Preview of Award 2031479 - Final Annual Project Report

Cover

Federal Agency and Organization Element to Which Report is Submitted:	4900
Federal Award or Other Identifying Number Assigned by Agency:	2031479
Project Title:	Innovation Pathways to Data Careers
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Recipient Organization:	Education Development Center
Project/Grant Period:	10/01/2020 - 09/30/2025
Reporting Period:	10/01/2024 - 09/30/2025
Submitting Official (if other than PD\PI):	N/A
Submission Date:	N/A
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	N/A

Accomplishments

* What are the major goals of the project?

- Coordinate/support an IPDC RPP team as it explores what it takes to successfully implement a technical Innovation Pathway that is based on a state framework that is more generic in nature. The Research/Practice partnership will include stakeholders representing up to 8 school districts and relevant industry, higher education and community partners.
  1. Develop, test and roll out: 1) a Civics+Data module introducing data literacy through student developed Civics projects that are a new legislatively-mandated requirement for high school students in Massachusetts; 2) Visualization+Data and Python+Data courses that are backward-designed from college coursework; and 3) connect the Civics+Data, Visualization+Data, and Python+Data coursework to form the core of the IPDC that links to local community college programs preparing middle skilled data practitioners and university programs preparing data scientists. Up to 5 additional districts will field test the pathway.
  2. Build the capacity of 70+ Mass. educators to successfully implement the IPDC and teach the coursework.
  3. Roll out the Civics+Data Module for broad dissemination across Massachusetts. Identify and train Implementation Coaches from development/implementation districts to serve as PD providers and assist new districts in identifying content areas and infusion models to achieve the new civics requirements.

In addition, students will be introduced to high demand career pathways in data analytics. Using the Profile for a Data Practitioner and Burning Glass data for entry level careers, students will begin to examine the knowledge, skills and competencies needed for college and career pursuits.

* What was accomplished under these goals and objectives (you must provide information for at least one of the 4 categories below)?

Major Activities:	This final year of the IPDC project focused on three interconnected priorities that advanced the project's overall goals: the continued implementation and refinement of the data science pathway in participating districts, the expansion of district and educator capacity to sustain high-quality data-focused instruction, and broad dissemination of project insights and resources across Massachusetts and the national data science education community. These efforts built on earlier years of development and piloting, during which the project integrated data science activities into state-mandated student-developed Civics projects, collaborated with Bootstrap to incorporate data science into Algebra II, and designed and piloted the Visualization+Data and Python+Data courses

to align high school coursework with community college Data Analytics programs. With the full IPDC curriculum now available on the project website, this no-cost extension year deepened classroom integration, supported diverse learners through innovations such as self-paced modules, strengthened connections between high school and postsecondary programs, and expanded statewide and national dissemination to prepare more students and educators with foundational data literacy and data science skills.

Continued Implementation: The data science pathway continued in Burlington and Chelsea school districts with the major continued innovations taking place at Burlington High School. In Burlington, the Data+Python class was revised and made available in self-grading python modules. These modules were based on work done in previous years, but were adapted, tested, and successfully used as self-paced modules to accommodate a wide range of students. These modules were also adapted for use with individual self-paced learners doing capstone projects. Providing self-paced modules made it possible for Burlington High School to use the curriculum with more diverse learners who required differentiated instruction.

Interest in data science in Burlington underwent a rapid expansion because of the IPDC program. This year there were more students taking classes, getting involved in data science in clubs, earning industry certifications, and completing capstone projects in data.

At Burlington high ten students participated in both Data+Python and Data Visualization. One of the direct results of the IPDC project on the school environment in Burlington was an increased interest in data science from business and science students. As a result, 30 students used their senior capstone project to learn Excel and pass their certification exam.

Because of their awareness of data science, 39 students joined a student-led Data Science Initiative, which brought in guest speakers from academia and industry, expanding student exposure and enthusiasm for data science.

