

Design and Implementation of a Mentorship Education Program at Xavier University of Louisiana: Impact and Lessons Learned

Maryam Foroozesh, Tiera S. Coston, Tyra T. Gross, Clair Wilkins-Green, & Elizabeth Yost Hammer

Xavier University of Louisiana

Historically Black Colleges and Universities (HBCUs), such as Xavier University of Louisiana (Xavier), have strong cultures of mentoring underrepresented students. We report on the design and implementation of the Preparing Mentors and Advisors at Xavier (P-MAX) Program, a mentor-training program at an HBCU. Over half of the full-time Xavier faculty members have participated in at least one P-MAX event over the life of the Program, with about 60% completing the 8-hour foundational workshop. Pre/post program self-assessments indicate that mentors report significant increases in both their mentoring skills and confidence. Recommendations to consider when designing and implementing a mentor training program are provided. These range from being thoughtful about who delivers the mentoring lessons to paying close attention to the specific audience and institutional culture.

Keywords: STEM, mentoring, undergraduate, HBCU, biomedical sciences

Acknowledgement: The work reported in this publication was supported by the National Institute of General Medical Sciences of the NIH under award numbers RL5GM118966, TL4GM118968, and UL1GM118967. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Introduction

The opportunity to formalize Xavier University of Louisiana's tradition of mentoring was presented when the University was awarded one of ten Building Infrastructure Leading to Diversity (BUILD) grants from the National Institute of General Medical Sciences (NIGMS) of the National Institutes of Health (NIH). The BUILD grants were awarded to select institutions to implement and study innovative ways to engage and retain underrepresented student populations in the biomedical research workforce (NIGMS, n.d.). The NIH mandated that mentoring be incorporated into any strategies undertaken to fulfill the overall goal of the BUILD Initiative (DHHS, n.d.). Certain elements that formalized Xavier's mentoring tradition already existed within the Institution, and BUILD provided the resources to implement the remaining elements. Four essential elements were used for this process at Xavier and must exist together to enhance the outcomes of any mentor training initiative (Coston & Payton-Stewart, 2019). First, there must be support and commitment to mentoring at the institutional level. Second, the mentoring initiatives must be administered from institutional units that are trusted and respected by the institutional community. Third, the initiatives must be carried out by people who have developed the competency and expertise and can effectively gain the buy-in of the institutional community. Finally, the mentoring initiatives must be evidence-based and provide the institutional community with continuous support and useful

resources.

Xavier's mission demands the education, support, and guidance for each student who enters the University for the cultivation and development of his/her expertise in his/her field of study, leadership, and service. Simultaneously, fulfillment of the BUILD Program's ultimate goal required designing and implementing a mentor training program that formalized Xavier's mentoring culture. Preparing Mentors and Advisors at Xavier (P-MAX), the P-MAX mentor training program is the continuously evolving result of intentional efforts. Its establishment and maintenance involve continuous revision and improvement based on robust evaluations and lessons learned from challenges and successes. Here, the design and implementation of the P-MAX Program are presented, including resources, evaluation methods, lessons learned, and strategies for overcoming challenges and strengthening successes.

Method

Institutional Commitment

Educational institutional leadership at all levels is obligated to ensure that the values, standards, and practices that are esteemed by the institution are effectively passed from one generation of stakeholders to the next (Keyser et al., 2008). This responsibility can be met through engagement in effective mentorship throughout the institution.

Critical areas exist that an institution must address to maintain a healthy mentoring environment. These are 1) the criteria for selecting mentors; 2) incentives for motivating faculty and staff to serve effectively as mentors; 3) factors that facilitate the mentor-mentee relationships; 4) factors that strengthen mentees' abilities to progress in their career paths responsibly and successfully; and 5) factors that contribute to the professional development of both mentees and mentors. Mentorship at Xavier addresses each of these areas through thoughtful, evidence-based approaches. Xavier's approach to mentoring its students is not merely a sentiment, attitude, or feeling; it is a collaboration of tangible initiatives, policies, and people with a common goal.

Institutional Offices and Programs

The P-MAX Program does not operate in isolation; there are a number of institutional offices and initiatives with which the Program works collaboratively to solidify the mentoring landscape at Xavier. For example, the Student Academic Success office (SASO) works to improve the retention and graduation rates of Xavier students, particularly freshmen. One of its stated goals is to "engage a system of monitoring and mentoring for the academic progress of new freshman students" (Xavier University of Louisiana, n.d.-b). The Center for Undergraduate Research and Graduate Opportunity (CURGO) provides support and resources for students seeking research experiences and graduate degrees, coordinates pipeline programs to increase student access to advanced degrees, and supports faculty research with undergraduate students (CURGO, n.d.). The Mentor to Mentee (M²M) initiative is a component of the BUILD Post-baccalaureate Technician Program (PTP). PTP is a research training program designed to enhance the knowledge and skills of recent Xavier graduates who are considering pursuing graduate degrees in the biomedical sciences but are not quite prepared to do so immediately after graduation. M²M provides psychosocial support, mentee and mentorship training, assistance in the transition from undergraduate students to post-graduate research staff (positions which involve being both a mentee/trainee and a near-peer mentor/trainer to the undergraduate students in their research groups), and support in the application and matriculation processes for graduate programs. In addition, each academic department at Xavier has a concrete plan in place to address the mentoring and advising needs of its students. Finally, the Center for the Advancement of Teaching and Faculty Development (CAT+FD) designs and implements all P-MAX activities for mentorship training, described in detail below. The importance of the collaborations between P-MAX and these offices, programs, and initiatives are the foundation for the mentoring infrastructure at Xavier.

