# Partnerships in practice: Student-Staff Synergy in the School of Chemistry at the University of Glasgow

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## Abstract

This case study reports on three student-staff partnerships which aimed to improve lab skills and interest in chemistry, develop self-efficacy and interpersonal skills, and build community in an undergraduate chemistry programme. Each partnership is described from conception, through implementation to evaluation, and the value of input from student partners, who had previously taken the courses, is discussed. In addition, student and staff partners reflect on their experiences. Despite the three projects spanning very different teaching activities, common themes on the benefits and challenges of such partnerships emerged. In particular, novel, unexpected and successful routes to engage with the voice of the student partners and main student cohort, combined with increased student satisfaction and engagement, validated the success of the partnerships and led to permanent changes in the curriculum.

## Introduction

The importance of including students as critics and creators of their own learning and teaching in Higher Education has been recognised for decades. However, in recent years there has been a surge in the popularity of connecting to the student body through student-staff partnerships. This is likely due to the growing body of literature extolling the benefits of such collaborations (e.g. Bovill, 2019). Whilst there are many related routes to involving students in reforming their own learning experiences, such as student representatives, interns and co-creators, the uniquely defining feature of the student-staff partnership is the equality of all partners, and the removal of a staff-student power imbalance (Cook-Sather et al., 2014).
A key principle underlying the Learning and Teaching Strategy at the University of Glasgow is the value of the student voice. Indeed, student input is recognised as being so important that, in 2018, University of Glasgow launched a Student-Staff Partnership Scheme (SSPS) to fund collaboration between students and staff in the areas of assessment and feedback, curriculum design, and decolonising the curriculum. The scheme continues to finance a number of student-staff collaborations annually.

The School of Chemistry (SoC) in the University of Glasgow has been awarded three SSPS grants since 2022/23, involving six students and three staff members. For each project, two students were each employed for 110 hours during one academic year. During this time, each project created, delivered and evaluated new learning activities in the curriculum. In this paper, we briefly describe the aims and outputs from each project, evaluate their impact on teaching, and reflect on the experiences of the students and staff in the partnerships.

We will show that, even though the projects are very diverse, there were many similarities in the experiences of the partners, which were mainly very positive. For all projects, the student partners are former learners in a previous year of the course they are looking to improve. We use the term "near-peer" to show that they are at a slightly more advanced stage to the current cohort taking that course. "Level" refers to the normal year of study in our Scottish undergraduate degrees, where a BSc (Hons) normally takes 4 years and an MSci 5 years. Science students at University of Glasgow take multiple elective subjects at level 1 and 2. These partnerships strived to improve aspects of the level 1 and 2 courses and experiences of student at these stages. Typically, 600 students study chemistry at level 1 and 150 in level 2. Although we will discuss the huge range of benefits experienced by the student partners below, we feel it is crucial to note here the value of funding such initiatives. Many such initiatives in other institutions are unpaid roles, which can lead to elitism, and bias the student voice being heard (Mercer-Mapstone and Bovill, 2020). As well as demonstrating to students how highly our institution recognises the student voice, monetary renumeration increases inclusivity by enabling students to take part who are financially unable to work for free, a factor which directly influenced the makeup of our partnership teams.

**Evaluation Methods**

Each of the three partnerships evaluated the effectiveness of the respective educational interventions on the curriculum by surveying the respective student cohorts with various paper-based questionnaires after the interventions. All questionnaires were anonymous, participation was voluntary, and all studies were approved by the Ethics Committee of the College of Science and Engineering at the University of Glasgow.

To evaluate the functioning of the partnerships and the experience of the partners, all members of the partnerships (i.e. the authors of this paper) contributed written or verbal (recorded and then transcribed) reflections. Partners were asked to include in their reflections any negative aspects of partnerships (which are seldom reported (Mercer-Mapstone et al., 2017)) and any impact of financial remuneration. Two authors independently conducted reflexive thematic analyses (Braun & Clarke, 2022, pp.34-37) on the collection of reflections using an inductive approach. This involved coding the partners' reflections and going through an iterative process of identifying and grouping the codes and classifying them into themes. Both coders then compared their analyses and conversed to produce an agreed set of themes. The proposed overarching themes, as reported in the Discussion section below, were discussed by all authors to ensure consensus and that no reflections had been misinterpreted.

