

Article

Building the Next Generation of Youth Researchers Through a Participatory Internship Program

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Abstract

Background/Objectives: Youth are increasingly engaged in mental health research, but many models remain consultative rather than participatory. We examined the Technology and Adolescent Mental Health Internship (TAMI) as an implementation-focused instrumental case study of a structured youth participatory action research internship for high school students recruited through schools serving Chicago's West and South Sides. **Methods:** The case study included an embedded multimethod formative evaluation with participatory interpretation by a post-program youth advisory board ($n = 8$). In Year 3, 18 participants completed baseline surveys, and 16 provided matched pre-post surveys (matched survey completion = 89%). Measures included a study-developed five-item research-task self-efficacy indicator, post-program attitudes and intentions, and four open-ended items. We conducted one exploratory paired-samples t -test and an inductive descriptive content analysis. **Results:** In exploratory analyses, mean research-task self-efficacy scores increased from 21.8 (SD = 2.1) at baseline to 23.8 (SD = 1.4) post-program, $t(15) = 4.09$, $p = 0.001$, $d_z = 1.02$. Among the 15 respondents who responded to each of these post-program items, all reported being confident or very confident explaining youth mental health research, and all reported being at least somewhat likely to participate in future research, advocacy, or mental health activities. Participants described learning related to literature review, research design, ethics, data interpretation, and science communication. They recommended a longer program, additional applied practice, and more guest speakers. **Conclusions:** The TAMI was delivered within one program cycle and was viewed favorably by respondents. This case illustrates how youth-generated questions, adult scaffolding, collaborative interpretation, and youth co-authorship can be incorporated into a structured research internship. Larger, independent evaluations are needed to assess outcomes, sustainability, and transferability.



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1. Introduction

Over the past decade, adolescent mental health in the United States has deteriorated across nearly every indicator, with rising rates of anxiety, depression, suicidality, loneli-

ness, and psychological distress (Centers for Disease Control and Prevention [CDC], 2024; Twenge et al., 2019; U.S. Surgeon General, 2021). These trends are shaped by overlapping structural, interpersonal, and technology-enhanced risk factors (Alvarez et al., 2022; Khalaf et al., 2023; U.S. Surgeon General, 2023). Researchers, clinicians, educators, parents, funders, and policymakers have responded with urgency; however, adolescents themselves remain largely absent from the design of research, programs, and policies intended to improve their mental health.

Current research models involve adolescents mainly as subjects or as episodic research team members, limiting the developmental relevance, contextual validity, and long-term impact of the resulting work (Ozer et al., 2020; Vaughn et al., 2018). Similarly, the limited involvement of high school students in the design and implementation of mental health research stems from entrenched academic norms that favor adult expertise over youth lived experience. For instance, restrictive IRB protocols systematically position students as passive research subjects rather than active contributors (Flicker et al., 2007). These barriers are reinforced by structural disinvestment, as under-resourced schools frequently lack the infrastructure to support research engagement, including administrative capacity, mentorship, and college-preparatory pathways.

These forces sustain a model in which youth, especially those from under-resourced communities, are engaged primarily as subjects of study rather than partners in knowledge production. This dynamic aligns with what Tuck's (2009) concept of "damage-centered research" which documents harm and brokenness while reinforcing one-dimensional portrayals of deficit-based narratives of these communities. In contrast, Tuck advances a desire-based framework that foregrounds complexity, agency, community knowledge, and possibility (Tuck, 2009). In settings such as Chicago's West and South Sides, where our case study program is situated, limited access to research training and professional development further constrain pathways into research and leadership, perpetuating inequities in who produces knowledge and whose voices shape it.

Youth Participatory Action Research (YPAR) represents a social-justice-oriented framework that shifts the role of young people from "subjects" being studied to active investigators of issues affecting their own lives and communities (Ozer, 2017; Cammarota & Fine, 2008). YPAR is grounded in participatory action research and critical youth studies and aims to position young people as key decision-makers and knowledge producers, challenging adult-centered approaches to youth research. In doing so, it opens up space to address emergent issues in ways that are youth-endorsed, contextually grounded, and responsive to their real-world needs (Ginwright & James, 2002; Ozer, 2017). When implemented with fidelity and intention in youth research spaces, YPAR can serve as a developmental and pipeline intervention, building research confidence, critical consciousness, advocacy, and civic engagement among participants (McCafferty et al., 2026; Smith et al., 2024).

A range of strategies have been developed to involve youth in health research, including community advisory boards, youth advisory boards, patient research networks, and Community-Based Participatory Research (CBPR) partnerships (Duea et al., 2022; Wallerstein et al., 2018). Although consultative youth-engaged models have expanded, fewer full-spectrum participatory models integrate sustained research-methods training, youth-led inquiry, shared data interpretation, and formal dissemination or youth co-authorship within adolescent mental health research, particularly for youth from historically under-resourced communities (Contractor et al., 2025; Leman et al., 2025; Malorni et al., 2022; McCafferty et al., 2026; Ozer et al., 2020).

Structured internships and pathway programs provide adolescents with sustained exposure to research and health careers, mentorship, and opportunities to practice research and communication skills (Affini et al., 2024). Community-based YPAR programs have

extended this model (moving from symbolic participation to structural governance) by engaging youth as co-investigators who define research questions, collect and analyze data, and disseminate findings to community stakeholders (Lindquist-Grantz & Abraczinskas, 2020; Rodríguez & Brown, 2009; Contractor et al., 2025). However, despite these advances, the structural mechanisms for operationalizing shared governance or youth-led inquiry remain limited (Malorni et al., 2022; Leman et al., 2025).

