

## **A Book Club Model to Promote Personal and Professional Development Activities for Female Engineering and Computer Science Students**

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## **Introduction and Motivation**

Professional and leadership development is one recommended strategy to support and retain female engineers and computer scientists in their professional careers in industry or academia [1], [2], [3], [4]. For women in engineering and computer science, personal vision, or knowing who one wants to be and what one wants to accomplish in life, as it relates to their profession has been found to increase work engagement and retention [4].

Additionally, professional development activities can support women to acknowledge ways that they may be holding themselves back by illuminating the historic, structural reasons that contribute to some behaviors and develop strategies to move themselves forward. Unfortunately, the ways students demonstrate academic success can encourage the approaches that later hold them back from success in their professional lives [5].

An example of this is illustrated in applying for new job opportunities. It has recently been revealed in an internal Hewlett Packard report that men apply for jobs if they have met 60% of the qualifications while women apply if they have met 100% of the qualifications [6]. Some of the reasons for this gender difference have been elucidated. Women indicate that they did not apply if they did not meet all the qualifications because they were following the guidelines and avoiding failure, not because they lacked confidence to do the job [7]. Armed with this information, professional women can alter the way that they approach new opportunities. Similarly, employers are encouraged to change their practices in job posting to attract more female candidates [8].

Likewise, undergraduate education has a role to play in enhancing student's professional development engagement [9]. For female students this can include understanding the behaviors and actions that support academic success and professional success, and most critically, illuminate the differences. Discussion of this topic at the undergraduate level is well-timed as students have the opportunity to practice these skills and modulate depending on the environment. Also, it is important and timely for undergraduate students to be exploring their personal vision for their profession aspirations.

Since activities for continued learning in post-graduation environments, such as opportunities for reflection to align with the individual's professional objectives and development of strategies that further their advancement, occur in the form of professional development training, it is valuable to expose undergraduate students to similar structures prior to their transition to the professional workforce.

Thus, a program for female undergraduate engineering and computer science students was developed with these two aims: (i) to reveal ways in which women may hold themselves back and how these can be reinforced by academic training; and (ii) to introduce students to personal

and professional development tools that promote continued learning and growth through their careers. This program was structured as a book club that included opportunities for personal reflection and group discussions. It was a voluntary extracurricular activity sponsored by the School of Engineering and Computer Science.

### **Book club model**

Book club discussions have previously been used as professional development activities for students to deepen interdisciplinary collaboration in health sciences [10], explore leadership issues for women [11] and for preservice teacher training [12]. Additionally, a book discussion series was conducted for graduate students in science, technology, engineering, and math to promote personal and professional development and community building [13], [14]. For that series, the book *Lean In* by Sheryl Sandberg [6] was used to structure facilitated conversations.

For this program, *Playing Big: Find Your Voice, Your Mission, Your Message* by Tara Mohr [5] was selected for the book club reading. This book was selected by the facilitator because of the emphasis on personal growth to empower the individual and to align with what is most valuable to the individual. The book group facilitator completed the Playing Big Facilitators Training with Tara Mohr and as such was well versed in the concepts presented in the book.

The book has an interesting framing which is to acknowledge that the historical exclusion of women from political, public, and professional spheres has contributed to external barriers that have slowed professional progress and internal factors may limit beliefs in the potential for contributing professionally [5]. While considerable progress has been made to reduce the external barriers to women's progress, Mohr stresses that the internal effects of inequality are still deeply rooted and moving past these requires unlearning and relearning:

But inequality of men and women has also left *internal effects* in us. Over generations, it shaped how we think of ourselves and what we see as possible for our lives and work. It shaped our fears – fears of speaking up, of rocking the boat, of displeasing others. It caused women to develop a number of behaviors that enabled them to survive in environments where they had no legal, financial, or political power – behaviors like conflict avoidance, self-censoring, people-pleasing, tentative speech and action.... The tools you'll acquire in this book are for playing bigger in the ways you most want to; but at a deeper level, they are tools for unlearning the lessons that centuries of women's marginalization have left in each of us. (Mohr p.xxvii-iii)

The book presents tools and concepts to support women to share their ideas, their voices, and take actions that align with their aspirations and life's purpose. It is important to note that Mohr's definition of 'playing big' is not about traditional ideas like wealth generation, prestige, or power. Instead, it is about taking bold, unencumbered strides toward work that is meaningful to the individual.