## Examples of Practice

*Partnership 1: Near-peer mentoring to build community and develop self-efficacy in Level 2 undergraduate chemistry students*

Data collected from Level 2 undergraduate students just before the COVID-19 pandemic showed that they strongly relied on feedback from staff to indicate how well they were performing, and could not self-evaluate their work. In addition, students preferred chalk-and-talk–style learning and found activities where they had to work in groups or speak out to be particularly stressful (Docherty, 2021).

As students returned to campus post-pandemic, after long periods of online learning, addressing issues of low levels of self-efficacy and anxiety towards working with peers became ever more pertinent. Near-peer mentoring has previously been reported as an excellent way to increase academic performance and sense of belonging (Zaniewski and Reinholz, 2016), particularly in underrepresented groups (Trujillo et al., 2015).

To develop community and independent learning within the Level 2 cohort, in academic year 2022/23, lunchtime peer study sessions were introduced, facilitated by Level 3 student partners. Two-hour drop-in sessions were held once or twice a week. A topic of the day was chosen and students were provided with old exam questions on that topic. It is SoC policy not to release solutions to these, so the opportunity to compare answers and get validation from peers that they had taken the correct approach helped to build self-efficacy and evaluative judgement. When answers differed, group discussion and input from the student partner facilitators helped solve issues. Many academics who delivered the lecture courses also dropped in when their topic was studied to offer guidance.

Around 30 students, ~25% of the cohort, regularly attended the study sessions. We viewed this as a good attendance level since it was at a time immediately after the pandemic, when only around half of the class attended lectures in person, and many students preferred to watch lecture recordings at home. The students had a wide mix of abilities, ranging from those who would go on to attain top grades in the exams that year to those who failed and had to resit. Many who did not attend reported that this was due to having clashes with the study sessions and timetabled teaching, rather than consciously choosing not to take part.

The steps taken to create a relaxed and inclusive environment were an important aspect of the success of this initiative. Rooms were booked in the chemistry building to foster identity and community within the SoC, tables were moved into groups at the start of the session to encourage mixing, and students could eat lunch in the room and come and go as they pleased. They could work together on any content, although most stayed with our suggested topics.
In addition to the study sessions, the student and staff partners organised a tea and biscuits welcome afternoon to launch the scheme, and a buffet lunch for Levels 2 and 3 students and staff later in the year to help build community and engagement.

Level 2 students reported that giving them the opportunity to practice and discuss past exam questions together, whilst getting to know their peers and students from the year above, made them feel more confident and more integrated within the SoC. The benefits reported

by the Level 3 student partners were that, academically, they improved their chemistry knowledge while preparing for the peer study sessions, socially, they enjoyed getting to know students in the year below and, professionally, being employed by the SoC gave them a new perspective on learning and teaching as they interacted with staff whilst working on the project.

An unexpected benefit of the partnership was that the Level 2 students, and particularly their elected class representatives, formed such strong connections to the student partner facilitators and looked up to them for general advice about studying and what Level 3 would be like, finding them more approachable than academic staff. The staff partner, the Level 2 course lead, benefited from the partnership as she found a new route to engage with undergraduates and hear the voice of this cohort via their interactions with the student partners. The study sessions were regarded as so successful and valuable that, even in a tight economic climate, the SoC continues to fund the employment of student partners for this project, and it has now run for three consecutive years.

*Partnership 2: Redeveloping an interactive teaching unit*

Interactive teaching units (ITUs) have run in the SoC for decades (Grant et al, 2005). Their aim is to link coursework to real-world problems and develop transferrable skills through group work and active learning. Groups of 12 Level 2 students and a member of academic staff would undertake a highly-structured 3-hour session once per semester on a particular topic. Negative student feedback revealed that students did not see the relevance of ITUs and felt anxious working in groups with peers they did not know. Enforced changes to learning practices during the pandemic prompted staff to make several modifications to the ITUs, including using joint note-taking software, experimenting with different learning spaces, and developing new content, but these had mixed successes.

In 2023, staff recruited two students who had just completed the ITUs to join a student-staff partnership to redevelop the unit, an approach that has been shown to have positive outcomes (Jagersma, 2011). The partnership created new content, a new delivery format and more explanation of the purpose of the activity through a pre-ITU exercise to increase student buy-in. Additionally, a larger learning space with up to 10 groups of 8 students each was utilised, resulting in students being under less scrutiny from staff and increasing the energy in the room. To make the sessions more inclusive, students could sit with friends and could choose from several roles to adopt within the group.

