

Providing Sustainable Scientific Writing Support for Graduate Engineering Students by Creating a Local Scientific Learning Community

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Notes

Note that the first two authors contributed equally to this manuscript. Also note that this study received ethics approval from the ethics board of our institution to gather data from our participants from voluntary, anonymous, online surveys.

Abstract

Objectives: Provide sustainable support to graduate students that are writing scientific texts, while breaking their sense of isolation

Graduate students share the results of their scientific research mainly by writing and publishing scientific papers. To acquire the writing skills necessary for this task, engineering graduate students tend to use the same proven tools they have used for acquiring their technical engineering skills, i.e. classical pedagogical resources such as guides, workshops, and classroom-style instruction, if using any tools at all. Many institutions and educators also turn to these classical methods, even if they do not have adequate resources to meet student demand; thus, students may have limited access to many of these learning tools. Furthermore, personalized feedback on student scientific writing in progress is limited in scope to a specific assigned task e.g. in a class. With no practical experience, many students also feel a sense of isolation in the undertaking of scientific writing. In this context, we aimed to create a sustainable means for providing support for scientific writing by leveraging our existing engineering community's experience and knowledge.

Methods: Create a local scientific learning community that supports each other through feedback and exchange

At our engineering school, we created a microcosm of the scientific community at large in order to give students practical experience and feedback in writing and evaluating scientific texts. Students, professors, and research staff of diverse backgrounds and experience exchanged, evaluated and discussed texts within the scope of various activities and services. With the guidance of the library and motivated students and professors, these activities included, among others, the following: a web platform mimicking the article submission process of a conference, with volunteer peer reviewers; regular writing-support group meetings of small groups of students exchanging and giving feedback on scientific texts in progress; writing blitz activities where students focused on their own writing but in a rallying group setting; regular contests on scientific writing and reviewing with specific writing goals in mind. The activities mostly emphasized practical results, where students achieved tangible goals in a group setting instead of working in isolation. The activities also afforded students the opportunity to exchange insights,

learned experiences, and ideas on how to best communicate research. The support for these activities came from the existing resource of students, professors, librarians, and research staff. Results: Students joined a sustainable learning community in which they reported feeling less isolated and having better support in scientific writing and publishing

The activities mentioned above were supported by the established local community. Students from diverse engineering fields made connections and reported that they appreciated the support of their peers within the local scientific community, but more importantly found that their communications skills improved. Students who started this active learning process as scientific writing “novices” were eventually able to mentor other students, and honed their critical reviewing skills as well.

Conclusion: Support for student writing can be achieved through community-based exchange, even with limited resources

Providing the tools for graduate students to collaborate, share and receive feedback, constructively discuss, actively learn, and experience first hand, a microcosm of scientific communication, succeeded in supporting student writing and critical thinking as well as breaking student isolation. A paucity of resources should not inhibit educators from launching a scientific writing assistance program, as they can guide the growth of a learning community that provides such assistance.

1 Introduction

In this paper we present various activities that engineering educators can use to provide assistance to graduate students in their scientific writing. As these activities rely on a learning community of peers, we have found that they can be sustainably deployed to reach a large number of graduate students without exhausting staff resources. The sustainable attributes of these activities grew naturally out of a response to student needs as well as the reality of how little dedicated staff time could be allocated to the program. We hope that by describing this program we can contribute to possible strategies that other engineering educators can use when wishing to assist a larger number of graduate students in scientific writing than their current resources allow.

In section 2, we outline why scientific writing is important for engineering graduate students and the types of challenges they face in their writing endeavours. Section 3 briefly discusses why many standard attempts to provide scientific writing support to graduate students can fall short of meeting their needs, introduces what we mean by providing “sustainable” support to students, and outlines the concept of leveraging the existing community of graduate students, faculty, and staff to provide support through a learning community. Section 4 gives the story of our writing program’s scientific learning community and the activities therein: an online peer review service, contests on scientific writing, structured writing blitz activities, and writing support groups that meet regularly. For each activity we start by giving some context from the literature on why the

activity can be useful for scientific writing support, and then describe our activity including a summary of possible benefits and challenges. We conclude in section 5 with some thoughts on how we see our program developing in the future, and also with a summary of our impressions on the usefulness of this learning community initiative to provide scientific writing support to engineering graduate students.