### **Book club objectives and organization**

One of the goals of the book club was to carve out time for participants to reflect on their past experiences and uncover what playing big means to them. Undergraduate engineering and computer science students' schedules tend to be fast paced and packed with curricular, co-

curricular, and work commitments offering little time to pause and consider how activities today may connect with their future plans and how, or if, those future plans align with their purpose in life. The book offers recommendations and tools for women to make small and large shifts in order to pursue their broader goals.

The book club consisted of four sessions that were 1.5 hours and typically met every other week. All 13 participants received a copy of the book. There was no course credit given for participation. Prior to sessions, students read a few chapters to prepare for the discussion.

The topics covered over the four sessions aligned with the concepts introduced in the *Playing Big* text (12 chapters):

- Introduction
- The Inner Critic
- The Voice of Inner Wisdom
- A Very Old New Way of Looking at Fear
- Unhooking from Praise and Criticism
- Leaving Good-Student Habits Behind
- Hiding
- Leaping
- Communicating with Power
- Callings
- Let It Be Easy
- Joining the Transition Team

Sessions typically started with a welcome and an invitation to set aside the stressors of the day. In some cases, the group elected to start with a guided breathing exercise. The structure of the rest of the session was discussion in response to guided questions related to the concepts covered in the readings. There was time for reflection via journaling and opportunities to share stories. With the larger cohort, these discussions sometimes were done in small groups in order to encourage participation and sharing.

The content that was explored, the ethos and environment of the meetings, and the methods for facilitating sharing and engaging in conversation in each of the four sessions is elaborated in the following sections.

### ***Session 1: Introductions and Foundations for Playing Bigger***

At the start of the first session, it was important to set time aside to discuss the expectations of participation in the group in order to create a productive, inclusive environment free from judgment. Critically, this included ensuring confidentiality of the participants so that they could be comfortable to share their personal experiences as they reflected on and applied concepts from the book. Participants also committed to be present, eliminating electronic distractions, in order to listen carefully to the words and tone of other members when they were sharing. They also agreed to not give advice, but instead to offer support or share their own experience. Additionally, participants were encouraged to ask open-ended questions to support each other to find their own authentic answers. Finally, group members were reminded that if and when they

encounter an internal critical voice that discourages them from participating to recall that this inner critic was not offering a rational response and to do their best to quiet the voice and get involved in the conversation.

In addition, during the first session, time was spent on introductions and learning a little about each other. Then time was devoted to discussing our views on the definition of playing big as well as the concepts of the inner critic. In particular there was emphasis on the assertion from the *Playing Big* book that simply being more confident will not quiet self-doubt brought forward by our inner critical voice. Some students struggled to connect with this concept since it contradicts their longstanding views on how to be successful. We emphasized the tools to identify the inner critic voice and practices to quiet the critic.

Finally, we discussed the concept of inner mentor. Prior to the session, participants also completed a “future self” visualization, drawn from Co-Active coaching practices [15]. For an effective experience they were encouraged to set aside 20 min to listen to the guided visualization in a calm, quiet environment and then 5 min afterwards to write down their reflections. During the session, some students shared their experiences with the visualization and described their inner mentor.

### ***Session 2: Fear and Unhooking from Praise and Criticism***

This session began with a discussion on distinctions of fear brought forward in the book. *Pachad* is defined as the fear of projected or imagined things. *Yirah* is a different fear that comes forward when connected to a calling or life’s dream. This inspired space brings out feelings of expansiveness, exhilaration, or awe. In the session there was time to journal about experiences with both fears. Then if there were willing participants, they shared experiences of *yirah* with the group.

The second part of the session focused on sociological and cultural reasons that women are more impacted by praise and criticism and how those may influence women to hold themselves back from sharing or pursuing their ideas. Students were asked to consider ways that praise and criticism may have held them back previously. Then there was discussion on strategies of how to approach receiving feedback in a neutral way to simply gather information and to recognize that criticism is something that will always come to those pursuing bold, important, novel work.

