

Mentors' Learning Support Roles and Their Impact On Girls' Identity Imaginations

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Abstract: Mentoring programs have been intentionally designed to support Black and Latina girls in pursuing STEAM. Here, we examine how the support roles mentors play in an OST STEAM program relate to younger girls' imaginings of their own identities. Findings from surveys taken by middle-school girls and mentors indicate that by the end of the program year, girls showed more willingness to imagine themselves in various identities, relating to the support roles mentors most often played.

Introduction and Background

Black and Latina girls are traditionally and still dramatically underrepresented in science, technology, engineering, and mathematics (STEM) fields. Several studies have explored the reasons behind the gap, citing factors such as negative stereotypes, lack of opportunities, and more (e.g., Margolis et al., 2008; Wang, 2013). Out-of-school time (OST) programs have been designed to spark and sustain girls' interest in STEM as early as middle school when their interest starts to decline (e.g., Barron, 2006). Studies have shown that mentoring is a promising means of promoting girls in STEM, and women who have chosen courses, college majors, or careers in STEM emphasize the importance of role models in their decision-making processes (e.g., Stoeger et al., 2016). Our previous work has shown that mentors helped create a counterspace (Ong, Smith, & Ko, 2017) -- a safe place to explore their identities and interests in solidarity with one another and to imagine potential futures for themselves -- during a year of online programming due to the pandemic by adapting quickly to youth needs, highlighting and celebrating the full, authentic selves of the learners, and by remaining mindful of the challenges associated with intentional community building (Thompson et al., 2021). In addition, a number of generative roles have been identified to describe how educators including mentors and caring adults can advance learners' technological knowledge and skills (Nacu et al., 2014; Barron et al., 2009). In this study, we build on those frameworks in an OST STEAM program for middle-school girls, asking: How do the support roles that mentors see themselves play relate to the STEAM identities of youth over a year?

Methods

The Digital Youth Divas (DYD) is an OST STEAM program serving primarily Black and Latina girls in middle school. The program is designed to foster community between youth participants and high-school to college-aged mentors who facilitate the STEAM activities. In the 2020-2021 program year, there were 30 girls participating consistently in virtual programming 1-3 times per week. There were 12 mentors working with the youth. Eleven of the twelve identify as women, and all identify as Black, Latina, and/or Asian.

Youth took a survey at the beginning and end of the program year. For this preliminary analysis we looked at the item: "How much would you use the following words to describe yourself?" followed by words such as "reader, student, engineer" etc. Fifteen of the youth answered this question on both the pre- and post-surveys and thus are included in the analysis here. The mentors took part in weekly planning and professional development meetings, including a workshop on support roles for learning. At the end of the program year, mentors took a survey asking questions about their perceptions of how the program went, and what support roles they felt they played. For this paper, we noted changes between youth pre- and post-survey responses. Then, we identified the support roles the mentors said they were most likely to play. Finally, we considered these two sets of data in relation to one another, and looked for themes or relationships that emerged.

Findings

Youth responses to question "How much would you use the following words to describe yourself" were generally more positive on the post-survey than on the pre-survey, meaning that youth were more likely to

choose “Very Much” or “A little, or sometimes” to each word choice on the post-survey. This demonstrates that the girls showed more willingness to imagine themselves in multiple potential futures in STEAM after participating in the program. Specifically, the descriptors entrepreneur, performer, fashionista, designer, and visual artist showed the most positive growth among all the descriptors. The only descriptors that did not show positive gain were computer programmer and athlete. Our poster will display additional details from the data.

On the mentors’ post-survey, they most often reported “always” playing the roles of encourager (80%), friend (80%), and monitor (60%). These roles primarily centered around validating youth’s ideas (encourager, friend) and supporting the learning processes (monitor). The mentors elaborated in open-response questions on the survey, reflecting on the most meaningful parts of the mentoring experience. They shared that “being able to build relationships with the girls” and “connecting with the girls and learning alongside them” were the most valuable parts of the experience. A mentor shared:

I had a strong STEM identity coming in as a Divas Mentor, since I was a declared computer science major by the time I signed up for the position, but being a mentor has allowed me to take that identity and share it proudly with youth girls, at an age where I knew I was also a STEM kid but wasn't sure if I should embrace it.

This mentor took joy and pride in acting as an encouraging role model for the youth, and knew it was a crucial time to support girls of color in their STEM journeys. The roles played by the mentors are active, highly supportive, and uplift the girls’ sense of self, which can in turn impact their openness and imaginations. Although not all the descriptors chosen by the girls are strictly-STEM related, it is likely that the support of the mentors helped the girls feel more confident in embracing all their interests and identities, allowing them to see themselves as complex and unique individuals with many possibilities open to them in the future.

Discussion

We do not seek to imply that the mentors alone caused the changes in the girls’ responses. Rather, we expect there are several factors at play, including the program curriculum, parent involvement, other STEAM learning opportunities, or other influential people in the girls’ lives. However, we do know that mentors play a crucial role in girls’ OST STEAM learning, so it is likely that the mentor roles influence this development in some ways. Correlational analyses in the future could further tease apart the relationship between mentor roles and youth STEM interest and identity development. Additionally, the importance of providing ongoing training and support for mentors so they can better enact multiple roles is becoming increasingly clear from this and other burgeoning work in the field. As a limitation of this study, we acknowledge that we present here tentative findings from a small data set. However, with a relationship between mentor actions and girls’ imaginations becoming visible even at this small scale, we are encouraged to more deeply explore how mentors can support and encourage Black and Latina girls in their social dreaming and ideas about the multiple future pathways their lives could take.

References

- Barron, B. (2006). Interest and self-sustained learning as catalysts of development: A learning ecology perspective. *Human Development*, 49(4), 193–224.
- Barron, B., Martin, C. K., Takeuchi, L., & Fithian, R. (2009). Parents as learning partners in the development of technological fluency. *International Journal of Learning and Media*, 1(2), 55–77.
- Margolis, J., Estrella, R., Goode, J., Holme, J. J., & Nao, K. (2008). *Stuck in the Shallow End: Education, Race, and Computing*. Cambridge, MA: The MIT Press.
- Nacu, D. C., Martin, C. K., Pinkard, N., & Gray, T. (2014). Analyzing educators online interactions: A framework of online learning support roles. *Learning, Media and Technology*, 41(2), 283–305.
- Ong, M., Smith, J. M., & Ko, L. T. (2017). Counterspaces for women of color in STEM higher education: Marginal and central spaces for persistence and success. *Journal of Research in Science Teaching*, 55(2), 206–245.
- Stoeger, H., Schirmer, S., Laemmle, L., Obergriesser, S., Heilemann, M., & Ziegler, A. (2016). A contextual perspective on talented female participants and their development in extracurricular STEM programs. *Annals of the New York Academy of Sciences*, 1377(1), 53–66.
- Thompson, N., Ju, B., Erete, S., Nacu, D., & Pinkard, N. (2021). Sustaining Community and Relationships with Black and Latina Girls in an Out-of-School STEAM Learning Program during a Global Crisis. 2021 *International Society of the Learning Sciences Annual Meeting*, June 2021, Online.

Wang, X. (2013). Why students choose STEM majors: Motivation, high school learning, and postsecondary context of support. *American Educational Research Journal*, 50(5), 1081-1121.

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