



# The Importance of STEM Programs for Women in Carceral Settings

## An Analysis of Operation Restoration's Lab Assistant Program

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## ABOUT US

STEM-OPS is an NSF Eddie Bernice Johnson INCLUDES Alliance working to improve science, technology, engineering, and mathematics (STEM) learning opportunities in prisons and supporting access to STEM (broadly defined) for those who are directly impacted by the carceral system.

## ACKNOWLEDGMENTS

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## ABOUT US

For more information, contact Operation Restoration at [labassistant@or-nola.org](mailto:labassistant@or-nola.org).

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# STEM-OPS Program Intersection

## Progression of STEM-OPS Programming

STEM Opportunities in Prison Settings (STEM-OPS) is a National Science Foundation (NSF) Eddie Bernice Johnson INCLUDES Alliance working to improve science, technology, engineering, and mathematics (STEM) learning opportunities in prisons and supporting access to STEM (broadly defined) for those who are directly impacted by the carceral system.

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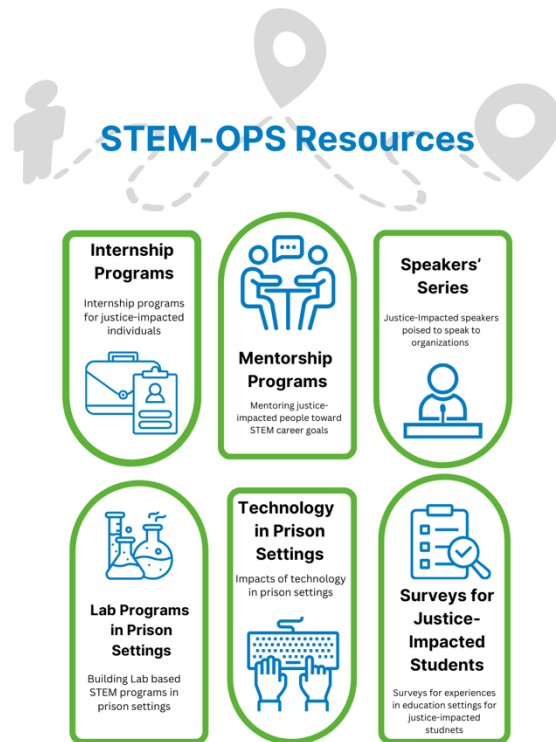
*The goal of STEM-OPS is that all persons impacted by the carceral system are able, and encouraged, to pursue a culturally responsive and equitable high-quality STEM education and career.*

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All programs highlighted in STEM-OPS resources were collaboratively created to ensure support at all stages for a person who is impacted by the carceral system.

The *Importance of STEM Programs for Women in Carceral Settings* white paper focuses on building a lab assistant program specifically for women who are currently incarcerated but this program can be scaled across the country, to address the shortage of lab assistants in the medical field.

A justice-impacted person can benefit from the STEM-OPS package of resources. For some, it might be best to follow a particular path, for instance, starting with an internship, moving to becoming a mentor, and eventually speaking about their experiences. Alternatively, each program can stand alone, supporting someone at any stage of their journey.



# Introduction

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*“All persons impacted by the carceral system are able, and encouraged, to pursue a culturally responsive and equitable high-quality STEM education and career.”*

## MISSION OF OPERATION RESTORATION’S LAB ASSISTANT PROGRAM

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As part of STEM-OPS, Operation Restoration’s Lab Assistant Program aims to provide incarcerated women with educational opportunities and training in science, technology, engineering, and mathematics (STEM) fields. This innovative program addresses the extreme shortage of laboratory assistants in the medical field and seeks to empower women through education, foster critical-thinking skills, and create pathways for successful reintegration into society upon release. This white paper will outline the guiding practices of the program, identify barriers to implementing STEM education in prison settings, and provide proven strategies to overcome these barriers.

Numerous studies have proven that prison education programs significantly decrease recidivism and increase post-release employment and wages. Taking steps to limit recidivism and increase the chances of a successful reentry is crucial in the United States, which currently has the highest incarceration rate in the world (Fair & Walmsley, 2021). The United States also incarcerates the highest number of women and girls than any country, accounting for nearly a third of the world's incarcerated women and girls (Carson, 2022). While the rate of incarceration for Black women is decreasing, it still remains disproportionately high, at 1.6 times the rate of white women. These disparities are even more pronounced among American Indian and Latinx people who, in 2021, were imprisoned at 4.2 times and 2.4 times the rate of whites, respectively (Walmsley, n.d.). For Black men, the lifetime risk of incarceration declined by nearly half from 1999 to 2019. We estimate that less than 1 in 5 Black men born in 2001 will be imprisoned compared with 1 in 3 for the 1981 birth cohort (Robey et al., 2023; Roehrkasse & Wildeman, 2022). In contrast, women's incarceration has grown at twice the pace of men's incarceration (Kajstura & Sawyer, 2024). As a result, women's incarceration in the United States remains at a historic and global high; over 30% of the world's incarcerated female population is located in the U.S. despite having only 4% of the world's female population (Kajstura, 2018).