To address this gap, we describe the Technology and Adolescent Mental Health Internship (TAMI), a YPAR-based research training program for high school students from Chicago's West and South Sides. We present TAMI as an implementation-focused instrumental case study with three aims:

1. Characterize the TAMI's design, participatory processes, governance structure and virtual delivery.
2. Examine whether selected measures were sensitive to change and identify the domains youth associated with participation.
3. Identify implementation lessons and boundary conditions relevant to adapting structured internship models within YPAR.

Conceptually, TAMI links several program core elements, including research methods instruction, peer-led groups, adult scaffolding, and dissemination opportunities, to proximal mechanisms such as mastery experiences, youth voice, supportive youth-adult relationships, and collaborative inquiry (Bandura, 1997; Ozer, 2017; Zeldin et al., 2017). These mechanisms are hypothesized to foster immediate outcomes, such as research confidence, project/people management, specialized skill development, and intentions to remain involved in research. The present evaluation assessed selected process and implementation outcomes but did not evaluate longer-term academic, civic, or mental health effects.

2. The TAMI Program

2.1. Origins and Design Rationale

The TAMI program was conceptualized by the lead author as a community-engaged research training program from the EMERGE Innovations Lab based at the Rush University College of Nursing in Chicago, Illinois. The program's development began in 2022 through community consultations with teachers and principals from prospective partner schools. The research team originally proposed a Youth Advisory Board (YAB) as the primary model for student engagement. However, teachers and principals recommended a research internship model, noting that this designation carried more beneficial implications for colleges, scholarship committees, and employers and would enable students to convert their participation into concrete academic and professional credentials (e.g., résumé entries and college application materials). The internship functioned as an entry point through which youth could first develop foundational research skills and receive portable credentials. The post-program YAB later emerged as an ongoing pathway for TAMI alumni interested in applying those skills to remain active in research projects. Using this sequential model, the internship provided structured preparation, whereas the YAB supported deeper and more sustained participation in study design, instrument review, interpretation, and dissemination.

This reframing preserved the core YPAR principles of shared governance, collaborative inquiry, and sustained community-centered knowledge production while simultaneously enhancing the program's perceived value within students' existing developmental and institutional contexts (Cammarota & Fine, 2008; Ozer, 2017). The first TAMI cohort began in Fall 2023, completing a 12-week virtual internship to bridge opportunity gaps for high school students. All participants were enrolled through a standard application and selection process, which prioritized representation from schools in Chicago's West and South

Sides. By focusing on these neighborhoods, the program addressed entrenched structural disinvestment and the resulting lack of access to formal research training and professional development pathways. Since its founding, TAMI has graduated over 75 students from eight high schools and supported seven alumni as co-authors on two peer-reviewed publications, operationalizing the program's emphasis on youth-research partnerships.

2.2. Program Structure and YPAR Processes

The program introduces high school participants to youth mental health research through community-based participatory methods, research ethics, study design, literature reviews, and dissemination across multiple formats. Grounded in positive youth development (PYD) theory (Lerner et al., 2005), the program centers on experiential learning and positions youth as knowledge producers rather than recipients. A key feature of the TAMI is its integration of digital health tools and technology-based learning. Students explore how technology can support (or impair) youth mental health and community well-being and engage with digital data collection platforms throughout the research process. This technology-forward orientation aligns with emerging digital YPAR models that leverage technological tools to extend the reach and impact of participatory inquiry (Vaughn et al., 2018).

Likewise, all TAMI sessions were conducted once a week virtually via Zoom, with Google Classroom for learning and communication. Asynchronous collaboration allowed students to participate across schools and schedules and coordinate tasks remotely to develop leadership and science communication competencies. Weekly sessions occurred after Chicago Public School times (i.e., 4 PM) to minimize scheduling conflicts and maximize attendance. Some scheduling conflicts occurred related to after-school activities, family responsibilities, examination periods, and variations in dismissal or travel schedules across schools. Hence, students were not mandated to turn on their cameras or be physically in front of a computer. Facilitators addressed these conflicts through advance reminders, providing asynchronous materials in Google Classroom (e.g., weekly slides), and direct follow-up with students when participation declined. Students from the same school also communicated task updates to peers who missed a session. These strategies supported retention but required substantial facilitator coordination and did not fully resolve differences in students' available time and access to quiet, reliable spaces for virtual participation.

TAMI students were organized into inter-school groups of five to six, with each group selecting two peer leaders responsible for coordinating tasks and facilitating group progress, consistent with youth-adult partnership models that balance autonomy with developmental support (Zeldin et al., 2017). Each group addressed a single open-ended capstone prompt (i.e., they were encouraged to design a project to identify and investigate a youth mental health issue relevant to them and their community). Across three program years of the TAMI, groups investigated topics including sleep quality, academic pressure, school shootings, body image, depression and anxiety, diet and depressive symptoms, PTSD among young people affected by gun violence, standardized testing stress, and the effects of economic stress on youth mental well-being.

Graded weekly assignments reinforced core concepts introduced in each session and supported progressive skill development. To ensure that grading (which carries its own evaluative authority) did not reproduce the adult-dominated relationships that YPAR seeks to disrupt, assignments were used primarily as opportunities for feedback and did not reflect whether a student belonged in research. In addition, low scores did not exclude them from leadership, capstone, or dissemination opportunities.

The program also incorporated two to three guest speaker sessions per cohort, featuring past TAMI alumni (describing their pathway to college or experiences with the program), youth mental health researchers, career experts, and health professionals who addressed topics

directly relevant to participants' stated interests. Speakers represented careers in nursing, public health, medicine, and clinical psychology and came from communities similar to those of the TAMI participants. Instructional feedback on weekly assignments and quiz explanations contributed to student confidence and reinforced a learning environment where errors were treated as opportunities for deepened understanding, not as deficiencies. This mentorship dimension aligns with PYD principles, emphasizing the importance of adult connections, future orientation/planning, and exposure to pathways of opportunity for adolescents from historically underserved communities (Lerner et al., 2015).

