

Sustaining Graduate Student Professional Development with Near Peer Group Led Activities

Ms. Susan Wainscott, University of Nevada - Las Vegas

Susan Wainscott is the Engineering Librarian for the University of Nevada, Las Vegas University Libraries. She holds a Master of Library and Information Science from San Jose State University and a Master of Science in Biological Sciences from Illinois State University.

Prof. Satchi Venkataraman, San Diego State University

Satchi Venkataraman, Ph.D., is a Professor of Aerospace Engineering. He has served as Graduate Advisor for the Aerospace Engineering program (17 years) and as an Associate Director at the Computational Sciences Research Center at San Diego State University (11 years). His expertise is in computational mechanics and optimization applied to design of lightweight and durable composite aircraft structures. He has extensive experience in developing programs for student professional development and broadening participation (co-PI and PI on three NSF S-STEM grants).

Ashley Schwartz, San Diego State University

Dustin Thoman, San Diego State University

Dr. Dustin Thoman is a Professor in the Department of Psychology and the Center for Research in Mathematics and Science Education at San Diego State University. He also serves as California Research Director for Motivate Lab. His scholarship is grounded in social psychology, diversity science, and a social contextual framework of motivation. He studies how motivation can be supported or disrupted by the social and cultural contexts in which interests are sparked, developed, and ultimately become (or not) lifelong pursuits. He and his team utilize insights from motivation science to identify and remove institutional and social-contextual barriers that impede the development of educational and career interests for students from marginalized and historically underrepresented backgrounds. Improving equity and inclusion is at the heart of his team's research and translational work to support research on equity and inclusion in STEM education.

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Abstract

Students pursuing interdisciplinary STEM research and degrees may feel unique or isolated within their degree programs because they miss out on a coherent academic community and identity that most scientists and engineers take for granted. A U.S. Public University's interdisciplinary graduate engineering program has successfully addressed some of these challenges with a two semester sequence of one credit courses focused on professional development topics. This course's goals continued to receive support for another academic year through a follow-up near-peer led group comprising students who had previously completed the course. These students designed and implemented continued professional growth activities among the PhD and Masters seeking group members for one academic year. This study explores the potential benefits of this student-led group. At the end of one academic year, a focus group was held for leaders of the post-course cohort, and a second for the remaining members. Transcripts were coded using the college student thriving frameworks of Coe-Nesbitt et al. and Schreiner, and emergent themes were noted. Most, though not all, members articulated descriptions of thriving that were consistent with several aspects of the two thriving frameworks. We explored two research questions. First, how do interdisciplinary graduate students in a near-peer led professional development group describe thriving in graduate school? We also explored how the near-peer led professional development group experience factors into the students' self-descriptions of thriving or not thriving within their graduate program. We found that both near-peer leaders and other members demonstrated group agency in seeking support from within and beyond the group. We provide suggestions to transfer these to other graduate programs.

Introduction

For the past two decades, there has been increased recognition of the importance of focused efforts needed for the professional development of graduate students [1]. Professional development is an essential component of graduate education in STEM fields, as it equips students with the skills, perspectives, and experiences needed to succeed in an increasingly complex and competitive workforce [2]. While graduate programs excel at developing technical expertise and research proficiency, many students receive limited formal training in the professional competencies required beyond the laboratory or classroom. Addressing this gap is critical to preparing graduates for diverse career pathways in academia, industry, government, and entrepreneurship [3]. The support and mentorship for career development that is provided to graduate students by their research mentors varies widely and is often inconsistent or incomplete at best, and completely lacking at worst [3].