Operation Restoration’s Lab Assistant Program provides entry-level access to STEM education while also responding to both a national laboratory staff shortage and the high unemployment rate among formerly incarcerated women. Most incarcerated learners lack access and exposure to high-quality STEM education, thus reducing pathways to STEM careers upon their release. This discrepancy is heightened for Black and Brown women and girls who already face systemic inequalities in mainstream STEM education prior to incarceration.

While the number of formal educational programs in prison is growing, the majority of these programs are focused on basic and secondary education or humanities in higher education rather than STEM programming. Not surprisingly, those seeking higher education post-release gravitate to the social sciences. Yet STEM education offers the opportunity to find employment in a rapidly growing workforce.

Between 2011 and 2021, the STEM workforce grew by 20% (National Center for Science and Engineering Statistics, 2023). While the industry saw growth in the percentage of women and underrepresented

minorities, both populations remain underrepresented in the overall STEM workforce, with Black female workers making up the lowest representations with lower median earnings. Two years after release from prison, formerly incarcerated Black women of prime working years, ages 35–44, face the highest unemployment rate of 43.6% compared to white men at 18.4% (Couloute & Kopf, 2018).

In providing the Lab Assistant Program, Operation Restoration takes into consideration both the historic exclusion of women from STEM fields, including the disproportionate exclusion of Black and Brown women, along with additional challenges that incarcerated and formerly incarcerated women face when seeking employment after their release. In 2008, 40% of formerly incarcerated Black women were unemployed (Couloute & Kopf, 2018). Unemployment rates for formerly incarcerated women who do not have a high school diploma range from almost 30% for white women to 60% for Black women (Amaning, 2024). Operation Restoration addresses these challenges by providing wraparound services to remove barriers and provides the additional support necessary for students to succeed.

This white paper describes the highly successful Lab Assistant Program based at Operation Restoration in New Orleans, LA. These ideas and principles can be used to start a similar program at your organization. If you are interested in technical assistance in starting your own program, email Operation Restoration at [highereducation@or-nola.org](mailto:highereducation@or-nola.org).

## Program Description

Operation Restoration's Lab Assistant Program prepares currently and formerly incarcerated women to work in laboratory healthcare settings and obtain immediate employment.

Participants receive the required training as well as supportive services to help eliminate barriers to graduation. Operation Restoration provides connections to employers seeking qualified lab personnel. As a result, participants in this program gain access to stable, high-quality employment opportunities with pathways for upward mobility in the field of clinical laboratory medicine.

## Program Components

The Lab Assistant Program currently consists of two components, which includes the in-prison program component offered at the Louisiana Correctional Institute for Women in partnership with the Louisiana Department of Public Safety and Corrections, and the Rapid Reskilling Program offered at Operation Restoration's headquarters in New Orleans.

Participants who are part of the in-prison program:

- Complete a 6-month program designed to prepare the women to begin a career as a laboratory assistant; the curriculum includes basic anatomy and physiology, medical terminology, pathophysiology, and pharmaceutical applications
- Students may receive up to 3 hours of for-credit coursework through a partnership with a local community college that can be transferred to pursue associate and bachelor's degrees in clinical laboratory science to advance their careers in the field
- Students receive a certificate of completion from Operation Restoration during a graduation ceremony attended by family members of the students. (This is not a credential from an accredited program but we prepare students to sit for state licensure and educate them on options for upward mobility in laboratory professions. The certificate is essential in the licensure process.)

All Rapid Reskilling participants:

- Complete an accelerated 8-week training taught by a licensed medical technologist; the trainer for this program develops relationships with partner sites to aid in placing students at those sites for employment at the completion of the course
- Have the option of simultaneously enrolling in courses at a local community college to continue their education
- Guide and support students step-by-step in licensure process
- Receive a stipend of \$1000 upon graduation; OR does not monitor how this money is spent, but it is intended to help with the costs associated with finding a job.