Eleven students also completed data science capstone projects: One used data science to analyze genome data, one team used data and machine learning to predict housing prices and another team used machine learning to control an autonomous drone. Another group of two students used data science and AI to launch a product for job seekers, inputting data from users' resumes and a target job, and then providing information on upskilling programs to help users secure positions.

IPDC Website (ipdc.org): The IPDC website is a long term dissemination vehicle for sharing IPDC curricula and resources for teachers and administrators aiming to equip students with essential 21st-century data skills. These materials, co-designed and developed by practicing teachers and piloted within this project, help high schools establish and implement pathways connecting students to community college programs for middle-skilled data practitioners and university programs preparing future data scientists.

Over the past year, as part of our dissemination and communications strategy, we updated the website to better reflect the program's broader national relevance and reach. Updates to the homepage and site language highlight the pathway's alignment not only with Massachusetts' Career Pathway Framework, but also with the needs of

other states implementing similar models. The revised site now emphasizes the availability of curricula and resources for educators and administrators nationwide, supports cross-disciplinary integration of data skills in high school Civics, Algebra, and Computer Science courses, and clearly communicates the project's goal of preparing students for a range of postsecondary and career opportunities in data science. These updates ensure that the site communicates the project's mission, its scalability, and its value to educators beyond Massachusetts.

Our dissemination activities focused on presentations at important national and regional conferences and meetings with the Massachusetts Department of Elementary and Secondary Education staff, school superintendents and the Middlesex League to plan for further ongoing implementation once the project has ended. See Dissemination section below for details on these activities.

Specific Objectives:	Executive Summary of Research Findings
Significant Results:	The IPDC project drew on a variety of data sources that address three research questions:

1. What did participants suggest were benefits for students and teachers by participating in IPDC courses and the IPDC pathway?

2. What did participants suggest were challenges related to implementation of and student learning from IPDC courses and the IPDC pathway?

3. What suggestions for improvement did participants provide for IPDC courses and the IPDC pathway?

Major findings in response to these questions include the following:

·   Students who completed the Visualization + Data course at Chelsea High in spring 2023, who were in Grade 11, and who were in the IPDC pathway indicated that their interests, self-efficacy, and self-concept in working with data were significantly higher at the end of the course than at the start of the course, based on post- and retrospective-pre-course survey responses. Findings for a group of Grade 12 students who were not in the IPDC pathway are difficult to interpret due to a small sample size. (RQ1)

·   A majority of students who completed the Civics + Data course at Chelsea High in fall 2022 said in a post-course survey that they felt most confident performing some of the course's more basic and general skills, and most interest in some of the course's more creative and analytic skills. They expressed less confidence and interest in some of the course's more technical skills. (RQ1)

·   Students who completed the Visualization + Data course at Chelsea High in spring 2022 (i.e., the first IPDC cohort at the school) indicated in a post-course survey that they felt most confident performing activities using Tableau, and greatest interest in learning more conceptual and analytic skills such as explaining how the brain understands data visualizations. They expressed less confidence in fixing messy data and creating calculated fields. (RQ1)

·   Students who completed the Python + Data course at Chelsea High in spring 2023 indicated in a post-course survey that they felt more confident in writing specific types of code (e.g., if-else statements) and greatest interest in writing code to create different types of graphs. They expressed less confidence in larger-scale tasks such as using data structures like lists or dictionaries or manipulating datasets. (RQ1)

· In post-course surveys for all three courses at Chelsea High, high proportions of student respondents expressed interest in taking additional data-related courses and exploring data-focused careers. Sample sizes of respondents were small, however. (RQ1)

· In interviews, teachers corroborated many comments from students about what students may have gained most from IPDC courses. Observed benefits include a greater sense of agency with data; greater interests in data science; greater willingness to explore and learn from each other; and the acquisition of practical and workforce-relevant skills. (RQ1)

· In focus group interviews, students shared a variety of challenges that they experienced in IPDC courses. Challenges included: cleaning datasets; initially learning programs like Tableau and Python; keeping up with courses if they were absent or didn't master prior content; inconsistent course pacing; and inadequate opportunities to practice the data skills they were learning. Teachers observed that students needed additional support in writing survey questions, presenting final projects, and considering data quality when looking for datasets to analyze. (RQ2)