The student partners felt appreciated for the responsibility and independence given to them as equal partners on the project, especially in team meetings where ideas were developed together, and then implemented. They also gained subject-specific knowledge while researching and producing the new materials, and experienced teaching through co-running the new sessions with staff and evaluating the new format. The staff greatly appreciated the students' contributions as it allowed the content to be pitched at the right level and gave unique insights into students' motivations and barriers to learning in groups. The resulting new ITU format has received excellent feedback for the last 2 years, as shown in Figure 1.

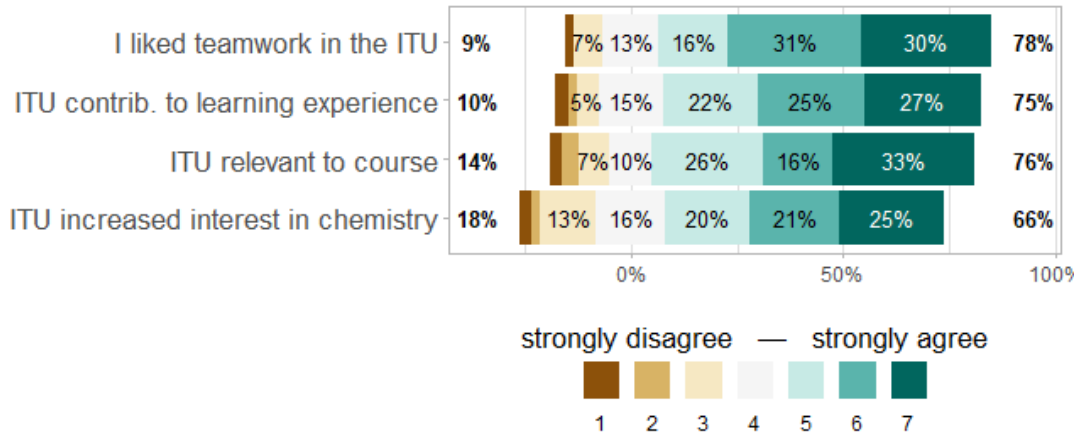


*Figure 1: Diverging bar chart showing student responses to a selection of 7-point Likert-style questions regarding the Interactive Teaching Units, from a wider class survey during the most recent academic year (2024/2025).*

A large majority of participants (n=109) agree with the statements such as "The ITU contributed to my learning experience".

*Partnership 3: Direct peer-assessment of lab skills*

There is increasing evidence of student opinion (voice) being sought in order to design and implement changes in a (chemistry) laboratory environment (Jardine et al., 2023; Hurst (2024) and the advantages that these partnerships can bring. Student achievement in laboratories is commonly assessed through written lab reports (Hunt et al., 2011), and thus the acquisition of practical laboratory skills is only measured by proxy rather than through a direct observation of a performance. Both the observer and the one being observed can learn, and so a peer-observation inspired by Seery et al. (2017) was proposed.

A final-year undergraduate student conducted a pilot study with fifteen participants to introduce this peer-observation to the Level 1 Quantitative-1 Laboratory module as part of her dissertation. Given the positive feedback, the student's supervisor and the lab coordinator sought to implement this for the entire 600-student Level 1 cohort the following year. They decided to ask the final-year student to stay on as a partner and recruited another student who had just completed the lab course as a partner to provide a different perspective and help with implementation and evaluation throughout the year. Over the summer, the checklists used for assessments were revised and additional practice resources including demonstration videos and online-practice calculations were created.

Following successful implementation, Level 1 students taking the assessment reported, during evaluation, increased confidence in the practical skills and agreed that this was a "fair" and enjoyable way for these skills to be assessed. Unexpected advantages reported by students included increased social interactions and that the majority actually preferred being assessed by peers rather than staff. For example, one student commented:

> "It allows students to get to know each other and if you watch others it helps to remember the procedures and allows you to see if there are better ways of performing the task" (anon).

The student partner, being a near-peer to the new Level 1 cohort, was able to mix with the students during the lab sessions and gain additional informal feedback, and in passing this on to the partnership team, gave a voice to these students that would otherwise not have been heard. For instance, she uncovered that finding a second observer in addition to the student's lab partner was awkward, and the assessment was modified accordingly the following year. The magnitude of success of this project became clear when a recent external evaluation of our programmes (Royal Society of Chemistry accreditation) particularly commended this addition to the practical provision and made suggestion that a similar format should be introduced into other lab teaching and learning across other levels.

## Discussion

Our reflections on working in partnerships can be grouped into the following main themes.