Our YPAR process unfolded through four interconnected stages (problem identification, skill building, data collection and analysis, and action/advocacy). During *problem identification* in the first two weeks of the program, youth articulated mental health concerns that were salient to them and their communities. In the *skill-building* phase, students developed foundational research competencies in survey design, interviewing, literature synthesis, and focus group facilitation, with program administrators providing methodological and ethical guidance while intentionally preserving youth ownership of the project direction (Ozer & Douglas, 2013).

In the *data collection and analysis stage*, students designed brief practice surveys and analyzed de-identified example or within-cohort data for educational purposes. These activities were not intended to produce generalizable knowledge, were not included in the TAMI evaluation, and were not disseminated as empirical research findings. Finally, in the *action and advocacy stage*, students translated findings into dissemination products (e.g., infographics, slide decks, and policy briefs tailored to peers, families, and local stakeholders). The program culminated in group presentations at an in-person graduation ceremony held on a university campus attended by family members, peers, and community partners. Students received \$50 monthly gift cards each month upon meeting designated attendance benchmarks and received certificates of completion at the end of the program. These tangible recognitions serve to acknowledge their time and effort and provide portable credentials that students can present in college applications, scholarship materials, and résumés.

In the most recent program year (Year 3, September–November 2025), TAMI added a formal post-program YAB to provide a continuation pathway for internship alumni seeking deeper engagement in ongoing research. Unlike the time-limited internship, which combined research training with a youth-led capstone, the YAB engaged youth in an active research project from inception through interpretation and dissemination. Members conducted needs assessments, refined research questions, reviewed recruitment materials and data-collection instruments, contributed to IRB materials, and participated in the interpretation of the TAMI evaluation. The YAB therefore complemented rather than replaced the internship structure.

2.3. YPAR Principles in Practice

Shared governance was foundational, as youth co-developed capstone topics, selected their methods of data gathering, analysis, and dissemination, and interpreted findings. Rather than implementing a predefined curriculum in the first year, we created a structured space for youth to shape the direction of inquiry, fostering ownership, agency, and collective responsibility. Importantly, students drove the discussion and project development.

Youth-led inquiry was equally central, as interns independently generated research questions to address a broadly framed organizing topic centered on youth mental health issues. TAMI students drew on their lived experiences, current concerns, and community contexts, addressing issues ranging from mental health stigma and academic stress to trauma and dietary well being.

Adult facilitation as scaffolding rather than authority defined the relational approach, as program administrators provided methodological and ethical guidance while intentionally withholding directional control, an approach consistent with best practices in youth-adult partnerships (Zeldin et al., 2017). For instance, participants were encouraged to think about non-traditional ways of disseminating their research findings, including using social media (e.g., TikTok, podcasts, poetry).

Community relevance guided all program decisions. The inter-school grouping model brought students from the West and South sides of Chicago and from both selective enrollment schools (SEs) and neighborhood schools. SEs represented public schools that used merit-based admissions (combining standardized test scores and 7th-grade GPA) with a Socioeconomic Tier System to ensure geographic and economic diversity by dividing the city's census tracts into four tiers based on several factors. This mixed school approach enriched capstone projects and issues the students decided to center, by ensuring their inquiry reflected a diversity of experiences and perspectives rather than a uniform viewpoint. This structural feature, generated by the program's multi-school design, emerged as a meaningful programmatic strength.

2.4. Adult Facilitation and Capacity

Adult program facilitation drew on the team's prior experience in adolescent mental health research, community-engaged research, research ethics, trauma-informed practice, youth mentoring, and mixed-methods inquiry. Core facilitation competencies included balancing methodological guidance with youth decision-making, recognizing when adult intervention was necessary for feasibility reasons, providing developmentally appropriate feedback, supporting group conflict resolution, and translating research concepts without minimizing their complexity. Guest researchers and health professionals supplemented this capacity by providing topic-specific instruction and career mentorship.

The TAMI used shared, but not fully youth-controlled, decision-making. Youth led the selection of capstone topics, development of project questions, choice of dissemination formats, and interpretation of the capstone findings. Adults retained responsibility for the overall curriculum, program schedule, ethical oversight, institutional approvals, participant safety, and final feasibility decisions. For the Year 3 evaluation, adults developed the original survey items and conducted the initial statistical and qualitative analyses, whereas YAB members reviewed the interpretations, refined the qualitative categories, and contributed to decisions about emphasis and reporting.

3. Methods

3.1. Study Design

We used an implementation-focused instrumental case study design (Stake, 1995) with an embedded multi-method formative evaluation informed by participatory evaluation principles (Cousins & Whitmore, 1998). TAMI served as the focal case through which we examined how a structured internship operationalized selected YPAR principles, what implementation conditions supported or constrained delivery, and whether the selected evaluation indicators captured changes during one program cycle.

Quantitative data were collected through pre-post surveys, and qualitative data were collected through four open-ended post-program items and facilitator field notes. Surveys were administered via REDCap (Version 13.1.0; Vanderbilt University, Nashville, TN, USA) (Harris et al., 2009). Qualitative data was managed and coded manually in Microsoft Excel. The evaluation was formative because it was intended to refine the program and its evaluation approach rather than establish effectiveness. Quantitative and qualitative findings were analyzed separately and integrated descriptively during interpretation.

The evaluation addressed three questions: (1) To what extent were the selected research-task self-efficacy and related indicators responsive to change during the internship? (2) Which learning and development domains did the youth associate with their participation? (3) What preliminary implementation lessons and potential boundary conditions were evident in this case? In this formative evaluation, program deliverability was characterized by completion of the planned program cycle, matched survey completion, and documented implementation challenges. Acceptability was assessed using post-program satisfaction, willingness to recommend TAMI, future participation intentions, and suggestions for improvement.