### ***Session 3: Skills for Playing Big***

The third session highlighted habits that may prevent women from playing big and strategies to unlearn those habits. This included recognizing that the necessary behaviors to excel in academic work are not frequently aligned with those skills needed to excel in careers. Also, the ways in which some women hide from or delay taking steps to play big were discussed. This was followed by ways to address hiding through a specific type of action called a leap. In the session, time was allocated for participants to journal on projects or goals they’d like to move forward and propose a strategy for a leap. Then as a group we discussed one or two volunteered leap ideas, refined the leap to ensure it met the criteria, and constructed a way for the leaper to check-in with the group for accountability. One student developed a leap to explore and seek

guidance on alternate professional pathways to traditional computer science jobs that aligned with her interest in digital storytelling. Another student's leap was to reinitiate contact with her internship supervisor to seek mentorship on ways she could gather experience in a variety of post-graduation biotechnology industry pathways and find her niche.

#### ***Session 4: More Skills and Moving Forward***

The fourth and final session covered additional skills and plans for moving forward. The first area was to illuminate the undermining words and ways that women communicate in order to convey calm and flexibility and to be perceived as nice when sharing their ideas. The participants spent time assessing their communication patterns and then strategizing ways to shift their communication to display confidence, competence and warmth. Then we moved on to talking about callings, on identifying and embracing them, and participants spent time journaling about what was calling them now. The final topic discussed was on strategies of self-care that maintain energy and motivation to play big.

Some time at the end was spent to identify ways that the group could continue to support each other following the book club. Cohort 2018 opted to continue conversations via the group site on our learning management system. Cohort 2019 was very small and decided to stay in communication via email.

An end of program survey (Appendix A) was conducted at the end of the final session.

#### **Participants**

In Fall 2018, 13 total participants were identified from two clusters of students. The first cluster consisted of 10 electrical engineering, computer engineering, and computer science students that had received funding to travel to and attend the Grace Hopper Celebration of Women in Computing. This was an effort organized by the School of Engineering and Computer Science's Diversity Coordinator. As a part of the commitment to receiving funding, these students were expected to participate in one additional professional development activity and the Playing Big book club was identified as an option. The second cluster consisted of three students that were recruited through advertising to the Society of Women Engineers campus club and included students in bioengineering and electrical engineering. The facilitator had taught the two bioengineering students previously.

Due to class conflicts, not all the students were able to participate during the same time frame. As a result, participants were unevenly split into two cohorts of the book club based on schedule availability. The larger cohort of 10 students met on Tuesdays 4-5:30pm and the smaller cohort of 3 students met on Mondays 6-7:30pm.

A third cohort of the book club was created in Spring 2019. Students were recruited through advertising to the Society of Women Engineers campus club and to the capstone design courses (Bioengineering, Civil Engineering, and Electrical and Computer Engineering). Two bioengineering students committed to participate. This group met Thursdays 10-11:30am.

There was regular involvement by participants with only occasional absences due to illness.

## Participant Feedback

A survey (Appendix A) was conducted at the conclusion of the last session. Responses aggregated for all cohorts (n = 13) indicated strong agreement with the following statements:

- I benefited more by participating in the book group than if I had only read the book. (Average score: 4.8/5)
- I plan to use the Playing Big skills in the future. (Average score: 4.7/5)
- Having participated in this book group, I would be more likely to participate in a professional development program in the future. (Average score: 4.4/5)

Feedback was generally positive, and students offered constructive suggestions for improvements for future iterations of the book club. A number of comments in response to the question “was there anything in particular that resonated for you” revealed students related to numerous topics in the book and were appraising their ways of operating with that context. Other responses indicated the benefit of connecting with other women including the female facilitator. These included:

- I found it surprising how relevant the topics presented in the book were. I expected it to be just another generic motivational speech. This last section especially applied to me because I struggle with acknowledging [*sic*] my calling and undermining myself.
- The last section especially, there were a lot of moments/examples that I realized I had been doing. Talking about each section and sharing examples was really helpful and I was able to see that I was doing a lot of the things I shouldn't be doing and how I can change them.
- Having the opportunity to discuss what I read and think more about how they play into my life was beneficial [*sic*].
- All the book chapters had great ideas on how to reframe thinking or be nicer to yourself (?) in order to achieve goals. I would like to grow into someone who is able to do that.
- Ways to let it be easy – I constantly think that I have to do stuff myself and it makes it hard to [*sic*] me to really think long term about anything else. I also like the writing activities during meets [*sic*] to get my thinking cap on.
- It was awesome to connect to a professor and my peer on topics relevant to all of us, and putting us all on the same level of thought or playing field. Makes me want to open up with any woman from any background or status.
- It helped [to] have a moderately small group of females I was familiar with to discuss the topics. Knowing I wasn't alone and how others dealt with issues gives strength in the future choices one makes. There was empowerment with discussion of fears and communication.

