

A growing Noyce Scholarship Program: successes, triumphs and challenges along the way

Noyce
Scholarship
Program-lessons
along the way

87

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Abstract

Purpose – The article discusses the development and growth of a newly established Noyce Scholarship Program at a Hispanic Serving Institution and the collaborative efforts of the School of Education (SOE) and its partners during the recruitment and retention process.

Design/methodology/approach – The author will explore and answer questions: (1) What were the articulated agreements implemented during the recruitment and application process? (2) In what ways did the scholar's professional growth benefit from the dedicated and shared resources of the SOE's partners? (3) How did the process of mentoring transform into a collaborative research effort resulting in presentation experiences?

Findings – The balance of triumphs, challenges and success in the program allows room for growth and reflection. Once scholars were admitted and accepted into the program, various supports were implemented to ensure scholars would be given tools needed to become highly effective educators in high-needs schools. In an informal discussion with scholars, they indicated the program taught them the necessary tools and dispositions needed to effectively teach the curriculum in STEM-based classrooms. However, they believed the issues of the program could be solved through constant communication and consideration of scholar input. Scholars also expressed appreciation for experiences encountered for scholar success.

Originality/value – The Noyce Scholars Program has provided opportunities for STEM majors to demonstrate hope and vision regarding the teacher shortage, particularly in STEM areas. The story of a professional development school's unpredictable journey in addressing the teacher pipeline will hopefully be a source of valuable information for other Professional Development School (PDS) partnerships. Recruitment, clinical preparation and continuous support of partners will continue to be integral factors in shaping future efforts to address the STEM teacher shortage creating a better world, locally and globally.

Keywords Teacher recruitment and retention, Collaborative relationships, STEM teacher candidates

Paper type Practitioner paper

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NAPDS Nine Essentials addressed:

- (1) Essential 5: Research and Results: A PDS community that engages in collaborative research and participates in the public sharing of results in a variety of outlets.
- (2) Essential 6: Articulated Agreements: A PDS requires intentionally evolving written articulated agreement(s) that delineate the commitments, expectations, roles and responsibilities of all involved.
- (3) Essential 9: Resources and Recognition: A PDS provides dedicated and shared resources and establishes traditions to recognize, enhance, celebrate and sustain the work of partners and the partnership.



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Introduction

Within the teacher recruiting process research has shown that to attract qualified potential science and mathematics educators into teaching careers, strategies should include early recruitment of STEM majors. The importance of attracting qualified math and science teachers has yielded policies and programs that introduce teaching opportunities to STEM majors. For instance, national and state initiatives such as federal loan forgiveness programs, scholarships and alternative certification programs have been implemented into teacher education programs (Clewell, 2001).

Teacher incentive programs should require strategies that ensure the longevity of STEM scholars turned teachers if they are to teach beyond the required two-year commitment of scholarship programs (Liou, Kirchhoff, & Lawrenz, 2010). This article seeks to share recruitment/retention strategies, challenges and triumphs of a Noyce Scholar Program at a Hispanic Serving Institution. The article will also describe supports and initiatives used to ensure the production of highly effective STEM teachers in high-needs schools. The author will then consider the larger implications of how the Noyce Program can further improve strategies and maintain the success of supports currently in place.

Context

To alleviate the shortage of secondary STEM discipline teachers, Dalton State College faculty members from the School of Education, and School of Arts and Sciences, collaborated and submitted a grant proposal to the National Science Foundation Robert Noyce Teacher Scholarship Program in the spring semester of 2020. The proposal was accepted, and Dalton State College (DSC) was awarded about \$1.2 million for 5 years from 2021 to 2026. DSC, with strong existing collaborative partnerships with high-need school systems and local STEM-based industries, proposed to start a Noyce Scholars Program focusing on minority and underrepresented STEM students. DSC, a Hispanic-Serving Institution located in Northwest Georgia, would partner with Whitfield County Schools (WCS) and Dalton Public Schools (DPS), two high-needs school systems based on poverty levels. The Noyce Program centered on the theory of change where DSC's Community Teaching Program would engage community members in the creation, delivery and assessment of a slightly alternative teaching program. The program would support future STEM teachers before, during and after the preparation program giving STEM educators opportunities to belong to the STEM Education Community with the probability of retention in high-needs schools. Additional goals included developing STEM teachers' understanding of the population of students they taught and making life connections of students to STEM opportunities in the manufacturing community in the greater Dalton area.

