

1. Introduction

Youth-In-Custody encounter numerous barriers to school success. They often face disrupted and fragmented education caused by frequent moves, changes in placement, and delays when transferring schools. These students face numerous educational and emotional challenges that impact academic achievement including lower academic achievements, learning difficulties, school credit deficiencies, absenteeism, increased risk for dropping out, behavioral and emotional struggles, and limited social support. System involvement is also correlated with reduced post-secondary achievements, higher rates of poverty, homelessness, unplanned and unwanted pregnancy, higher rates of unemployment, substance abuse, sexual exploitation, increased likelihood of adult incarceration, and lifetime reliance on public services.

For these reasons, YIC education programs have been developed to help schools work closely with Human Services programs, child and family teams, and community resources to address the unique educational needs of these students and their families to increase their opportunity for success. They are committed to providing equitable educational experiences and quality learning opportunities for students in a variety of custody situations and placement settings.

There is growing interest among academics to participate in activities that will bring the knowledge, approaches, and tools of the scientific way of knowing to people outside of the scientific enterprise. Scientific agencies and administrators have established standards for investigators to provide activities related to the “broader impacts” of their research to the public, specifically through public engagement of non-traditional groups who do not or cannot gain access to science education and nature through traditional venues¹. This increased interest makes participation by scientists in STEM educational programming for YIC a viable option for a wide range of academic institutions.

In 2017, STEMCAP was invited to provide programming that will inspire and augment existing resources for STEM education of this population. Since then, with the support of the USBE, more than 100 presenters comprised of scientists (university faculty and graduate students), artists, and community partners, have offered over 250 workshops to bring the excitement of science to eight YIC centers in Utah.

STEMCAP forges novel connections through inquiry-based and interactive STEM programming that puts scientists, artists, and community educators inside YIC Centers. By creating interactive opportunities among science-engaged community members and students, the program highlights common ground for participant learning.

The objective of this document is to guide members of academic institutions who wish to create, maintain, and evaluate the impacts of YIC-centered STEM education programs fostered by scientists across the country.

Cultivating STEM education programs nationwide includes providing information for other academic institutions with this tool for implementing programming in their local community. This manual provides guidance to help YIC explore STEM fields from diverse perspectives. STEMCAP's programming illuminates pathways for YIC to consider and/or pursue a degree or career in STEM, conservation, or science communication – and/or to become more informed and appreciative of the connections of STEM with society.

A combination of informal feedback and formal responses from instruments STEMCAP has created with professional evaluators and the oversight of the U of U Institutional Review Board (IRB) suggests that these activities benefit the students, YIC educators, scientists, community artists, and conservationists. STEMCAP shares the strides taken to provide evidence of the program's positive effects, along with the challenges and barriers faced (Sect. 8).

1.1 DEFINITIONS AND GLOSSARY

Science-Engaged Community Member: An individual from the local community whose work informs or is informed by scientific knowledge, concepts, or practices.

STEM-Related fields: Any academic field that engages with scientific concepts and practices (e.g., environmental humanities).

Conservation: Practices focused on protecting nature, restoring habitats, enhancing ecosystem services, preventing resource depletion, and protecting biological diversity.

Community Science Research Projects: Projects that employ community participants who collaborate to assist with collecting, sorting and analyzing data.

STEMCAP Participant groups:

- **Students** = Youth-In-Custody (YIC) in Residential Centers
- **Presenters** = Academic scientists, artists, humanists, community conservationists
- **YIC Educators** = YIC secondary teachers employed by local school districts

1.2 GOALS

(*These are referenced with the corresponding acronyms in parentheses throughout the manual)

Goals for the Program (GP)

1. Expand and deepen access to STEM-related fields and research topics for YIC students.
2. Enhance the building of relationships across participant groups.
3. Create a model program that cultivates YIC and academic partnerships for scaling and implementation in other institutions.
4. Provide opportunities for students and educators to contribute to conservation efforts.
5. Provide meaningful opportunities for community scientists to learn from and connect with YIC.

Goals for Students (GS)

1. Develop and sustain curiosity and interest in STEM-related fields and research topics.
2. Develop and sustain positive attitudes and confidence related to STEM educational and professional pursuits.
3. Deepen understanding of the nature of scientific inquiry and increase science knowledge content.
4. Experience art as a tool for teaching, learning, and communicating about STEM.
5. Foster personal and academic positive self-identity.
6. Enhance understanding of self as a contributing community member and promote civic engagement.
7. Develop problem solving, critical thinking, and communication skills surrounding STEM.