BUILDing P-MAX

P-MAX is a mentorship training program designed to provide participants with the knowledge and skills needed to mentor and advise undergraduate students, particularly those students engaged in research. To accommodate the varied and busy schedules of the participants, one cycle of the P-MAX Program is held over a period of 12 months. P-MAX begins with an 8-hour workshop held in June or July, followed by three one-hour workshops in each of the subsequent fall and spring semesters. These seven events, totaling 14 hours, comprise the full P-MAX Program. The Program's schedule is based on the ebb and flow of the academic year at Xavier, with the intent of maximizing participation. As an incentive to take part in the P-MAX, students participating in the summer workshop and at least four of the six semester workshops receive a certificate of completion. One-hour workshops are typically held during the lunch hour, with lunch provided for the participants.

P-MAX events are promoted inside and outside of the Xavier University community through weekly email blasts describing each event and providing a convenient link for registration. Because many Xavier students engage in research opportunities outside of the University at local research-intensive partner institutions, P-MAX training is also promoted to help prepare faculty and staff at other institutions to mentor Xavier students. A schedule of programming is published in advance that allows interested faculty and staff at other institutions to participate by adjusting their schedules accordingly. Additionally, select events undergo targeted promotion to certain campus departments, divisions, or special interest groups.

During the COVID pandemic, P-MAX events were offered remotely, which provided an opportunity to include non-local participants. Post-COVID, to retain that advantage and provide additional flexibility to the participants, P-MAX events have been offered in a hybrid format. In the Summer of 2022, a fully online and self-paced version of P-MAX Online was launched and is now available free-of-charge to any interested Xavier or non-Xavier individual. The availability of P-MAX Online has been widely shared across the campus, with research-intensive partner institutions, through the NIH's Diversity Programs Consortium (DPC), and further nationally via listservs.

Foundational topics are presented at the 8-hour workshop. These include developing a mentoring philosophy, effective communication, setting goals and expectations, and implicit bias and stereotype threat as they relate to mentoring, with a focus on mentoring individuals from underrepresented groups and at an HBCU. However, the one-hour semester workshops are on ad hoc topics generated by the participants (participant-driven programming). On every workshop evaluation, participants are given the opportunity to suggest the types of programming (e.g., workshops, panel discussions, roundtables)

and the specific topics helpful to them in their mentoring roles. When possible, the participant-requested programming is offered. Information (e.g., slides, handouts, links, etc.) from all P-MAX workshops is uploaded to a wiki maintained by CAT+FD, which allows unfettered access to P-MAX resources (CAT+FD Wiki, 2022). Participant-driven programming sparks and maintains interest, enhances participation, and creates more buy-in among participants. Examples of topics suggested by participants and incorporated into semester programming include self-affirmation as a mentoring tool, a practical view of an effective mentoring relationship, mentee discussion panels, and growth and fixed mindsets in mentoring. The semester programming is open to anyone who wishes to participate, regardless of whether they have completed the 8-hour foundational workshop. The 1-hour workshops attract both P-MAX veterans as well as first-time attendees who are drawn by the workshop topic. The diversity of the participants often leads to lively discussions and sharing of knowledge and experiences. This approach also allows new content to be produced and added to the Program and ensures that no two program years are the same. Participants who missed the 8-hour foundational summer workshop, have access to all P-MAX material through the CAT+FD Wiki in addition to the full self-paced training through P-MAX Online.

Resources

P-MAX is modeled after Entering Mentoring (EM), a mentor-training seminar developed at the University of Wisconsin Madison that is intended to produce effective mentors and ultimately enhance the experience of students engaged in undergraduate research (Handelsman et al., 2005; Pfund, Branchaw & Handelsman, 2014). The EM materials were created by experts engaged in research on effective learning and refined through continuous practice and research. This evidence-based approach to mentor training helps to gain the buy-in of participants from a wide spectrum of disciplines. Case studies form the foundation for most of the P-MAX programming and are used to stimulate discussion on the topic. The case studies and other content come from the Entering Mentoring series. However, some of the richest discussions occur when participants share their own real-world experiences.