The many facets of recruiting and application process

The Noyce Scholarship advisory committee consisted of several partners of the School of Education and project investigators. Local district partners (WCS and DPS), industry partners (Shaw Industries- Carpet/Flooring), local area partners (commerce and government) and campus partners (various faculty and staff outside of SOE). Members of the advisory committee agreed to advertise the program to the community through word of mouth and referrals. The principal and coinvestigators of the project (executive leadership council) agreed to primarily be responsible for planning and implementing recruitment strategies that would target current freshmen and sophomores enrolled in STEM fields. The focus of recruitment was to ensure freshmen and sophomores were greatly informed about the Noyce Scholars Program. Past literature (Astin & Astin, 1992) shows during the first two years of college, important career decisions are made. This data guided the leadership council to purposefully write a strategic recruitment plan that would provide explanations of several

recruitment strategies for the fall of 2021. Campus recruitment would be the responsibility of the executive leadership council; each council member agreed to his/her role in the recruitment process. Leadership council members would visit campus STEM clubs, campus clubs and one sorority/fraternity each semester. The rationale to visit campus clubs and fraternal organizations was to ensure STEM freshmen and sophomores majors were informed of Noyce scholarship opportunities. [Gandhi-Lee, Skaza, Marti, Schrader, and Orgill \(2017\)](#) found students who experienced encounters with faculty in and out of the classroom positively impacted recruitment and retention of STEM majors. Furthermore, having access to a wide range of organizations would reach various demographic groups. Additional recruitment efforts included members of the leadership team visiting a foundational course (Math 1113) course once a semester to introduce and discuss the aim of the program in recruiting STEM majors toward a career in secondary teaching. Math 1113 is a required precalculus course that biology, chemistry and mathematics majors will take during freshmen year. The course is taken by many students (500+) per academic year and is a beneficial way to target STEM majors. The intentions and agreed with leadership devised strategies provided a sound blueprint for future recruitment plans. Scholar feedback indicated that visits from the leadership team were beneficial and aided in decisions to apply to the program, as faculty members could provide the most accurate information along with personal experiences as educators and STEM professionals.

Despite the leadership team's agreement to follow a written recruitment plan, many factors slowed the recruitment process throughout the semester. Time constraints were a primary factor in the prevention of consistent recruiting of potential Noyce scholars. At the time of NSF grant approval, one-half of the leadership team consisted of faculty members who taught full loads while fulfilling the responsibilities of service and scholarship duties as faculty. Consistently visiting classes and providing pertinent program information was a challenge for the leadership team. Navigating between teaching classes and visiting STEM courses in between classes yielded low visitations and information sessions. In addition, the prolonged effects of the pandemic provided challenges to the recruitment process. An overall decrease in enrollment brought fewer numbers in STEM disciplines, and freshmen perspectives classes were not taught during the Fall of 2021 due to staffing shortages and low enrollment. Moreover, the college's marketing department was not equipped with adequate staffing to meet the program's marketing needs at that time.

Following the recruiting period, the application requirements were determined. Prior research has shown the challenges STEM-turned-education majors experience in connecting single disciplines to integrated components of education such as differentiation and content connections ([Mumcu, Uslu, & Yildiz, 2022](#)). With this challenge in mind, the council agreed on the importance of providing application requirements that would properly vet applicants. An application review committee was formed to collaborate and discuss resources and support needed to foster scholar growth and effectiveness in STEM classrooms. Moreover, to ensure uniform decisions regarding the application and vetting process, the application review committee created an applicant rubric system. Applications were ranked and received feedback from the scholar application review committee. Candidates were required to include a written autobiography as well as three personal references—one of which would include a STEM professor. Applicants were selected on application responses and previous STEM credits. The process occurred within one week and three applicants were informed of acceptance into the program.

Mentoring with meaning

Studies indicate Noyce programs should include adequate funding to provide activities and support systems that will help new teachers cope with challenges in high-needs schools

(Ticknor, Gober, Howard, Shaw, & Mathis, 2017). During the induction phase, a myriad of supports was implemented to make certain that Noyce scholars would become highly effective STEM teachers in high-needs school systems. The first support assigned each scholar a mentor from one of the two school partner districts for two years. Mentoring is considered as developing relationships between an experienced person with expertise and knowledge (mentor) who provides advice to a less experienced person with a lesser level of professional skills (mentee) (Ezimme, Nuel, Peace, & Ifechi, 2021). Surveys were used to match mentors and scholars and mentor meetings occurred outside of school hours. Fundamental aspects of the mentoring model (Schunk & Mullen, 2013) were used as a guide to facilitate the mentoring program. The mentoring model speculates how mentoring should work and positions students as entering the process by goal setting and planning purposefully for outcomes. Noyce scholar engagement was measured through personal reflections on academic and social progress, impact, effectiveness and acknowledgment. Both mentor and mentee had opportunities to choose spaces that were conducive to having conversations that involved equitable ideas, learning, knowledge, and wisdom. This process led to profound and strong mentoring relationships. Through survey completion, data suggested participants were delighted to share knowledge and expertise and mentors were appreciative of receiving new instructional tasks and activities. Mentors also expressed positivity in becoming a perceived role model and were open to mentoring additional Noyce scholars in the future (Flores-Scott & Nerad, 2012).

