



Feedback Mechanisms for Peer Leader Development

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Abstract

At Washington University in St. Louis, Missouri, the training required of all Peer Leaders includes enrollment in academic mentoring courses. Several fundamental feedback mechanisms are provided for PLTL Leaders to share their ideas and experiences with each other, including interactive Sharing Best Practices discussion posts, peer-to-peer observations, and reflection assignments. These mechanisms allow Peer Leaders of every experience level the opportunity to connect with each other, share facilitation experiences, and provide other Peer Leaders with firsthand insights into successful practices. This paper presents the ways in which these methodologies, among others, are instrumental in creating a closer community of PLTL Leaders and a stronger program for the participating students.

Keywords: PLTL Community, Feedback Mechanisms, Observation, Reflection, Discussion Posts, Peer Leader Training

Introduction

At its core, Peer–Led Team Learning (PLTL) provides support for undergraduate students enrolled in introductory STEM courses. In addition to benefiting the students, PLTL can create an environment where Peer Leaders can develop their academic, interpersonal, and leadership skill sets. To maximize the effectiveness and productivity of Peer Leaders (and the PLTL program as a whole), Peer Leader training needs to be effective (Gosser & Roth, 1998). While focusing on the course content during Peer Leader training is important, the interpersonal aspects are not trivial, rather they are critical skills for Peer Leaders to hone for an effective PLTL program. Generally, undergraduate Peer Leaders can significantly benefit from playing a mentorship role for their peers. Marshall et al. (2021) describe that leaders strengthen knowledge related to the course content and interpersonal skills. In a broad sense, our PLTL program must benefit both the students enrolled in the introductory courses as well as the Peer Leaders.

PLTL plays an important role in the two–semester General Chemistry course sequence (Chem 111A, Chem 112A) at Washington University (“WashU”) in St. Louis, Missouri. Peer Leaders for the course sequence typically serve for the first time in their second year of their undergraduate degree and continue for an additional two years until graduation. For most leaders, this results in six semesters of leading PLTL sessions. Approximately 40 Peer Leaders host PLTL groups weekly concurrently with the course. For each semester that leaders host PLTL sessions, they also enroll in a required course called Practical Applications of Academic Mentoring (PAAM) that meets once a week. During this course, the leaders collaborate in small groups to review the relevant material and discuss ways to facilitate the problem set with their groups. From a community perspective, PAAM creates a recurring space for all leaders to connect. In addition to PAAM, first-time leaders must additionally enroll in a course entitled Seminar in Academic Mentoring (SAM), a more theory–based training. There, the new leaders learn about the mechanics of leading sessions and the PLTL philosophy in more detail (Frey, et al, 2012).

Mentoring programs across different institutions use a variety of strategies to implement Peer Leader feedback mechanisms, which can be adapted to enhance the PLTL experience. For example, some programs use periodic interviews to evaluate mentor performance at different stages of the mentoring process (Tinoco-Giraldo, et al., 2020). These interviews provide a platform for mentors and mentees to discuss progress on predefined objectives and reevaluate approaches as necessary. Additionally, self-evaluation surveys are often employed to assess the quality of interactions between mentors and mentees, allowing both parties to reflect on their performance and the mentoring relationship's effectiveness. Other programs implement a goal achievement scale, enabling participants to track and provide feedback on skill development throughout the program. To ensure a

structured and systematic evaluation, some programs adopt a four-phase approach: evaluation planning, evidence collection, data synthesis, and reporting. Online surveys, particularly those utilizing Likert-like scales, are another popular method, offering immediate insights into participants' perceptions of mentoring sessions.

Studies such as those by Jacobi (1991) highlight the importance of designing feedback mechanisms that prioritize continuous improvement, engage both mentors and mentees, employ diverse evaluation methods, and remain adaptable to program-specific needs. Jacobi also emphasizes the critical need for rigorous evaluation standards, particularly in programs lacking standardized mentoring approaches. This point aligns with findings from the Open University, UK, which demonstrated the effectiveness of integrating both quantitative (e.g., questionnaires) and qualitative (e.g., focus groups) methods in assessing peer mentoring programs (Robson and Hutton, 2023). Adapting these evidence-based practices could enhance PLTL leader feedback mechanisms, fostering a more dynamic and impactful mentoring experience.

