Gender Equitable Teaching Strategies (GETS)

SciGirls Strategies
Implementation Evaluation Report

May 2021

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I. Background and Purpose

For the SciGirls Strategies supplement, ten educators were trained to be SciGirls Strategies trainers in June of 2019 (see the attached Training Evaluation Report, 2019). During that time, they developed action plans for their local teacher training. The goal was for each Trainer to train ten or more teachers in their local schools/districts. Trainers could plan and schedule their workshops to fit their local context in order to accomplish the objectives of building teacher’s confidence and skills in using SciGirls gender equitable and culturally responsive teaching strategies. After the training workshop, the Trainers met once a month virtually and had continual access to the facilitators of their training: University of Minnesota professor Dr. Barbara Billington and St. Catherine University professor, Dr. Siri Anderson, the project’s Co-PI Dr. Brenda Britsch and two TPT staff members, Leah Defenbaugh and Alex Dexheimer. Alex was replaced in 2020 by Demetrius Trundle.

The goal of the SciGirls Strategies project are:

1) To increase the number of high school girls, including ethnic minorities, recruited and retained in traditionally male CTE-STEM pathways
2) To enhance the teaching and coaching practices of CTE educators, counselors and role models with gender equitable and culturally responsive strategies
3) To research the impacts of strategies and role model experiences on girls’ interest in STEM careers
4) To evaluate the effectiveness of training in these strategies for educators, counselors and role models
5) To develop training that can easily be scaled up to reach a much larger audience

The goals of the SciGirls Strategies supplemental Train-the-Trainer (TTT) activity are to:
1) Leverage the existing accredited SciGirls GETS course, resources and best practices to a new educator population across ten school districts in Minnesota and Western Wisconsin by employing a Train-the-Trainer model.
2) Support SciGirls GETS Minnesota and Western Wisconsin trainers as they deliver the educator curriculum to ten school districts and 120 educators and counselors for CEU and graduate credit.
3) Build additional significant long-term capacity around gender equitable and culturally responsive CTE and STEM education within each participating school district engaging 25,000 students.

Course resources may be accessed at: Genderequitableteachingstrategies.weebly.com
Educator Assignments required for the Gender Equitable Teaching and Advising Strategies (GETS) Course Completion (CEUs and Stipends)

(Note that percentages for assignments refer to CEU requirements.)

1. Self-Assessments - CRP & GETS (30%) - These both happen during the first 2-4 weeks: 1) GETS Rubric (by reporting on the Self-Assessment on GETS Google Form), 2) My Culturally Responsive Practices Rubric.
2. Portfolio - 4-6 submissions over the year (30%) - One required submission will be your praxis on Role Models. These postings will occur during the academic year. Final reflection due in May/June. These postings will include evidence collected in your class or school, examples of lesson plans you’ve modified to include GETS strategies, student work samples, data analysis, recorded conversations with students, teachers, counselors.
3. Ongoing Accountability/Engagement/Participation (30%) - Your participation happens throughout the year and your team’s monthly meetings and will be assessed through attendance, participation in F2F or/and online discussions, keeping up to date on postings/interactions on Facebook, providing feedback to peers, and communicating with your school’s counselors about considering strategies to promote an increase in girls and students of color in STEM-CTE classes.
4. Responses to Surveys/Class Reflections (10%) (Happens throughout the year).
5. Active use of women STEM role models.

This 2021 SciGirls Strategies Evaluation Report characterizes the implementation of the local training using data from Trainer interviews, Trainer surveys, and teacher trainee surveys. The data were analyzed to draw conclusions about successful local course implementation models by trained trainers and the effects on participating teachers. We also report on the obstacles posed by COVID-19.

II. Evaluation Design, Methods, and Measures

The external evaluation examined both the TTT model and the effect on the trainees’ teaching practice using a mixed-methods approach (Frechtling, 2010), collecting quantitative and qualitative data on the nature and extent of the effects on the trainees and their perceptions of the effects on their students.

The evaluation timeline is shown below for context. The focus of this report is on the local courses offered during the 2020-21 school year.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2019</td>
<td>Needs Assessment by Trainers signed up for TTT workshop</td>
</tr>
<tr>
<td>June 25-28</td>
<td>TTT workshop daily surveys</td>
</tr>
<tr>
<td>May 2020</td>
<td>Trainer course implementation survey</td>
</tr>
<tr>
<td></td>
<td>Trainee implementation survey</td>
</tr>
<tr>
<td></td>
<td>Focus groups with trainer and trainees from implementing sites</td>
</tr>
</tbody>
</table>
III. Results

Data for courses offered in the 2019-20 school year were collected, analyzed, and reported in a May 2020 report. The three Trainers who offered a course in 2019-20 shared several characteristics: at least one supportive colleague, a way to recruit colleagues, a plan/syllabus for the course, and a confident attitude toward the course as a “conversation among colleagues.”

Trainers who did not offer the course that year cited several obstacles – developing a plan from scratch (they would have liked templates), recruiting (would be good to have a committed colleague who could help with that), and competing school or district initiatives. They were given the opportunity to offer the course during the 2020-21 school year and four Trainers did.

First, a summary of the findings from the TTT workshop, followed by Trainer and trainee results for the 2020 and 2021 implementations, followed by case studies of five Trainers from 2021.

III.A. Trainers’ Backgrounds from 2019 Needs Assessment

In the 2019 needs assessment completed before the TTT workshop, Trainers reported they signed up to be a Trainer because they were passionate about helping girls stay interested in STEM, wanting to be able to support girls and all learners, and wanting to be trained in ways that would benefit girls in STEM.

- Prior to the workshop they rated themselves on the novice end of the spectrum on the SciGirls Strategies.
- They reported only moderate experience in using SciGirls Strategies.
- Their expectations for the TTT workshop were that by the end of the week, they would understand the expectations, be able locate and organize the resources their teacher trainees could use, have ideas for getting buy-in from their staffs, and have a plan for the course. All Trainers had agreements signed by their school or district that allowed them to participate.
- Trainers anticipated that the barriers in offering the training in their local school and/or districts would be teachers finding time to participate, attracting and keeping teachers (particularly experienced and intransigent teachers), funding, and being knowledgeable enough to support the teachers during the training.

The SciGirls Strategies are research-based gender equitable and culturally responsive teaching strategies that can be found here (and in the GETS syllabi):
http://www.scigirlsconnect.org/scigirls-strategies-engage-girls-stem/
III.B. Trainers’ Success Factors

At the end of the TTT, trainers reported that they felt the face-to-face training would turn out to be very important to their success, followed by personal support from facilitators, the Weebly course materials, and district support for the course.