The baseline materials for the Entering Mentoring and Entering Research curricula were developed using funding from the Howard Hughes Medical Institute (HHMI) and the National Science Foundation (NSF). Funding from the NIH supported further development of the materials and their nationwide dissemination along with training on how to effectively use them. This work was conducted through the Mentor Training Core of the National Research Mentoring Network (NRMN), whose goal is to increase the participation of underrepresented groups in biomedical

research careers through effective mentorship (NRMN, 2021). With the understanding that good mentoring relationships are needed at every level, NRMN offers a variety of mentoring programs and resources to individuals at levels ranging from undergraduate and postdoctoral to faculty and administrators. The MyNRMN platform facilitates the development and expansion of mentoring networks among and across institutions. P-MAX participants are introduced to MyNRMN at the summer workshop and are encouraged to join NRMN and explore the MyNRMN site.

The materials and resources developed and disseminated through NRMN are now sustained and made available through the Center for the Improvement of Mentored Research Experiences (CIMER). CIMER is an organization whose mission is to improve mentoring relationships using evidence-based, culturally responsive interventions, and offers a variety of resources and services related to mentorship training. Its interactive site allows users to customize evidence-based mentor and mentee training curricula for their specific needs. Additionally, CIMER offers an assessment platform that can facilitate single- or multi-site evaluation of mentorship training efforts (CIMER, n.d.-a).

Implementing P-MAX

From the conceptualization of Xavier's BUILD Program, Project Pathways, the decision was made to introduce the mentor training program to the Xavier community from the Center for the Advancement of Teaching and Faculty Development (CAT+FD) for a variety of reasons. First, CAT+FD is a center dedicated to faculty development. P-MAX is engaged primarily by faculty, although not exclusively. Hence, it was intuitive to operate P-MAX out of a place where faculty were already engaged. Second, in 2014, mentoring was added to CAT+FD's vision statement as an area of faculty support to support Xavier in formalizing the mentoring culture throughout the campus. Third, CAT+FD is a trusted institutional unit with a reputation of excellence across the University. CAT+FD has enjoyed a high level of participation from faculty for many years, including those years since the implementation of the P-MAX Program, which helps to facilitate a high level of participation in the P-MAX events. CAT+FD was established in 1994 as a stand-alone unit under the direct supervision of the Provost and Senior Vice President for Academic Affairs. Since 2014, CAT+FD's mission has been to promote Xavier's "mission through the development of faculty across all career stages and areas of professional responsibility" (CAT+FD, 2016). The vision of CAT+FD delineates the areas of responsibility as teaching, mentoring, scholarship, service, and work/life balance.

The campus-wide reputation of CAT+FD is an integral part of the success of initiatives that are administered through it. Faculty can seek evidence-based assistance, information, and advice in any

of the areas of faculty responsibility enumerated in the vision statement of CAT+FD. For many years, CAT+FD has used faculty participation in its events, programs, and initiatives as one of the metrics by which to gauge its effectiveness. Since the implementation of P-MAX in 2015, CAT+FD has consistently enjoyed high faculty participation in its various offerings, with no less than 59% annual participation. This reputation and level of faculty participation are an integral part of the foundation for successful initiatives. CAT+FD was designed to support faculty, who play a critical role in the success of Xavier's students. Although the mission of CAT+FD focuses on faculty, staff are also supported as they mentor students in various capacities. Virtually all programming offered through CAT+FD is open to both faculty and staff.

In 2011, the STEM Educational Improvement Specialist (EIS) position was conceptualized and implemented to develop a bridge between CAT+FD and the STEM departments at Xavier, and to provide pedagogical support to STEM faculty. In 2014, the responsibilities of the EIS position were broadened to include the conception, development, and implementation of mentoring programs and initiatives targeting faculty and staff, both internal and external to Xavier. Because of the new responsibilities related to mentorship training, the EIS position further evolved to include extensive support of faculty in non-STEM disciplines. The evolution of the EIS position to focus on mentorship training advanced the formalization and enhancement of the mentoring culture upon which Xavier was established.

Although the EIS is important to the success of P-MAX, it takes many more human resources to keep P-MAX running effectively. One of the greatest lessons learned very early after P-MAX was implemented is that who delivers the messages of the Program matters. P-MAX participants place more value on information that comes from individuals who are similarly situated to them; that is, faculty engage more with information coming from other faculty, while staff relate more to information coming from other staff. This phenomenon has been observed in other contexts where the source from which information comes can play a role in the listener's attitude about the information (Allen et al., 2007). For this reason, most of the P-MAX programming is facilitated by faculty-staff teams who can bring their unique perspectives to the presentation of the information. Programming also relies heavily on interactive discussions where colleagues can hear from one another and see the similarities in their situations, which facilitates buy-in for the ideas and solutions presented. Expert guest speakers are also periodically invited to speak on mentoring-related topics of interest to the Xavier community. These speakers typically garner high attendance and evaluation numbers.