· Teachers reported a variety of challenges in implementing IPDC courses. History teachers said that most of their disciplinary peers need significant support to teach with data. Finding student-friendly real-world datasets that match students' interests is time-consuming and difficult. Finding a flexible online platform to administer the Python + Data course was challenging. (RQ2)

· To improve IPDC courses and the IPDC pathway experience, students offered multiple suggestions in focus group interviews. Suggestions include: design different levels of each course, reserving more open data assignments for more advanced classes; offer more opportunities to work with more datasets; spend less time focusing on single graph types; and consider reversing the order of courses in the IPDC pathway. (RQ3)

· Teachers offered suggestions for improving implementation of IPDC courses. Some recommendations include: provide exemplar student assignments and final projects to students and teachers to help people gauge what high quality work can look like. Provide teachers with iterative PD and pre-set lesson plans that can be implemented and discussed throughout the school year. Invite data experts to talk with teachers during PD sessions. Spend more time helping students learn to evaluate and find good quality datasets. (RQ3)

· To strengthen the IPDC pathway, teachers recommended that a designated staff person serve as the pathway lead. Ensure there is a staff person who can focus on student internship placement. Select students who are interested in and motivated to participate in the pathway. Build courses around shared curricula. (RQ3)

See attachment 1. IPDC Research Findings 2025-09-30 for research study details.

Key outcomes or Other
achievements:

* What opportunities for training and professional development has the project provided?

Summer 2025 professional development focused on building capacity to teach Algebra II + Data. Eight educators participated in an in-person institute during Session 2 (July 21–25, Worcester, MA; 4½ days) with monthly virtual support during the school year. The workshop, led by Emmanuel Schanzer (Bootstrap), built teachers' skills to integrate real-world datasets and data-science practices into Algebra II/Math 3. Bootstrap website materials were shared, and each educator received a classroom set of student workbooks.

Post-workshop outcomes (data analyzed and reported in fall 2024).

- 100% were new to Bootstrap workshops.

- 100% said goals were clear and content was directly relevant.

- 100% rated the PD as high quality and appropriate for their grade/subject.

- 100% saw a role for Bootstrap:Algebra 2 in their teaching this year.

- 100% reported learning more CS and that the programming is approachable for students.

- 100% were comfortable with the content presented and rated the presenter as respectful, positive, responsive, and highly qualified.

- 87.5% agreed students will enjoy the material; 12.5% neither agreed nor disagreed.

Representative teacher feedback.

- "The practical applications and ease of implementation."

- "This class teaches math, computer science, and data and also how to teach."

- "The ease of creating scatter plots and models in Pyret. I feel freed from the TI-84."

- "Working with messy data and a visual approach to model fitting was powerful."

- "Bootstrap content is a bridge that holds calculations, functions, and representations together… Parent functions become tools for modeling rather than the end goal."

- "With Algebra 2 activities that use real-world data, I expect fewer 'when will we use this' questions and more engagement.

Participants reported plans to embed Bootstrap:Algebra 2 lessons across units, with several reorganizing sequences to feature data-rich modeling tasks. Ongoing monthly virtual support will help teachers adapt datasets to local contexts, implement lessons, and collect student work artifacts that show growth in Algebra II concepts and data reasoning.

Also during Summer 2025, four teachers from four different districts participated in the PD to learn how to incorporate Civics+Data into data science and AI programming. Teachers practiced and observed how to use Civics+Data modules with students during the PD. They also attended industry visits and listened to career speakers from Finance, Healthcare, Cloud Computing, Robotics, Life Science, and Technology to learn about data science applications in industry. 100% of teachers expressed an increase in data science knowledge and skills, and a greater awareness of data science career opportunities for students.

* Have the results been disseminated to communities of interest? If so, please provide details.

The Special Interest Group on Information Technology Education (SIGITE) Conference was held at the El Paso Community College on October 10-11, 2024. This annual event gathered educators, researchers, practitioners, and industry professionals dedicated to advancing information technology education.