To support the development of the Peer Leaders throughout their entire PLTL career, various Peer Leader feedback mechanisms have been put in place through PAAM at WashU. The following assignments are required for completion of PAAM every semester, Sharing Best Practices (SBPs) discussion posts, peer-to-peer observations (PPOs), and formal reflections. Each of these mechanisms functions differently, utilizing different perspectives and groups of Peer Leaders, but they all attempt to promote the development of Peer Leaders. Described in this paper are how these three feedback mechanisms are structured as assignments in PAAM and showcase growth. Peer leader training is a pillar of the PLTL pedagogical philosophy and is practiced in different ways. The continuous course assignments and practices of the PLTL program in General Chemistry at WashU may be useful for other members of the PLTL community. The hope is that the analyses presented here can serve as a tool for enhancing Peer Leader development. Peer leader names were anonymized for analysis and discussion in the data presented below.

Feedback Mechanisms

Sharing Best Practices (SBPs)

SBPs are electronic, written Peer Leader interactions facilitated by the Discussions feature on Canvas, the learning management system used for PAAM. At the beginning of the semester, each leader is assigned two weeks: one to create a SBP post and another to reply to one. When creating a post, leaders are tasked with reflecting on their sessions and either describing an aspect they would like feedback on or sharing a firsthand experience. This could be a big or small issue they have been running into with their group, or a practice they incorporated into their sessions that worked well. When responding to a post, leaders reply

to an existing post created by a fellow leader that week. Here, responding leaders offer advice or share their experiences to support the Peer Leader who created the post. The discussion board is visible to all Peer Leaders throughout the semester, so students can maintain engagement with the posts.

These discussion boards provide a platform for Peer Leaders to ask questions or share advice and an opportunity for Peer Leaders to improve their facilitation strategies and sessions based on the feedback and experiences of their peers. By receiving direct, curated responses, Peer Leaders can target areas of difficulty in their PLTL groups and explore solutions they might not have encountered otherwise. Even those who are not directly involved in the discussion can also implement suitable strategies in their sessions that are discussed in SPB threads.

To show the benefits of this focused “peer-to-peer group” assignment, a selection of actual discussion posts and responses written by Peer Leaders are presented in tables below with the first column containing a discussion post and the second column containing responses to that post.

Table 1: Peer Leader A’s Discussion Post and Responses from Peer Leader B and Peer Leader C

Discussion Post	Responses
<p>Peer Leader A: <i>I noticed right away that two students in my group were close friends. They immediately sat next to each other and started to chat before the session started. When it came time for the icebreaker (I had everyone pair up with someone they did not know and spend 1 minute trying to find the most niche thing they had in common), they even tried to pair up! Although I separated them to the best of my ability, I think they were still texting/chatting every so often from across the room (and giggling a bit) while other students were sharing work. So, I was wondering if anyone had any tips on having friends in your group and how to keep them on task?</i></p>	<p>Peer Leader B: <i>One thing that really helped was to make assigned seats for the first few weeks to encourage everyone to get to know each other. After everyone got to know each other, they were not as separated from the group and would not just chat between themselves (...) by the end of the semester my whole group was super close.</i></p> <p>Peer Leader C: <i>I assigned pairs/small groups for different problems and made sure they were in different groups (...) after they started getting to know other members of the group, there was less of a noticeable difference between the two students that were friends and the rest of the group.</i></p>

Table 2: Peer Leader D’s Discussion Post and Responses from Peer Leader E and Peer Leader F

Discussion Post	Responses
<p>Peer Leader D: <i>One of my biggest concerns is that with the larger groups [of] people, students will feel less comfortable asking questions and raising concerns. Just in this first section session, there was already a moment when I took a second to ask if there were any questions or if there were any aspects that were confusing to my students[,] and while I notice[d] some confused faces[,] no one said anything, so I just want to make sure in the future that they feel comfortable voicing up when they need some clarifications. Can any of you speak on ways to create an environment more conducive to discussion or strategies for working in a larger group, in general?</i></p>	<p>Peer Leader E: <i>Some things that I would maybe consider [are] implementing more small group/partner work than before. As they're working, you can move around from group to group and ask them if they have any questions or points of confusion. Rotating groups and partners each time (...) can help all the students get to know each other in closer settings so that they can slowly get used to speaking up in the larger group setting.</i></p> <p>Peer Leader F: <i>It can also be helpful to target the confusion with probing questions. This can be difficult sometimes because you're essentially trying to read your students['] minds to figure out where they are confused, but if you can take some extra time to pre-plan more probing questions for common stumbling points, this can help guide your students to the right path. Or at the very least they can generate enough discussion that it is less intimidating for your students to ask their questions.</i></p>