Recognizing this need, graduate programs—and more specifically graduate programs in STEM disciplines—have developed and implemented activities or avenues for the professional development of graduate students. The types and models for implementing graduate student professional development vary significantly and range from informal and optional activities to well-structured courses for teaching professional development, to broad general modules designed for training all graduate students across disciplines versus training discipline-focused cohorts [4]. Graduate student professional development training and/or courses are housed and offered by different entities: those that serve the entire campus or university level (e.g., Offices of Graduate Studies or the Graduate Dean), those that serve groups of students with connected disciplines (e.g., Offices of the Dean of a College or Directors of a School), and those that serve

a specific cohort of students within a narrow discipline (offered by departments) [1]. When faced with resource limitations at universities, these professional development activities tend to be skewed toward offerings at the campus level. All models have their pros and cons. Another avenue for professional development within small or discipline-specific cohorts is through training programs (e.g., National Science Foundation (NSF) Research Traineeships or NSF S-STEM programs). Optimally, students can access a well-scaffolded set of professional training activities—from broad university-level to discipline-specific offerings—that complement each other and optimize resources.

Evolution of the near-peer led professional development group

Our previous work has reported on the design of a year-long, one-credit professional development course [5] for students in an interdisciplinary Computational Science graduate program at San Diego State University (SDSU) [6]. The program was designed to onboard and acclimatize students into the interdisciplinary program, and assist them in developing an interdisciplinary identity [7]. Additionally, the program included activities to help students become aware of the various aspects of professional development needed for their future careers and encourage the pursuit of professional development activities to support academic, professional, and personal growth. To encourage students to continue pursuing avenues and opportunities for continuing their professional development during graduate studies, each was required during the course to create and update an individual development plan (IDP) that incorporated academic, professional, and personal development goals [8]. The professional development course was a requirement for students participating in a two-year scholarship program but was made available to all students.

One of the lessons we learned from evaluating the course is that, to be effective, activities within the professional development course must be continued by students beyond the first year. We found that for students to adopt individual development planning as a habit, there must be multiple reinforcing opportunities to participate in such activities, with early small successes to motivate students [8]. We contend that professional development for graduate students will be most effective when spread throughout the degree program and is designed to give students increasing autonomy and agency over their professional development.

However, for various reasons, it is currently nearly impossible to develop multi-year professional development courses. Even within a two-year scholarship program, sustaining a second-year course was not feasible. The scholarship program directors (grant principle investigators (PIs)) tried different approaches to encouraging students to pursue professional development activities on their own in the second year. One approach was to ask students at the beginning of the academic year (in the fall semester) to update their individual development plan and outline the near-term professional development activities they would pursue that semester. They were then asked to report on the professional development activities they pursued and to comment on their growth in professional skills. Students received feedback and guidance from mentors. Not surprisingly, even when students developed reasonable and achievable plans, not all were successful in accomplishing them. As the semester progressed and pressures from coursework, research, and teaching assignments increased, the focus on professional development waned, and many students did not pursue their planned activities. However, a small subgroup of students was successful.

Informally interviewing the students who were successful revealed that these students had research mentors who periodically asked them about their IDPs and engaged them in discussions about their plans. The role of research mentors engaging in student professional development emerged as the single most important factor. To help facilitate and initiate this, during the first year—when enrolled in the professional development course—students were asked to share or discuss their IDPs with their mentors. We discovered that there were a few students who were not yet comfortable approaching their mentors. Other students were told by their mentors that IDPs were not important at that time and that students should instead focus on making progress in research. In such cases, students were given the opportunity to work with a peer mentor—often a student one or two years ahead in the program who had demonstrated agency in developing their own IDP.

In addition to asking each student to report what they had accomplished in the fall semester, they were also asked to reflect on and assess whether their proposed professional development activities had been reasonable given their time availability, and to use their fall experiences to update their IDP for the spring semester. Despite these efforts, by the end of the spring semester only about half of students demonstrated the ability to independently seek out and pursue professional development activities. Although this outcome was disappointing, we learned something valuable: peer mentors reported increased engagement in updating and using their own IDPs and in participating in professional development activities.

This finding led to a second change in the scholarship program. In addition to the approaches described above, we invited second-year students to participate in a discussion session in which they could share with students enrolled in the professional development course the challenges they faced when creating their IDPs and the strategies (“hacks”) they devised to overcome these challenges. This activity, in addition to contributing to peer cohort development, was very effective in motivating second-year students to make more concerted efforts to update their own IDPs and pursue professional development activities. In a follow-up conversation with these second-year students, they mentioned that they enjoyed meeting the new students but were even more pleased to reconnect with their peer cohort from the previous year’s professional development course. Several students expressed interest in having more opportunities to meet with their peer cohort. This feedback led to the creation of a peer-led professional development group.