Goals for Educators (GE)

1. Gain access to scientific expertise and academic resources via an institution of higher education.
2. Explore the use of art as a tool for teaching STEM.
3. Increase perception of self as part of the scientific community.
4. Develop skills for incorporating cutting-edge science, community science, research projects, and hands-on activities into their classrooms.

Goals for Presenters (GPR)

1. Increase interest in and capacity for successful public engagement of science.
2. Reflect on knowledge and opinion of YIC and consider how public perceptions and stereotypes impact them.
3. Shift self-identity from being communicators only to other scientists to being communicators to diverse audiences with a broad spectrum of learning backgrounds.
4. Communicate the meaning and impacts of their research or professional work on society at large.
5. Develop awareness of and skills for collaborating on cross-disciplinary approaches to present STEM.

1.3 OVERVIEW OF YOUTH-IN-CUSTODY

1.3.1 YIC Across the United States

In the United States, there are over 48,000 youth held in facilities outside their home due to criminal involvement². Nationally, youth confinement as a result of criminal involvement is administered by Juvenile Justice System (JJS), comprised of federal, state, and local jurisdictions. The JJS is entirely separate from the adult criminal justice system. The majority of YIC are charged with nonviolent crimes. Although the US has the highest global rate of juvenile incarceration, the number of youth in residential placement in the US has dropped by 60% since 2000², with a 67% decline in youth arrests between 2009 and 2018³.

Youth detention facilities

There are over 1,700 youth detention facilities in the US. These include detention centers, shelters, reception/diagnostic centers, group homes, wilderness camps, long-term secure facilities, and residential treatment centers². Some centers that are more focused on rehabilitation have “youth-in-care” approaches, which offer a wider variety of programs. However, few of these centers have programming focused on STEM and or environmental challenges beyond the classroom.

The administration and educational practices of each YIC center differ from state to state and among facilities within each state. Thus, it is critical to learn about the structure, terminology, and functions of

each YIC center. In Utah, education and treatment programs related to YIC fall within the control of the Utah Juvenile Justice Services (UJJS) and the Utah State Board of Education (USBE).

Demographic disparity in Utah and the US

Over two-thirds of YIC are held in a JJS Center for over one month, with a quarter of them housed in a Center for over six months. In Utah (2017), 67% of new intakes into the JJS were white, 23% were Latino/Hispanic, 7% were “Other Non-white” and 3% were Black/ African American. Black, Indigenous and youth of color were overrepresented, as the racial make-up of all youth in Utah in 2017 was 75% white, 17% Latino/Hispanic, 7% “Other Non-white” and Black/ African- American. As of 2019, only 14% of all individuals under 18 in the country were Black. However, 42% of those assigned male at birth (hereafter “males”) and 35% of those assigned female at birth (hereafter “females”) in juvenile facilities were Black. Similarly, Indigenous youth made up 3% of females and 1.5% of males in juvenile facilities (not including those in facilities run by Native American sovereign nations, which made up only 138 of the 48,000 youth in confinement on any given day in 2019), while making up less than 1% of all youth nationally². Figure 1 shows disproportion representation of non-white youth within the juvenile justice system in the United States.