Table 3: Peer Leader G’s Discussion Post and Response from Peer Leader H

Discussion Post	Responses
<p>Peer Leader G: <i>I wanted to share a facilitation strategy that I've started using to help my students collaborate more when they are in small groups. Last semester I had several students who were very quiet and often tried to work separately from their partner in small groups, only checking their final answer. To combat this[,] I have started having my small</i></p>	<p>Peer Leader H: <i>THANK YOU so much for sharing this strategy! Although my group this semester is overall very cooperative, and most students are more than willing to discuss and collaborate with their peers, I still got one student who is more interested in working on their own than interacting with others. Since that student always finished first, I tried to prompt some social</i></p>

Discussion Post	Responses
<p><i>groups get up from their desks and work together on sections of the boards while they solve the problem. I have noticed that this keeps everyone in the group much more engaged and promotes discussion within the group because everyone can see their group[']s work. Additionally, if a group gets stuck[,] it is way easier for them to ask other groups for help because they can see the other group's strategy very clearly.</i></p>	<p><i>interactions by suggesting people to discuss their problem solving strategies or check answers with their partners when they finished working (but before the large[-]group discussion). I guess to some extent this works, but not completely solving the issue at its root cause. The strategy you suggested is actually brilliant!! I will definitely use it when I encounter similar situations in the future.</i></p>

Table 4: Peer Leader I’s Discussion Post and Response from Peer Leader J

Discussion Post	Responses
<p>Peer Leader I: <i>My students are very comfortable with each other, but this familiarity has had negative consequences as folks have been sharing in the group their scores on quizzes and exams and asking others their scores as well. It started after the first quiz[,] and I cut the conversation short and (...) talked about how success isn't defined numerically. I wish I had pushed this harder, because yesterday, without prompting, one student shared his exam I score, which led to other students reacting to it (...) I am observing that my students are still stuck in a comparative mindset. My students really get along well, but I fear that they are crossing boundaries that make me and other group members uncomfortable.</i></p>	<p>Peer Leader J: <i>Some kids often talk about how ‘free’ their exams are and it was easier than expected. One thing I've done to stop this is cut the conversation short, and then I turn on lecture-mode (...) the real point I drive home (...) is that success is not measured by scores but rather their approach. All that matters in this class is that you are learning through experience and changing your approach to things that haven't worked and improving approaches that have worked. It is so easy to think that an A means you are succeeding, but real success is when you are able to analyze your shortcomings, figure out what went wrong, and put the effort in to change it and not get bogged down by a low score. After I gave this speech to them, they have not seemed to mention scores and changed the conversation directly to ‘what have you been doing to study?’</i></p>

Peer Leader A, **Peer Leader D**, and **Peer Leader I** all wrote discussion posts about a particular issue they were facing with their PLTL sessions. **Peer Leader A** posted about the challenge of having students in their group who are already good friends and asked for advice on how to best facilitate this unique dynamic. **Peer Leader D** voiced concern about navigating the dynamics of having a larger group especially after noticing the discomfort some students felt speaking up in a larger setting. Lastly, **Peer Leader I** discussed how their students shared their test scores during PLTL. They then asked for advice on asserting boundaries, changing this comparative mindset, and redefining the concept of success.

All three of these Peer Leaders received suggested solutions for their respective challenges from other Peer Leaders. To solve **Peer Leader A**'s group bonding problem, **Peer Leader B** suggested creating assigned seats, and **Peer Leader C** suggested separating the students into different working groups. To help **Peer Leader D** adapt to a larger PLTL group, **Peer Leader E** suggested implementing more small group or partner work than before, and **Peer Leader F** suggested targeting points of unspoken confusion with probing questions to guide students on the right path. Finally, to address **Peer Leader I**'s challenge with their group's attitude towards tests, **Peer Leader J** provided a personal anecdote about how they cut their group's discussion short when a similar issue occurred and had a conversation with their students about growth mindset and how real success is adaptation and effort-based. Evidently, the SPB platform serves as a resource for Peer Leaders to gain from their colleagues' solutions to specific challenges they are facing.