Eleven months later (May 2020), the seven Trainers who did not offer courses reported several obstacles: not having had time to get their action plan together so they didn’t recruit teachers, only a few teachers expressing interest, district support was not there or changed, heavier than expected course loads, and most importantly, the COVID-19 pandemic closed all schools and prohibited Trainers who had hoped to begin in the spring from starting as all teachers had to switch to distance learning for their students. One Trainer dropped out of teaching due to the pandemic, but one of the other Trainers offered to do a second course with educators.

The three Trainers who were able to offer the GETS course in 2019-2020 recruited widely, but then asked people they knew or worked within a group (their Professional Learning Community, or PLC) or who were like-minded (value diversity, have a growth mindset). Trainees in those courses reported in the May 2020 focus group that the individual invitation from a trusted colleague with a specific plan and doable expectations on an important topic made them want to sign up.

In addition to the three Trainers who offered the course in 2019-20, four more Trainers offered at least partial courses from June 2020-June 2021 during the pandemic. Two Trainers who did not offer a course this past year intend to offer one, beginning this summer or in the fall of the 2021-2022 academic year. They have been addressing the problems they had last year, like talking to administrators, personally recruiting colleagues, planning to start this summer when teachers have more time. They are all still committed to the value of the program. Another Trainer who did not complete the course is planning on teaching it in the coming year. One Trainer hopes to teach the course at some point in the future.

Details of Successful Course Implementation

Sites that implemented during the 2019-2020 school year had different formats. At one site the district paid for substitutes and food for two full days. SciGirls Strategies GETS sessions were held during district staff development, plus stipends were provided for 18 hours of additional work done outside of the group training hours. This Trainer was able to recruit ten teachers, and all finished the course. At a second site, the group met once a month for an hour after school and during available professional development (PD) days; seven out of the nine teacher trainees finished the course. At a third site, the teachers do online only instruction. They used their PLC time for the course; eight out of nine trainees finished.

<table>
<thead>
<tr>
<th>Dates offered</th>
<th>When, where, and how met</th>
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<tbody>
<tr>
<td>September 2019-</td>
<td>Face to face for 18 hours and up to 16 hours of prep, reflection, and work time.</td>
</tr>
<tr>
<td>December 2020</td>
<td>Training dates:</td>
</tr>
<tr>
<td></td>
<td>Thursday, Sept. 19, 8 – 3:30 (full day sub and lunch provided)</td>
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<tr>
<td>10 started</td>
<td>Monday, Sept. 30, 2 sessions of district staff development</td>
</tr>
<tr>
<td>10 finished</td>
<td>Friday, Nov. 1, 2 sessions of district staff development</td>
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</tbody>
</table>
Wednesday, Dec. 4, 8 – 3:30 (full day sub and lunch provided)
Plus, an additional staff development stipend of up to 18 hours for work
done beyond the scheduled training hours.

| 2019-2020                      | We would meet once a month for an hour after school and during available
| 9 started                      | PD days in my classroom.                                          |
| 7 finished                    |                                                                  |

| 2020-21                       | I developed a virtual course the participants could take built around each of |
| 4/7 participated              | the 6 SciGirls Strategies. We met once a month to talk but it was too much   |
| 2/6 participated              | with COVID-19.                                                          |
| 6/6 participated              | Summer 2020 meetings, then postponed due to COVID-19 so we did not      |
| None yet (Two Trainers)       | continue in September.                                                 |
| 0/5 participated              | This was the Trainer who repeated the course with new trainees.           |
|                               | Will be offered in the 2021-2022 school year.                          |

The trainers identified the **most effective elements** of their courses. As in the TTT workshop evaluations, the teachers in the local courses valued discussion with colleagues, reflection, and resources:

- Teacher discussion and work time for planning
- Regular meetings and reflections
- Sharing with each other what we are trying in our classrooms. What is working, what is not working.
- The information about the SciGirls Strategies
- Having the book study groups.
- Reading different books.
- Choosing their own pathways.
- The role model videos

The Trainers report the course resulted in **positive changes.**

- Awareness, changes is lesson plans, changes in support practice, offering more class opportunities in STEM to more students.
- We had good discussions amongst the group, and teachers in the group would reflect upon their own practice and how they could incorporate more gender and cultural equity. I did not survey any change within the school or district as a whole.
- I feel like we have better discussions about how we approach STEM and student learning. We have new insight into working with students.

Of the nine Trainers who offered or planned to offer the GETS course, eight intend to offer the course again in their schools and/or districts. As one Trainer put it, “This is about the
journey. It is about helping students improve their learning, through different exposure to new ideas for them.”

Suggestions for Improving Trainer Training from Trainers

- Make it longer but spread out
- Provide more practical examples of exemplary lessons
- Provide slide shows and agendas from past SciGirls courses to get us started
- Need ideas for recruiting
- Need access to research articles

C. 2019-20 and 2020-21 Trainee Reflections on Their Local Course (23 in 2020, 11 in 2021)

Responding teacher trainees were from three different schools teaching STEM in grades 6th – 12th and the subjects of Biology, Physical Science, and Math, among others. Teachers reported that the focus in their classrooms varied from highlighting female scientists and role models to addressing STEM stereotypes, increasing classroom discussion and engagement, teaching science thinking skills, reducing stereotype threats, connecting girls to STEM resources and ideology, changing stigmas for B and C courses, changing the curriculum so it reflects the students lived experiences, adding a focus on growth mindset, providing socio-emotional support during this difficult pandemic year (2020-2021).

Most of the teachers (91% in 2020; 100% in 2021) felt they had adequate support for their individual growth finding the connections with the cohort and the reading materials and resources most valuable. Teachers wished they had more time to connect with other teachers and plan lessons, while enjoying the regular meetings, and meaningful activities and discussions.

Participation in the GETS course affected the teachers’ personal practice by increasing their awareness, helping them elevate female voices and examples, being intentional in their efforts, selecting resources more carefully, connecting material to students’ lives, being more deliberate in how to address students, connecting concepts to careers, having books in the classroom to showcase women and people of color, emphasis on learning over grades, focusing on their own mindsets, emphasize that it is okay to make mistakes.

Teacher reported changing the way they think (mindset) about engaging the girls in their classes through encouraging leadership, purposeful actions, being aware of stereotypes, question more when girls are not participating, and reading and talking about why girls don’t pursue STEM and why they leave.

“Ah-ha” moments and insights for the teachers happened with increasing female and diverse role models and images in their classrooms, giving all students the opportunity to lead, realizing they (the teachers) had struggled in STEM, and learning to follow up on students’ interest (like in “Hidden Figures”).

