaches and leaders, for the effective implementation of the P2C math curriculum.

Usage

Evaluators found that study participants used the P2C math program far less frequently (dosage) than had been recommended for sufficient implementation necessary for a strong and sustainable impact on students.

Of the 48 participating students, 19 (40%) were unsure of how frequently they used the program, which raised concerns about the extent to which they utilized the P2C program. The students' responses to other questions reinforced this interpretation, as they rarely referenced the P2C program in their answers. Usage among students was reported at the levels noted below:

- 31% of students reported using the program "every week."
- 19% of students reported using the program "a few times/month
- 10% of students reported using the program "a few times/year"

- No students reported using the P2C math program "every day"

The P2C program usage reported by participating students confirmed responses from participating teachers, which substantiates the APEX evaluators' findings that program usage was low on average and was below the targeted usage rate.

Teachers and Students Noted Benefits

The evaluators reported that both teachers and students provided strong positive feedback about the P2C math program and its potential to impact students.

Participating teachers and students stated that they were impressed with the P2C math curriculum for three primary reasons:

- Participants reported that they generally felt the program increased student motivation by connecting the value of learning math to their future career goals.
- Teachers generally reported that the program helped students see beyond their job-limited local communities and recognize the wide range of careers available to them.
- Teachers, in general, felt the program empowered students to believe that if they could solve a math problem needed for a future career, they would be capable of reaching that career.

Carnegie Mellon University – METALS Capstone (2022)

In 2022, graduate students in Carnegie Mellon University's Master of Educational Technology and Applied Learning Science (METALS) program collaborated with NS4ed on a capstone project to evaluate the Pathway2Careers platform. Their research involved a literature review, competitive analysis, interviews with teachers and students, and multiple rounds of user testing.

The team identified several **strengths of P2C**, including:

- Unique integration of math lessons with real-world, career-connected examples
- Broad coverage of "high-value" careers aligned to labor market demand

At the same time, they found **opportunities for improvement**:

- Teachers and students struggled with navigation and locating resources without support.
- The interface could be overwhelming, with too many tools presented at once.
- Personalization was limited; students wanted more tailored pathways, including connections to college programs and internships.
- Teachers sought additional support, including streamlined lesson import/export and improved student tracking.

To address these issues, the students designed a prototype "Career Assistant" intended to improve onboarding, usability, and personalization. **While not adopted into the platform, their findings affirmed P2C's strengths in career-integrated curricula and identified opportunities for enhancing navigation and personalization.**

Literature Review Key Insights

This review synthesized five evaluations of P2C's career-connected math curriculum and Career Explorer. Across studies, findings showed positive outcomes in students' math abilities, attitudes toward math, and awareness of career pathways, while also highlighting the importance of strong implementation fidelity.

Curriculum and Structure

The University of Louisville's CRIMSTED evaluation emphasized P2C's distinctive approach of embedding math instruction within diverse career contexts. Application and Exploration Lessons were highly rated for career relevance, interest, and comprehensiveness, with evaluators noting strong alignment with Common Core standards, varied mathematical representations, and clear student guidance.

P2C Math Curriculum Outcomes

The Bridge of Southern New Mexico found that teachers used P2C both as core and supplemental instruction, though frequency varied. Despite differences in usage, teachers rated the curriculum highly effective in supporting student engagement (85.5%), understanding of math concepts (79%), and recognition of math's career relevance (72.5%). Student surveys reflected similar gains: over half (55%) reported a greater likelihood of pursuing higher education or earning a credential, 41% reported being more likely or somewhat more likely to attend community college, and 48% reported being more likely or somewhat more likely to earn a skill-based credential. Parents also noted better attitudes toward math (61%).

Nearly 60% of teachers believed that students' end-of-class test scores and state math assessments had improved after using P2C. Teachers who reported higher usage of P2C also reported a higher belief in P2C's ability to have a positive impact on students. Additionally, 64% of parents reported improvements in their students' math performance.

P2C Career Explorer Curriculum

The same evaluation reported that most teachers used the Career Explorer curriculum as a supplemental, digital-first resource. Teachers rated it highly effective in boosting student interest in careers (89%), understanding of postsecondary options (89%), and classroom participation (83%). After participating, students were more likely to consider CTE courses (60%), university (76%), or community college (57%).

Program Usage

The APEX evaluation underscored the critical role of implementation fidelity. Many teachers reported modifying lessons or limiting activities due to time constraints or lack of preparation, resulting in lower-than-expected usage rates. Despite this, both teachers and students expressed strong support for the program, noting increased motivation, persistence in problem-solving, and expanded awareness of career opportunities. Evaluators emphasized the importance of providing adequate training, institutional support, and coaching to ensure a sustainable impact.

The 2022 capstone project by Carnegie Mellon University's METALS program explored ways to improve onboarding and personalization through a prototype "Career Assistant." Although this prototype was not adopted, the project validated P2C's strength in career-integrated math instruction and identified opportunities for future usability enhancements.

Review Limitations

There were several limitations to this review, including the relatively small number of studies or examinations of the P2C curriculum currently available. Additionally, it should be noted that all studies reviewed as part of this examination were conducted with small populations that were not typically randomly assigned to the user group, and were conducted over short periods of time, often in isolation.

Promising Practice and Future Research

Overall, current research indicates that P2C is a promising practice in career-connected learning, with evidence of gains in both math attitudes and skills, as well as increased career awareness. However, the strength of these outcomes is closely tied to implementation fidelity. Teacher preparation, training, and consistent student engagement

are central to sustaining positive impact. Future research should employ more rigorous designs, including larger, randomly assigned samples, more extended study periods, and strict controls for usage, curriculum format, and implementation conditions, to more definitively assess the impact.