2 Engineering graduate students and scientific writing

2.1 The importance of scientific writing for engineering graduate students

Graduate students must share the results of their research, mainly by writing and publishing scientific papers, in order to disseminate their ideas and begin the path to a successful career, be it in academia or industry. Studies have shown that scientists publishing more prolifically, do so with higher quality work [1]. Good writing skills are important for graduate students who must communicate with and adapt to different audiences [2]. PhD students themselves recognize good communication skills as a top attribute contributing toward a successful PhD [3]. The expectations on graduate writing skills are quite high but in reality these skills might be subpar [4], [5]. For better or for worse, a publication record becomes the yardstick by which academic productivity is measured, and thus determines how research grants are allocated to faculty. This need for publications can be a huge incentive for faculty to support students acquiring better communication skills. Although supervisors acknowledge the need for their graduate students to acquire appropriate writing skills, they often do not have the time or resources to provide this support on their own [6]. The importance of acquiring skills related to scientific writing is mostly self evident to graduate students and their supervisors; however, many obstacles impede the easy acquisition of these skills by students.

2.2 Graduate students feel isolated in their writing tasks

The isolation of some graduate student gives rise to additional issues related to acquiring scientific communication skills. Mullen [2] states that there is a strong preconception in the graduate student environment that writing is a solitary endeavour and more so, that graduate students must already possess the appropriate skills to accomplish the task of academic writing. However, she further mentions various studies that actually show that graduate students find the process both stressful and difficult. The situation is worse for international students who experience and perceive high levels of isolation academically, but also socially [7].

2.3 Engineers are hard to attract to writing activities

Many universities have writing centres that even offer personalized services for help with students' writing; however, few address the particular needs of engineering students [5]. Our

personal communications with several writing centres in large universities with faculties in the arts, sciences, and engineering indicate that engineering students are often the ones that are the most difficult to attract to their writing support activities. Universities that do have centres that aim to respond to the specific issues arising from engineering-based communication find increased interactions between engineering students and these centres [5]. We have found that engineers are both more attracted to, and more engaged with, activities that actually allow them to accomplish something related to their own work during the activity. Colwell, Whittington, & Jenks [8] identified the roots of engineering graduate students' disdain for large writing tasks included a lack of previous writing experience at the undergraduate level, a bias in experience with technical writing rather than scientific communication, and inconsistencies in the feedback they received on their writing from different advisors. Many engineers enter graduate studies with an inadequate appreciation of both the publication process as well as the process of academic writing [9].

3 Sustainable writing support: Can we provide writing support by leveraging existing resources?

3.1 Why are traditional writing support models harder to sustain?

Traditionally, a graduate student's primary resource for writing support is the graduate student's supervisor. Some institutions also provide instructions in a classroom setting, but as mentioned earlier, many institutions will assume that students already possess the skills for scientific communication if they have made it to the graduate level. Graduate supervisors are often overloaded in tasks related to their duties and may not have the time, willingness, or ability to mentor a student in scientific writing even if they are accomplished writers themselves [2], [6], [9]. Particularly, English as a second language (ESL) science and engineering students report issues with their supervisors' guidance in writing, such as inadequate time available for guidance, as well as a propensity to "take over" the task and simply re-write student texts [10]. Graduate mentoring for writing is held in high regard among engineering faculty, but if the burden of individualized mentoring is assumed solely by a faculty member, the process can be laborious and the effect on faculty research productivity significant [9]. Alternately, the student to teacher ratio in a classroom setting might disadvantage a student's ability to get enough personalized feedback and training. Most universities will also offer writing support services as part of Student Services or through a dedicated Writing Centre, but again, depending on the size of the institution, these resources can be overtaxed and can rarely offer continued, personalized support and feedback to students, especially related to engineering-specific scientific communication, as reported earlier. Thus although many traditional means (both formal and informal) already exist to provide students with opportunities to learn scientific communication skills related to writing, the demands on these means by a large body of students might render their maintenance and accessibility limited.

3.2 What we mean by “sustainable support”

To begin, we should briefly outline what we mean by “sustainable support” in the context of our project. Our program aims to have *on-going* and *accessible* support for engineering graduate students in their scientific writing and communication endeavours, without having to dedicate significantly more time, staff, or other resources to the endeavour, as the number of students receiving support grows. The types of graduate student writing support we aim to make sustainable are as follows:

- Personalized Feedback
- Shared Expertise
- Motivation
- Experience Reviewing
- Breaking Isolation

To find a “renewable” *source* for this support, we decided to leverage our existing engineering community’s experience, knowledge, and motivation to get involved in group activities that aim to help each other in scientific writing. Thus to support graduate students in their writing, we tap into a pool of graduate students themselves, along with faculty and staff, making up a larger learning community of peers participating in group activities.