Rather than request advice on a challenge, **Peer Leader G** shared advice, namely a facilitation strategy to increase collaboration. This sharing of advice helped fellow **Peer Leader H**, who enthusiastically voiced experiencing the same problems with social interaction and said that they were excited to implement this new strategy at their next meeting. Having a space for Peer Leaders to offer advice clearly allows other Peer Leaders to gain valuable insights into successful techniques and apply them to their own sessions.

These examples demonstrate that engaging in SBP and embracing the offered solutions can greatly improve Peer Leader skill sets and aid in building stronger group dynamics. This conclusion is clear from multiple Peer Leaders voicing their excitement about implementing peer feedback in their future sessions. This exercise also speaks to the importance of creating constructive spaces that can be engaged by Peer Leaders. Peer Leaders are able to gain unique, curated insights from individuals who have had similar group experiences or challenges during their own facilitation whenever an issue, idea, or question arises. This is demonstrated when **Peer Leaders B** and **C** are able to sympathize with **Peer Leader A**'s unique group dynamic issue, when **Peer Leader D** was able to obtain different solutions to their issue from **Peer Leaders E** and **F**, when **Peer Leader G** shared a strategy that resonated with **Peer Leader H**, and when **Peer Leader J** expanded upon **Peer Leader I**'s solution to a relatively common problem faced by PLTL

leaders. This is knowledge that would be nearly impossible to gain from instructor or student feedback alone. Encouraging Peer Leaders to actively engage with each other in this manner has clearly cultivated a community that promotes the exchange of ideas and advice, allowing them to consequently adapt to and improve their own PLTL sessions.

Peer-to-peer Observations (PPOs)

Peer observations have been shown to beneficially impact leader development. Specifically, Bell and Mladenovic (2008) describe the benefits for both the Peer Leader being observed (receiving direct feedback) as well as the Peer Leader doing the observing (seeing leading strategies put in practice). At WashU, PPOs are structured so each Peer Leader observes another Peer Leader each semester. The observer does not participate in the session other than being introduced at the beginning, so as to minimally disrupt the session. Throughout the session, the observing leader focuses on the practicing leader's interactions with the students, student-to-student interactions, and adherence to the PLTL philosophy. This observation is documented by the observer through an online form which highlights strengths of and potential areas of improvement for the practicing leader. The observer is asked to expand on their commentary by providing specific anecdotes they witnessed. At the end of the form, there is a section for the observer to provide advice to the practicing leader and suggest potential changes they would like to incorporate into their own practices. After the observation, the leader who was observed gains access to the results of the observation form, which they can use as feedback for personal improvement. Meanwhile, the observing leader takes away insights on how to enhance their own sessions.

PPO assignments provide a direct mode of communication between two leaders. Some aspects of the observation are similar to the SBP assignment in terms of offering advice and getting feedback from other Peer Leaders. PPOs deviate in that they are specifically a communication between two leaders. The guided questions that are addressed in the observation form create a structured discussion that is normalized across semesters. The comments are from an outside-in perspective helping the practicing Peer Leader see potential blind spots in their facilitation.

As described previously, practicing semesterly observations is beneficial for both the Peer Leader running the session and the observer. The Peer Leader gets feedback from an observer's point of view and the observer gains insight on how sessions from other leaders are run. Since the Peer Leader being observed receives the observation form results, they hear specific feedback on the strengths and areas of improvement of their sessions. The feedback can also be used as a proxy for the practical evolution of a Peer Leader's facilitation tendencies. The leader's development likely occurs with increased experience, but also as a result of the various feedback mechanisms available.

Comparative Analysis

Using observation outcomes for tracking Peer Leader development is conducted by qualitatively comparing the observing leader's comments on the practicing leader's strengths and areas of improvement across more than one semester. One discrepancy in such evaluations is that the observers are not necessarily consistent among observations, resulting in potential bias and subjective comments. To mitigate this inconsistency, conclusions are not drawn from observation results in detail but rather the focus is on aggregate changes in facilitation habits.