The following year, the scholarship program identified four students who had completed the two years of the program and had demonstrated strong engagement in professional development activities. The grant PI and co-author three met with them and discussed the possibility of creating peer-led professional development activities, with these students serving as coordinators. Second-year students were informed of the creation of the near peer-led professional development group. The PI obtained permission from the funding agency to extend the scholarship for these near-peer leaders for a third year as an incentive.

The group was given wide latitude in choosing the content and schedule of activities (Appendix A). The only requirement was that they meet weekly and request help as needed. The group was also asked to keep records of the activities pursued and participation rates. The PI facilitated

access to a room for weekly meetings. Students chose to meet on Fridays during the lunch hour. Students on campus met in person and were joined online (via Zoom) by others. The PI joined the group on three occasions for 15–30 minutes each: once at the start of the semester, once at the midpoint, and once at the final meeting of the semester. These meetings were intended to check in with students, assess how they were doing, and identify any requests or concerns. This group was also invited at the start of the semester to meet the current first-year cohort enrolled in the professional development course. This practice continued in the spring semester. At the end of both the fall and spring semesters, group leaders and members met with the grant program evaluator for focus group sessions.

Theoretical frameworks

Based on our prior work, we expected that this continued professional development opportunity and the student-led design would maintain or increase each student's sense of agency. The COMP 600 Professional Development course had already been modified using student feedback to increase students' sense of agency [7], [9], [10]. Students had also been shown to respond to these improvements with an increased intention of continuing to use their IDPs [8]. The instructor now sought to support students post-course with a structure to continue their professional development and to move beyond persistence in graduate school towards a state of thriving.

Thriving graduate students experience a state of well-being that goes beyond surviving or persisting in graduate school [11]. One student thriving framework, the Thriving Quotient [12], focuses on five attributes. Two attributes are components of academic thriving. Of these, engaged learning involves an effort beyond the minimum effort needed to obtain a grade whereby the student is focused on understanding the concepts, making connections to their current knowledge or experiences, and seeking opportunities to learn. Additionally, an academically thriving student demonstrates academic determination through personal goals, priority setting and balancing of time and effort to achieve those goals. Intrapersonal thriving is a third attribute focused on a long-term positive attitude to struggles. The fourth and fifth attributes are focused on interpersonal thriving. The diverse citizenship attribute is focused on a curiosity about and desire to learn from persons with backgrounds or life experiences that are different from that of the student. Finally, the social connections attribute addresses the network of support built with peers, colleagues and friends within the academic program. Petridis [13] explored the Thriving Quotient framework with graduate students and found that support from persons both within and external to the degree program was key to graduate student thriving.

Coe-Nesbitt et al. [14] also studied thriving in the graduate student experience and identified six attributes of a thriving student:

1. achieving: making progress towards or reaching academic research and career-related goals;
2. engaging: engaging with their coursework, research, campus and community activities through participation in events;
3. connecting: actively making connections with others in their academic network and a building a supportive community of friends, peers, and faculty;
4. balancing: continually and iteratively seeking improved school-life-work balance including mental health and financial well-being;

5. enjoying: managing stress well and finding pleasure in their graduate school experience; and
6. being: believing that each student brings their life experiences, resources, skills, life-goals, and intrinsic personality traits to their graduate program and deploys them to seek positive outcomes.

Because thriving is part of a positive psychology, or assets-based framework [15], many interventions to enhance graduate student thriving are similarly grounded. We intended that the additional year of professional development activities would strengthen students' existing skills in goal setting, planning, and adjusting their IDPs. Additionally, we hoped that participation in student-led activities organized in a student-designed schedule, and working closely with near-peers would bolster all group members' and leaders' agency and allow them to thrive during their graduate program.

Research questions

How do interdisciplinary graduate students in a near-peer led professional development group describe thriving in graduate school?