Joyce Malyn-Smith (EDC), Deborah Boisvert (EDC/CSforMA), and Michael Harris (BHCC) led a plenary panel session that examined the development of the IPDC project designed to facilitate students' transition from high school to community college in pursuit of data-related careers. The presentation outlined a framework intended for adoption by additional colleges. It described EDC's partners and their roles. Burlington High School and Chelsea High School, piloting the pathway, adopted both integrated and elective approaches to teaching data science in secondary education. BHCC, representing the community college perspective, used practitioner input and industry feedback in course development, producing certificate programs, associate degrees, and university transfer pathways coordinated with high school curricula.

The panel outlined foundational courses such as Civics+Data and Algebra II+Data, aimed at expanding access to all students. Further modules, including Visualization+Data and Python+Data, which could be offered as dual enrollment,

assisted students in developing advanced skills. The presentation emphasized that alignment with industry certifications and direct collaboration with employers and workforce boards were crucial to the development of the various components.

The paper titled Building an Innovation Pathway to Data Careers (Boisvert, D., Malyn-Smith, J., and Harris, M., 2024) captured the presentation in the SIGITE Proceedings Document (attachment 2a).

To increase regional awareness of the data science project, staff were invited to present at the New England Data Science Summit on October 23rd in New Hampshire. Hosted by the New Hampshire Department of Education and Data Science 4 Everyone, each New England state was asked to showcase what data science or data literacy looks like within their state. Project staff spoke about the IPDC and its progression of courses. This event took place concurrently with the 2024 Association of Teachers of Mathematics in New England's Regional Conference to spotlight the importance of data science and data science education with state education leaders.

The DS4E (Data Science for Everyone) Conference held on February 17-18, 2025 in San Antonio, TX, brought together educators, industry professionals, and data science advocates to discuss the expanding role of data science in education. Panel discussions focused on integrating data science into K-12 and higher education curricula with key themes including strategies for training teachers in data literacy, innovative classroom practices, and the importance of equitable access to data science education. Attendees explored case studies of successful data science programs, networked with peers, and engaged with exhibitors showcasing the latest educational technologies.

Deborah Boisvert (EDC/CSforMA) and Emmanuel Schanzer (Bootstrap) presented a Structured Session on how to bring data science education to high school students through a variety of coursework or through a pathway format. It highlighted the importance of data skills across various industries and careers, emphasizing their foundational role in AI, business, healthcare, and more. The Massachusetts Innovation Career Pathway Framework was showcased, detailing partnerships between schools, employers, and colleges, and outlining a progression of courses: Civics+Data, Algebra II+Data, Visualization+Data, and Python+Data. The presentation shared implementation models from Burlington and Chelsea school districts, demonstrating integration of data projects into multiple subjects and offering paid internships and capstone experiences. Participants discussed and developed strategies to encourage school district and teacher buy-in, professional development, and how to best impact students' skills in data analysis, storytelling, and critical thinking. The session was captured in conference proceedings: Structured Session: Building an Effective High School Data Pathway (Boisvert, D., Malyn-Smith, J., Schanzer, E., and Tyrell, S., 2024). See attachment 2b).

Project staff presented a poster session at the 2025 Computer Science Teachers Association (CSTA) Annual Conference in Cleveland, OH in July. The session, titled "Building an Innovative Pathway to Data Careers," highlighted the IPDC project. The poster (attachment 2c) introduced our project's scalable model for integrating data literacy and foundational data science skills into high school courses such as Civics, Algebra, and Computer Science; and the Profile of the Data Intern (attachment 2d).The presentation emphasized backward-designed instructional modules drawn from the Profile of the Data Intern and aligned with Massachusetts' Career Pathway Framework and computer science standards.

The session showcased examples of student projects using real-world datasets (e.g., gentrification, voter demographics), tools for data visualization, and scaffolds for building models and making inferences. Resources shared included module templates, curriculum maps, professional learning strategies, and equity-centered instructional approaches like project-based learning and differentiated instruction.