To show the benefits of this external observation assignment, the results from six observation forms from three Peer Leaders are discussed in the table below. The early observation excerpts present an issue or point of improvement for the Peer Leader and the late observation excerpts demonstrate how it was addressed.

Table 5: Early and Late Observations of Peer Leader K, Peer Leader L, and Peer Leader M

Early Observation	Late Observation
<p>In the fall semester of 2018, it was suggested, for example, that Peer Leader K limit the extent to which she let her students get off track when solving a problem. The observer commented: <i>It is a positive that [Peer Leader K] took a hands-off approach and allowed [their] students to struggle a bit, I think that at a certain point it would have been good to intervene and regroup so that the students got somewhere.</i> When considering the effect this facilitation tendency might have when working on an entire problem set, Peer Leader K might run into timing issues quickly.</p>	<p>A year later in the fall semester of 2019, Peer Leader K's observer specifically commented that they <i>kept the group moving productively</i> while they also <i>allowed discussion to continue, even if it wasn't in the right direction, and let students catch each other's errors to (...) improve understanding.</i></p>
<p>Peer Leader L received a recommendation to engage quiet students more in content discussions during the fall 2018 semester. As previously mentioned, using data from the observations allows for some ambiguities; it is possible that the particular students in their session were abnormally quiet.</p>	<p>A year later during the fall 2019 semester, Peer Leader L's observer took notice of how well they included quieter students by adapting the learning strategies used throughout her session. The structure for feedback provided by the peer-to-peer observations would have allowed Peer Leader L to take note of the feedback they</p>

Early Observation	Late Observation
	received in 2018 as they developed as a peer leader throughout the following semesters.
<p>In the fall of 2018, Peer Leader M was generally recommended to attempt to improve student communication, assessed through the observer’s comment: [<i>Peer Leader M</i>] could have students write their work on the board when they finish and then have another student explain what is on the board.</p> <p>During the spring of 2019, one semester later, the observer commented that Peer Leader M engaged in ping-pong talk which encouraged dominant students to participate. As a consequence, quiet students are not given the space to contribute their ideas to discussion in these types of situations.</p>	<p>Seeing these pieces of feedback in their observation assessments, along with the other feedback mechanisms put in place, Peer Leader M had the opportunity to know where they could improve. The following year in fall 2019, Peer Leader M seemed to have adopted an innovative facilitation strategy that addressed both of these points. The observer commented on how Peer Leader M used hybrid [learning] strategies, like a hybrid of round robin and small groups. This was interesting (...) because it took out the stress of being wrong on a student, but still had everyone participating.</p>

Data obtained through the observation forms is highly qualitative and allows for hypothesizing direct and indirect connections between a leader’s facilitation strategies across semesters. Highlighted are three Peer Leaders’ experiences who all showed growth between their two observations. In the earlier observation, **Peer Leader K** received feedback around balancing the timing of their sessions better and managed to resolve the issue according to the more recent observation. Similarly, **Peer Leader L** integrated feedback from the earlier observation in terms of managing quiet students in their sessions. It is also possible to pull out more nuanced changes in Peer Leader facilitation as shown from **Peer Leader M**’s outcomes which revolved around generally improving student communication. Of course, it is not possible to completely attribute the general improvements of **Peer Leader K**, **Peer Leader L**, and **Peer Leader M** as Peer Leaders respond only to the observation feedback mechanism put in place. These data are assessments from fellow Peer Leaders which those being observed have access to, in addition to the other feedback mechanisms mentioned here. Concurrently, the observation data serve as ways that the evolution of the leaders can be viewed from a firsthand interaction by another Peer Leader from all the sources of feedback.

The PPO assignment creates a structured one-on-one space for Peer Leaders both to provide feedback and get insight on new ways to lead sessions. While the exchange of

ideas and advice is similar to the SBP mechanism, the observation style creates a third party perspective on the leader's facilitation methods, allowing blind spots to be uncovered. In other words, PPOs allow for observers to construct a perspective based on direct experience. This is distinct from SPBs, in which respondents base their advice on the inquirer's account of events, rather than their own.