Other responses to this question indicated that specific topics discussed in the book were particularly powerful. These included the themes on callings, communicating with power, the inner critic, and the inner mentor.

Participants also offered constructive suggestions to consider for future offerings. Some comments emphasized suggestions regarding the basic structure. These included having more meetings to allow further discussion of topics, spending more time on forming connections between participants through icebreaking activities, and having snacks. Additionally, one student felt that while there was benefit to a small group size, having a slightly larger group could provide more perspectives.

Other feedback related to instructional delivery. Suggestions included revisiting topics from previous sections with more intentionality and using mock situations to illustrate ideas from the readings. Another recommended providing time during the sessions for participants to identify areas they want to work on, practice with the group, and then allocate time to check-in during the following meeting.

Another useful suggestion was to consider offering the book club early in the semester or outside of the semester in order to avoid the high workload times of the semester. Finally, there was also interest in selecting other personal and professional development books, such as *Lean In* by Sheryl Sandberg.

## **Lessons Learned and Recommendations**

Observations of the three different cohorts in terms of engagement and openness to share their experiences offer insights on ways to best structure future offerings of the book group. The students that attend Grace Hopper Celebration of Women in Computing were less engaged and enthusiastic during sessions than their counterparts who had joined based on their interest in this specific program. This is likely because those students were expected to participate in a professional development activity as part of the funding to attend Grace Hopper. This may have contributed to a feeling of obligation to participate. Based on this observation, recruitment for the third cohort was conducted via clubs and senior project courses and was completely voluntary. This resulted in only two students participating, but both were highly engaged and open to sharing their experiences. Other contributing factors to their significant level of commitment were that they knew each other well and had familiarity with the facilitator.

It will be critical to create an environment in future offerings where students feel connected to each other and feel it is safe to share. It is also important to set aside time at the start to gather and disconnect from the activities that just occurred [6] in order to pivot more meaningfully to a place of reflection. As was suggested in participant feedback offering food and setting aside time at the start for informal discussion and catching up could promote this shift. It can also build more of a sense of community. Since it would be difficult to schedule longer sessions to accommodate more time to connect, it would make sense to keep the duration the same but have more meetings.

It was also observed that discussion was enhanced if students were farther in their programs and had completed an internship so they could share examples from their experience. These students tend to be very busy with their coursework and have less time to devote to co-curricular



activities, however the timing may be ideal in order to reflect on the collection of their experiences.

Thus far, the program has not yet been offered again in order to revisit the objectives and restructure for impact and the unique needs of our student population. The book club structure supported the aim to introduce students to personal and professional development tools that promote continued learning and growth. This allows students to familiarize themselves with a common way to continue to develop personally and professionally after graduation as they progress in their careers. Future books club offerings could feature different books that highlight various topics so that students could participate in each year of their program if they choose. Additionally, the facilitator could rotate to allow students to connect with faculty members across a range of disciplines.

The other aim of this program – to reveal ways in which women may hold themselves back and how these can be reinforced by academic training – was more challenging to highlight in a book club modality. This aim may be better supported in a workshop format with emphasis on a few topics from the book, rather than a multi-session discussion of all the topics in the book. As workshop formats are common for professional development activities, this structure would also support the former aim. A workshop format allows for a shorter time commitment from participants that could be timed at a less busy part of the semester. The workshop structure offers scalability as well. A larger audience of STEM students could participate. As an optional follow-up activity, those students that wish to deepen their engagement can participate in smaller groups with the facilitator, organized by discipline or class level. It is hoped this format can be offered when our campus returns to in-person instruction in Fall 2021.

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## Appendix A

### Playing Big Book Club Survey

Please rate your agreement with each statement.	Rating				
	<-disagree		agree->		
	1	2	3	4	5
1. I benefited more by participating in the book group than if I had only read the book.					
2. I plan to use the Playing Big skills in the future.					
3. Having participated in this book group, I would be more likely to participate in a professional development program in the future.					

4. What can be done to improve the book group?

5. Was there anything in particular that resonated for you?