Teachers (100% in both years) reported statistically significant (p<0.01) changes in how they used the SciGirls Strategies in their classroom from before the course to after, including empowering girls, encouraging them and emphasizing that STEM is collaborative, social, and
community oriented. Teachers also reported statistically significant changes in their confidence (p<0.01) from before to after the course in the SciGirls Strategies. Teachers felt the greatest impacts of the course on them were becoming more interested in learning more strategies, becoming more aware of resources for teaching and learning STEM for all, connecting with other educators, and learning to think about their own practice.

D. Trainer Reflections on the Effect of their Participation on their Students

The impacts on students were reported to be identifying with STEM and STEM careers, increased collaboration and discussion, STEM course selection, and more active and confident students. Effects were greater for 2019-20 (5.9-6.1/10) than 2020-21 (3.5-5.3) due to learning being virtual. Stories about students who were greatly affected by these strategies (2019-20, 2020-21) are listed below:

- I had a student who was interested in pacing faster in class. I asked her what she might be interested in doing as an extension project with her extra time. I guided her toward writing stories and drawing pictures about women in science. She enjoyed the project and learned a lot.
- I’ve encouraged two girls who were very quiet to speak up, and now they are very comfortable doing so in my class and others.
- I had one student ask me to give her a letter of recommendation to a transportation camp for the summer. I thought it was really cool that: 1) this student is interested in the engineering components of transportation and 2) that she saw me as someone that encouraged her and supported her in this way enough to write her a letter of recommendation.
- I had put up posters in my room of females in STEM. During class, I had one boy stop and ask why they were all female. Right away about five girls raised their hands ready to articulate the reason why. After that, a bunch of the boys wanted to go back and learn more about the scientists and everyone agreed that they were women that we should all know about.
- I got back some amazingly clear summaries after reading an article on seven ways girls are pushed out of science. They were paying attention.
- I feel like I have helped my students’ problem solve more and encouraged more students to continue with STEM classes.
- I have a girl who was very passive and not great in math. Thus, in her mind, she was bad at design robotics. I kept encouraging her. She saw the space station woman spacewalk and just lit up. Then as we were doing robotics via sphero block code, she was amazing in doing math for planning, even though she is in math support. So cool.
- My favorite story is that two female students overheard my facilitator and I discussing SciGirls, and they both yelled ‘SciGirls Rocks!’
- I had one student that took advantage of a female STEM workshop that the Perry Initiative sponsored last fall at the U of M. She came back from this experience so excited about Orthopedics after she had great female speakers on the subject.
- I would try to put a slide of females doing STEM jobs on the PowerPoint when the students were coming into class. I also have senior girls that stop in my room, eat lunch in my room, and are my student assistants. Those students were taking biotech and human anatomy. They would talk about the jobs on the PowerPoint. Some did not know a few of the jobs and others
would tell me that is what they want to do when they are older. For the seniors, they were at a place where they were looking to the future and seeing the different jobs were helpful. For the 10th graders, they talked about the jobs but were more interested in the paid then the work.

- Towards the end of the SciGirls program our school offered a Girl Power program with woman who are successful in many areas including science. This year, we had a NASA engineer present to the school. This has always been optional for students to attend, and I have always had a few students interested, but this year I had more female students interested in going than I have ever had before.
- My students came in with the mindset they cannot do math, and throughout the year, have discovered that they are capable of being successful in math.
- I feel like have better tools to improve my courses. but haven't made significate improvements yet.
- One student who is considering going into cosmetology after graduation was able to make connections between why understanding basic chemistry will be important on the job as she mixes chemicals (dies etc.). Although this is traditionally a female dominated industry, she was able to see the ‘science’ behind her career choice.
- One student, Mary, was very shy at the beginning of the year. By the end of January, Mary was able to share her thoughts and beliefs in a positive way.
- Several of my students were affected by our Draw a Mathematician activity. We had a really good discussion on the reasons most of them drew male mathematicians. It really opened the eyes of some students of how females have been underrepresented in the history of math.
- We had a gallery walk of women scientists, and a group of three girls I eavesdropped on were discussing the pros/cons of the lifestyle of one of the scientists (the specific one I don’t even remember). And while one was still convinced that she ‘was not very good at science’, they were inquisitive about what that life might look like, and how they might fit in.
- I watched young people engage in conversations about how they might move into fields that are aligned with science. In conjunction with academic course work students are also building their profiles about future careers and it was awesome to see young women interested in science related areas.
- My female students in particular really responded to the reading assigned to the reading an article about why girls leave STEM. More than a 1/3rd of my girls went beyond the parameters of the assignment. I got less responses to the deliberate use of role model articles, but I think they still added value.
- A girl in one of my courses felt discouraged because she has a disability and did not think she could have a meaningful future career. After research and exploration, she discovered that she has the ability/skills to pursue a career as a vet tech or assistant. She will consider a career as a veterinarian and is considering taking classes to prepare her for that field.
- I had a female student say she fails all of her tests in this course, so she needs to make sure she does her homework. It was a great opportunity to talk to her and the rest of the class about the fact that Bs and Cs on Pre-Calculus tests are not failing grades.
- I think that one of the greatest benefits was the willingness of students to ask questions and not be scared. Having a learning environment where kids aren't scared to be vulnerable and ask for help is huge!
Overall Findings from Survey Data

Nearly all of the teachers (95%) would recommend the SciGirls Strategies GETS workshop to another teacher describing it as challenging their thinking and practice, fun/impactful/amazing, and reframing for them.

Several of the Trainers were able to do talks or posters at conferences, or workshops for their faculty or at the district level. They were able to see, and share, the value of SciGirls Strategies for engaging students in the virtual environment and for supporting students from different backgrounds (culturally responsive teaching).

Suggestions for improvement included offering more models for running the course with easy-to-use resources like slide shows and a syllabus with resources, providing more time for discussion and interaction, and making the website and videos easier to navigate.

E. Case studies of 2020-21 Trainer implementation

Trainers were interviewed about their plans and efforts to implement the SciGirls GETS course during the 2020-21 school year. They all had some success in sharing SciGirls Strategies, even if they didn’t offer the course, so their efforts are informative in thinking about the options for trainers under various conditions.

Karin - This trainer teaches science in an alternative school for 120 high school students who don’t make it in the regular school. She began with 13 teachers in the fall 2019, ending with three in May 2020 due to COVID-19 and intended to continue the course in the fall 2020 but COVID-19 again derailed the work of many of the teachers. The hybrid training course was supposed to be offered for all the staff through monthly 90-minute sessions, but they had to learn Canvas, so it became voluntary. One math teacher completed the course. She had a College in the Schools course that turned out to be all girls, so she used so much of what she learned. The girls even had hoodies made for Women in Stats!