3.3 Student driven and educator guided - a more sustainable, learning community model

“Graduate students are novice researchers and writers who must be initiated into the culture of academic writing.” [2]. Cross defines a learning community as a “[group] of people engaged in intellectual interaction for the purpose of learning” and states that such a community is a pragmatic and effective means of educating students as these students get “involved in thinking, questioning, and actively seeking knowledge” [11]. But to launch such a community, there has to be some guidance and structure for students to participate, as well as some allure to students in knowing they will benefit from participating within the learning community. Students tend to trust the guidance of faculty when it comes to matters concerning scientific writing. Faculty members in turn can generally empathize with the trials and tribulations of writing that graduate students endure [2] and can also recognize that these students need more writing support resources at their disposal. With this in mind, an initiative by four faculty and two staff members at our institution has ultimately resulted in a learning community for writing support to graduate students. What follows is an historical description of the activities making up the sustainable, learning community model that came about naturally, in several stages; the activities were created in response to student needs and interactions, but managed with scarce traditional writing support staff or resources.

4 Our writing program

4.1 Our institutional profile

Our institution is a North American engineering school that offers undergraduate as well as graduate student programs in various engineering disciplines. French is the main language of instruction, and thus a large part of the student population are ESL students who nevertheless, often need to eventually publish their research in English venues. The institution is quickly growing, having doubled in student population in the last 10 years, reaching a total of 10,600 students in 2017. A significant part of this growth is related to incoming graduate students, with more than 2,600 students at the graduate level in 2017. Another significant aspect of this growth is the rise in international students, who are often ESL students, and also are not necessarily fluent in French; this dual language barrier can further cause them to feel isolated. This surge in graduate student registration comes at the same time as an increased interest of our institution for research validation on a local, national and international level. This push for research validation creates a great interest in scientific publication (often in English), as more students are arriving with needs related to scientific communication. Note that all our activities described below are offered in a bilingual environment of French and English, so students can communicate in whichever of these two languages they feel the most comfortable with.

4.2 Launching a writing support learning community

In 2013, four professors at our engineering school envisioned a community of graduate students helping each other with their communication skills. They began with the idea of supporting graduate students in the writing and publication of scientific articles, by creating a website [12] containing (amongst other things) a series of guides on scientific style, article writing and peer review. These guides were written with the aim of familiarizing engineering graduate students with the academic publication process (including peer review, rounds of revisions, etc.). But beyond the guides, they also wished to get more experienced graduate students from the school helping the less experienced ones with their scientific writing. So in the winter of 2014, using the freely available EasyChair [13] conference management system, they created a peer review service that allowed students to submit drafts of their scientific papers and get feedback on them from the more experienced students. They gained immediate visibility for their service within the school by holding an abstract writing contest which asked students to either submit a two page abstract on their research, or to review other students' abstracts, with cash prizes for the best abstract and best review. The contest served to attract attention to the online peer review platform, and recruit reviewers.

For the next year, the professors continued this peer review service by assigning submitted student papers to volunteer student reviewers on the platform. Eventually, one of the professors had to drop out, leaving three professors involved in the initiative. By the beginning of 2015, they thought the concept of a community of students helping each other had the potential to grow, but they lacked the time to promote the service and develop new activities that would interest and support students. They contacted the school's library which had the space and experience available for creating workshop sessions on diverse subjects, including publishing support. A librarian joined the project dedicating about 30% of his time to the community program. At the end of the year, they also hired a part-time Review and Writing Support person in order to bring in someone with experience with scientific writing in the engineering field to the team, besides the professors. This new configuration was aimed at finding activities that would support students in their scientific writing as well as get them interested in actively joining the learning community.

Until the spring of 2016, interactions among students were mainly online, through the peer review service. This changed in the summer of 2016 when the program launched workshops with topics on scientific writing, to interact with students in person and find out more about their writing support needs. As this was a pilot project trying to adapt the writing support to suit the needs of the graduate student community, the workshops from week to week would test out different formats based both on student feedback as well as on academic literature related to writing support. These workshops would often begin with presentations on different topics suggested by students, followed by test activities (e.g. different writing exercises related to scientific writing, group discussion on topics related to writing, dedicated writing time, students bringing texts to get feedback on their work, etc.). For all these activities, impressions on the activity were taken from students (both verbally and by the use of survey forms). A true learning community culture began to develop as these activities were evolving with the help of students, for the students. The key to any activity becoming successful was a balance of having enough structure to guide the students but also having flexibility to change the format based on student feedback. With time it became apparent that launching distinct activities addressing different student needs would work best. The perceived distinct needs requiring support as well as the present activities in place to address them will be described in the following section.