How does the near-peer led professional development group experience factor into the students' self-descriptions of thriving or not thriving within their graduate program?

Methods

To explore our research questions, we worked under the IRB approved protocols in SDSU IRB HS-2019-0247. Co-author one conducted two online, 45 minute focus groups in late spring 2025; one for the group's four near-peer leaders, and the second for the remaining six group members, with one member absent. Both focus groups were asked a series of open ended questions (Appendix B).

All participants were asked the question analyzed by Coe-Nesbitt et al. [14]: “How would you describe a student who is thriving in your program?” Based on Petridis' [13] study of thriving among graduate students, we focused on the interpersonal aspect of social connections, and several questions probed for the participant's description of the support provided by the people in their life. Additional questions focused on the function of the group from the perspective of the focus group participants and each participants' plans for future professional development.

The online meeting software's auto-transcription feature was used to generate raw transcripts which were then edited by the focus group leader and de-identified. This co-author then deductively coded each transcript in two rounds, seeking evidence of each of two thriving frameworks [12], [14]. After removing these codes from view, the same co-author later completed several iterative rounds of inductive coding to note additional emergent themes. The de-identified and coded quotes and theme descriptions were then shared with all co-authors. After feedback and clarifications about context, such as the mechanics of the group's formation and functioning were made, the coding was updated.

Research findings

Thriving descriptions

We asked students to describe the characteristics of a hypothetical student who is thriving in the Computational Science graduate program. In these descriptions, group leaders addressed all six aspects of thriving identified by Coe Nesbitt et al. [14] (Table 1). In the second focus group (members), students' descriptions included only three aspects (Achieving, Engaging and Balancing). Students included attributes that would be observable such as publications *"getting a lot of papers out,"* presence at events, and course attendance *"showing up, and not just for your classes, but for the entire experience."* Other statements include states of mind of a thriving student, someone who *"is interested in what they're doing,"* or internal processes like maintaining balance e.g., *"someone who's able to balance a lot of different aspects of life in terms of research and coursework, and even the social, mental, and health aspects of everything."*

Table 1. Responses consistent with an aspect of thriving as defined by Coe Nesbitt et al. [14].

<u>Thriving Aspects</u>	definition: leaders	definition: members	experiences: leaders
Achieving	X	X	
Engaging	X	X	X
Connecting	X		X
Balancing	X	X	X
Enjoying	X		
Being	X		X

One group leader also reflected upon their personal experiences to describe thriving, and touched on four of the aspects (Engaging, Connecting, Balancing, and Being). For instance, in a description that addressed Being, the student shared that when thriving, working on their personal goals were a key factor, as well as the importance of attending to their own needs: *"I am achieving the goals that I've created for myself, whatever those may be, and showing up for myself every day."*

Aspects of the Thriving Quotient framework [12] were found within both the prompted descriptions of thriving and self-descriptions provided across the entirety of each focus group. Both leaders and members described aspects of thriving from this framework when describing their current status (Table 2). We identified both aspects of academic thriving in student responses. The descriptions of engaged learning from both focus groups focused on traditional coursework: *"people that really thrive ... balance the coursework and the ability to still reach your research goals,"* and *"showing up, and not just for your classes."* Personal experiences demonstrating engaged learning more often described how the students engaged with the near-peer led group:

it didn't feel as much of a lecture style ... we were all just sitting at this round table and just talking, and it was all of my friends, so maybe it felt a more open space where we could be a little bit more honest about how we were feeling about different topics. And we weren't just there to listen to a lecture. It was like we all went into it knowing that we

have to contribute to make it valuable.

Table 2. Sample responses consistent with aspects of the Thriving Quotient framework [12].