Other Dissemination Activities: This dissemination opportunity helped engage a national audience of educators and computer science leaders, sparked interest in scaling similar models, and reinforced the project's contributions to broadening participation in computing and data careers.

In Massachusetts, a meeting with the state's Innovation Career Pathway Community of Practice led to discussion of a workshop for school leaders on integrating data science into state-funded Innovation Career Pathways to build on the webinar in August 2024. This will happen in the coming year.

Burlington met with Holliston, Mendon Upton, and Reading school districts regarding implementing pathways, and also met with Middlesex Community College to explore incorporating data science into post-secondary pathways for Burlington graduates. Burlington also provided industry mentorship to the Data+Python teacher in Chelsea.

A meeting with school Superintendents from the Middlesex League to discuss work-based learning partnerships with Microsoft, resulted in a multi-district AI Summer Academy. Some of the IPDC students were participants in the Academy and

presented projects at a showcase attended by the Lt. Governor, the Massachusetts Executive Office of Labor and Workforce, the Mass AI Hub, the Director of the Mass Association of School Superintendents, Superintendents from six districts, the Secretary of Education, members from the Executive Office of Education, State Senators and Representatives, and the media. IPDC materials will be included in a Playbook for Massachusetts schools to replicate the AI Summer Career Academy, ensuring further sustainability and impact.

Educators in participating schools continue to grow dissemination activities. Teachers in Burlington High School used the civics modules and python lessons for 50 students from 6 districts in their 2025 summer program supported by the Mass AI Hub. As a result of successful workshop implementation these materials are now integrated into this program which is being promoted to school districts across the state.

Looking Ahead
Overall, the IPDC project has established a robust and scalable model for integrating data literacy into high school coursework statewide, built strong district capacity, and generated actionable research findings that inform future implementation. With state funding, community college partnerships, and a widely used website, the project's impacts will continue beyond the award period.

Supporting Files

Filename	Description	Uploaded By	Uploaded On
1 IPDC Research Findings 2025-09-30.pdf	Research Findings Report	Joyce Malyn-Smith	12/09/2025
Dissemination Attachments 2a-d.pdf	Dissemination Attachments 2a-d	Joyce Malyn-Smith	12/09/2025
Dissemination Attachments 2e-g.pdf	Dissemination Attachments 2e-g	Joyce Malyn-Smith	12/16/2025

Products

Books

Book Chapters

Inventions

Journals or Juried Conference Papers
View all journal publications currently available in the [NSF Public Access Repository](#) for this award.

The results in the NSF Public Access Repository will include a comprehensive listing of all journal publications recorded to date that are associated with this award.

Licenses

Other Conference Presentations / Papers

Other Products
View all workshop reports currently available in the [NSF Public Access Repository](#) for this award.

The results in the NSF Public Access Repository will include a comprehensive listing of all workshop report publications recorded to date that are associated with this award.

Other Publications

Patent Applications

Technologies or Techniques

Thesis/Dissertations

Websites or Other Internet Sites
Data Science for High School: an innovative pathway for data careers
https://sites.google.com/edc.org/ipdc

Shares resources and curricula to integrate data science into social studies and Algebra classes, and to develop basic skills in data science through Visualization+Data and Python+Data courses. These data experiences form a pathway to data careers connecting the high school data skills progression to community college data analytics programs.

Participants/Organizations

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Malyn-Smith, Joyce	PD/PI	1
Boisvert, Deborah	Co PD/PI	1
DeMallie, Anne	Co PD/PI	1
Tyrrell, Shereen	Co PD/PI	1
Louie, Josephine	Other Professional	1

Full details of individuals who have worked on the project:

Joyce Malyn-Smith
Email: Jmalynsmith@edc.org
Most Senior Project Role: PD/PI
Nearest Person Month Worked: 1

Contribution to the Project: Principal Investigator - co-lead the project leadership team and strategy with the NIC; oversee the budget and the relationship with NSF regarding programmatic elements