3.2. Measures

Measures were selected by mapping the TAMI curriculum to brief indicators that could be administered without imposing substantial additional burden. Therefore, our evaluation prioritized responsiveness to change and program relevance over a comprehensive measurement of distal outcomes.

Research self-efficacy (RSE) was assessed using a study-developed five-item indicator of participants' perceived capability to explain research, formulate a basic research question, locate and summarize a relevant research article, and create a simple chart to display data. Items were rated from 1 (Strongly Disagree) to 5 (Strongly Agree) and summed, with possible scores ranging from 5 to 25. The indicator was aligned with the TAMI curriculum but was not previously validated; therefore, it was interpreted as an exploratory, program-specific measure rather than an established research self-efficacy scale. A sixth item assessing participants' ability to distinguish among research designs was administered only at baseline and excluded from the composite to preserve pre–post comparability.

Research knowledge was evaluated using a 12-item multiple-choice assessment encompassing fundamental research concepts presented throughout the TAMI curriculum. These concepts included the principles of community-based participatory research, informed consent, distinctions in research design, and the logic of mixed-methods inquiry. The assessment of research knowledge was considered a secondary outcome, as ceiling effects were expected owing to participants' previous academic involvement.

Post-program attitudes and behavioral intentions were assessed using brief single-item indicators of overall satisfaction (1 = Very Dissatisfied to 5 = Very Satisfied), confidence explaining youth mental health research (1 = Not Confident to 4 = Very Confident), and intention to participate in future research or mental health advocacy (1 = Very Unlikely to 4 = Very Likely). These indicators were included to minimize respondent burden and are interpreted descriptively rather than as validated measures.

Qualitative data were collected through four open-ended survey items at the post-program stage, asking participants to describe in their own words (1) the most important skills or knowledge gained through TAMI, (2) how they planned to apply these skills, (3) advice for future TAMI interns, and (4) suggestions for program improvement. Facilitators' field notes provided additional process data.

3.3. Data Analysis

Quantitative analyses included descriptive statistics for each research-task self-efficacy item and the total score at baseline and post-program. All quantitative statistical analyses were conducted using Python (Version 3.11.0; Python Software Foundation, Wilmington, DE, USA) utilizing the SciPy library (Version 1.11.0; Scientific Computing in Python, scipy.org). A paired-samples *t*-test was conducted as the single exploratory inferential assessment of within-person change. Cohen's d_z was calculated using the mean paired difference divided by the standard deviation of the paired differences. Item-level inferential

tests were not conducted because of the small sample and multiple-comparison concerns. High baseline scores and the bounded response scale were considered when interpreting the findings. Before conducting the paired-samples *t*-test, we assessed the normality of the within-person difference scores using the Shapiro–Wilk test and examined the distribution for extreme observations. The difference scores did not show a statistically detectable departure from normality, $W = 0.942$, $p = 0.372$, and demonstrated modest positive skewness (skewness = 0.52).

Qualitative responses to the four open-ended items were analyzed using inductive descriptive content analysis. The lead author read the responses repeatedly, generated initial descriptive codes, and grouped conceptually related codes into candidate themes. During the interpretive review, YAB members were invited to identify findings that they felt were overstated, incomplete, inconsistent with their experiences, or insufficiently critical of the program. Facilitator field notes (CE, KJ, AD, RE) contextualized the emerging interpretations but were not treated as an equivalent qualitative dataset. Youth co-authors reviewed the candidate themes and interpretations and selected excerpts through a participatory interpretive review process. The analysis was intended to identify descriptive patterns in the brief survey responses rather than establish saturation or generate theory.

3.4. Ethical Considerations

The program and evaluation were conducted under a protocol reviewed and approved by the Rush University Medical Center Institutional Review Board (ORA#: 21122902) as part of the lead author's ongoing research program. The YAB component was explicitly covered under this approval. The eight YAB members, all of whom had participated in the Year 3 cohort, conducted a participatory interpretive review of de-identified response summaries, candidate categories, selected excerpts, and proposed interpretations. Because they were members of the evaluated cohort, this process was treated as participant-researcher interpretation rather than independent validation.

All data were de-identified prior to analysis, and written parental consent was obtained prior to enrollment, including for co-authorship. Participation in the evaluation process was voluntary and separate from internship participation. Declining the surveys or individual items did not affect assignment feedback, gift cards, certificates, YAB eligibility, or authorship opportunities. Participants and parents/guardians were informed that responses would be de-identified and that critical feedback would not affect participants' standing in the program. Written parental consent and youth assent were obtained before evaluation activities.

3.5. Positionality and Reflexivity

The lead author served as the founder, lead facilitator, and primary evaluator of TAMI. These overlapping roles sustained familiarity with the program and its participants while also creating risks of confirmation bias, social desirability bias, and disproportionate adult influence on data interpretation and reporting. All eight YAB members participated in the Year 3 TAMI cohort and transitioned to advisory roles after completing their internship. As participant-researchers, they brought direct knowledge of the program to the interpretation of findings, but they also reviewed data from a cohort in which they had participated and may have reviewed categories that included their responses. Their insider position strengthened contextual interpretation while introducing the possibility of program allegiance, selective recall, or reluctance to express criticism. To increase interpretive accountability, YAB members reviewed de-identified response summaries, candidate categories, selected excerpts, proposed interpretations, and contributed to decisions about which findings to emphasize. These procedures supported participatory interpretation but did not provide

independent validation or eliminate power asymmetries and potential biases associated with the authors' relationships with the program.

4. Results

4.1. Participant Characteristics

Students were recruited through school announcements, educator referrals, direct outreach, or other applicable channels. Eligibility required attendance in any high school in the program's catchment area, irrespective of grade level. Applicants completed an online survey, and selections were made by one study member (AD) based on school representation and responses to application prompts. In Year 3, 36 students applied, 27 were offered places, and 18 enrolled in the program. Prior research experience was not required.