4.3 Activities to keep a writing support learning community engaged

There are four activities described below, a Peer Review Service, Writing and Reviewing Contests, Writing Blitzes, and Writing Support Groups; these make up the core activities that are regularly offered at our institution at large, as writing support in our learning community. We have also launched an initiative of establishing these activities (and others) within a single engineering laboratory setting; the particulars of this laboratory initiative are discussed in a separate paper at this conference [14]. With a librarian committing about 10 hours per week, the

Review and Writing Support person 14 hours per week, and otherwise the goodwill of the three professors as well as motivated students who have taken leadership roles in the learning community, we estimate that there have been over 800 students participants in different activities since launching the program with the numbers growing each year (over 500 participants in 2017-2018 alone). Table 1 presents a summary of the different student writing needs that have been identified as well as the learning community activities that aim to support them.

		Activities Giving Writing Support			
		Writing and Reviewing Contests	Writing Blitz	Online Peer Review	Writing Support Groups
Student Writing Support Need	Personalized Feedback			✓	✓
	Shared Expertise			✓	✓
	Experience Reviewing	✓		✓	✓
	Motivation	✓	✓		✓
	Breaking Isolation		✓		✓

Table 1: Types of writing support provided by activity

4.3.1 A web platform offering a peer review service

The benefits of peer-review systems in an academic learning environment are generally acknowledged (e.g. [15]–[17]). Just before our own online peer-review platform was launched, a similar system was launched in Sweden [18] as part of a wholly student initiative to test the potential of such a service for thesis-writing support. They concluded such a system could be scaled up (sustainably) and become a large scale crowd-sourced method for providing greater feedback for thesis writing to a large group of students, while also benefiting the volunteer reviewers who gain experience in the review process. While this study and others mention a wide variation in the quality of the reviews performed by volunteer reviewers, Kim et al. [19] conclude that a greater consistency in review quality may be achieved by providing structured template review forms to guide the volunteer reviewers, as well as feedback to reviewers on their

reviews. They also concluded that such a peer-review system can actually benefit from a *diversity* in the types of reviewers participating, e.g. their backgrounds, experience, etc.

4.3.1.1 Our peer review service

Our learning community offers an online peer review service for scientific papers. Presently, we are using the Open Journal System [20] open source software to manage the online service. This service allows students to submit a draft of their paper and receive useful comments from peers who have volunteered to become reviewers in the community. The goal of this service is not to proofread the text, but to give comments related to the reader's impression of clarity and narrative of the text as well as, when relevant, the quality of language. There are 35 students who volunteer as reviewers presently, and the service receives an average of 15 draft articles each year. Since many articles are reviewed by more than one reviewer, more than 100 reviews have been provided by the service. A goal for next year will be to give this service greater visibility to increase submissions, as there are sufficient reviewers to meet an increased demand.

Despite there being a variation in review quality, authors have consistently found the service beneficial, presumably because they appreciate any comment at all on their text before they submit it to a conference or journal. Feedback we have received on the service from authors (from informal comments and short surveys) show that 100% of the students that have used the service found the reviewer comments very relevant.

To facilitate reviewing and also to try to address variation in review quality, we have introduced a reviewer template that guides the reviewer in commenting on different aspects of the clarity of the text. We have also initiated giving feedback on the reviews themselves to the volunteer reviewer (by the Review and Writing Support person), again to address quality issues but also to motivate the volunteer reviewers by giving them feedback. A recent, small, voluntary survey of reviewers showed that they mostly found that reviewing helped them develop skills in both reviewing and writing, and that being a reviewer was manageable in time commitment, while all found it to be a gratifying activity (Figure 1). The peer review service affords students the opportunity to get personalized feedback on their writing, learn from the expertise of others, and see how a review is done as an author but also gain experience reviewing as a volunteer reviewer (while also receiving feedback on these reviews).