Funding Support: None

Change in active other support: No

International Collaboration: No
International Travel: No

Deborah G Boisvert
Email: dboisvert@edc.org
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 1

Contribution to the Project: Co-Principal Investigator - co-lead the project leadership team, manage the linkages and knowledge sharing within the NIC, and provide guidance/resources to the RPP team

Funding Support: None

Change in active other support: No

International Collaboration: No
International Travel: No

Anne DeMallie
Email: ademallie@doe.mass.edu
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 1

Contribution to the Project: Co-Principal Investigator - recruit schools and teachers, lead efforts to obtain DESE and Department of Higher Education endorsements for the Visualization+Data and Python

Funding Support: None

Change in active other support: No

International Collaboration: No
International Travel: No

Shereen G Tyrrell
Email: styrrell@bpsk12.org
Most Senior Project Role: Co PD/PI
Nearest Person Month Worked: 1

Contribution to the Project: Co-Principal Investigator - co-lead the RPP team consisting of a social studies, computer science and mathematics teachers; supports school-based team activities, and engages employers

Funding Support: None

Change in active other support: No

International Collaboration: No
International Travel: No

Josephine Louie
Email: jlouie@edc.org
Most Senior Project Role: Other Professional
Nearest Person Month Worked: 1

Contribution to the Project: Researcher - serving as research lead and technical monitor for research, overseeing the implementation of the research plan, and reviewing results.

Funding Support: None

International Collaboration: No
International Travel: No

What other organizations have been involved as partners?

Name	Type of Partner Organization	Location
Burlington Public Schools	School or School Systems	Burlington, MA
Education Design	Other Nonprofits	Newton, MA

Full details of organizations that have been involved as partners:

Burlington Public Schools

Organization Type: School or School Systems
Organization Location: Burlington, MA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Planning and Curriculum Design; Piloting of courses

Education Design

Organization Type: Other Nonprofits
Organization Location: Newton, MA

Partner's Contribution to the Project:
Collaborative Research

More Detail on Partner and Contribution: Evaluation Services

Were other collaborators or contacts involved? If so, please provide details.
Nothing to report

Impacts

What is the impact on the development of the principal discipline(s) of the project?

This project contributes new courses (Data Visualization and Python+Data) and related curriculum to Massachusetts high schools, and curricular enhancements to the state-mandated student-developed Civics projects implemented primarily in high school social studies classes. The project also provides a model for the development of a data science career pathway connecting high school students to data science programs at community colleges. This model is influencing the development of data science pathways in Massachusetts in three ways. First, our supplement expanded the integration of data literacy into Algebra II and Math 3 courses in MA. Second, our model is being used in the development of NSF data science proposals for S-STEM and ATE; and the City of Boston's data science initiative. And third, through state funding earmarked to EDC, our data science pathway model will become institutionalized as part of a statewide strategic plan to build pathways to data science careers in Massachusetts.

The impact over the life of the project is worth noting. Over the course of the project 13 teachers have been trained to integrate data into their Civics and Social Studies Courses with 500+ students developing data rich civics projects, and 49 students participated in a stand alone Civics + Data Course. Eight teachers were trained in Python+Data with 140+ students participating in a Python+Data course. Four teachers were trained in Visualization+Data with 115+ students participating in a stand alone Visualization+Data course. And 31 teachers were trained in Algebra II+Data with approximately 2000 students integrating data activities into their Algebra II coursework.

The IPDC curriculum products increase the availability of free high quality data science resources that are foundational to AI for teachers. These materials and a guide to implementation are easily accessible on the IPDC website. These groundbreaking materials will be referenced in the AI Summer Academy Playbook which will be disseminated statewide through the Massachusetts Technology Collaborative and the Governor's AI Hub.

New Summer Academy. Burlington brought together eight District Superintendents and the Secretary of Education at Microsoft to discuss the value of career-based learning and a major area of focus was on data science. As a result of this meeting, Burlington created an AI Summer Academy and Civics+Data modules were incorporated in the program which reached 50 students from 8 Massachusetts school districts, and offered PD to teachers from 4 districts. The IPDC website

and Civics+Data are being incorporated into an AI Summer Carer Academy Playbook which will be disseminated statewide in partnership with the Massachusetts Technology Collaborative and the Governor's AI Hub. The program was only possible because of the foundational work done with the IPDC in Burlington and Chelsea in building partnerships between districts, and creating open source curriculum materials in data science.