The train-the-trainer model has been employed to ensure that all facilitators have been properly trained. The EIS completed the Facilitating Mentor

and Mentee Training Train-the-Trainers workshops offered by the NRMN (2015-2019). The workshop provided guidance and resources to help build a mentor and/or mentee training program. It also provided valuable opportunities to engage in facilitation and receive immediate, constructive feedback. Upon completing the Train-the-Trainers workshop, participants were designated as NRMN-Trained Facilitators. Trained facilitators went on to demonstrate their competency in facilitation to earn the next designation of Certified Facilitator from the Center for the Improvement of Mentored Experiences in Research (CIMER). All faculty and staff who serve as P-MAX facilitators are trained before engaging P-MAX participants. To become a P-MAX facilitator, faculty or staff must 1) complete the 8-hour summer workshop; 2) demonstrate a high level of engagement in P-MAX events; and 3) have ongoing mentoring relationships with students. Additionally, each facilitator has one-on-one sessions with the EIS as needed to develop their facilitation skills. Although facilitators are provided a nominal fee for facilitating a session during the 8-hour workshop, many faculty and staff facilitate one-hour workshops during the semesters without compensation.

Evaluation

Both process and outcome evaluation are utilized to measure and maximize the efficacy of the P-MAX Program. Process evaluation is comprised of participation in program events and individual event evaluations. Outcome evaluation consists of a 27-item repeated measures pre/post P-MAX participant self-assessment, and the mentoring experiences of students mentored by P-MAX-trained faculty captured in the students' annual program assessment.

Participants are encouraged to register prior to each P-MAX event and must sign in once they arrive at the event. Sign-in forms are designed to accommodate those who did not register prior to the event. All participants are required to sign in for each event. Every P-MAX event is evaluated for quality and usefulness. Additionally, these evaluation forms give participants the opportunity to provide qualitative feedback for the event, and to offer suggestions for improvement and future events. This information is used for continuous enhancement of the programming.

The efficacy of P-MAX training for program participants is captured via a pre/post programming self-assessment. At the beginning of the first eight-hour training session, participants are invited to complete a confidential 27-item online self-assessment designed to capture their perceptions of their mentoring skills in different facets of an effective mentoring relationship (for example, "Helping your mentees develop strategies to meet goals" and "Taking into account the biases and prejudices you bring to the mentor/mentee relationships," and of their confidence as a mentor. At the conclusion of the year's

Table 1

P-MAX Workshop Evaluation Results. Shown are the average Quality and Usefulness ratings for all P-MAX workshops.

Prompt	Rating Averages
Please rate the quality of this workshop. (n=448)	4.59
How likely are you to use the information presented in your teaching and/or professional life? (n=475)	4.65

Note: Quality scale: 1= 'Poor' and 5= 'Outstanding'
Usefulness scale: 1= 'Not at all likely' and 5= 'Extremely likely'

Table 2

P-MAX Pre/Post Outcomes. Shown is the change in mentors' perceptions of their mentoring confidence and skill from pre to post P-MAX training.

P-MAX Pre/Post Outcomes				
(All Participants: n=90)				
Domain	Pre	Post	Percent-age-Point Increase	Sig.
	Mean (SD)	Mean (SD)		
Skills	75.5% (11.6)	85.1% (8.4)	9.5	<0.001**
Confidence	77.0% (12.4)	86.8% (10.2)	9.8	<0.001**
P-MAX Pre/Post Outcomes				
(Novice Mentors: n=16)				
Domain	Pre	Post	Percent-age-Point Increase	Sig.
	Mean (SD)	Mean (SD)		
Skills	72.8% (13.7)	82.6% (9.5)	9.8	<0.01**
Confidence	70.9% (13.4)	82.2% (11.1)	11.3	<0.01**
P-MAX Pre/Post Outcomes				
(Mentors with Prior Mentoring Experience: n=74)				
Domain	Pre	Post	Percent-age-Point Increase	Sig.
	Mean (SD)	Mean (SD)		
Skills	76.2% (11.1)	85.6% (8.1)	9.4	<0.01**
Confidence	78.3% (11.8)	87.8% (9.7)	9.5	<0.001**

** Significant at/beyond .01
One-tailed tests of significance reported.

programming, these participants are again invited to complete the self-assessment, and their pre- and post-programming responses are matched. A paired t-test is then utilized for these repeated measures design to test the one-tailed hypothesis that participants' self-perceived mentoring skills and confidence as a mentor will increase during their time in the Program. Using a two-tailed test was not deemed appropriate since there was no reasonable hypothesis that participants would self-report a worsening of skills or confidence as a mentor because of participation in mentor training. The assessment also contains several open-ended questions, asking experienced mentors what advice they would give to those just

beginning to mentor, and what they believe to be the qualities of an effective mentor. These items are designed to have participants reflect on their mentoring experiences and share lessons learned for the benefit of other mentors.