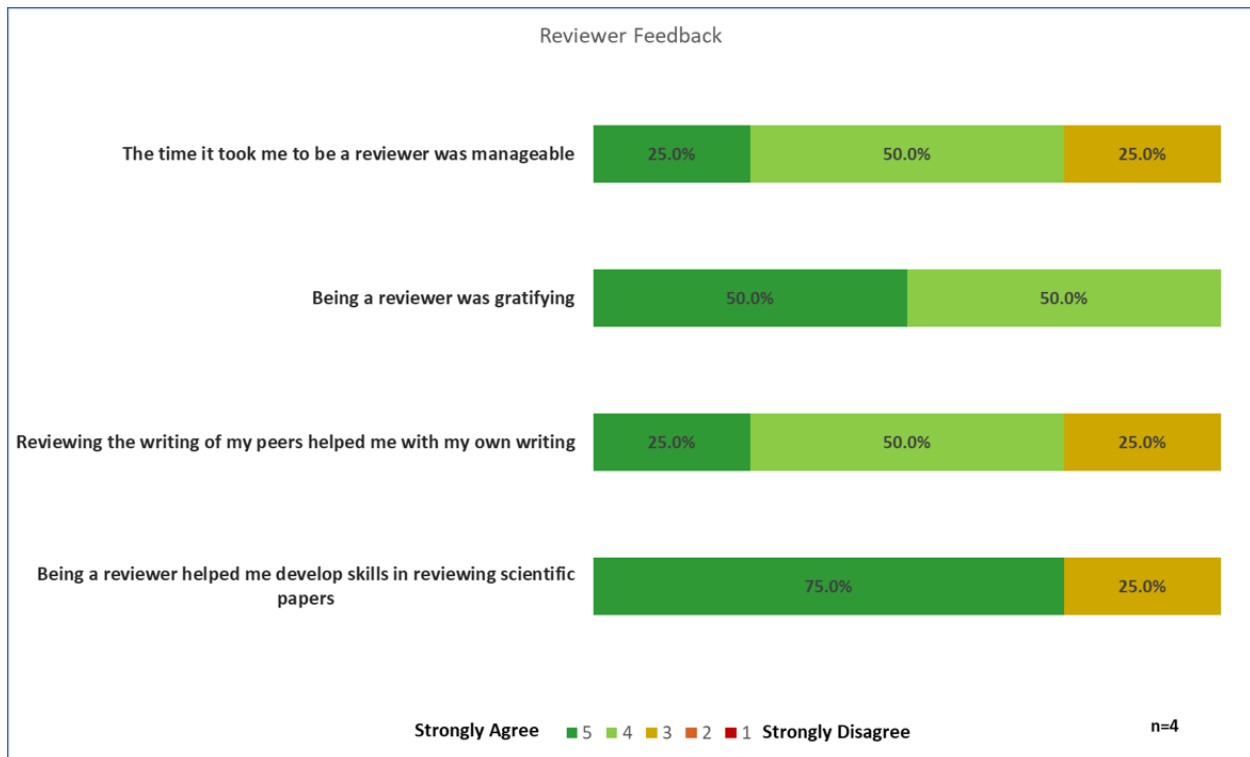


Figure 1: A recent small survey getting volunteer reviewer feedback from Peer Review Service

Some of the reviewers also met with a member of our team in October 2017 to see how we could further improve their experience doing peer reviews, which resulted in ideas on how to build on the learning community model, including having reviewers meet more regularly in person to exchange tips and expertise, and to allow more of an online forum between reviewers and authors in order to clarify points and get feedback from the authors on the reviews done by the reviewers.

4.3.2 Regular contests on scientific writing and reviewing

As mentioned earlier, the first Abstract Writing and Reviewing contest brought visibility to the writing support service. It allowed for the recruitment of 30 student reviewers that became the base of the community at the start, giving feedback to other students via the peer-review service. Since launching this program, we have held a total of four contests on different themes, and always with cash prizes as well as visibility for the winners in our institution. On average, each contest attracts more than 30 submissions. One recurring format is the abstract contest wherein students are asked to submit a 1000 word abstract about their research, and other students compete in their reviews of these abstracts. Another format we have used is to ask students to choose from a list of scientific publications written by professors at our institution, and summarize the content in 1000 words or less with the goal of making it accessible to the layperson. In all the contests, the submissions were evaluated by a jury of at least 10 professors

from the school. An advantage of having professors on the jury when holding such contests was getting professors involved in our scientific learning community. Another advantage was the ability to attract students to enter, as they know professors will read their work. In fact, in the most recent contest, we incorporated personalized feedback from the jury about the submissions, to be conveyed to the contestants. The contests serve to sensitize students to the importance of writing as a tool to synthesize thoughts about research, and they also serve to recruit new students into the fold of our learning community. Finally, contests allow us to gather a sizeable sample of students' writing from year to year and see whether we can notice patterns, such as recurring difficulties in expressing ideas. Anecdotally, the founding professors noticed a significant improvement in the quality of submissions for the most recent contest, compared to past editions. In summary, contests have allowed students to gain experience reviewing as well as motivating students to start writing about their research, even in the early stages.

4.3.3 Writing blitz activities

Craig [21], discussing graduate students in engineering and computer science, found that successful writers are the ones who avoid “back loading”; that is, they avoid leaving writing to the end of their research process. She states that the complementary group of unsuccessful writers may make progress on the research itself, but by not writing early, have delayed the effort to express their thoughts clearly, which may even lead to gaps or inconsistencies in the students' work when reviewed by a supervisor. Furthermore, she points out that writing about work that was done quite a while before makes keeping interest and attention on the writing task more difficult. Writing a major paper while synthesizing a scholarly argument proves easier for graduate students when done in multiple, smaller steps with feedback [2] and on a regular schedule with specific goals in mind [8], [22]. Graduate students may have the desire to start early on their writing projects and may even have the willingness to incorporate some discipline into their writing routine, but they often lack the tools, experience, or *perceived* availability of time to incorporate such structure into their writing practice.