Reflections

Reflection assignments are required for Peer Leaders once per semester and serve as a formal written self-review of their PLTL sessions. This assignment encourages the writer to reflect on the dynamics of their group and how they changed during the semester, what barriers might exist for the students in their group, and what they did to help students overcome struggles to ensure a productive semester while embracing the PLTL philosophy. These assignments are not graded on meeting specific criteria of content; it is an open-ended assignment in which the leader reflects on the semester. Reflection assignments can be a useful tool for Peer Leaders to identify their strengths and areas for improvement. They also serve as a record of each Peer Leader's PLTL experience, providing Peer Leaders with easy access to the diversity of skills they learned and anecdotes they experienced firsthand throughout their PLTL career. The reflection assignments are collected in Canvas for PAAM course credit and are visible only to the instructors. Peer Leaders are encouraged to retain a copy of their reflections for their records, as these may be useful when reflecting on their PLTL experience or preparing for professional interviews, for example.

The reflection assignment is similar to the SPB platform in the sense that Peer Leaders can choose which topics to address. However, unlike the SPB platform, which serves more as a forum of isolated subjects, the reflection assignment asks for a comprehensive review of the semester. Whereas the SPB platform and PPOs involve peer-to-peer interactions, the reflection assignment provides leaders an intentional space to confer with themselves. These unique angles of the reflection assignment allow for broad introspection and independent problem-solving.

To highlight how this comprehensive "peer-to-self" assignment benefits Peer Leaders in practice, early reflections written by a selection of three Peer Leaders are compared to their most recent reflections. The early reflection is from the Peer Leader's first semester in the role, and the most recent reflection is from their latest semester in the role. It is important to note that each of these reflections was written independent of one another, meaning Peer Leaders did not reference their early reflection when writing their most recent reflection. Rather, Peer Leaders simply discussed their PLTL experience from a particular semester.

Three Peer Leaders' reflections are presented in Tables 6, 7 and 8. The first column of the table contains an excerpt from the Peer Leader's early reflection, the second column contains key takeaways from the early reflection, the third column contains an excerpt

from the Peer Leader's more recent reflection, and the fourth column contains key takeaways from the more recent reflection.

Table 6: Early and Recent Reflections from Peer Leader N and Key Takeaways

Early Reflection Excerpt	Early Reflection Key Takeaways	Recent Reflection Excerpt	Recent Reflection Key Takeaways
<p><i>Currently, I think that I'm just not comfortable with the awkward silence, which is okay. In the future, I hope to learn to accept and mediate the silences (...) I am excited to see how the group dynamic plays out as we all get to know each other and get more comfortable working together (...) I plan on letting the students direct the conversation more – this means not speaking up when the silence is dragging, having students explain concepts to each other (currently, students are asking me questions and expecting direct answers), and encouraging each individual to participate.</i></p>	<p>Peer Leader N struggled with accepting and mediating silences.</p> <p>Peer Leader N established some goals for the future, namely letting students direct the conversation more, even when there are periods of silence, and having students participate and explain concepts throughout the session.</p>	<p><i>(...) To address this, I have intentionally created groups ahead of each session to try to balance the members in each group. I also ask group members to write their work on the board when they're finished to create more time for other groups to work through the problem. I also ask students to walk me through each step of their thinking (...) Although they are eager to get the answer (and are consequently disappointed when I cannot provide it), they have come to understand the reasoning behind why things are structured the way they are in this program.</i></p>	<p>Peer Leader N discussed spending time before the session to create balanced groups or asking students to walk them through each step of their thinking.</p> <p>Peer Leader N concluded the reflection with a statement about student growth, writing that their students came to embrace the PLTL philosophy and the way sessions are structured.</p>