As part of the annual assessment of the research training programs at Xavier, undergraduate research mentees of P-MAX-trained mentors are asked to share their thoughts on their mentors and mentor-mentee relationships (note that it is not possible to have a comparative control group for this assessment due to the fact that all program mentors are required to undertake P-MAX training before they could serve as mentors to such students). On a four-point scale of 'Poor', 'Fair',

Table 3
Mentees' Mentoring Experience Perceptions.

Item	% of Mentees Rating Each Aspect as Good/Excellent
My working relationship with my research mentor	92.5
Support and guidance from my research mentor	92.5
My research experience overall	89.1
The amount of time I spent doing meaningful research	86.5
The amount of time I spent with my research mentor	83.1

Note: Shown is the percentage of mentees responding "Good" or "Excellent" to prompts about their mentored research experience. n=76

'Good', and 'Excellent', mentees are asked to assess their working relationships with their research mentors and the support, guidance, and time they received from those mentors. All evaluation data is used to inform changes designed to improve the efficacy of the P-MAX Program.

Results

P-MAX Impact

Annual attendance at P-MAX workshops has remained remarkably consistent across the years. Over half of Xavier faculty have participated in P-MAX workshops and completed the 8-hour summer sessions. With the high level of participation in P-MAX, it was important to gain insights into how the individual programming events were being perceived by participants and any ways in which the programming could be improved. This was accomplished using a standard CAT+FD evaluation form.

The evaluation form contains five items followed by a Likert scale from 1 to 5. The first item included five items with 1 representing 'Poor' and 5 representing 'Outstanding.' Items two through five included five ratings with 1 representing 'Not at all Likely' and 5 representing 'Extremely Likely.' The last three prompts (3-5) were followed by spaces for free writing, as follows:

Please rate the quality of this workshop.

How likely are you to use the information presented in your teaching and/or professional life?

What worked?

What didn't work?

Suggested improvement(s)/future topics.

Analysis of the evaluation data from 32 P-MAX events that have occurred since the Program was implemented reveal ratings that averaged greater than 4.5 on the 5-point Likert scale for both quality

and usefulness (Table 1).

Understanding the perceptions of the mentors who have undergone the P-MAX training is critical to maintaining an effective program. The P-MAX Program now has six years of pre/post data. Results indicate significant increases in both mentoring skills and confidence as a mentor from pre- to post-test. Note also that the far smaller standard deviation of the post-tests indicates that there was substantially less variance amongst respondents in their post-test self-assessment of both aspects compared to the pre-tests. 82% of all P-MAX participants completing the paired pre/post assessment already had mentoring experience prior to their participation in the Program. Regardless of their prior experience, at the culmination of the Program, mentors report statistically significant gains in mentoring skills and in their confidence as a mentor (Table 2).

Mentees' perceptions of their P-MAX-trained mentors provide some of the most useful information about the impact of the Program. With respect to the mentees' perceptions of their mentors, and satisfaction with their mentoring experience, seventy-six student mentees (all whose mentors have completed P-MAX training) completed an annual self-assessment of their research experiences. These mentees were overwhelmingly positive about their experiences with their research mentors, with more than 90% stating that their working relationship, support, and guidance from their P-MAX-trained mentor was 'good' or 'excellent.' Mentees consistently indicated that working with their P-MAX-trained mentors enhanced their research program experience, making it the highest-rated of all programmatic aspects in which they participated. While intuitive, it is also clear from the results that a positive experience with a research mentor is highly correlated with a more positive research experience overall (Table 3).

Discussion

Xavier has been able to formalize its long-

standing tradition of mentoring through the P-MAX Program. The resources that have been put into place to sustain all the mentoring efforts, the high level of participation in mentorship training, and the positive outcomes reported by both mentors and mentees provide compelling evidence of the success of this initiative. Xavier has continuously cultivated the areas needed to create and maintain a healthy mentoring environment, and the implementation of P-MAX has been a particularly significant accomplishment in this process. In its research training programs, particularly the BUILD Program, Xavier has established clear criteria for faculty and staff serving as mentors. One of these criteria is participation in at least eight hours of mentor training through P-MAX. Additionally, Xavier has designated “mentoring of students” as a service that is highly valued by the University in its faculty handbook and in tenure and promotion evaluations, encouraging faculty to serve as mentors and role models to their students (Xavier University of Louisiana, 2017).

Mentoring at Xavier is not only a faculty-student paradigm; formalized faculty mentoring has occurred for many years where experienced faculty work with new faculty during their first year at the University. A faculty-in-residence (FIR) for new faculty position in CAT+FD has been dedicated solely to mentoring and supporting new faculty to support this mentoring program. To ensure that all mentoring initiatives work in collaboration with one another, the FIR for new faculty also participates in and facilitates P-MAX programming.