All program participants:

- Have access to case management services from Operation Restoration's social services department to remove barriers to obtain and maintain employment; these services include assisting with education fees and materials, and providing clothing, technology, childcare, and transportation to remove any barriers associated with completing the program and finding employment.
- Receive assistance preparing for the job market and connecting with employers and pursuing further education and career opportunities, if desired

- Participate in the lab assistant training at no cost (Operation Restoration and its partners cover the cost of tuition, textbooks, licensure fees, uniforms if required, etc. Funding may be secured by grant partnerships.)

## About Operation Restoration

Formed in 2016 and led by formerly incarcerated women, Operation Restoration's mission is to support women and girls impacted by incarceration to recognize their full potential, restore their lives, and discover new possibilities. For more information about the Lab Assistant Program or Operation Restoration, email [labassistant@or-nola.org](mailto:labassistant@or-nola.org). Operation Restoration's Lab Assistant Program has been featured in the press; [read articles and accolades about the program](#).



## Guiding Practices

Using evidence-based guiding practices that include collaborative learning, experiential learning, and individual development, the Lab Assistant Program considers the multiple factors incarcerated women face that have historically precluded them from STEM education and careers.

### Collaborative Learning

The Lab Assistant Program fosters a collaborative learning environment, encouraging participants to engage in group projects, discussions, and problem-solving activities. This approach promotes teamwork, communication skills, and knowledge sharing. In the Lab Assistant Program, students are routinely engaged in group discussions and break off into small groups for activities.

Collaborative learning has been found to boost motivation and significantly improve learning outcomes (Barkley et al., 2005; Tran, 2019). Traditional didactic instruction in STEM education limits the engagement of students, where the rapid growth of STEM industries has required modification of educational practices to meet the demand. By working collaboratively, the education becomes student-centered, providing an environment that encourages higher academic achievement, motivation, and satisfaction. This approach encourages students to become interested in and complete STEM educational programs.

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*“They taught us to reach our goals, that the sky is the limit, and to keep going forward.”*

— Shontal H., former program participant

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### Experiential Learning

The Lab Assistant Program emphasizes hands-on experiences and practical applications of STEM concepts. Students do hands-on testing and lessons in every class by engaging in laboratory experiments and other interactive activities to reinforce theoretical knowledge. All students, regardless of incarceration, receive the same lectures and lessons. In the Rapid Reskilling Program, students shadow lab technicians at work and learn how to engage in lab technology systems. For incarcerated students, the instructor models the shadowing lesson by using visual aids.

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*“I realized I had worth, other than being a punching bag.”*

— Tarrormica D., former program participant

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Research states that experiential learning can help overcome disengagement (Kong, 2021) from STEM subjects. Experiential learning promotes student agency and allows students to take control of their learning. This control creates a growth mindset that boosts interest and develops skills that translate beyond the classroom and the job.

## Individual Development

The Lab Assistant Program acknowledges each participant's unique needs and strengths. Individualized learning plans are developed to cater to diverse learning styles and skill levels, ensuring that each participant has the opportunity to succeed.

The Lab Assistant Program provides a practical education that emphasizes humanizing pedagogical practices that take into consideration social–emotional learning (SEL). SEL is “a process of gaining the knowledge and skills to manage emotions, achieve goals, show empathy, and make responsible decisions to build the capacity for establishing and maintaining healthy relationships” (King et al., 2023, ¶17). The program recognizes that these skills are just as important as academic skills when it comes to students’ success in the program and in their careers.

Specifically, individuals are provided with different strategies for their own learning needs and literacy levels based on an individual lesson plan created when they entered the program. For example, some students have test questions read to them rather than reading the test themselves. Students are provided individual and group tutoring sessions, and lessons are recorded so that students can review them again on their own time. Individualized plans also include any barriers to education that students may need like transportation, childcare, and a living stipend.

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*“We had emotional support, that extra push to keep going. Life happens, and y’all were there, like childcare assistance—a lot of girls needed that to get to class every day.”*

— Tarrormica D., former program participant

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# Barriers to Implementing the STEM-OPS Lab Assistant Program in Prison Settings

## Limited Resources

Prisons often need more resources and equipment for engaging in STEM education. To overcome this barrier, partnerships can be established with educational institutions, private organizations, and government agencies, and grant funds can be secured, to provide necessary resources, such as textbooks, materials, and access to technology.