Year 3 of the TAMI (September–November 2025) constituted the first cohort for which matched pre–post evaluation data were collected and analyzed prospectively. Of the 18 students who completed the pre-program survey, 16 also completed the post-program survey, yielding an 89% matched survey-completion rate. Participants ranged in age from 15 to 18 years ($M = 15.9$, $SD = 0.8$). Most identified as female (72%), followed by male (22%) and another self-described gender identity (6%). Participants identified as Asian (61%), Black or African American (22%), White (11%), or Hispanic or Latino (6%). Half were in 11th grade, 28% were in 10th grade, and 22% were in 12th grade. Seven participants (39%) reported prior research experience, and three (17%) identified as first-generation college students. Intended career interests included health professions (50%), STEM fields outside the health professions (28%), social sciences (11%), and undecided or other fields (11%). Sociodemographic characteristics are presented in Table 1.

Table 1. Participant demographics ($N = 18$).

Variable	Category or Value	<i>n</i> (%)
Age, years	$M = 15.9$, $SD = 0.8$	18
Grade level	10th grade	5 (27.8%)
	11th grade	9 (50.0%)
	12th grade	4 (22.2%)
Gender	Female	13 (72.2%)
	Male	4 (22.2%)
	Self-described identity	1 (5.6%)
Race/ethnicity	Asian	11 (61.1%)
	Black or African American	4 (22.2%)
	White	2 (11.1%)
	Hispanic or Latino	1 (5.6%)
Prior research experience	Yes	7 (38.9%)
First-generation college student	Yes	3 (16.7%)
Intended career interest	Health professions	9 (50.0%)
	STEM	5 (27.8%)
	Social sciences	2 (11.1%)
	Undecided	2 (11.1%)

Note. Percentages may not total 100% because of rounding. Race and ethnicity were collected using a check-all-that-apply item; however, each participant selected one category.

4.2. Research Self-Efficacy (RSE)

As an exploratory assessment of measurement responsiveness, we examined within-person changes among the 16 participants with matched surveys. The mean research-task self-efficacy scores increased from 21.8 (SD = 2.1) at baseline to 23.8 (SD = 1.4) post-program. The mean paired change was 2.1 points (SD = 2.0), 95% CI [1.0, 3.1], $t(15) = 4.09$, $p = 0.001$, $d_z = 1.02$. Individual changes ranged from -1 to $+6$ points. Three participants entered with the maximum possible baseline score of 25, limiting their opportunity for upward change. A Wilcoxon signed-rank sensitivity analysis yielded the same substantive conclusion. Median total scores increased from 21.5 (IQR = 20.75–23.0) at baseline to 24.0 (IQR = 23.0–25.0) post-program, $p = 0.003$. This convergence supports the robustness of the observed pre–post pattern, although the findings remain exploratory and do not establish the program’s effectiveness. The pre–post RSE data are presented in Table 2.

Table 2. Research Self-Efficacy: Pre- and Post-Program Scores ($n = 16$ matched pairs).

	Pre-Program	Post-Program	Change
Mean (SD)	21.8 (2.1)	23.8 (1.4)	+2.1 (2.0)
Minimum	18	21	—
Maximum	25	25	—

Note. Paired t -test: $t(15) = 4.09$, $p = 0.001$, $d_z = 1.02$.

The item-level descriptive means showed pre–post gains across all five items. The largest mean increases were for items asking participants to explain research to others (4.19 to 4.75) and to formulate research questions (4.38 to 4.94), which had the most room for growth from the baseline. Items with higher baseline means (finding articles at 4.56 and synthesizing articles at 4.31) showed smaller absolute changes. Item-level inferential tests were not conducted (see Section 3.4). Item-level pre–post means are summarized in Table 3.

Table 3. Research-task Self-Efficacy Item-Level Pre- and Post-Program Means ($n = 16$).

Research-Task Self-Efficacy Item	Pre M (SD)	Post M (SD)	Mean Change
Explain research to others	4.19 (0.66)	4.75 (0.45)	+0.56
Formulate a research question	4.38 (0.50)	4.94 (0.25)	+0.56
Create a data visualization	4.31 (0.70)	4.69 (0.60)	+0.38
Find a relevant research article	4.56 (0.51)	4.88 (0.34)	+0.31
Summarize a research article	4.31 (0.70)	4.56 (0.51)	+0.25
Total score	21.75 (2.08)	23.81 (1.38)	+2.06

Note. Items were rated on a 1 (*Strongly Disagree*) to 5 (*Strongly Agree*) scale, with a total range of 5–25. Higher scores indicate greater research self-efficacy.

4.3. Baseline Understanding of Research

At pre-program, participants responded to open-ended prompts asking what research meant to them to set a baseline. These responses documented the range of starting frameworks youth brought to the TAMI and provided interpretive context for post-program growth. Most participants articulated procedural or epistemic insights, although subjective responses varied considerably across the cohort.

“Research means investigating a question from the ground up, which may serve a broader purpose.” (Participant 3)

“Research is a way to understand the world around us through a more objective and credible lens.” (Participant 13)

“Research is analyzing different forms of input, or data, and seeing how it reveals different patterns, trends, and ideas that can be new, supporting older claims, or refuting them.”
(Participant 9)

Contrasting these with participants who described research in narrower terms, that is, research is “looking up stuff as evidence” (Participant 14) or “creating an academic piece about a topic you have come to master” (Participant 18), further illustrates the range of baseline orientations the TAMI was designed to expand upon. These responses illustrate the range of conceptual starting points represented in this cohort. Because the baseline and post-program qualitative prompts were not directly parallel, we did not treat them as evidence of qualitative pre–post change.