Xavier faculty are encouraged to include students in their disciplinary research, which includes writing support for students into their grant proposals. Xavier’s commitment to the success of mentoring relationships can be seen in the questions on its grant proposal routing form. Any principal investigator who writes a grant proposal containing a student training component must attest to having completed P-MAX training or agree to complete it before the proposal funding is received.

All programs and initiatives would mean little without evidence of a positive impact. P-MAX participation, mentors’ perception of increased mentoring confidence and skills, and the mentees’ perception of an enhanced mentoring experience all provide evidence of the effectiveness of Xavier’s approach to mentoring. The mentoring culture has propagated and manifests itself today in the fulfillment of Xavier’s mission through its community – students, alumni, faculty, and staff. Formalization of the culture through P-MAX and other mentoring initiatives only enhances the positive impact.

Recommendations

Implementing any mentor training program must begin with a commitment from all stakeholders to support its implementation, and a firm

understanding of its value to the institution, as well as its intended outcomes. In addition, there are a few more items to keep in mind as the Program is conceptualized, created, and revised.

The messenger(s) chosen to deliver the lesson of the Program must be selected thoughtfully. The audience and the type of messenger from whom they are most likely to receive “difficult-to-hear” information must be carefully considered. Because it is unlikely that a monolithic audience will exist at any given time, having well-trained facilitators with varied backgrounds, experiences, and points of view will increase the likelihood that the message of the training will be received.

As important as the content of the training program is, the atmosphere in which the training occurs must be conducive to the participants’ engagement. This involves creating a training that is convenient in time and place for the participants and may mean evening, weekend, or online sessions. Once there is an understanding of the potential participants’ needs, it is important to be receptive to the structure that may bring to a training program. Providing food and refreshments, particularly during midday and longer sessions (more than two hours), is also extremely effective in improving participation.

There are train-the-trainer workshops that provide proven approaches to creating and implementing mentor training programs. Additionally, there are open access repositories of training materials that can be tailored in any way the program creator chooses. Creating a mentor training program is a work-intensive process, and having access to content that has been repeatedly tested and revised will lessen the workload of the process.

Resistance to the need and content of the Program can be expected. There are those, particularly people who have been mentoring for an extended period-of-time, who feel that they are veteran mentors who cannot benefit from training. One of the most effective ways to address this type of resistance is to leverage those mentors’ experiences by inviting them to be facilitators or inviting them to provide insight on a topic. This approach ensures the veteran mentors’ participation in training, while highlighting their status as a resource for other mentors.

Close attention must be paid to the culture of the institution. The customs, traditions, and values will inform how the training program is structured and executed. The importance of crafting a training program around the culture of the institution is equally important if there is a desire to shift the paradigm that currently exists. A mentor training program can be an impetus for change within an institution through those who are trained (Thomas, Bystydzienski, & Desai, 2015; DeVries, & Webb, 2006). P-MAX continuously reinforces the commitment that Xavier has made to mentoring as an institution by incorporating its mentoring-related promulgations throughout the training.

Limitations

This study outlines elements that are essential to the successful design and implementation of a mentor training program. Additionally, evidence supporting the positive impact of the P-MAX Program is presented. However, because all faculty and staff who serve as mentors in formal research training programs at Xavier are required to complete the P-MAX training before taking on that role, this study lacks a comparison group of mentors who have not engaged in this training. Consequently, the positive outcomes described cannot be definitively attributed to the impact of the P-MAX Program. P-MAX has proven effective at Xavier in increasing the mentoring self-efficacy of program participants, but the transferability of the Program to an institution with a history, structure, and culture dissimilar to Xavier is not certain. It is firmly believed that the elements of effective mentor training presented in this study are broad enough to apply to virtually any educational institution, but additional research is necessary for diverse types of institutions to generate empirical evidence of transferability. Institutions targeted in the research should be a diverse representation according to the Carnegie Classification of Institutions of Higher Education (Classifications - Basic, Enrollment Profile, Undergraduate Instructional Program, Graduate Instructional Program, and Size and Setting) (2022).

Because the overall effectiveness of the P-MAX Program will be measured by increased participation in the biomedical workforce by individuals from underrepresented groups, the professional activities, and positions of each cohort of mentored students must be tracked for many years to come.

Additional Acknowledgement: The authors acknowledge Xavier University of Louisiana for nurturing and sustaining its mentoring culture since its founding. They also acknowledge the support and work of the Diversity Program Consortium (DPC), whose goal is to diversify the biomedical, behavioral, clinical, and social sciences research workforce through training and mentorship.