## Staffing and Training

Prisons may need more staff knowledgeable in the importance of STEM and how this translates into careers. For example, phlebotomy is a profession that is available to women with convictions. Only having access to simulated sticks (act of drawing blood with a needle) and not being able to have live draws puts them at a disadvantage in the hiring process. Overcoming this barrier requires investing in professional development programs, training correctional staff on the importance of expanding their thoughts around what should be allowed inside of a prison setting, and recruiting qualified educators or STEM professionals to support the program. Operation Restoration provides instructors for the Lab Assistant Program.

## Security Concerns

The nature of prison environments presents security challenges that may be perceived as obstacles to implementing a lab program. Developing stringent protocols and security measures, such as limited tool access, strict supervision, and appropriate screening of materials, can help mitigate these concerns and ensure safety. For example, glass slides are used in the Lab Assistant Program. When used, the program facilitator brings them in and the prison inspects them before they are brought into the classroom. A microscope is also available to program staff; the prison keeps this equipment, and the program facilitator simply accesses it for programming.

## Digital Divide

The digital divide differs from state to state, institution to institution, and jail to prison. In some cases, incarcerated individuals may have limited access to technology and internet connectivity. Bridging the digital divide can be addressed by establishing computer labs within the prison, providing offline educational resources, and exploring partnerships with organizations that support technology access and literacy in prison settings.

## Stigma and Perception

There may be societal skepticism regarding the value and effectiveness of providing STEM education in prisons. Raising awareness, showcasing success stories of program graduates, and engaging with community leaders and stakeholders can help combat stigma and promote the positive impact of STEM-OPS in prison settings.

# Strategies to Implementing the STEM-OPS Lab Assistant Program in Prison Settings

## Resource Mobilization

Partner with local educational institutions, organizations, and businesses to secure necessary resources, including equipment, textbooks, and funding.

## Training and Professional Development

Provide training opportunities for correctional staff to enhance their STEM knowledge and instructional methods and recruit qualified educators or STEM professionals to supplement the curriculum.

## Collaborative Efforts

Engage with community stakeholders, policymakers, and advocates to promote the program's goals, garner support, and address concerns related to security and societal perceptions.

## Technology Accessibility

Develop strategies to ensure technological access within prison facilities, such as establishing computer labs, providing offline educational resources, and exploring technology-based learning methods that do not require internet connectivity.

Operation Restoration's students do not have access to the internet. The instructor uses PowerPoint slides that have been saved to a flash drive and shown on a projector. The flash drive is reviewed by security and kept at the prison for the duration of use to avoid the need for it to be reviewed prior to every class. The prison also has smart whiteboards, which have some functions but not internet. Operation Restoration seeks to help students overcome barriers to digital literacy upon release.

## Program Evaluation and Impact Assessment

Regularly evaluate the program's effectiveness and collect data to showcase the positive outcomes and successes achieved through the STEM-OPS Program, strengthening the case for continued support and expansion.

Programs should gather more specific feedback from students to see what worked well and what could be improved. Programs can also use the data to understand what alumni are gaining from the experience, employment outcomes, licensure attainment, and whether they are interested in coming back as near-peer mentors. In our experience, however feedback is collected, it is essential to offer anonymity to ensure everyone participates. The [Higher Education in Prison Program Experience Survey](#) is available from STEM-OPS. By adopting these strategies and addressing the identified barriers, Operation Restoration's Lab Assistant Program provides incarcerated and returning women with transformative educational opportunities, equips them with valuable STEM skills, and facilitates their successful reintegration into society.

# Research Behind the White Paper

## Community-Based System Dynamics

A systems map is a visual representation of a system, in this case a visual representation of the carceral system with a focus on gaining STEM education and careers within that system. A systems map is a tool that can help you uncover how complex a system really is and identify where intervention can be most impactful. By highlighting how different variables in a system are causally interrelated, you can identify the system behaviors that cause it to be self-sustaining. When you understand how system variables are interrelated and how their relationships reinforce or interfere with each other, you can begin to develop proactive strategies for changing systems, such as how to break or work around bad cycles or how to accelerate a positive one.