Table 7: Early and Recent Reflections from Peer Leader O and Key Takeaways

Early Reflection Excerpt	Early Reflection Key Takeaways	Recent Reflection Excerpt	Recent Reflection Key Takeaways
<p><i>I think that I can do a better job paying attention to the individual different approaches that students may have when solving the problems in the PLTL packet; this is difficult to do sometimes when there is a time crunch, and it is a little challenging to quickly translate a student's words into what their approach is in my head, so I hope to improve at that.</i></p>	<p>Peer Leader O initially struggled to incorporate all the ideas of the group into their session. Time limitations and the challenge of rapidly processing student language made this especially difficult.</p>	<p><i>One strategy that I've been using a lot is really exploring and giving good consideration/evaluation to the alternative routes to problems that my students come up with and holding off on prompting the route used in [PAAM] until after they have finished doing the problem their way (...) [one] time, students took a longer (and more creative!) route to solve the first part of a problem, and I prompted them for the faster way after they were done. To my excitement, the longer route they took in part one of the problem actually unlocked an alternative way to solve the second part of the problem, which was neat!</i></p>	<p>Peer Leader O stated that they've frequently been exploring and giving good consideration to alternative methods proposed by their students.</p> <p>By letting their students take a longer route to a problem before prompting them for the faster route, Peer Leader O learned from their students a new way to solve a different problem.</p>

Table 8: Early and Recent Reflections from Peer Leader P and Key Takeaways

Early Reflection Excerpt	Early Reflection Key Takeaways	Recent Reflection Excerpt	Recent Reflection Key Takeaways
<p><i>I have to keep an eye out on the unspoken choices my group makes in how they do and don't like to work (...) I need to embrace the uniqueness of my group, but never force it into something it is not. It is dynamic, ever changing (...) I need to keep myself open eyed and open minded, never forgetting my resource of other PLTL leaders (...) keep them [students] focused on the enjoyable parts of life which are quick to be thrown away when the stress of midterms or the first final start to mount.</i></p>	<p>Peer Leader P commented on being mindful of their group dynamic, paying attention to the group's unspoken choices and never forcing the group "into something it is not."</p> <p>Peer Leader P mentioned keeping themselves open-minded and using other PLTL leaders as a resource.</p> <p>Peer Leader P acknowledged sources of stress that their students face.</p>	<p><i>I have really been struggling with the dynamics of my sessions in a way that I hadn't expected from this semester or myself at what I thought was a confident point in my journey as a PLTL Leader (...) I felt as if my students were disconnected from me, not quite fully buying in on icebreakers or collaboration (...) I've struggled with energy this semester (...) and I've had to remind myself that spring of freshman year is no joke, have I just gotten removed enough from freshman year that empathy is taking more of a conscious effort? (...) I don't feel my students embracing the philosophy or embracing my particular brand of it (...) that's not to say the semester hasn't been good, I just feel like [it's] missing something.</i></p>	<p>Peer Leader P said that their sessions were "missing something."</p> <p>Peer Leader P expressed that they felt challenged by student detachment, lack of energy, and lack of enthusiasm in their most recent PLTL group.</p> <p>Peer Leader P worried that their removal from freshman year had made them less naturally understanding of student stress.</p>

Peer Leader N and **Peer Leader O** exhibited a similar trend. Both discussed challenges they were having in their early reflections, and both discussed strategies in their most recent reflection that showed growth from those challenges. **Peer Leader N** was able to utilize new facilitation strategies, and **Peer Leader O** transformed an area of improvement, exploring alternative solutions, into a strength. The connections between the content in **Peer Leader N** and **Peer Leader O**'s early and recent reflections could indicate that the reflection assignment helped these Peer Leaders identify areas of improvement, either consciously or subconsciously, and that awareness then allowed these Peer Leaders to effectively target those areas of improvement. In other words, the reflection assignment facilitated intentional and introspective problem-solving.

A comparison of **Peer Leader P**'s early reflection to their most recent reflection presents a different situation in which content from the early reflection presents potential solutions to challenges faced in later sessions. The advice from **Peer Leader P**'s earlier self on group dynamics could potentially be applied to the challenges they faced with their most recent group, demonstrating the usefulness of consulting past reflections for present challenges. **Peer Leader P**'s case showcases how earlier reflections can be a reservoir of wisdom for experienced leaders to pull from.

Distinct from SPBs and PPOs, the reflection assignment gives Peer Leaders a voice to talk to themselves about their semester in PLTL, allowing for distinct benefits. The comparisons of early and recent Peer Leader reflections provide evidence that the reflection assignment helps Peer Leaders identify and thus improve areas of improvement. The comparison also shows how reflections can be useful resources for leaders to look back on as they advance further in their PLTL careers.