References

- Allen, J., Jimmieson, N. L., Bordia, P., & Irmer, B. E. (2007). Uncertainty during organizational change: Managing perceptions through communication. *Journal of Change Management*, 7(2), 187-210.
doi: 10.1080/14697010701563379.
- Branchaw, J. L., Pfund, C., & Rediske, R. (2010). *Entering Research Facilitator's Manual: Workshops for students beginning research in science*. Freeman & Company.
- Carnegie Foundation (2022). *The Carnegie Classification of Institutions of Higher Education*. https://carnegieclassifications.acenet.edu/classification_descriptions/basic.php.
- Center for the Advancement of Teaching and Faculty Development [CAT+FD]. (2016). *Mission, vision & values*. <https://cat.xula.edu/about/mission>.
- Center for the Advancement of Teaching and Faculty Development [CAT+FD] Wiki (2022). *Preparing mentors and advisors at Xavier (P-MAX)*. [https://catwiki.xula.edu/Preparing_Mentors_and_Advisors_at_Xavier_\(P-MAX\)](https://catwiki.xula.edu/Preparing_Mentors_and_Advisors_at_Xavier_(P-MAX)).
- Center for Undergraduate Research and Graduate Opportunity (CURGO). (n.d.). *Mission*. <http://www.xula.edu/curgo>.
- Center for the Improvement of Mentored Experiences in Research (CIMER). (n.d.-a). *Center for the Improvement of Mentored Experiences in Research*. <https://cimerproject.org/>.
- Center for the Improvement of Mentored Experiences in Research (CIMER) (n.d.-b). *Facilitator Recognition Program*. <https://cimerproject.org/facilitator-community/>.
- Coston, T.S., & Payton-Stewart, F. (2019). Maximizing mentoring: Enhancing the impact of mentoring programs and initiatives through the Center for the Advancement of Teaching and Faculty Development at Xavier University of Louisiana. In L. Winfield, Z. Wilson Kennedy, G. Thomas, & L. Watkins (Eds.), *Growing Diverse STEM Communities: Methodology, impact and evidence* (pp. 215-227). American Chemical Society.
- Department of Health and Human Services (DHHS). (n.d.). *Funding Opportunity Announcement Number RFA-RM-13-016*. <https://grants.nih.gov/grants/guide/rfa-files/RFA-RM-13-016.html>.
- DeVries, J., & Webb, C. (2006). Mentoring for gender equality and organizational change. *Employee Relations*, 28(6) 573-587. doi: 10.1108/01425450610704506
- Keyser, D. J., Lakoski, J. M., Lara-Cinisomo, S., Schultz, D. J., Williams, V. L., Zellers, D. F., & Pincus, H. A. (2008). Advancing institutional efforts to support research mentorship: A conceptual framework and self-assessment tool. *Academic Medicine*, 83(3), pp. 217-225.
- Handelsman, J., Pfund, C., Miller Lauffer, S., & Maidl Pribbenow, C. (2005). *Entering mentoring: A seminar to train a new generation of scientists*. University of Wisconsin Press.
- Loughlin, M. (October 2007). *Xavier University: The full story*. <https://www.xula.edu/about/the-full-story.html>
- National Institute of General Medical Sciences (NIGMS). (n.d.). *Building Infrastructure Leading to Diversity (BUILD) initiatives*. <https://www.nigms.nih.gov/training/dpc/pages/build.aspx>.

- Pfund, C., Branchaw, J., & Handelsman, J. (2014). *Entering mentoring*. W. H. Freeman & Company.
- Thomas, N., Bystydzienski, J., & Desai, A. (2015). Changing institutional culture through peer mentoring of women STEM faculty. *Innovative Higher Education*, 40(2), 143-157.
- Thompson, M. A. (1999). The 'science' and 'art' of teaching and learning at Xavier University of Louisiana. In L. Foster, J. A. Guyden, & A. L. Miller (Eds.), *Essays on the academic and social lives of white faculty members at historically Black colleges and universities* (pp. 51-60). Rowman & Littlefield Publishers, Inc.
- Xavier University of Louisiana (XULA) (2017). 2017-2018 Faculty Handbook. <https://www.xula.edu/assets/2017-2018-faculty-handbook.pdf>.
- Xavier University of Louisiana (XULA). (n.d.-a). BUILD at Xavier University of Louisiana. <http://www.xula.edu/build/index.html>.
- Xavier University of Louisiana (XULA). (n.d.-b). Student Academic Success Office. <http://www.xula.edu/saso/>.
- Xavier University of Louisiana (XULA). (n.d.-c). University mission statement. <https://www.xula.edu/about/mission-values.html#:~:text=Xavier%20University%20of%20Louisiana%20Mission&text=The%20ultimate%20purpose%20of%20the,service%20in%20a%20global%20society>.