<u>Thriving Quotient Aspects</u>	definition: leaders	definition: members	experiences: leaders	experiences: members
Engaged Learning (academic)	X	X	X	X
Academic Determinism (academic)	X	X	X	
Social Connectedness (interpersonal)	X	X	X	X
Positive Perspective (intrapersonal)				
Diverse Citizenship (interpersonal)				

We identified the academic determinism aspect of academic thriving in both focus groups. One of the leaders described a thriving student in terms of managing effort and time to achieve balance in many aspects of life: *"someone who's able to balance a lot of different aspects of life in terms of research and coursework, and even the social, mental, and health aspects of everything."* This example of the academic determinism aspect of thriving is also consistent with the graduate engineering thriving model of Zerbe et al. [11], which highlights skillsets, termed 'hidden competencies', that thriving students develop concurrent to their academic and research skills. Among these skills are managing ones' own mental and social health.

When asked about the support students felt from various groups that factor into Petridis' [13] graduate student thriving framework, experiences were varied. Some felt supported by family and friends, while others described a sense of isolation or disconnection. One group member shared that they felt unable to dedicate an adequate amount of effort to maintaining these relationships:

We've been talking about balance a lot where Okay I have to give more time and energy to these things about grad school. Whether that's the logistics like [colleague] was talking about, or research or maintaining friendships like, I'm giving a lot more energy to that where I realize, oh, I've had to take away from some of my outside relationships.

Members also described struggles from a lack of proximity to friends, e.g. *"I moved here, too, though, so none of my friends from home are even here."* Another difficulty was lack of understanding of the time and effort that graduate school and research requires, for instance:

I don't think my family ... they even know what I'm doing. Like I've I've gone to visit, and I'll have stuff to do, and I mean I think they're proud of me, but I think they have no idea what is going on.

There was a difference in the support experienced between graduate program peers versus the group. Members of the near-peer led group were consistently described as a good source of support:

I can relate to some of my Computational Science friends a little bit more than people that even though they're doing the same, or like similar work than me. I feel like I can relate to us more than my own major friends.

Feelings of support from graduate program peers varied, with one leader feeling supported:

I have more of a traditional lab setting where I have more active members in a physical lab that I go to. So I do get that support there as well. ... But I definitely felt supported by my lab members and adjacent folks in research.

Phases within the graduate program may have shifted the level and sources of support perceived by students in prior semesters. While the near-peer leaders had already spent a full semester or longer in the the research phase of their degree programs, the other group members had just entered a phase where coursework was completed and the shift to research work had begun. Some members felt more support from the group than they have experienced from peers in their disciplinary research lab:

My Computational Science cohort here, I've seen them more this semester than I have any of my friends in my own major, because after classes ended, it's just kind of like, all right, everybody goes their separate ways. Everybody's working on their own research. ...

Everybody kind of diverged and I guess some parts of me are kind of disappointed in that.

One leader linked this disconnect to a lack of physical proximity: "all our work is on the computer. So I don't see a lot of actual research lab members a lot."

Experiences of support from faculty also varied from advisors who were very available and supportive, such as for this group member:

I think I've been pretty lucky with my faculty, my advisor. He's here almost like every day, always drops into the lab. So I get to check in with him a lot. And then I know a lot of professors who are like in the [discipline] side. Most of them are very open and supportive, so I've been feeling pretty good about my faculty.

Other statements asserted that support is available when students seek it out, as described by one of the group leaders:

And in the Computational Science program every professor is usually very supportive as well. It's kind of like a thing where it's just you look, go out and look for. It's always there. So that's what I've found.

Overall, descriptions of thriving from both near-peer leaders and other group members were consistent with the two frameworks, but lacking two aspects of the Thriving Quotient: Positive Perspective and Diverse Citizenship.

Am I thriving?

While leaders and group members provided descriptions of thriving that were consistent with several aspects of the two thriving frameworks, when asked if they were currently thriving, only a few answered affirmatively. One leader described their focus on achieving personal goals as well as engagement with the group when they are thriving:

Not necessarily that I'm producing like a lot of research products or publications or going to conferences necessarily, but that I am like achieving the goals that I've created for

myself, whatever those may be, and like showing up for myself every day and showing up for the group as a whole.