Conclusions

The PLTL program for General Chemistry I and II at WashU incorporates three key feedback mechanisms - Sharing Best Practices (SBPs) discussion posts, peer-to-peer observations (PPOs), and formal reflection assignments - that contribute to the professional and personal development of Peer Leaders. These mechanisms, grounded in real experiences and successes of students, provide leaders with tools to refine their facilitation strategies, overcome challenges, and support each other in creating an inclusive and effective learning environment. Integrated into the Peer Leader experience through PAAM assignments, each mechanism has different voices and perspectives providing feedback. For instance, SBPs create a platform where Peer Leaders can openly discuss isolated facilitation challenges and share successful strategies. This peer-to-peer group exchange of ideas helps leaders address specific issues, such as managing group dynamics or encouraging student participation, and implementing new approaches they might not have considered otherwise.

Similarly, PPOs provide a structured opportunity for leaders to observe and be observed one-on-one, offering valuable perspectives on their session dynamics. This

process encourages leaders to identify areas for improvement they may not otherwise be aware of, such as managing group discussions or engaging quieter students, and apply feedback in a way that enhances their effectiveness over time. Reflection assignments further support this growth by prompting leaders to critically and comprehensively evaluate their sessions, consider the dynamics of their groups, and assess their adherence to PLTL principles. Through these reflections, leaders can better understand their strengths and areas for improvement, guiding their development throughout their tenure in the program.

This paper serves as a survey of WashU's methodology regarding the Peer Leader feedback mechanisms implemented into the PAAM training course. The aim is to provide a detailed exposition of these feedback mechanisms and to demonstrate how these feedback mechanisms work well within WashU Chemistry's framework. This paper is also a foundation upon which future research questions can be built. For instance, longitudinal studies could be conducted to identify the impact of the training course experience on Peer Leaders' careers over time. Additionally, associations could be made between the content in the feedback mechanism assignments (e.g., the traits Peer Leaders exhibited while leading their sessions, which are recorded in observation assignments) and the demographics of those Peer Leaders. Also, feedback provided for a Peer Leader by another Peer Leader in observation assignments, feedback given to that Peer Leader by their students on end-of-semester surveys, and that same Peer Leader's own self-reflections can be compared and contrasted. As another example, the PLTL coordinating group at WashU investigates how to optimize the PAAM program by focusing on aspects of the program that need improvement, perhaps by collecting qualitative data regarding the extent to which Peer Leaders personally found these assignments helpful. In the same vein, future studies could develop a standard for collecting and analyzing quantitative data on Peer Leader and student performance to assess the efficacy of the feedback mechanisms.

On the topic of training program improvement, there are opportunities to build on the existing feedback mechanisms to support Peer Leader growth. One potential enhancement could be the introduction of a more structured reflection assignment while allowing SBPs to continue promoting open-ended dialogue. Making reflections more structured could provide a clearer framework for tracking the impact of specific changes. This approach would allow leaders to systematically evaluate the outcomes of their adjustments, ensuring that successful strategies are recognized and replicated across the program. Another possibility is the standardization of the observation process. By assigning the same observer to follow a Peer Leader over multiple semesters, the feedback could become more consistent and focused, offering a clearer picture of the leader's development over time. This consistency could help mitigate the variability that can arise from having different observers and provide more reliable data on how a leader's facilitation techniques evolve. Moreover, expanding the scope of SBPs to include more frequent and diverse types of interactions could further enrich the learning experience for

Peer Leaders. For example, incorporating case studies or scenario-based discussions into the SBP framework could help leaders think more critically about how to handle complex situations in their sessions. Additionally, creating opportunities for cross-disciplinary interactions among leaders from different courses could introduce new perspectives and innovative practices that can be adapted to their PLTL groups.

These feedback mechanisms not only empower individual Peer Leaders to develop but also to strengthen the entire PLTL community at WashU. By continuously abiding by and refining these systems, the program nurtures a culture of collaboration, where leaders support one another in achieving improvement in facilitation and leadership. This collective growth ultimately enriches the broader university community, as Peer Leaders bring these enhanced skills and insights to their roles, contributing to a more vibrant and supportive learning environment for students. Through these efforts, the PLTL program not only helps leaders improve in their roles but also builds a strong, interconnected community committed to mutual success.

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