Her plan for the group was for them to do the GETS and CRP rubrics, and the implicit Bias Tests related to gender, race, sexuality, and socioeconomic status and read Make Me! Understanding and Engaging Student Resistance in School. They were planning to do observations and reflections on the SciGirls Strategies.

The original list of participants included the Principal, the Dean, and teachers of Art, Agriculture, ELA, FACs, Math, PE/Health, Science, Social Studies and Special Education. Beginning in August 2019 with a two-day workshop, they had planned to meet monthly through April and also to discuss the training in their PLCs. Her update plan was to offer the course from February – June 2021. The schedule below shows how she adapted her training to plan for her group of teachers.
## Timeline for Implementation of PD / Trainings during AY 2019-20

<table>
<thead>
<tr>
<th>Month</th>
<th>Goal(s)</th>
<th>Group/Team Activity/Meeting</th>
<th>Individual Implementation and Deliverables</th>
</tr>
</thead>
</table>
| Aug 28-29 | Intro to GETS Who Why What How                                          | Overview                     | Draw STEM professional at work  
Self-assessment of GETAS rubric  
Self-assessment of CRP rubric  
Assign IBT - Gender, race, sexuality - due 9/30  
Pass out & assign “Make Me!” |
Make Me! Ch 3: Resistance Theory discussion  
Make Me! Ch 6: Disengagement discussion |
Make Me! Ch 6: Disengagement discussion |
| Nov 27    | Disengagement STEM is community driven                                   | Strategy 5 - Community Plan   | Make Me! Ch 6: Disengagement discussion |
| Dec       | Individual reflections                                                    | Individual reflections        | Individual reflections |
| Jan 27    | Socioeconomics of resistance Building a growth mindset                   | Strategy 3 - Growth Mindset Plan | Make Me! Ch 8: Socioeconomics discussion  
Make Me! Ch 12: Is it my Fault? discussion |
| March 31  | Individual reflections                                                   | Individual reflections        | Individual reflections |
| April 13  | Resistance is Hope Facing stereotypes - STEM & others                    | Strategy 4 - Stereotypes Plan | Make Me! Ch 13: Resistance is hope discussion |
| May       | Individual reflections                                                   | Individual reflections        | Individual reflections |

This Trainer had four major successes, in spite of COVID-19: Two-day PD, posters, school board presentation, and PLC work on equity.

### Two-Day Professional Development - Reflections on Equity

The administration asked her to do two PD days for the district this past spring. These sessions began with the rubrics that led into discussions about how the *SciGirls Strategies* addressed the district focus on anti-hate speech, and support for diverse students in being and feeling successful called, *Reflections on Equity*. Selected slides from March PD shown below:
Sample slides from April PD

Agenda

1. Self-reflection needed
2. Breakout groups
3. Naming and pronouns
4. Gender
5. Neurodiversity
6. Asexuality
7. All

Culturally Responsive Teaching

CRT is a pedagogy that recognizes, respects, and uses cultural characteristics, experiences, and perspectives of culturally diverse students and backgrounds as meaningful sources for creating optimal learning environments and teaching them more effectively.

Transgender Terminology

- They are transgender.
- He transitioned a few years ago.
- She transitioned.
- Before they transitioned.
- When he presented as female.
- Gender identity and sexual orientation are not the same.
- Do not ask about preferences/private parts unless a person explicitly asks that conversation.

Behold, the Straight for Equality Ally Spectrum:

1. If You See Something, Say Something
2. Be Intolerant of Intolerance:
   Tolerance of intolerance is oppression.
   - DaShanne Stokes (Social Justice Activist)
3. Amplify the Voices of Others
   The job of a journalist is to amplify the voices of the marginalized. To do that, you need to hear those voices in the first place.
   - Alison Kilgore (Climate Change Activist, Feminism Activist)

Evaluations included comments like the following:
• Before these informative sessions, I did not know enough information to be informed on how to appropriately address these topics when they are presented in the classroom.
• I would like to continue having more of these professional development sessions because I believe it creates a greater knowledge base for educators to have a more welcoming environment for their students, regardless of gender or prior experiences that may have been inequitable either with an educator, family member, friend, peer, etc.
• Knowing the correct language and pronouns is vital in showing respect toward others. A good video to watch on YouTube is, “I Am Jazz”.
• When we think about our responsibilities as educators and role models, it is so true that our students deserve to have their identities affirmed, be addressed by their chosen names, fully seen for the diversity each brings to our classrooms and celebrated for who they are. Attending to these needs allows us to build relationships that are foundational to education.
• I appreciate the information and the conversations that are being had. I also appreciated the clarification on gender terms. The reality is that we all want students to learn. I want schools to be safe, I want students to learn and grow and become the best versions of themselves they can. If our students don’t feel valued and seen in the school setting, they can’t grow (basic needs hierarchy). We have the power and responsibility to create that safe place where all of us (students and staff) can have continual conversations that may be hard but will validate and empower. Thanks for the time put into the PD! I am really looking forward to continuing these conversations through my coaching role.
• The slides were very informative and insightful. We also had some great conversations in our meetings. I wish everyone could take this professional development. This PD helped to provide a more thorough and reflective understanding of how evolving gender truly is. By continuing to educate myself with the many resources that were provided in our slides, I hope to be a better ally for my students and provide a safe, welcoming environment for all.
• I’m still in the “I’m talking about LGBTQ+ equality” on the ally spectrum and it will take more depth of involvement for me to move into the “superally” category, but I look forward to having those conversations!
• The gender equity pd was very engaging and I appreciated being able to have these open and honest conversations about gender with my colleagues. It is comforting to know that we are all on the same page with our LGBTQ+ students.
• As someone new to the school realm, and fairly new to some of these conversations/meanings/terms. I felt very lucky to be a part of these conversations. I think when I came into the school, I felt like I was someone who was in support of the LGBTQ+ Community but working in the school has opened my eyes so much more and I realized I was only at the tip of the iceberg.
• I hope that this important work continues so that all people feel welcomed and safe in our building, across our district, and out in our community.
• The terminology is always changing and evolving as LGBTQ+ lifestyle becomes more accepted in mainstream society. Great statistics about calling people by their preferred pronouns and names!

This trainer created a poster for classrooms on equity that were posted throughout the school.
Presentation to school board
This was requested as a result of the PD. They now want PD on equity offered districtwide.

PLC Study
Her PLC read Make Me! Dr. Barb Billington was a guest speaker (2 Math teachers, 2 English, 1 Special Needs teacher). They identified strategies to try, including trying to understand why each student was not engaged in class. Strategies included: giving students choices, asking open-ended questions, encourage respectful conversations, having students talk about their strengths and see what we (teachers) see in them. Barb’s slides show below (note this are the kind of slides with specific resources trainers were requesting).