The same leader also shared that they *"have thrived in the program when I as [colleague] mentioned, had balance, was involved in the community and was focused on being like a productive version of myself."* Another near-peer leader described the need to seek out the support from a variety of people that enabled them to thrive: *"I feel supported, but I think I had to seek out that support initially and not just half hide in the background, just going to classes and stuff."*

When a direct question about thriving was posed to the other group members, only one identified as thriving. Their response focused on how the people in the group allowed them to thrive. The shared experiences of the group members, the friendships that formed, and the time spent together were all important to this student:

I'm a very social person, and I thrive being able to be around people ... makes me think that maybe I am thriving during grad school because I have this support system, ... the research happens. The courses happen. But at the end of the day, I think, having a group of people that are your friends, and they're also going through the same thing as you. It makes a huge difference in the overall experience.

That only a few participants described themselves as currently thriving is unsurprising as many of the other group members were in a phase of the graduate program where the familiarity of courses had recently been replaced with full time research efforts. Descriptions of the absence of thriving included a mention of 'survival mode'. Moving beyond surviving or persisting in a degree program toward a state of thriving may involve developing a sense of agency and the opportunity to reflect on making progress towards personally meaningful goals [12]. One student mentioned feeling overwhelmed or scattered:

I feel like I've been on survival mode for such a long time and like, especially right now, like, I just feel like my brain is all over the place. And I think that's just how it is for this time of period. But like I don't know when I like, I feel like if I in a few years look back at this whole experience, I would say that, like I got the most out of it that I could have, even though during it I was feeling like things were super overwhelming.

Another student described their feelings in the midst of transitioning from coursework to research,

The term thriving in grad school seems like an oxymoron to me. I feel like I've just been in survival mode for the most part, all throughout college, except once you get your grades, it's like, Okay, well, like, surviving was worth it. But now that research is not contingent upon grades, it's like, Okay, I don't understand what thriving actually means as a grad student.

A third mentioned burnout and that reprioritization was helping them move closer to thriving after a rough period of time where they had lost motivation:

I felt like this whole semester or majority of it. I was very much in surviving mode but around like a week or so ago I reached a burnout stage. and then, after I got to that point, I sort of took time. I took a little reset and I tried to sort of reprioritize what it is that I really want out of what I'm doing long term like, kind of just find the motivation again. And I think, after taking that time. I've started to feel like I'm getting back towards thriving

but you know I'm also getting into the worst of it. So I don't know how it's gonna go. I think I just kind of go back and forth a lot between surviving mode and that.

While this group member clearly does not identify as thriving, they have demonstrated skills and a perspective that are consistent with several models of thriving. They have taken time to reflect and evaluate their goals and priorities in relation to their long term goals, which is a key aspect of managing mental health in the Zerbe et al. [11] model of thriving. They are also demonstrating persistence and had continued to participate with the group, which is consistent with connecting and engaging in the Coe-Nesbitt et al. [14] framework, and the Social-Connectedness aspect of the Thriving Quotient [12].

Several other members did not describe themselves as presently thriving, yet they were able to identify their struggles, a need to take some action, and the availability of support within this near-peer led group as well as elsewhere within their networks. For instance the above group member discussed the importance of resetting by actively pausing to adjust their priorities and looking towards their long-term goals as a way to approach thriving. Another described the necessity of actively seeking connection and support:

I had to seek out that support initially and not just half hide in the background, just going to classes and stuff. I had to really insert myself into the program, and actually try to be involved. And once I did that, I think I got a lot more support from academic mentors and peers and things like that.

This student finds benefits to actively building their peer network, which is key to several models of student thriving [11], [12], [14]. It does appear that these students have discovered activities and choices that encourage a state of thriving, and they are actively practicing many of them.

Emergent themes

We defined an emergent theme in statements describing the participants' design of and participation in the group activities in the second semester, which we name *group agency*. Group agency refers to the participants working together to set goals for the group, iteratively updating those goals, and taking actions to achieve these goals. This theme is consistent with Bandura's definition of 'collective agency': "they pool their knowledge, skills and resources, and act in concert to shape their future" [9]. The group was student-led and the group agency expanded from near-peer leaders to encompass the entire group in the second semester: "*we opted to really focus or turn it back, turn the table back to everyone in the group, and really work together to come up with ideas for, for what to discuss and what to work on,*" and also "*I think the biggest thing was turning the table and asking people what they wanted to actually enact.*" Other evidence of group agency also involves the participants adding group goal setting and planning to their discussions:

In the early semester, we really focused on goal setting and I'm thinking about plans for the semester, not only for the course, but for individual plans for everyone's research and career development strategies. And then in the middle, we kind of talked a little bit, about career development, I guess. And then towards the end, as people were getting stressed. We began talking about how to avoid burnout and kind of things that are kind of towards the end of stressful times, and then again, goal wrap up.