4.4. Research Knowledge

The 12-item research knowledge measure showed a substantial ceiling effect at baseline. Nine of the 12 items had zero between-participant variance at pre-program, and post-program responses were similarly uniform. Given this floor on detectable change, the measure did not function as a sensitive indicator of program impact, and we do not report inferential analyses on this measure. The measurement implications are subsequently addressed.

4.5. Post-Program Attitudes and Behavioral Intentions

Fifteen participants completed the overall post-program survey, and 15 participants provided responses to each confidence and future-participation item, although item-level respondents were not identical. Eight participants (53%) reported being very satisfied with the TAMI, and seven (47%) reported being satisfied. Eight participants (53%) felt very confident in explaining youth mental health research to a friend or classmate, and seven (47%) felt confident. Regarding future participation in youth research, advocacy, or mental health projects, 12 participants (80%) reported being very likely to participate, two (13%) reported being likely, and one (7%) reported being somewhat likely. No participant reported being unlikely to participate. All 15 respondents indicated that they would recommend the TAMI to their peers.

4.6. Qualitative Themes

4.6.1. Skill Development and Research Competency

Participants described growth in foundational research skills, including conducting literature reviews and synthesizing evidence, formulating researchable questions, applying ethical and trauma-informed research practices, and engaging in quantitative, qualitative, and mixed-methods approaches. Many participants also highlighted growth in public speaking and scientific communication; competencies they articulated as directly applicable to college coursework, internships, and health or STEM career pathways.

“I am proud of learning how to turn a broad idea into a focused, testable research question and then build a concise literature map around it. Developing inclusion/exclusion criteria, extracting key findings, and synthesizing them into a coherent rationale made my project sharper and more actionable.” (Participant 3)

“I learned how to properly and effectively conduct a literature review. That was the skill I felt I exercised most during the program and improved the most on.” (Participant 11)

“I am proud of learning how to collect data in the right and ethical way. We learned about informed consent, privacy, and how to respect people’s answers.” (Participant 20)

4.6.2. Value of Mentorship and Collaborative Learning

Students identified mentorship, peer collaboration, and exposure to guest speakers as defining features of their program experience. A supportive relational climate was described as fostering both intellectual risk-taking and a sense of collective scholarly identity. Participants framed these relationships as central to their learning and motivation.

“I made new friends, learned new things, and had so much fun. Make sure to stay on top of your work and get to know your group members.” (Participant 7)

“I got to work with a bunch of creative and hardworking people to create an impactful final project, which is something rare that this internship offers.” (Participant 19)

“The program was very effective at maximizing the most amount of content in the least amount of time. I believe that this internship is quite short and still very effective.” (Participant 13)

4.6.3. Future Application of Skills

Participants articulated specific and concrete ways they intended to use their TAMI experience, including in AP Research coursework, undergraduate research, community health projects, and professional development. This forward orientation suggests that the TAMI’s impact extends beyond immediate skill acquisition to shape participants’ longer-term research and advocacy trajectories.

“I see myself being a researcher in a lab, using these skills I learned in the future to help enhance science and improve the well-being of youth across the world.” (Participant 10)

“In the future, I can see myself using these skills in AP Research. These methods of research will be extremely useful.” (Participant 7)

“I can use these skills in college and in my future career, especially in healthcare. Knowing how to collect and understand data will help me make better decisions and help people.” (Participant 20)

4.6.4. Suggestions for Program Improvement

Students offered actionable recommendations consistent with the YPAR principles of iterative, youth-informed program improvement. A recurring suggestion was to extend the program duration to allow for deeper engagement with the content and project work. Participants also requested additional structured practice activities, more time for capstone development, expanded methodological training, and more guest speaker sessions.

“I think having just a couple more weeks would have allowed for a more comprehensive project.” (Participant 3)

“The program could improve by having more activities where we can practice the skills we just learned.” (Participant 6)

“If possible, I think it would be beneficial for interns to hear from more speakers!” (Participant 17)

4.7. Youth Researcher Perspectives

To supplement the formal evaluation findings, the following perspectives were written by five youth co-authors. These reflections were generated for the manuscript after the evaluation was completed and were not included in the thematic analysis of the open-ended survey responses. Specifically, youth co-authors contributed to the formal analysis and review of the qualitative themes, the interpretation of results, decisions about what to report, and the review and editing of the manuscript prior to publication, consistent

with ICMJE authorship criteria and the spirit of our YPAR approach. These perspectives are published with the youth co-authors' full knowledge and consent as an expression of authentic youth voice and genuine co-authorship.

"Before TAMI, I saw research as something adults did, while youth were mostly just part of the study. TAMI changed that for me because it showed me that youth can actually help shape the questions being asked and the purpose behind the research. What stood out to me most was realizing that when research is about young people—especially mental health—youth voices should be included from the start."—AZ

"Before TAMI, I thought research was just reading articles and writing papers. After TAMI, I learned that research is about real people and real issues, especially in youth mental health. What surprised me most was how much our opinions mattered and how we could create our own research projects. TAMI helped me build skills like data collection and communication, but it also showed me how research can make a difference. This kind of program is important because it gives youth a voice."—RR

"What made TAMI different from other programs I have been in is that it shifted my view of research from being a passive subject to an active lead investigator. In TAMI, we actually shaped study designs and analyzed data affecting our own Chicago communities. It was not only a resume builder—it was the realization that our insights on mental health carry as much weight as the data itself."—RMK

"Before TAMI, I viewed research as something restrictive in terms of subject matter and participation. TAMI disproved those notions by teaching me that anyone can learn and apply the foundational concepts of research to any topic that interests them, just as my group did for our capstone project. TAMI left more room for student collaboration and the exchange of ideas than any other program I have been part of."—KS

"Before TAMI, I had barely any exposure to research. TAMI gave me the opportunity to learn about different types of research methods and combine them with my existing skills to investigate a topic I was passionate about: mental health. Mental health affects such a large percentage of today's youth. Being able to research it and combine that research with lived experiences results in potentially very effective solutions to improve lives."—TH

5. Discussion

This instrumental case study shows that the TAMI was deliverable within one program cycle and was viewed favorably by respondents. The manuscript's primary contribution is its description of how a structured internship incorporated youth-generated questions, peer leadership, adult scaffolding, collaborative interpretation, multiple dissemination formats, and youth co-authorship. The exploratory survey findings provide information about measurement responsiveness but do not establish effectiveness.