Connie - This trainer ran a successful course for the second year. A math teacher, in a small online, alternative school, she offered the course to her PLC team, so they met every week. First, they established norms and roles including being on time, muting mics, beginning with a professional highlight, ending with a personal highlight with a notetaker, timekeeper, and place to store all docs. They read a variety of books. The group used the online teaching survival guide to develop lessons. They started with six teachers, three dropped, but then a student teacher joined, an additional two educators joined from the prior year. They group chose books to read. Some of their reflections are shown below:

The Growth Mindset
• Reading the Mindset book has changed how I do things. Using videos on people doing geometry and then have them reflecting on how math is utilized and applied to their world and seeing that different people can do these jobs.
A Mind for Numbers

- What I learned from this book is that you can improve your learning by identifying your struggles and developing new skills to improve your brain potential.
- Thinking and learning is something that students can control.
- Teach students how to learn. Ask a student why they are not getting the results they want. Help them to take ownership of their learning.
- Meet students where they are.
- Interweave assessment and teaching.
- Give a 50-minute presentation on metacognitive learning strategies.
- Clarify student responsibility.
- Students need to believe they can be successful, to know exactly what is expected of them, and to have an arsenal of effective learning strategies.

Learning How to Learn

- Students need to become their own personal learning scientist.
- Use music if it helps you.
- Study in different places when you can.
- Try to learn using a variety of senses.
- Sleep helps build new synaptic connections and washes away toxins.
- Eat your frog first.
- When you can set a firm daily quitting time to allow you to concentrate more intently when you are working.

Mindshift

- What I learned is there is focused time in learning, then breaks during which you are still learning because your brain is processing information.
- Use apps like Pomodoro to time your work for 20 minutes followed by a five-minute break.
- Use chunking by looking at the lesson, key concepts, and summary points so your brain is ready to learn.
- Apply metaphors, drawing, music, touch and smells.
- Think about new concepts just before going to sleep.
- Teach yourself out loud by talking things through.
- Be aware of your mindset and how that can help you learn.

Data Collection

This Trainer set up a spreadsheet for teachers to do needs assessment of students prior performance and to track ongoing work. Three of the five teachers completed it. They also got data on gender, race, age, and grade.
Presentation to other PLCs

The PLC teachers did a presentation for the other PLCs in the school on the ways they had changed their lessons. The SciGirls Strategies fit in with the district and school goals. The PLC group presented the GETS resources and examples of how they had redone their lessons by using context, metacognition, helping students develop good study habits, including more reading materials about women, using flow maps to have students analyze reading (like about things that keep women out of science), thinking about important contributions using a graphic organizer (like in video Disaster City), reflecting on Amanda Gorman’s inaugural poem with What do you notice? What do you wonder? What stands out to you?, and introducing women as mentors to challenge stereotypes in nonfiction articles in meteorology. A male math teacher is now consciously including videos by women explaining math concepts and a unit on careers that featured tradeswomen and apprenticeships.

Tom - This Trainer presented SciGirls Strategies virtually at two conferences: 1) July 14-16 – National Conference of Computers Teachers Association (20 minutes on role models), 2) Nov 11 SciGirls Strategies Poster session he had at the Minnesota Codes conference. See link to recording and a sampling of slides below: http://www.youtube.com/watch?v=NodRqu_Wy48. This Trainer is on the district Project Based Learning Committee that is developing a new online High School that will use project-based learning, or PBL. He is presenting SciGirls Strategies to them to support this model. He has also presented SciGirls Strategies and resources at the math department meeting.
GETS Course - This Trainer built the course in Schoology, the school platform. He plans to work with Dr. Barb Billington, who did the TTT to rebuild the course in Canvas so others can use it. The course started in September 2020. Seven teachers signed up, three dropped and four finished. One put in seven hours (for CEU credits), another put in eight hours, one did 12 hours, and one did 20 hours. There was a lot of overlap with the CRT training that was going on. The course was virtual (like school most of the year due to COVID-19) with monthly meetings and independent work. The syllabus is shown below:

**Unit 1 – SciGirls Basics**
Mentor video: Abby Sofia
Abby Sofia discussion – What do you notice? What do you wonder about the role model videos?
SciGirls Strategies Guide (pdf)
SciGirls Strategies Reflection
Unit 2 – The SciGirls Strategies

Strategy 1: Connecting STEM experiences to students’ lives
Strategy 2: Support girls as they investigate questions and solve problems using STEM practices
Strategy 3: Empower girls to embrace struggle, overcome challenges, and increase self-confidence in STEM
Strategy 4: Encourage girls to identify and challenge STEM stereotypes - must complete
Strategy 5: Emphasize that STEM is collaborative, social, and community-oriented
Strategy 6: Provide opportunities for girls to interact with and learn from diverse STEM role models

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<thead>
<tr>
<th>Strategy 1 Module</th>
<th>Strategy 2 Module</th>
<th>Strategy 3 Module</th>
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<tr>
<td>This module’s to dos</td>
<td>Role model video: Antoinette Smith</td>
<td>Role model video: Denise (Seven) Bailey</td>
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<tr>
<td>Role model video: Victoria Velez</td>
<td>Rubric: Where are you now?</td>
<td>Rubric: Where are you now?</td>
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<tr>
<td>Read an introduction here</td>
<td>Plan for your classroom</td>
<td>Listen to a podcast</td>
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<tr>
<td>Get a quick review of CRT from Zaretta Hammond</td>
<td>Expand: add resources</td>
<td>Stereotype threat discussion: Do you have any experience with stereotype threat?</td>
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<tr>
<td>Get a few more tips here</td>
<td>Reflection</td>
<td>Plan for your classroom</td>
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<td>Plan for your classroom</td>
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<td>Whistling Vivaldi by Claude Steele (optional)</td>
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<td>Expand: add resources</td>
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<td>Ladson-Billings talk (optional)</td>
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<td>Reflection</td>
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<th>Strategy 4 Module</th>
<th>Strategy 5 Module</th>
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<tr>
<td>This module’s to dos</td>
<td>Role model video: Aubrey Scott</td>
<td>This module’s to dos</td>
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<tr>
<td>Role model video: Rachel Obermoller</td>
<td>Rubric: Where are you now?</td>
<td>Role model video: Bridgette Shannon</td>
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<td>Rubric: Where are you now?</td>
<td>Plan for your classroom</td>
<td>Rubric: Where are you now?</td>
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<tr>
<td>Stereotype threats</td>
<td>Expand: add resources</td>
<td>Role models – Buck et al</td>
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<tr>
<td>How teachers can counter stereotype threats</td>
<td>Reflection</td>
<td>Find a potential role model - FabFems</td>
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<td>Plan to counteract stereotype threat in your classroom</td>
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<td>Plan for your classroom</td>
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<tr>
<td>Draw a Scientist resources</td>
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<td>Social media groups/individuals to consider</td>
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<tr>
<td>Expand: add resources</td>
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<td>Expand: add resources</td>
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<tr>
<td>Reflection</td>
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Unit 3 Capstone
- Capstone to dos
- STEM girls’ article
- Final evaluation