About the Authors

Dr. Maryam Foroozesh is an Endowed Professor of Chemistry at Xavier University of Louisiana, where she has worked for twenty-nine years as an Organic Chemistry and Toxicology instructor, an active biomedical researcher, and a principal investigator and program director for a number of federally-funded diversity programs (NIH/NIGMS-funded Building Infrastructure Leading to Diversity (BUILD), NIH/NIGMS-funded Research Initiative for Scientific Enhancement (RISE), and NSF-funded Innovation through Institutional Integration (I3) programs). Currently, she serves as the Lead Principal Investigator and Administrative Core and Research Enrichment Core Director for the BUILD Program. The Foroozesh research group focuses on two distinct projects; one aiming to design and synthesize ceramide analogs for the reversal of chemo-resistance in breast cancer; and the other, aiming to design and synthesize mechanism-based inhibitors for cytochrome P450 enzymes involved in carcinogenesis. Dr. Foroozesh's most valued accomplishment to date, however, is having served as the research advisor and mentor to over 110 underrepresented minority students at Xavier in various research projects. Over the years and in her various roles (supervisor,

colleague, Department Head, Division Chair, etc.), she has also served as a mentor to a number of junior faculty members, research associates, and post-baccalaureate technicians.

Dr. Tiera S. Coston is the Director of Academic Compliance and Accreditation at Tulane University. Previously, she served as the Assistant Dean for Academic Outreach & Engagement at Xavier University of Louisiana where she was also the Director of CARE, a program supporting the success of first-time, first-generation students. She earned a PhD in Molecular and Cellular Biology from Tulane University, a JD from Loyola University New Orleans College of Law, and a BS in Biology from Xavier. Dr. Coston has more than 16 years of experience in supporting faculty in the areas of pedagogy, curricular development and enhancement, and mentoring. She has also provided direct student support through the conceptualization, development, and implementation of three different mentorship education programs at Xavier - Preparing Mentors and Advisors at Xavier (P-MAX) for faculty and staff, Entering Research at Xavier University of Louisiana (ER-XULA) for undergraduate research students, and Mentee-to-Mentor (M2M) for post-baccalaureate technicians. She is a National Research Mentoring Network (NRMN) Certified Facilitator and has facilitated events at institutions throughout the United States and abroad. In all her work, her ultimate goal is to facilitate and promote student success for the benefit of local communities and the global society.

Dr. Tyra Toston Gross is an Associate Professor of Public Health at Xavier University of Louisiana, where she has worked as a public health instructor, researcher and mentor since August 2015. Her research expertise is in maternal & child health disparities. Prior to joining Xavier, she completed a postdoctoral fellowship in reproductive women's health at University of Texas Medical Branch. Given her interest in maternal & child health, the majority of Dr. Gross' research has focused on the health of reproductive-age women. Her current research projects include exploring the health of Black postpartum women in Louisiana, and smoking cessation needs for low-income pregnant women. Dr. Gross is a member of the American Public Health Association (APHA) and Society of Behavioral Medicine (SBM). She is a certified Personal & Executive Coach with the Capp Institute. Dr. Gross is also a proud wife and mother of four spunky kids and an aspiring entrepreneur and philanthropist.

Dr. Clair Wilkins-Green serves as Xavier University's Chief Institutional Research Officer and directs the operations of the Office of Planning, Institutional Research and Assessment Office. Dr. Wilkins-Green also serves in advisory roles for several committees and leadership teams, including the Institutional Review Board (IRB), Xavier's Quality

Design and Implementation of a Mentorship Education Program at Xavier University of Louisiana

Enhancement Plan (QEP) Committee, institutional strategic planning, and institutional assessment. Dr. Wilkins Green received her PhD in Politics from Manchester Metropolitan University and her MA in Political Science from Louisiana State University. Prior to joining Xavier, she held teaching roles at several universities in the United Kingdom and served as a Policy Researcher and a Clinical Trial Statistician at Cardiff University in Wales.

Dr. Elizabeth Yost Hammer is the Director of the Center for the Advancement of Teaching and Faculty Development and a Kellogg Professor in Liberal Arts at Xavier University of Louisiana. A social psychologist by training, she is a co-author for the 4th edition of *Psychology Applied to Modern Life*, now in its 13th edition. Dr. Hammer is also a co-author of *Myers' Psychology for the AP[®] Course*, as well as its *Teacher's Edition*. She has contributed chapters to several books intended to enhance teacher preparation including *The Handbook of the Teaching of Psychology* and the recently published, *Transforming Introductory Psychology: Expert Advice on Teacher Training, Course Design, and Student Success*. Dr. Hammer was a participant in American Psychological Association (APA) Introductory Psychology Initiative and a co-leader for the APA Summit on High School Psychology Education. She has served as president of Psi Chi (the International Honor Society for Psychology), treasurer of the Society for the Teaching of Psychology, and Chief Reader for the AP[®] Psychology Exam. She currently serves on the American Psychological Association's Committee on Associate and Baccalaureate Education. She, her husband, and their two dogs, work and play in New Orleans, Louisiana.