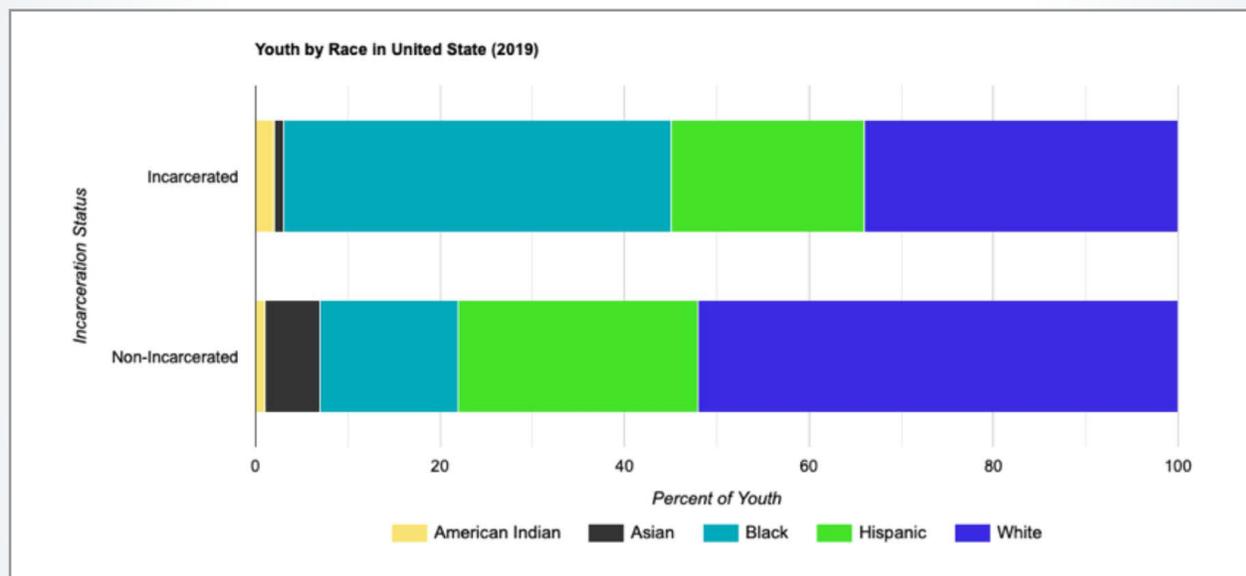


Figure 1, Proportion of incarcerated and non-incarcerated youth by race and ethnicity in the U.S.

Education and the JJS System

Youth-In-Custody receive state-mandated education until age 18, or until they obtain a high school diploma, GED, or equivalent secondary credential. More than 50% of YIC are 16–17 years old, and more than 85% are male². One in three YIC in the US qualify for special education services under the American Individual with Disabilities Education Act³, compared to only 14% of all youth enrolled in public schools¹⁵. For youth with long sentences, the majority (73%) of states in the US allow them to stay in the JJS system until they are at least 21 years old.

1.3.2 Utah Youth-In-Custody

The USBE defines YIC as: “Individuals under the age of 21 who are in custody of or receiving services from the Utah Department of Human Services or an equivalent Native American tribe, or who are being held in

a juvenile detention facility.” In Utah, YIC also includes any student over 21 who is confined in a residential secure care center. Students can remain in these centers until the age of 25 if they were adjudicated prior to turning 18. While STEMCAP works exclusively with Youth-In-Custody, **it is important to note that the USBE uses the acronym YIC for both Youth-In-Care and Youth-In-Custody students.** Youth-In-Care refers to any youth receiving services from the state (e.g. special education services) while Youth-In-Custody refers to those under state custody. Students who reside in secure care centers, residential treatment centers and detention centers are all in state custody, as are youth in group homes and foster care⁵. Utah offers a variety of educational pathways to meet the diverse needs of this large span of YIC (see Figure 2.)

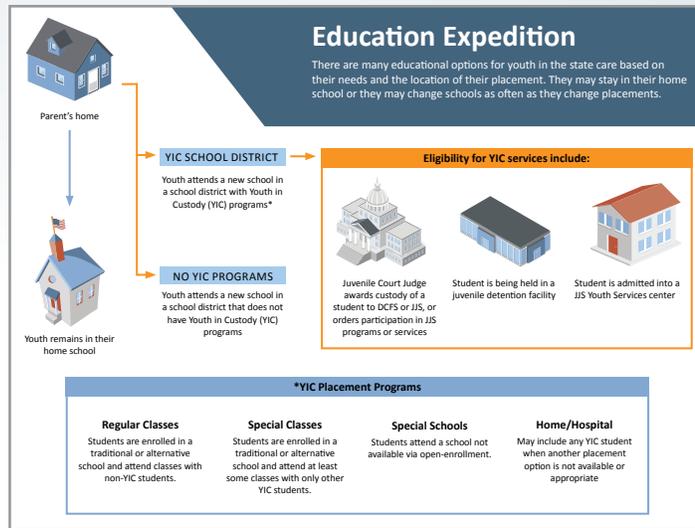


Figure 2, YIC’s pathways to alternative educational services; Utah Department of Human Services

STEMCAP works in facilities that span the entire spectrum of Utah YIC, including juvenile detention centers, long-term secure care centers, and residential treatment centers (referred to hereafter as “Centers”). Figure 3 demonstrates the various pathways youth take when they enter the juvenile justice system and the types of centers that house and school YIC.

Between 2018–2019, UJJS served nearly 7,000 individual youth (ages 12–21), all of whom participated in a YIC program for some time. Students are typically grouped into one or two class cohorts regardless of their grade levels and educational backgrounds, in a single Center. Many YIC have had significant gaps in their schooling due to social situations that negatively impact student learning, such as systemic racism, poverty, inadequate access to ADA accommodations, food insecurity, and related vulnerabilities. Students arrive at a Center at many different levels of school performance. While there is a wide range of academic ability in YIC, students often arrive performing below the academic standard for their age.

Educational services in Utah YIC Centers fall under the purview of the USBE. This means teachers and school administrators are USBE employees, and the Centers’ curriculum and school calendars follow those set forth by the school districts. STEMCAP works closely with the USBE to establish and maintain connections to YIC programs across the state.



Figure 3, Youth pathways through the Juvenile Justice System; Utah Department of Human Services