Reflections by teachers by strategy on what they will change as a result of the GETS course:
**Connect STEM experiences to girls’ lives**

- Currently, I think focusing on real world connections to STEM topics and tailoring lessons based on my current and ongoing knowledge of student interests through building relationships and SEL activities. I could imagine improving implementation by logging student responses and collecting more formalized student data to more effectively tailor my lessons. I could also implement more student voice and choice in lessons.

- I’m going to start with showing the role model videos to my classes. I’ve been wanting to highlight different mathematicians, and I think that this is an easy place to start with the role model videos. I also have been chatting with the students on what their future plans include and many already see themselves going into a STEM related field though they don’t describe it as such. Using the vocabulary such as STEM may also tie in things that they’ve been hearing that they don’t quite get yet.

- Students are more likely to engage with work if there is meaning and purpose provided as part of the context of the concept. A student who lives near a river that floods will be much more likely to engage in mitigation work around the river because they have a local connection to the place. Likewise someone who has a personal experience with cancer is going to have some level of passion for engaging with the topic because they know a little about it and may want to know more. The more we can empower students to derive meaning from their learning the more they will be willing to do the activities, experiments, and inventions to be problem solvers.

- We are teaching kids places and locations. I asked kids to use Google Map to find our school location, and describe where it is, where our classroom locates within the school, and what directions are there home located from the school. It’s very personal connected.

- I can choose the introduction story from culture relevant aspect. When we were doing bear rescue STEM project (the idea and materials are from Lakeshore store), we adopted it to monkey rescue project because in Chinese stories, around mid-autumn festival, monkeys are curious and want to rescue the moon from the well (they thought the reflection of the moon is the real moon). Also I want to borrow some ideas from 3-Act tasks. One of them is about kids want to get eggs from the fridge, but a box of eggs dropped. Another one of them is about sisters comparing their heights. Without rulers, how to decide the difference between the sisters?

**Support girls as they investigate questions and solve problems using STEM practices**

- Currently, my hands-on activities are limited in distance learning, and I have focused on interactive apps and various discussion strategies to build in realness. I have also focused on SEL and community building in Google Meet. In the future, I could imagine student surveys and reflections that allow students to connect their identities with STEM topics. I could also provide more defined building blocks for students to guide their own learning and development.

- The hands-on part is going to be hard right now with Distance Learning. I think that I am going to use this year as a building year to find the topics that I can use with students in the coming years that are more hands on. While searching for these topics I am sure that I will find some that are digital as well such as the coding apps, and those I can help push out to students. But I see this strategy as one that will take more preparation in pursuing.
• I love to put stuff into the hands of students. It's extremely valuable to provide as many hands on and brains on experiences as possible the classroom needs to be rich with learning and things to wonder about.

• In the start of the school year, we read a lot of books of black girls' stories, and how they succeeded in the STEM fields. Kids will choose different materials to make their own portrait and record their sentences about their dream and future in ChatterPix.

**Empower girls to embrace struggle, overcome challenges, and increase self-confidence in STEM**

• Currently, a major focus of my instructional practice is having a growth mindset and improving comfortability with mistakes. I have done this through real world examples of scientific mistakes and discoveries and by encouraging students to try everything even if not perfect or correct. In the future, I could be more explicit about the learning process and asking students to identify their learning style and process. As part of this, I could ask students to identify strategies that allow them to take risks and ask questions. I could also be more explicit in asking how I can better support students.

• Growth mindset is a large topic that we continue to address throughout the year. This time I will try and be more forward with my vocabulary and intention on why we are reflecting and why we are focusing on growth mindset. I am not afraid to admit my struggles and my mistakes with certain problems, I record myself talking through them and then share that with students. However it would be better if I were continuously talking through strategies and getting students to share their own strategies that they are using to succeed and overcome the challenges.

• Always encouraging, providing models to do their constructed work. Once they learn what it could look like then students are able to take those simple structures and personalize them and make them their own. Giving students a chance to fail and then redo or revise, iterations are so valuable in this work we do in hands on lab classes.

• I am using growth mindset with them. When they say: I don't know. I ask them to change into: I don't know yet, and I want to learn. And when they say: it's too hard. I asked them to change into: I haven't found ways to do it yet. I can try some more.

**Encourage girls to identify and challenge STEM stereotypes**

• So far, I have not explicitly tackled this topic. I have taught lessons focusing on all students having the capability of being scientists and the importance of scientific thinking. However, I have not focused on gender or stereotypes. I have planned to tackle this topic as part of an "intro to science" lesson at the start of a new rotation of classes. In the future, I could make this an ongoing topic in science classes and try to provide more role models for students and examples of scientists that do not fit the stereotypes. I could also ask students to reflect on any pressure or negativity they feel several times during the year.

• Many of my girls like to do things because I say it's hard, and they welcome that challenge. If I talk openly about STEM, talk about the challenges of gender roles and the pushing against stereotypes, some would be interested in breaking those barriers because they like to break down/through those barriers. So again, I need to be forward and intentional with my vocab and my intent as I help facilitate discussions with girls and students of color.
• I love pushing the limits about who can be a scientist, one of my very first things I ask students to do in my class is to draw themselves as a scientist. It's so important that scientists aren't just crazy old white guys with messy hair wearing lab coats. I want the students to create their own representation of what they would look like as a scientist and once you plans the seed then you just keep working on making it grow.

• I will read more books and introduce more female models from STEM field to them, especially with diverse background. Recently, I read a book named: Queen of Physics to them. And they liked it.

• For physical decoration in the classroom, I plan to have posters of famous characters from different culture background, different language signs, and different country flags, etc. I plan to get familiar with students' names before seeing them in person. I will do research on how to pronounce the names and learn the origin of the last name and the meaning of the first name. So when I see kids at the first time, I can pronounce their names correctly, and remember their names. I plan to hold high academic expectation for all students.