What is the impact on other disciplines?

The IPDC pathway and related materials including the Profile of the Data Intern will serve as a model to shape workforce education programs across Massachusetts and the nation now and in the future.

Over the course of the project 13 teachers have been trained to integrate data into their Civics and Social Studies Courses with 500+ students developing data rich civics projects, and 49 students participated in a stand alone Civics + Data Course. The integration of data rich activities into student-developed civics projects implemented in high school social studies classes is deepening students' learning of the civics and social studies concepts that are at the core of the student-developed projects. As teachers participate in professional development their data literacy will increase as will their capacity to guide student projects involving more and more complex data issues. As social studies teachers continue to explore data science as applied to Civics projects, they are working together with teachers from other disciplines to integrate data into other courses across the high school curriculum. This is increasing the amount of data focused activities in a larger number of classes across the high school curriculum.

Over the course of the project eight teachers were trained in Python+Data with 140+ students participating in a Python+Data course. Four teachers were trained in Visualization+Data with 115+ students participating in a stand alone Visualization+Data course. And 31 teachers were trained in Algebra II+Data with approximately 2000 students integrating data activities into their Algebra II coursework. With activities integrating Data into Algebra II and Math 3 courses posted on the Bootstrap website, teachers beyond Massachusetts are developing skills to integrate data into mathematics courses.

IPDC materials were a springboard in creating meaningful student capstone projects in data science in both Chelsea and Burlington, and these project ideas will continue to be shared through the Massachusetts Innovation Career Pathways' Community of Practice. In Burlington, the IPDC was a catalyst for bringing cross disciplinary teams together from science, social studies, math, computer science and business. The project inspired teachers to incorporate data science skills in lesson plans in new ways that we had not even anticipated, and students in the sciences, business and social studies are including data science in their college plans. The relationship and partnership built between Chelsea and Burlington has also made it possible to bring students from both schools together, and the districts have continued to share resources and industry contacts extending the impact of the IPDC.

What is the impact on the development of human resources?

More secondary teachers are becoming data literate and capable of integrating data science into social studies classes and mathematics classes, and using data visualization tools/techniques. More teachers will have developed core data skills enabling them to teach both data visualization and Python+data courses.

What was the impact on teaching and educational experiences?

Teaching and educational experiences are being deepened and expanded through the use of publicly available data sets, the focus on and integration of data into classroom activities and projects in authentic ways data are used in life and work.

What is the impact on physical resources that form infrastructure?
Nothing to report.

What is the impact on institutional resources that form infrastructure?
Nothing to report.

What is the impact on information resources that form infrastructure?

There is increased use of publicly available data sets in educational programs, courses, classes and activities promoted on the MA Department of Elementary and Secondary Education website expanding the informational resources available to teachers and students in the Commonwealth.

What is the impact on technology transfer?

Nothing to report.

What is the impact on society beyond science and technology?

Developing a data literate society is becoming an issue of national interest, particularly as data science skills are foundational to working on AI teams across all industry settings. This project will result in more students and teachers being data literate citizens and able to use data in decision-making as they engage in routine tasks and solve problems living, learning and working in a data-rich society.

What percentage of the award's budget was spent in a foreign country?
Nothing to report.

Changes/Problems

Changes in approach and reason for change
Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them
Nothing to report.

Changes that have a significant impact on expenditures
Nothing to report.

Significant changes in use or care of human subjects
Nothing to report.

Significant changes in use or care of vertebrate animals
Nothing to report.

Significant changes in use or care of biohazards
Nothing to report.

Change in primary performance site location
Nothing to report.

Special Requirements

Responses to any special reporting requirements specified in the award terms and conditions, as well as any award specific reporting requirements.