4.3.3.1 Our writing blitz activity

Our Writing Blitz activity evolved from the workshops mentioned in Section 4.2 based on student comments. The activity began as more interactive sessions with proposed writing exercises and feedback, but developed to become an activity solely focused on writing. The interactive components were delegated to other activities, such as the Writing Support Groups. The activity was honed to provide students a motivating, group setting to write. Setting concrete goals for a session are essential. Writing sessions are then divided into multiple 25 minute blocks for students to write without distraction (e.g. cell phones) while crossing objectives off as completed. Between each block, there are breaks of varying duration. As they make progress on

their writing in these sessions, students often realize that they misconceived a lack of time for disciplined writing, and start developing good writing habits in a motivating, group setting.

Writing blitzes allowed us to establish connections with new students often helping us to develop other activities such as the writing support groups (see Section 4.3.4). This activity drew regular participants who reported finding it so effective in achieving their goals in a disciplined manner, that many adopted the routine on their own, a few even initiating satellite versions outside of our set schedule. The most common comment was a request to prolong the length of the activity.

A special day-long version of this activity was organized in collaboration with a local, student initiated, inter-university organization that regularly animates writing retreats to help graduate students write their theses [23]. This event gathered 40 graduate students together for 12 hours, and gave them the chance to experiment with different conditions aimed at facilitating writing. We took care of all logistics for a complete day (coffee, tea, lunch, dinner, snacks) so students could concentrate on their writing. To make the event a little more fun and appealing to engineers, we added an experimental component to the day of writing, where students could try different writing conditions and environments (e.g. standing desks, sitting on a swiss balls, writing after exercising outside, etc.) Students from other universities were allowed to participate and the 40 places were quickly filled. Another aspect we tested was to keep track of the number of words that the 40 students wrote after each writing block and graphed them as a group total, cumulatively as the day progressed. At the end of the activity, we held a group discussion to get feedback from participants. Comments were extremely positive, with students especially liking the fact that tracking the number of words written as a group was a great motivator without getting competitive. A student remarked that the group had written the equivalent of a very large thesis during the day. One of our participating students reported that she had achieved more progress on her thesis that one day, than she had in the previous months of working by herself.

In summary, we have held over 50 writing blitzes. This activity is the easiest to initiate, taking very few resources (a space to accommodate students and a means of keeping track of time). It is so easy to initiate that, as mentioned before, students have started organizing the activity on their own. The activity has easily succeeded in motivating students to write and has broken the isolation many students feel.

4.3.4 Writing Support Groups

Based on feedback from students who had participated in various other activities, we realized there was a huge demand for personalized feedback on student writing, on a regular basis, and with a short turnaround time. We realized the most sustainable way of providing such feedback was through regular meetings of peers reviewing each other's work. We were greatly inspired by the description of such peer groups by Rowena Murray [24] who herself based her advice on the work of Robert Brown from 1994-95. Caffarella and Barnett [25] have shown that peer

mentorship is one of the most important student reported factors for developing scientific writing skills as well as producing texts of better quality. Furthermore, peer mentorship has a strong effect in keeping students from abandoning engineering programs [26].

4.3.4.1 Our writing support activity

We are addressing this need for personalized feedback with our writing support groups. These small groups (usually five or six students) meet on a regular basis to discuss each other's writing under our team's guidance. They exchange and read excerpts of the texts they are working on in between meetings. Students use the feedback from a meeting to revise their work, write more, and bring the modified text to the next meeting. The meetings are held bi-monthly and are approximately two hours long.

Beyond the regular group meetings, we also organize support groups around specific scientific communication events at our school. For example, the graduate student society recently held a scientific congress on campus and we organized multiple support groups for the graduate students that were presenting their research work at the congress, in order to give each other feedback on their presentations. A survey (Figure 2) sent out to these participants showed that all the students who responded found that having the activity in a group setting was useful as was the feedback they received from their peers. A majority said the activity also helped them develop their presentation skills.