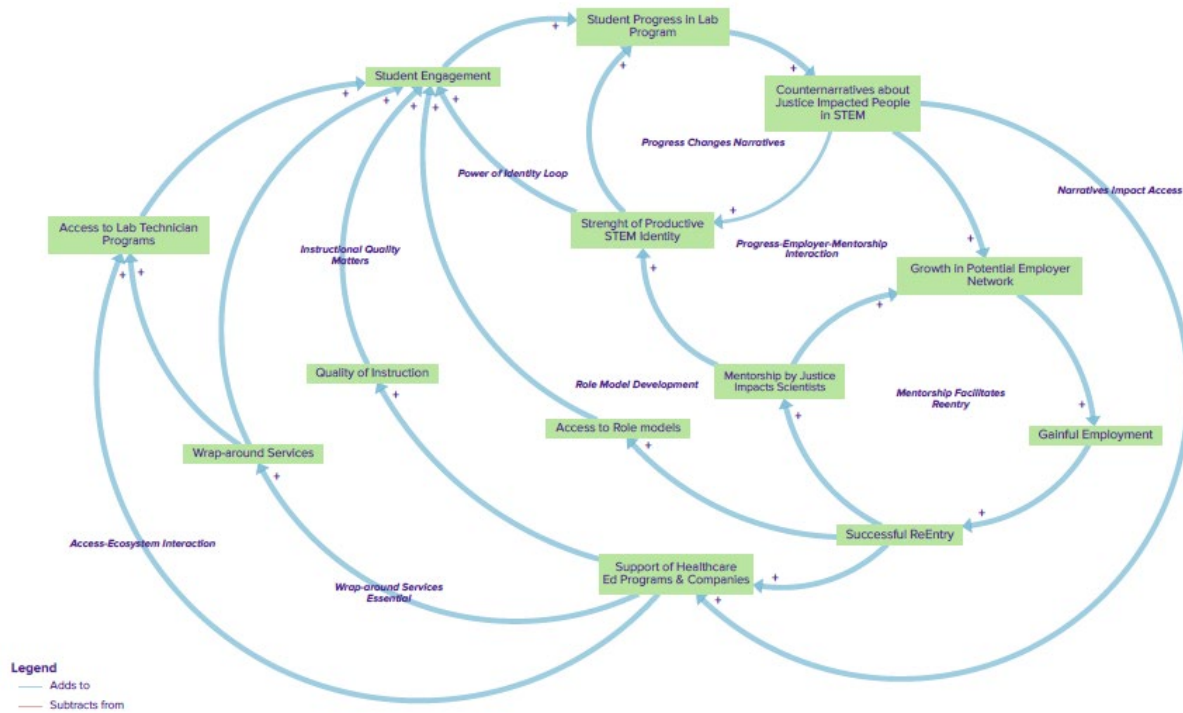
STEM-OPS's first systems map was built through the work of two diverse groups of 25 people each from the wider STEM-OPS community and other organizations, in addition to the core modeling team. STEM-OPS used a process called "community-based system dynamics" (CBSD), which is a shared way for communities to take part in building a shared understanding of their systems prior to working to change them. In CBSD, the people most involved in the system offer the most useful insights about relationships and variables within the system, which leads to the best opportunities to change it. This meant that roughly half the participants were justice-impacted individuals, whereas the remaining individuals represented other stakeholder groups, including departments of correction (DoCs), higher-education-in-prison (HEP) programs, reentry service providers, family members, and community members.

## The Lab Technician Systems Map

The Lab Technician Systems Map illustrates how access and successful completion of a high-quality lab technician program supports student engagement, success in education, employment, and reentry. The map illustrates several reinforcing virtuous/vicious cycles that share some common variables. Because these loops share variables, when one is working in a virtuous cycle it drives the other to do the same, or vice versa. We will describe these from the virtuous perspective, as they illustrate how student access to, and success in, lab programs leads to positive outcomes for the students including employment and successful reentry. It also supports counter narratives about justice-impacted people that help grow the support for such programs, and provides the funding to increase the wrap around services crucial to the program and funding to improve the quality of instruction.

Within the larger loop are smaller loops illustrating how access to role models and mentorship are crucial in a high-quality program and supports both student engagement, and growth of strong STEM identities, leading to progress and successful completion of the program, employment, and reentry.

# Lab Technician Program Map



For example, starting on the left side of the map at *Access to Lab Technician Programs*, read the map as follows:

- An increase in *Access to Lab Technician Programs* leads to an increase in *Student Engagement*.
- An increase in *Student Engagement* leads to an increase in *Student Progress in Lab Program*.
- An increase in *Student Progress in Lab Program* leads to an increase in *Counternarratives About Justice-Impacted People*.
- An increase in *Counternarratives About Justice-Impacted People* leads to an increase in *Support of Healthcare Education Programs and Companies*.
- An increase in *Support of Healthcare Education Programs and Companies* provides funding for an increase in *Access to Lab Technician Programs* and to the *Wrap-around Services* crucial for program success.

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