Noyce scholars valued ongoing learning from mentors as they received advice on teaching techniques, public speaking skills and how to handle uncomfortable situations within secondary learning environments. After numerous conversations with mentors and scholars recounting the challenges and triumphs of mentoring, the group decided to share their stories through a conference proposal and presentation. Scholars presented a paper "A Tale of Mentoring Part II: Growth of a Mentoring Community; Lessons Learned" at the 2022 Mentoring Conference, Albuquerque New Mexico. Scholars had an opportunity to lead a round table discussion sharing professional and personal experiences regarding the mentoring program.

Connecting real life to STEM

An important part of the scholarship program was for Noyce scholars to have summer work experiences in local industries (Shaw and Mohawk Industries) and attain information that would assist their future secondary students with exposure to real-life STEM careers. Noyce scholars participated in a two-week externship in one of two local floor-covering advanced manufacturing companies (Shaw and Mohawk). Both industries provided letters of collaboration and were excited to work with Noyce scholars. In the externship, Noyce scholars partnered with STEM professionals who worked in a particular part of the industry. Scholars were assigned a project that required them to use their discipline knowledge to assist the industry partner. The rationale behind the project assignment was to assist the Noyce scholar in developing their understanding of various STEM careers, and how their content area is applied in the local industry. Both industries provided Noyce scholars with various professionals to work with along with an opportunity to complete interviewing and reflection activities jointly created by industry partners and the SOE. Scholars learned about work environments where their students' family members work, therefore creating possibilities for scholars to form stronger student-teacher relationships. Scholars also benefited from receiving partial training in process analysis courses which are offered to emerging company leaders (Coffey, 2023).

The authors of the Noyce scholarship desired to recognize industry partner contributions of resources and collaborative efforts. Consequently, scholars were required to share their

externship experiences with local industry through community organizations such as Rotary, Civitan, Kiwanis and Society for Women Engineers. This opportunity not only publicly acknowledges our industry partners but highlights the broad impact of scholarly work during externships.

Conclusions

This article aimed to describe successes, challenges and triumphs experienced by a recently established Noyce Program at a Hispanic Servicing Institution. The idea of applying for the NSF grant came into existence from two Deans (School of Education and School of Arts and Sciences) determined to bring diversity to the teacher pipeline in local school systems. The Noyce Scholars Program initiative would intend to recruit STEM majors and shape them into effective educators through clinical practices and experiences rooted in existing school-community and university partnerships. Challenges did arise with both the recruiting process and the mentoring program. However, the challenges managed to bring increased collaboration from the advisory committee, leadership team and current Noyce scholars to consider alternate solutions and circumvent future challenges. The triumphs of the mentoring program highlight the opportunities for scholars to share and reflect on their mentoring experiences through research. Both mentors and scholars transformed from a traditional paradigm of mentoring into reciprocal mentorships which provided support through encouragement, understanding of supervisors, shared perspectives and the lending of expertise to other mentoring programs. Lastly, collaboration and sharing of resources with industry partners yielded various experiences of success for scholars. Scholars were provided an opportunity to better understand STEM careers available in industry partners receiving real-time experience in the everyday job function of these careers.

The balance of triumphs, challenges and success in the program allows room for growth and reflection. As previously discussed, once scholars were admitted and accepted into the program, various supports were implemented to ensure scholars would be given the tools needed to become highly effective educators in high-needs schools. In an informal discussion with Noyce scholars, they indicated the program taught them the necessary tools and dispositions needed to effectively teach the curriculum in STEM-based classrooms. However, they also believed issues of the program could be solved through constant communication and consideration of scholar input. Scholars also expressed appreciation for experiences they have encountered for scholar success.

The Noyce Scholars Program has provided opportunities for STEM majors to demonstrate hope and vision regarding the teacher shortage, particularly in STEM areas. The story of a professional development school's unpredictable journey in addressing the teacher pipeline will hopefully be a source of valuable information for other PDS partnerships. Recruitment, clinical preparation and continuous support of partners will continue to be integral factors in shaping future efforts to address the STEM teacher shortage creating a better world, locally and globally.

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