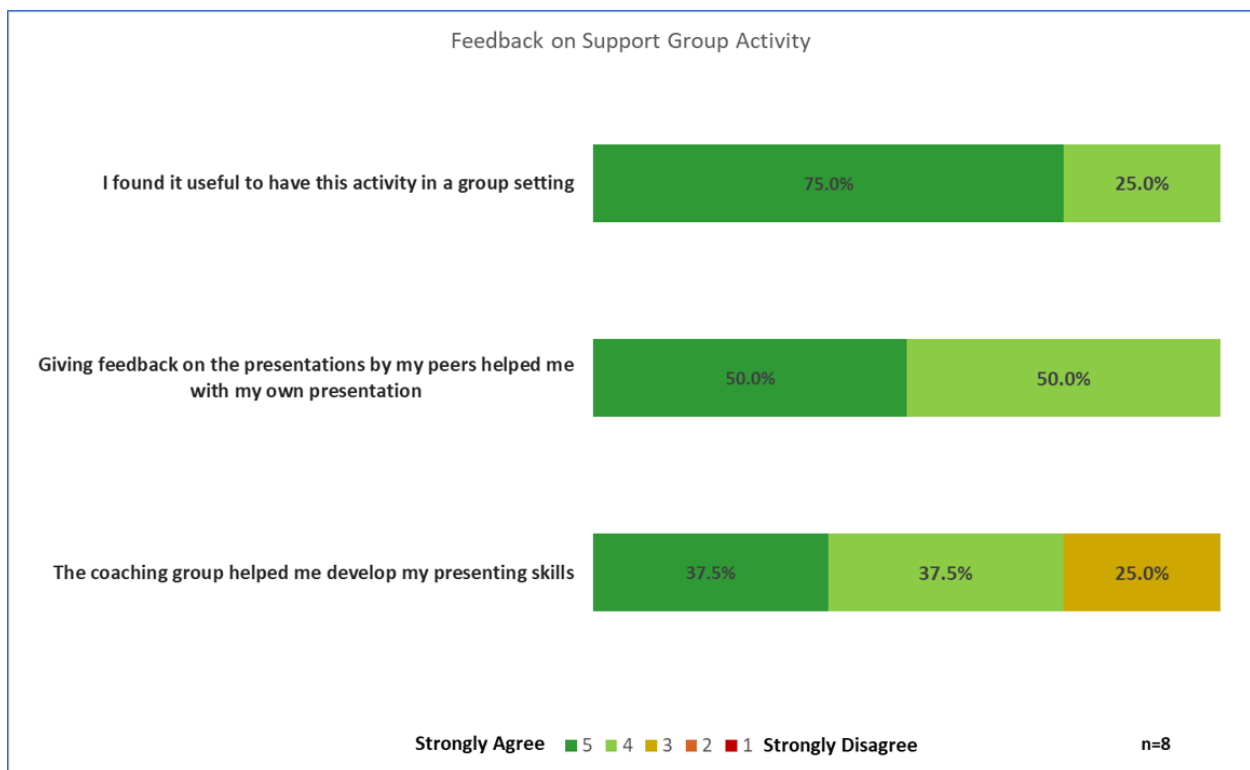


Figure 2: A recent small survey getting participant feedback on a Support Group activity

In general, this writing support group activity is the activity that has produced the most demand from students, spreading by word of mouth after we established our first groups with some students who had shown interest in the idea. Students have reported not only learning from feedback on their own writing, but also from listening to, and offering up feedback on the writing of their peers. Some students with little to no previous experience in scientific writing were able to offer advice to other students after having participated in the groups for a while. Members of the groups are often in different engineering fields, which actually helps in getting diverse perspectives on the writing as well as feedback on the clarity of the ideas presented. An unintended outcome from the groups was the formation of social bonds, with many international students gaining social support from the activity as well, which we have since found to be reported elsewhere [27]. Another outcome was students reporting that being in a group, they realized that like them, other students had the same perception of being alone in certain writing-related predicaments, such as an inexperience in scientific writing, or having a specific problem related to their research progress, or an issue with the relationship with their supervisor, etc.

The Writing Support Group activity is the one that seems to address all the writing support needs: personalized feedback, passing on of expertise, motivation to write, gaining experience reviewing the work of peers, and breaking the sense of isolation students feel. It is thus one of the most exciting and successful activities that we hold. However, it is also the activity that presently consumes the most resources. Organizing and coordinating groups, with students joining and leaving as their writing burdens change, often proves time consuming. Furthermore, students are (initially) attracted to the group activity knowing that an “expert” from our team will be there to give feedback, and are reluctant to hold meetings without a team member present. Furthermore, the format of the discussion is often dictated by the nature of the texts that students bring to be discussed; therefore at this point, one of our team members is preferred to run the activity to direct the discussion, as well as keep track of the time allocated to participants. Thus, although there is a strong sustainable component in the active learning nature of the group discussion as well as the development of a learning community, there are also many challenges to sustainability, as the activity presently consumes time and resources of a team member, and has not yet succeeded in spinning off to be run and organized by students alone. This type of sustainability in writing support groups seems to take time, as students need to gain confidence in emerging student mentors [28]. So we continue to tweak the activity to nudge it toward autonomous sustainability, as it seems to be the activity that holds the most potential.