The study-developed research-task self-efficacy indicator detected substantial exploratory pre–post gains ($d_z = 1.02$). Mean gains were descriptively larger among the 13 participants entering below the scale ceiling, suggesting the program had the greatest impact on youth with the least prior research exposure. This pattern aligns with YPAR priorities to broaden access for underrepresented students (Ozer et al., 2020) and supports social cognitive theory, which posits that mastery experiences, vicarious learning, and social persuasion foster self-efficacy (Bandura, 1997). TAMI's core components—hands-on inquiry, peer collaboration, and adult mentorship—directly engage these mechanisms. However, given the small sample size, high baseline scores, and absence of a comparison group, this non-experimental design precludes attributing these changes causally to TAMI participation. Conversely, the research-knowledge assessment exhibited marked ceiling effects and failed as a sensitive-to-change measurement in this cohort. Rather than indi-

cating an absence of learning, this finding underscores a measurement limitation. Future evaluations should incorporate youth-co-designed, scenario-based instruments capable of evaluating applied reasoning, shared decision-making, and the relational dimensions inherent to YPAR.

The 12-item knowledge measure did not function as a sensitive indicator of program impact, given the baseline ceiling described. This is a measurement lesson rather than a finding about TAMI itself. Standard knowledge assessments may systematically underestimate learning in YPAR programs that recruit academically engaged youth. In addition, brief surveys appear feasible to administer but may not fully capture the relational and decision-making processes central to YPAR. Future measurement development should incorporate youth-defined indicators of shared authority, belonging, critical inquiry, relational trust, and capacity to act on research findings. Future evaluations should incorporate scenario-based and applied knowledge assessments capable of capturing deeper conceptual and methodological growth.

Qualitative findings deepened this picture. Participants described growth in discrete research skills as well as in critical inquiry, ethical reasoning, and scientific communication, competencies the literature identifies as central to both YPAR participation and long-term civic engagement (Kirshner, 2015; Ozer, 2017). Participants described ways they intended to apply their skills in AP Research, college, health careers, and community settings. These statements indicate future orientation, but longitudinal follow-up is needed to determine whether intentions translate into subsequent research or advocacy participation.

TAMI builds on a developing tradition of structured YPAR internship models. The UC Berkeley YPAR Hub has documented pedagogical frameworks for youth-led research programs in which young people identify community issues, design studies, collect data, and disseminate findings (Ozer, 2017; Rodríguez & Brown, 2009). The Health Professions Recruitment and Exposure Programs (HPREP), focused on the medical and clinical pipeline, provide multi-week research experiences for high school students from underrepresented communities (Affini et al., 2024). Digital YPAR models have extended these approaches through technologically mediated formats (Vaughn et al., 2018). TAMI diverges from these traditional models through its explicit focus on mental health equity, cross-school collaboration, and formal shared governance structures, including youth co-authorship of peer-reviewed publications as a structural mechanism for epistemic justice.

TAMI's model of shared governance involved youth leadership over capstone questions, methods, interpretation, and dissemination, alongside adult responsibility for the curriculum, ethics, institutional approvals, and the original evaluation measures. The program's evolution to include a formal YAB in Year 3, with students contributing to IRB protocol development, illustrates a concrete pathway toward youth research leadership. The inclusion of six youth co-authors on this publication represents one operationalization of that commitment.

Classic models of YPAR distinguish genuine sharing of decision authority from decorative or tokenistic involvement (Arnstein, 1969; Hart, 1992). However, common models of youth engagement remain near the lower rungs of these ladders, where young people are consulted but do not shape decisions. Our goal was to move beyond consultation by giving youth authority over research questions, methods, interpretation, and authorship. However, the risk of tokenism is not removed by this structure alone.

Co-authorship can itself become symbolic when youth contributions are nominal, so we treated shared governance and co-authorship as ongoing practices to be examined rather than achievements to be declared. Positioning youth as credible knowledge producers also raises questions of epistemic justice, specifically the testimonial and hermeneutical injustices that arise when young people's accounts of their own lives are discounted

(Fricker, 2007). Centering youth interpretation of mental health data is one way to counter these injustices, while recognizing institutional authority over funding, design, and publication still rests largely with institutions and adults.

The cross-school grouping design, which combined students from selective enrollment and neighborhood schools, emerged as a notable programmatic feature. In qualitative reflections, students described how different community contexts enriched shared research questions, resulting in capstone projects that reflected a broader range of lived experience. This design element warrants deliberate replication and further evaluation.

The program's virtual delivery model and scalable structure carried implications for replicability. However, the TAMI's implementation relied on specific institutional conditions, including university-based mentorship infrastructure, school partnership agreements, and dedicated program coordination involving teachers and school administrators. Organizations seeking to adapt the TAMI's features, such as the internship framing, mixed school groupings, shared governance protocols, and public research dissemination ceremonies, will need to account for these enabling conditions in their own contexts.

5.1. Implementation Challenges and Contexts

The feasibility of the TAMI should be interpreted in relation to several implementation challenges and enabling conditions. Our use of a virtual delivery strategy expanded the program's reach but complicated attendance, relationship building, and small-group coordination. Students entered with different school calendars, extracurricular obligations, research exposure, and access to quiet spaces and reliable technology. Asynchronous materials and facilitator follow-up reduced but did not remove these participation differences. In addition, the combination of grading and shared governance created an inherent tension. Assignments provided structure and developmental feedback, but adult control over evaluation could also reinforce hierarchical relationships. Revision opportunities, transparent expectations, and separating assignment performance from access to leadership helped moderate this tension, although they did not eliminate the adult facilitator's institutional authority.