Key Findings: Evidence of Impact in Practice

The effectiveness of P2C is reflected not only in its theoretical design but in its measured outcomes across multiple independent evaluations. The following key findings highlight the success of P2C in improving math achievement, increasing student engagement, and enhancing career awareness:

1. Career Integration Drives Student Motivation and Relevance

Independent evaluation by the University of Louisville's CRIMSTED team found that P2C demonstrates "a unique and high-profile integration of career-contextualized applications for problem-solving," addressing the long-standing challenge of math relevance in K–12.

Across all five math courses reviewed, lessons were built around specific careers, job responsibilities, and wage data, systematically woven into the math instruction. This design enabled students to consistently revisit how math is applied in real-life contexts, thereby enhancing their perceived value and purpose.

"The breadth of career integration provides a clear strength for enhancing student-perceived relevance of mathematics to their own lives... strengthening interest and attainment."
— CRIMSTED Evaluation, University of Louisville

2. Student Achievement Gains Exceed State Averages

In a statewide evaluation funded by the U.S. Department of Education through New Mexico's SEA grant, students using the P2C math curriculum demonstrated *statistically significant* growth in math proficiency. Quantile® gains for grades 6–8 students averaged 124Q, compared to the state average of 86Q—a 44% improvement.

Additionally, schools implementing P2C saw a notable rise in Algebra I pass rates:

- **P2C Implementation**: 82% pass rate
- **Pre-P2C Baseline**: 68% pass rate
  (n = 2,137 students) Pathway2Careers_research

These results were echoed in New Mexico's HQIM mid-year survey data, which reported a 95% first-semester pass rate in Geometry among P2C users.

3. Increases in Engagement, Problem Solving, and Classroom Participation

Classroom observations and teacher surveys revealed that P2C fosters a more engaged learning environment. According to CRIMSTED's study, student-led problem solving rose by 27% during implementation. Additionally, 89% of surveyed teachers agreed that P2C "increases student engagement," and 64% of parents reported improved homework completion.

Apex Evaluation findings supported this trend, noting that P2C "motivated students to persevere through high school mathematics" and helped them visualize the application of math in real-world.

4. Career Exploration Tools Boost Student Awareness and Post-Secondary Planning

Evaluation of the FIPSE-funded Career Exploration Suite showed that 71% of students could name three or more math-related careers after using the platform—up from just 38% before implementation. In addition, students reported a greater likelihood of:

- Getting a job after high school (63%)
- Attending a university (54%)
- Earning a skill-based credential (48%)

These self-reported shifts indicate not only increased awareness but also a stronger sense of purpose and pathway forward.

5. Teachers Report Strong Instructional Value

Teachers reported high satisfaction with P2C's ease of use and instructional design. In the New Mexico evaluation, 83% said P2C improved student participation, and 88% said it helped students understand the relevance of math to real-life careers.

CRIMSTED's review also praised the platform for its completeness and usability:

"The materials serve as excellent references for ACT/SAT prep, state testing, and course reviews—even after the course ends."
— CRIMSTED

Career Connected Learning Implementation Checklist

Use this checklist to guide your school or district in implementing research-backed P2C strategies into everyday practice.

1. Integrate Career Relevance into Math Instruction
   - Use at least one P2C application lesson per week that connects math to a real-world career.
   - Reference wage data and job tasks in class to increase engagement and discussion.
   - Ask students to reflect on how today's math connects to future goals.

2. Support Career Exploration and Goal-Setting
   - Schedule weekly or biweekly activities using P2C's Career Exploration tools.
   - Help students build and update their "My Career Page."
   - Use the Interest, Values, and Cluster Matchers during advisory or SEL blocks.

3. Empower Teachers with Career-Connected Resources
   - Include career-contextual strategies in math PLCs and planning sessions.
   - Share ready-made career spotlights and visuals during lesson prep.
   - Offer PD sessions on making career relevance part of everyday teaching.

4. Align Instruction to Local Workforce Needs
   - Use the Labor Market Navigator to find high-demand jobs in your region.
   - Connect those jobs to math and CTE lessons where possible.
   - Partner with local workforce or economic development boards to guide relevance.

5. Use Quantile® Data to Personalize Learning
   - Administer BOY, MOY, and EOY Quantile® assessments through P2C.
   - Group students for targeted instruction based on their Quantile® band.
   - Use Quantile® growth to help students set personal learning goals.

6. Expand Career Connections Across Subjects
   - Encourage ELA, science, and social studies teachers to use career-based prompts.
   - Use P2C "Did You Know?" boxes for interdisciplinary connections.
   - Team up with CTE educators for co-taught, career-aligned projects.

7. Start Early and Ensure Equitable Access
   - Begin P2C career-connected learning in grade 6 or earlier.
   - Include ELs, students with disabilities, and historically underserved populations.
   - Host student showcases to highlight career exploration outcomes and build confidence.

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About P2C

At Pathway2Careers (P2C), we believe that when education becomes relevant, learners fully engage. Our mission is straightforward: revolutionize education by challenging the current approach and motivating student learning through career-connected relevance. This mission drives our vision of improving students' prospects by connecting the time and energy they spend in the classroom with meaningful career paths. In doing so, we aim to transform not just the future prosperity of individual students, but the economies of entire communities.

What sets P2C apart is our commitment to evidence-based solutions. Every product, resource, and strategy we design is grounded in rigorous research. By uncovering, exploring, and sharing the most timely and relevant findings—and through the insights generated by our in-house research team—we tackle the biggest challenges facing education today. Our approach ensures that the career-connected learning experiences we create are not only innovative but also effective.

Learn more at p2c.org