A second emergent theme was *commitment to a professional development group*. Several participants described wanting or needing a group/community in the future, "*I think community is really important to success, especially when things are challenging.*" One of the leaders

expressed commitment to building a similar group in their career: *"I think I will definitely try to, just from the gun, get an involved, get involved in many things, and just be more open with people and try to engage in conversations."* Another group member considered this a key life lesson:

Think it's a lesson in your twenties that you learn: I cannot do this all by myself. I need to make friends outside of the things that I do. So. Yes, I definitely will be seeking out groups of this nature.

Several of the leaders and group members have made a commitment to working with a supportive group of peers in order to collaboratively pursue professional development growth in the future.

Implications for practice

While designing a series of workshops or a course for professional development, instructors will likely draw upon their own experiences, or those of their peers and colleagues, to determine the topics and schedule of activities. However, no single mentor can provide for all of the students' needs. Multiple mentor or support network models suggest that near-peers provide unique and valuable sources of support [16-18] Including the perspectives and feedback of recent or current students in the degree program should increase the likelihood that the content and the timing of its delivery will be salient for a large proportion of the participants. Even better to build in regular student feedback and the flexibility to respond to the students' needs during the semester. This study shows the next potential step to help students adopt the professional development practices in a more independent fashion.

Formation of a group including near-peer mentors helped participants with motivation and accountability to make time for professional development and to accomplish the tasks that would otherwise be dropped to the bottom of the task list, deprioritized, actively avoided, or simply forgotten among the crush of obligations in graduate school. A student led group that meets outside of the curricular structure without direct faculty involvement will allow for more frank discussions of struggles and development of individual and collective agency. The support of the program can be made tangible through faculty encouragement of the time allotted, space to meet, and willingness to provide advice on request.

Engineers and computer scientists often work with teams that may be international and multi- or inter-disciplinary. To encourage strong team formation and development of collective agency skills, we recommend that faculty and program staff support a peer-led bridge experience to help students develop the skills and build the group cohesion necessary to become a self-led group. Collective agency was encouraged by the instructor. In our example, students were encouraged by a faculty mentor to meet weekly, more seasoned members were asked to serve as near-peer leaders to work with participants to determine what topics were addressed. These near-peer leaders were also encouraged to call upon their former instructor as needed for advice and the potential support to arrange and fund guest speakers. While collective agency was not explicitly discussed, the practice and demonstration of related collaboration skills added to the professional development experience for all group members.

Limitations and future directions

Our qualitative study of a small group is designed for deep description of these students' experiences, not to provide outcomes or intervention design that can be directly extrapolated to a larger population. We provide the students' schedule of activities in Appendix A for context, not as a recommended template for other groups or course design. However, some aspects of this near-peer led student group will likely translate well to other graduate student programs. Those programs with a professional development course, or a workshop or seminar series on this topic, could encourage similar student-led groups to form and continue their learning and skill building.

Assessment of interventions designed to increase collective agency within a group pose challenges [9, 19]. However, a collective agency scale has been developed in the field of applied social psychology that may be useful in graduate program settings. Delea et al. [20] presented survey questions and scales that could be used to collect each group member's assessment of the group's efficacy, and each member's sense of collective agency. In the future, such a survey instrument could be used to probe for the presence of collective agency within such student-led groups. Coupled with qualitative interview or focus group data, researchers and program evaluators could hone in on aspects of group formation and support that enhance or hinder collective agency development or group goal achievement within the local academic program environment.