Notably, the TAMI model was labor intensive. Facilitators provided weekly instruction, individualized feedback, group coordination, attendance follow-up, guest-speaker management, and support for research dissemination. The TAMI's implementation therefore depended on facilitator time, administrative coordination, school partnerships, technological infrastructure, and resources to compensate youth participation. Replication without this support may produce a more limited or symbolic form of participation.

The Year 3 cohort included a substantial proportion of students from selective-enrollment schools and participants with relatively high baseline research confidence. This composition may have facilitated project completion and contributed to the observed ceiling effects, while limiting conclusions about implementation among youth with fewer academic resources or less prior exposure. Broader recruitment from neighborhood schools may require additional time, scaffolding, technological support, and school-based coordination.

Finally, youth participation occurred within institutional boundaries that remained largely controlled by adults, including funding, IRB oversight, program scheduling, access to data, and publication procedures. The TAMI shared authority over several consequential research decisions but did not transfer control over all dimensions of the research enterprise. Its transferability may therefore depend not only on curriculum availability but also on whether institutions are prepared to provide youth with meaningful decision authority, compensation, mentorship, and sustained pathways for participation after the internship ends.

5.2. Implications for Co-Design and Digital Mental Health Research

The TAMI model has direct implications for the co-design of digital mental health interventions targeting youth. Participatory approaches to technology development are increasingly recognized as essential for producing tools that are contextually relevant, culturally responsive, and developmentally appropriate for adolescent users (Smith et al., 2024; Vaughn et al., 2018). The TAMI's training infrastructure offers a viable pathway through which YPAR preparation can translate into meaningful youth participation in the co-design and evaluation of digital health tools, including those targeting violence-exposed youth in Chicago. For youth navigating adversity, community violence, structural poverty, and racial trauma, participatory research models that center lived experience alongside rigorous inquiry may be well positioned to generate both valid knowledge and healing-oriented engagement. Future iterations of the TAMI should explicitly incorporate digital co-design modules and leverage the YAB infrastructure as an ongoing evaluation and co-design body for technology-based mental health interventions serving these communities.

5.3. Limitations

Several limitations warrant acknowledgment. Primarily, the small sample size ($n = 16$ matched pairs) limits statistical power, and effect size estimates should be interpreted with caution given the wide confidence intervals typical of samples this size. In addition, all outcome data were derived from self-report measures, which are susceptible to social desirability bias, particularly in program evaluation contexts. The absence of a comparison group precludes causal inference. Observed changes may reflect concurrent developmental experiences, academic exposure, or maturation effects rather than TAMI participation specifically.

Another primary limitation of this evaluation was that TAMI youth did not participate in selecting the original survey items or conducting the initial quantitative analysis. While utilizing brief, consistently administered items made matched pre-post data collection feasible within a compressed internship timeframe, and minimized student burden, this approach involved distinct trade-offs. The survey privileged individual, self-reported competencies defined primarily by adult evaluators, capturing discrete skills more readily than collective inquiry, relational trust, or shifts in how youth viewed their own research authority. Furthermore, prominent ceiling effects limited the ability to detect change among participants who entered the program with substantial prior academic preparation.

Although youth narratives and participatory interpretation broadened the evaluation, they did not eliminate these measurement constraints. However, during manuscript revisions, youth co-authors reviewed the findings and shaped study interpretations. In subsequent discussions regarding which results felt meaningful in relation to their lived program experiences, these YAB members identified vital dimensions of learning (e.g., the application of research to community concerns via their capstone projects) that the survey did not center. This discrepancy underscored a critical methodological imperative as future evaluations must co-design process evaluation measures alongside youth from the outset, combining individual outcomes with process indicators that track decision-making authority, participation quality, and relational belonging.

Likewise, the composition of this cohort, concentrated in selective enrollment schools, limits generalizability to the broader population the TAMI aims to serve. Students from selective enrollment contexts may differ systematically from youth attending open-enrollment neighborhood schools in prior academic preparation, baseline confidence in basic and applied research (as was the case), and access to institutional support. This concentration introduces a selection effect that may inflate observed gains. Future implementations

should deliberately recruit from a broader range of school types, prioritizing open-enrollment neighborhood schools on the West and South Sides, to more faithfully operationalize the program's equity mission. Finally, the current evaluation captured only immediate post-program outcomes. Future evaluations could incorporate follow-up assessments at six and 12 months, independent evaluations, larger and more diverse samples, and comparison conditions.

6. Conclusions

This case illustrates one approach to incorporating selected YPAR principles into a structured youth mental health research internship. The TAMI included youth-generated questions, peer leadership, collaborative interpretation, multiple dissemination formats, and youth co-authorship, while adults retained responsibility for institutional, ethical, and programmatic oversight. The preliminary evaluation indicates that the program was deliverable within one cohort and was viewed favorably by respondents, but it does not establish effectiveness, causal impact, or transformation of broader institutional power relations. Larger, independent, and longitudinal evaluations are needed to assess outcomes, sustainability, and transferability across school and community contexts.

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Abbreviations

The following abbreviations are used in this manuscript:

CBPR	Community-Based Participatory Research
CDC	Centers for Disease Control and Prevention
HPREP	Health Professions Recruitment and Exposure Program
IRB	Institutional Review Board
PYD	Positive Youth Development
RSE	Research Self-Efficacy
STEM	Science, Technology, Engineering, and Mathematics
TAMI	Technology and Adolescent Mental Health Internship
YAB	Youth Advisory Board
YPAR	Youth Participatory Action Research

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