Emphasize that STEM is collaborative, social, and community-oriented

• Currently, I spend a lot of time focusing on a strong class community and the importance of collaboration. I solicit feedback from multiple students and connect responses to make sure students see the importance of multiple perspectives. I have also highlighted the importance of working together as part of science practice and the history of science. However, I have not taught or considered STEM careers and perceptions about collaboration. In the future, I could provide more examples and 'work like a scientist' lessons where students experience the real culture of STEM practice.

• I believe that this is going to be the year to prepare and gather resources. When we return to in-person next year I would like to host a flipside after school class where we talk and explore different STEM activities. I think having the focused time for girls and students of color to come, participate, collaborate, communicate and work through problems together will be a benefit to all.

• No one scientist has ever figured out all of the parts - collaboration is key to developing the understandings, mimicking that in the classroom helps students to practice and learn the fundamentals of argumentation and communication.

• Every year when we have STEM project, I taught them how to work cooperatively, and how to listen and speak in the group, and what to do when you disagree with others. The rules are practiced and demonstrated by students.

Provide opportunities for girls to interact with and learn from diverse STEM role models

• Currently, I have not specifically provided role models for students in STEM career pathways. I have only focused on the idea that all students are scientists and can be scientists. I planned to be more explicit about this as the year goes on by providing examples with specific science topics. In the future, I could imagine being much more explicit throughout the year and by possibly doing a project where students can 'meet a scientist' or study a famous scientist. I could also ask local scientists to visit my classroom to provide their perspective.
• Through the role model videos, I hope to post one a week and lead a discussion around the video. How do the students see themselves represented? Can they relate to this role model at all? I think that next year in the after-school program I can reach out and see if I can get women in STEM fields to come and talk to the students after school, where they can meet someone and say, yes! This is what I’m interested in too!
• This is something I don’t do well, and I would like to improve on.
• We have girls won LEGO team competition from past years, and I can ask students from higher grade to introduce their dreams and what they did, as a plus of STEM girl books mentioned from previous questions. I will carefully select role models from different career industries and different races to present, and it could be relevant if the candidates are chosen from local areas.

Abby - This Trainer teaches math and coding in a small high school (308 students). Fall of 2019 was the original offering to start, restart was tried at the beginning of March. The third restart is scheduled was in the summer 2020. She plans to teach the course in the coming 2021-2022 year.

There were only two participants initially over the summer and one had to take medical leave in the fall, so it was me and an administrator. We decided it was best to postpone rather than to start. Timing is everything, so I hope the idea of covering the course material in meetings over the summer and implementing and reflecting in the fall of next year, is more appealing to colleagues. I sent an email and met with instructors for the initial meeting. For the summer, I am sending an email, calling, and even possibly relying on favors colleagues owe me. This course now relates to a new district goal, so hopefully, it will show a difference in the number of people enrolling in STEM classes. I really want to facilitate a group for this. I feel strongly for the importance of this course material.

Survey results for the two teachers who participated in the summer of 2020.

Heidi teaches 11th and 12th (Statistics and Pre-calculus)
• Changing the stigma around a 'B' and 'C' in courses. Early in the course, we discussed the differing views boys and girls have on grades. I realized I was one of those girls that allowed a 'B' in a college physics course alter my career choice. I do not regret teaching but wish I had continued on to be a physics major instead of setting for a minor.
• By far the most beneficial aspect of this course was the discussions we had after looking over the resources. I felt like SciGirls gave numerous resources, I especially liked the career focused resources.
• More discussion around careers and emphasis on learning over grades.
• I approach conversations differently. I want the girls to focus on what they have learned and what more they have to discover. I push them to discover things on their own instead of guiding them through the work.
• Realizing I was one of the statistics. I feared B’s in college and high school. Instead of focusing on learning, I focused on my letter grade. I now have changed discussions after tests to include how much each student has learned instead of focusing on how many items they didn’t learn.
• I would recommend it, especially those that do not currently feel like they are meeting the needs of all of their students.
Offered online is ok since clearly, we have all learned to do that better during this past year.

I do like self-paced courses although part of the value of this was the discussion aspect which is harder to achieve with self-paced courses.

Most of my female Pre-Calculus students are signing up for Calculus next year where I hope to continue to encourage them using STEM strategies

I had a female student say she fails all of her tests in this course, so she needs to make sure she does her homework. It was a great opportunity to talk to her and the rest of the class about the fact that Bs and Cs on Pre-Calculus tests are not failing grades.

Emily teaches Freshmen, Algebra 1

I focused on growth mindset. I feel like in math, it is very easy to get discouraged when you get a problem wrong or make a mistake. It is important for students to know that making mistakes helps them learn and grow and if they really want to understand something they have the power to do so, it just make take a little extra time and effort.

I do feel like I had adequate support. Abby did a great job of sharing the information and she was always available if we had questions. I think I could have done a better job at including more of the videos of women explaining different jobs in the STEM fields to show my students how what they are learning can be applicable in real life.

I have really tried to reiterate to students that it is okay to make mistakes as long as they learn from them.

I have been very cognizant about not making comparisons and I am trying to be extra supportive of the females in my classroom.

I would suggest taking SciGirls PD. It was very eye opening to learn about the gender inequities in a field I am passionate about. I would encourage them after they learn about a strategy to think of ways on how they could implement it and actually plan it into the lesson.

I would. I think it would offer a wider availability for people, although I did like the collaboration aspect that went along with working with a team and a trainer.

I thought it was very accessible and easy to follow along with.

I think that my students were opened to a wide variety of STEM related careers which broadened their understanding of all of the jobs that are out there. I also think that by encouraging girls that it was okay to make mistakes it made my learning environment more inviting.

I think that one of the greatest benefits was the willingness of students to ask questions and not be scared. Having a learning environment where kids aren't scared to be vulnerable and ask for help is huge!

Sandy - This Trainer teaches high school math at a small high school (N=278) with 100% Native American students with 74% low income. SciGirls supports the district’s goals to make learning more relevant to students and engage them. For example, more culturally relevant problems in math or show role model videos and ask students, What math classes did she take? How does math help her in her job? They have done mastery-based learning. In COVID-19 times, the teachers had too much to do already.

She tried to get the GETS course going last fall with an intro at a Teacher Day. She introduced SciGirls, showed one of the videos, and talked about the strategies. She suggested they do a book study in which teachers read and review a book, then form groups for discussion. Five people
signed up, but none started. She found the resources really helpful and posted on their school Teams account so the other teachers could reference them. They only have eight faculty so if they get some new people, she may try offering it again.

She would recommend the TTT but wishes she had taken it with a buddy to keep her motivated. She attended the monthly webinars, but said, “it wasn’t the same as a colleague bugging you to get it done. She would like to see an online version of the basic SciGirls Strategies training and the Train the Trainer workshop. She said, “It is a good model, it just didn't work for me at this time.”