Conclusion

Our data suggest that encouraging students to continue discussing and learning about professional development activities in a group can be successful in moving students towards thriving. In this case the students were coming from a shared experience in a year-long course sequence that had involved student feedback in their design of course activities, which students mirrored in their own group formation. Some students nearing the end of their degree program did self describe as thriving, while others transitioning from course-work to research efforts did not. Many students' descriptions of their experience in the group and in graduate school during these two semesters demonstrated collective agency, and articulations of thriving that could be incorporated into their personal goals. As the group did opt to review and refresh IDPs during each semester, these students have likely been influenced by these discussions to pursue individual action plans to achieve personal and professional goals that are consistent with thriving in graduate school. The students are also, by their own description, likely to seek out similar groups of peers and near-peers to support and discuss their professional development as they continue in their careers. Supporting the formation of student-led discussion groups focused on professional development could have positive ramifications for thriving in graduate school and for early career alumni.

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Appendix A

Schedule and Meeting Topics

2024-2025	week #	Date	Topic
Fall	1	Oct 4, 2024	Introductions and Goal Reflection
Fall	2	Oct 11, 2024	Creating Long Term Writing Plans
Fall	3	Oct 18, 2024	Resume/CV Writing
Fall	4	Oct 25, 2024	Preparing Skills
Fall	5	Nov 1, 2024	Tips for Attending a Conference
Fall	6	Nov 15, 2024	Networking
Fall	7	Nov 22, 2024	LinkedIn Lab: Mastering Personal Branding
Spring	1	Jan 31, 2025	Individual Development Plans and Goal Reflection
Spring	2	Feb 7, 2025	Time Management and Productivity Systems
Spring	3	Feb 14, 2025	Resume/CV Implementation
Spring	4	Feb 21, 2025	LinkedIn Implementation, Part I
Spring	5	Feb 28, 2025	Student Symposium / Communication Workshop
Spring	6	Mar 7, 2025	LinkedIn Implementation, Part II
Spring	7	Mar 14, 2025	Pi Day Elevator Pitches / Blitz Talks
Spring	8	Mar 21, 2025	Program Symposium Day
Spring	9	Mar 28, 2025	Mid-Semester Check-Up
Spring	10	Apr 11, 2025	Avoiding Burnout
Spring	11	Apr 18, 2025	Managing Faculty Feedback
Spring	12	Apr 25, 2025	Goal Reflection Worksheet
Spring	13	May 2, 2025	Discussion With COMP 600 students

Appendix B.

Script for 2nd year group near-peer leaders

Before we begin with the questions, can we do quick introductions?

How did the group make decisions? How did you work through disagreements?

(Thriving components)

How are you feeling about the degree program at this point in your progress?

Do you feel supported and encouraged by your: ? list off key groups (family, friends, peers in the university(ies), faculty, other folks)

How many of you would describe yourself as a "computational scientist" (count) why?

How many did not say yes (count) why?

“How would you describe a student who is thriving in your program?” [from Coe-Nesbitt et al. 2021]

How would you use the peer group to pursue professional development in the future?

Do you imagine forming or having a group like this after you graduate and as you progress in your career, or not?

Any recommendations for future cohorts or cohort leaders?

Did you all have any funding to run the cohort, such as for snacks?

Wrapping up, thank you very much for sharing your feedback with the group. I'll stop the recording now.

Script for 2nd year group members

What activities did you organize and undertake this year/semester?

Were there any topics or activities that were different from those in the COMP 600 course?

Were there activities that didn't work as expected?

(Thriving components)

How are you feeling about the degree program at this point in your progress?

Do you feel supported and encouraged by your: ? list off key groups (family, friends, peers in the university(ies), faculty, other folks)

How many of you would describe yourself as a "computational scientist" (count) why?

How many did not say yes (count) why?

How would you describe a student who is thriving in your program?

Do you all feel like you're thriving?

How would you use the peer group to pursue professional development in the future?

Do you imagine forming or having a group like this after you graduate and as you progress in your career, or not?

Any recommendations for future cohorts?

Wrapping up, thank you very much for sharing your feedback with the group. I'll stop the recording now.