4.4 A sustainable flow through writing support activities

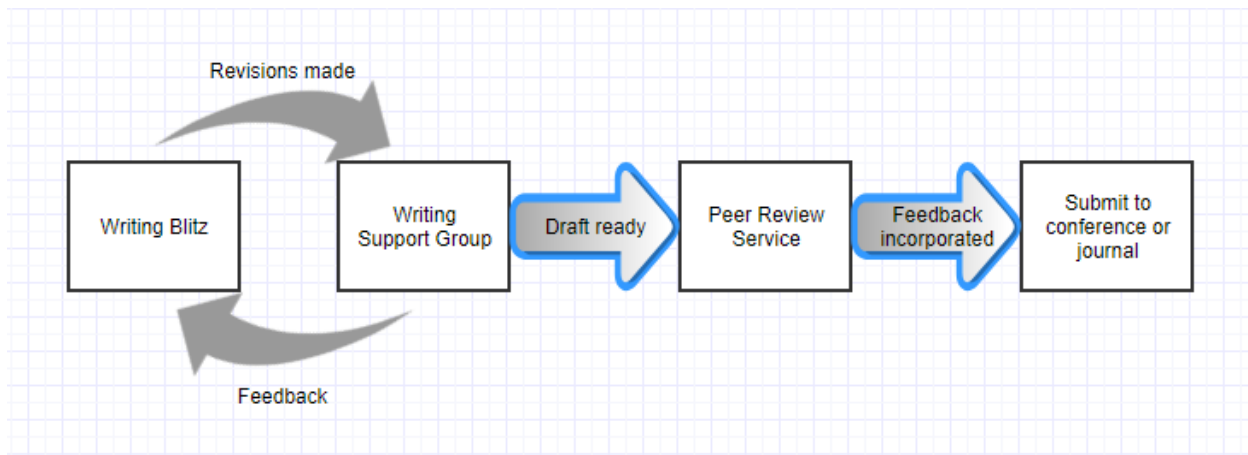


Figure 3: Writing workflow for some students

We have seen some students take advantage of the different writing support activities in the course of their scientific writing (Figure 3). They will use several cycles of going between Writing Blitzes and Writing Support Groups to make progress on sections of their article, get feedback, and make revisions. When they feel they have a suitable draft ready they will submit the whole article to the Peer Review Service for some final feedback before submitting to a conference or journal. The more these students participate in the system, the more comfortable they feel giving feedback during Writing Support Groups and becoming a volunteer reviewer for the Peer Review Service, thus replenishing the stock of mentors for novice writers.

5 Conclusion

5.1 Summary of our findings

In the course of exploring a writing support program that has grown and responded to the needs of graduate students in our engineering school, we have concluded that such support can be offered through an active learning community that exchanges support. We can offer writing support to graduate students, with little resources on our part, by initiating activities that offer personalized feedback, transfer expertise, offer peer-review experience, break down isolation, and motivate graduate students to write, all in a learning community setting. A scarcity of resources should not prevent an engineering school from providing scientific writing assistance to graduate students, as they can encourage the growth of a peer learning community.

5.2 Future work

As stated earlier, our learning community has been growing and continues to grow organically to meet the needs expressed by students. Therefore, we plan to continue to develop new ideas arising from student feedback and hope to recruit more and more students, faculty, and staff into the learning community.

In the near future, we intend to develop online toolkits for students to organize and animate activities on their own. For example, if a group of students would like to organize a Writing Blitz, we would like to make the necessary tools accessible in one place: e.g., the explanatory guidelines on running the activity, access to room reservations and schedules if needed, tools such as timers and forms to fill out objectives online, forms to count number of words written online, access to a network of students who might like to register, etc. A similar kit could be made available to run Writing Support Groups. We believe such toolkits would address an existing need in the graduate student community of our school, as students are not necessarily available when we hold our activities. We have heard from students who have expressed interest in organizing these activities on their own.

We have also been exploring the possibility of collaborating among several universities to expand the writing support learning community. This collaboration would be established with the support of other libraries or writing centres and would allow us to create a larger community of exchange in writing support. There is the possibility of creating inter-institution events related to writing, or even offering services across universities (e.g. a peer review service). We have already approached three local universities in the past year, all of whom were very interested and receptive to exploring such projects. An interesting angle that we have to offer beyond the sustainable writing program is our experience in getting engineers excited about scientific writing.

Finally, it was recently pointed out to us that this learning community model might be very suitable to help students with learning disabilities such as Dyslexia, a segment of the student population that traditional writing centers often struggle in helping. We find this observation very insightful and are excited by the possibility of pursuing this line of thinking in the future.

6 References

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