IV. Discussion
The SciGirls Strategies original GETS training (not the TTT supplement) was implemented from 2016-2019 trained 49 CTE/STEM educators to improve their practice for girls. It was successful in changing both teachers’ mindsets and their pedagogical practices. Teachers became more explicit in involving, supporting, and praising girls. They noticed when girls were not engaged, or not performing, and adjusted for that. They were proactive in providing STEM projects and experiences that engage girls through the SciGirls Strategies:

1. Connect STEM experience to girls’ lives.
2. Support girls as they investigate questions and solve problems using STEM practices.
3. Empower girls to embrace struggle, overcome challenges, and increase self-confidence in STEM.
4. Encourage girls to identify and challenge STEM stereotypes.
5. Emphasize that STEM is collaborative, social, and community oriented.
6. Provide opportunities for girls to interact with and learn from diverse role models.

The SciGirls Strategies TTT model has research-based attributes.

- During the four-day in-person workshop the strategies were modeled, feedback was encouraged, and support provided for development if knowledge and skills (Tobias, Downes, Eddens, & Ruiz, 2011).
- The training was flexible and responsive to the individuals in the group through small group discussions, individual planning, and sharing ideas (Orfaly et al., 2005).
- Trainers were given time to assimilate essential knowledge, skills, philosophies, and concepts throughout the four-day workshop, in monthly webinars throughout the year, and in private consultations with the instructor upon request (Pancucci, 2007). Some trainers would have preferred the training be spread out to allow for even more assimilation.
- While many examples were given, and most Trainers had gone through the first SciGirls GETS course which they could use with their teacher, several wanted even more in the way of a toolkit with templates, models, and resources as Levine, et al. (2007) has suggested.
- All the Trainers had to have an administrator commit to supporting them. Some would also have liked having a supportive colleague at their location to share recruiting and training, which is supported by Yarber, Brownson, Jacob, Baker, Jones, Baumann, Deshpande, Gillespie, Scharff & Brownson (2015).
Trainers reported that the workshop was interesting, modeled responsive teaching, and provided a good balance of information, discussion, and planning time. At the end of the four-day workshop, the Trainers wanted more time to plan, more time to work with other teachers, feedback on their plans from the facilitator, reassurance, specific lesson plans for each module, scope and sequence, ideas for training lessons, and actual research papers. They anticipated potential problems as being prepared to offer the course, time to review all the resources, recruiting, and support from their administration. So even though most had had a good learning experience, some needed more time to assimilate what they had learned and were not prepared to offer the course.

Another critical factor is that Trainers have to feel they have the skills and knowledge to offer their own course. Although they felt they benefitted from the TTT workshop, they were very clear that they were not wholly proficient in using the GETS strategies themselves and were not sure they would be able to offer what their fellow teachers needed and wanted. Thinking of the local course as a “conversation among colleagues” helped with this deficit in experience and knowledge some said.

The teacher trainees in both years, in face-to-face settings and virtual, reported that they benefitted from their locally delivered GETS courses. They reported changes in their practice and mindsets and positive effects on their students. This is evidence of the effectiveness of the TTT model. In addition to the three Trainers who offered the course in 2019-20, four more trainers offered at least partial courses from June 2020-June 2021 during the pandemic, for a total of seven out of 10 of the original Trainers. Two additional Trainers plan to teach the course in the 2021-2022 academic year; and one is considering it.

V. Conclusions and Options for the Future

Successful Train the Trainer models have multiple factors that make them successful. The GETS TTT model had those elements:

- Engaging, collegial, responsive, informative and skill-building workshop
- Financial support through stipends, money for resources, and graduate or CEU credits
- Facilitator support through feedback during the workshop on plans and in monthly webinars

What Trainers reported that they needed more of was:

- Time to assimilate what they had learned, time to plan and get feedback on their plans
- A toolkit of templates, models, and resources for a local course
- A dedicated colleague in their local district to provide support for recruiting and training

Options for the future to improve the SciGirls Strategies GETS TTT model

- Provide a toolkit of sample course syllabi with schedules, templates, models, and resources created by the facilitators as a starting point for new trainers, e.g., the best of 2016-2019 training and other resources including daily agendas, module resources, slide shows, videos by the facilitator like the SciGirls Snapshots (https://vimeopro.com/user10550772/scigirls-snapshots)
• Establish a community of practice with all of the SciGirls GETS trained educators to support their growth over time.
• Make it a pre-requisite for trainers to take the GETS training and implement it in their own classrooms to give them experience and confidence.
• Hold kickoff meeting months in advance so Trainers know what they will be doing and share that back in their district to recruit people so when they come in the summer for the training, they have the logistics done and can focus on the content.
• Require colleagues to sign up together, to make a commitment to delivering the local course, which could increase the number of trainees with this additional support.
• Hold weekly webinars following the four-day workshop to complete assimilation and planning with all kinds of practical things, like examples of how to change common routines, modify lessons, and teach about inequity explicitly to continue to inspire trainers.
• Assign facilitators as mentors to Trainers at each school to be sure each one is getting what they need to move forward in a timely way with a lifeline and a mentor.
• Provide exemplary lesson plans in different STEM and CTE subject areas for the Trainers to use with their teachers. Many are already available and more can be generated as part of training, then added to the website. Consider having a repository that everyone could add to all the time connected to the community of practice.
• Develop a rubric (like the EQuIP for NGSS) to evaluate the quality of gender equitable and culturally responsive lessons. Include activities in the summer workshop and webinars in which people bring up a routine or a lesson and everyone works on revising it to make it more equitable, then checks on their success with the rubric.
• Have a hard deadline for Trainers to have their recruiting and course plans completed before they take the course so they can begin after school starts in the fall after their own summer training. Provide eye-catching brochures, posters, and recruiting materials.

In summary, the GETS TTT pilot model was successful with seven Trainers with very different prior experience, from never having offered PD to having done a lot of PD with varying and changing COVID-19 conditions beginning in March 2020. They were, and are, all committed to the SciGirls Strategies for their own use and hope to bring it to others in the future.

The non-starters also provided valuable lessons about how to support adults who really want to become Trainers. All wanted to do the training in 2019-2020, but were derailed by personal issues, their own need to be an “expert,” changes in their school or district, the drastic changes in teaching due to the COVID-19 pandemic and school closures, and not knowing how to recruit.

This group included a range of prior experience with SciGirls as well as professional development. Through this pilot of the Train-the-Trainer model, the SciGirls GETS team can make refinements to the model to support scale up in the future.
References