*1. Benefits to student partners*

The student partners strongly highlighted the skills they developed during the projects. Firstly, these can be divided into softer skills, as described by two students:

> "…how fantastic an opportunity it has been to develop personal skills such as confidence, communication and critical thinking." (DS)

> "My project was focused on redeveloping part of the course meant to help students improve their teamwork and communication skills, and funnily enough I feel like in doing so, I was able to develop my own skills just as much as the students did." (AG)

Secondly, they also identified with improving discipline-specific skills. For example, one student mentions:

> "I enjoyed engaging with the chemistry and exploring different ways of explaining and understanding concepts." (AG)

The student partners also reflected on how being involved in design, delivery and evaluation of teaching material made them more aware of pedagogical practice, and gave a better general understanding of how they learn.

> "[It was great] being able to learn from staff members who had more experience in the area of implementing curriculum. I think as a student it's very informative to get a 'peek behind the curtain' (so to speak) and to understand how much thought and effort go into designing curriculum…" (CJ)

Another sub-category within "benefits to student partners" was that they reported gaining an insight into what it is like to be an academic. Two partners commented:

> "I was able to get a taste of what a career in academia could be like, and this has helped to shape the direction of my career going forward, as it is now something I am heavily considering." (AG)

> "I felt well-supported and celebrated in the shift from student to colleague which was so motivating for me personally." (TL)

*2. Benefits to staff partners*

The benefits for staff to engage and interact with student partners was another theme we identified. On one hand, the students brought vigour and freshness, as exemplified by this quote:

> "Our student partners are incredibly motivated and bring a huge amount of energy and enthusiasm to the project." (BP)

Another aspect of this theme is the value of students' intimate familiarity with the situation in the classroom, especially when they had recently completed the course. One staff partner wrote:

> "It was invaluable to hear our student partners' perspectives and ideas." (BP)

Indeed, the value of the student perspective was felt so strongly that, regardless of a formal partnership, one staff partner now has "a [strong] inner itch to […] run any new teaching materials past some students first" (CG) before deploying them.

*3. New connections to the student voice*

At the start of the projects, staff envisaged that the student voice they would interact with would be that of the student partners. From the outset, there was a strong respect from staff for the opinions and ideas of the student partners, even when critical of courses. Students spoke at length of how they felt heard and respected as equal partners, as highlighted in these comments:

> "They [the staff partners] took my suggestions seriously, and valued the perspective I offered as a second-year student instead of dismissing my comments because of that." (CJ)

> "I really liked that we got to choose the topic to focus on, and that we were really interested in and hoped other people would be interested in as well." (OD)

An additional unexpected benefit was the varied and rich connections that evolved during the project. In particular, the near-peer student partners formed strong connections to the main student cohorts and could engage with them in a new way that was inaccessible to staff. One student partner commented:

> "[Our relationship] was made easier due to David and I's closeness in age and experience with our mentees, albeit we were just a year ahead of them. I regarded this as a strength and often used our shared experience as a positive teaching tool, either to explain concepts, and also to meaningfully empathize with the students' struggles or anxieties they may have faced during the course of the academic year" (CC)

Staff partners hugely appreciated this new and effective route to the student voice. One academic commented:

> "The SSPS removed the perceived power dynamic that can still exist in focus groups organised by staff, allowing students more freedom of expression talking to student partners. It also enabled greater reach since many students would not have volunteered to participate in focus groups but expressed themselves in the classroom setting." (FD)

*4. Challenges*

In their reflections, all partners were specifically asked to comment on the challenges. Although these were outweighed by the vast amount of positive comments, we still wish to share them for completeness.

Several of the students "struggled with the part-time aspect of the project" (AG), especially during the summer months "trying to juggle multiple jobs" (AG). Furthermore, although the "peer mentoring sessions aimed to eliminate conventional student/teacher hierarchies, there was some level of separation and/or hierarchy from the students [towards the student partners in their facilitator role]" (CC). However, this relationship did not persist beyond the sessions.

Other challenges mentioned included one student partner wanting more clarity on project aims and timelines, and a staff member who commented that the development of new resources required a considerable amount of their own input in collaboration with the students. However, these comments were unique to individuals and not overarching themes.

*5. Impact*

The final theme we wish to highlight is that the collaborations resulted in real impact on learning and teaching practice in chemistry. It was evident from the partners' reflections that the impact of the projects was highly meaningful:

> "Our ideas actually had value" (AG)
>
> "[it was] especially exciting and satisfying to see the outcomes […] incorporated into our undergraduate labs" (BP)

Furthermore, evaluation of each of the implementations showed high levels of satisfaction with the students, and we witnessed an increase in engagement during the sessions. As a result, all three projects have been permanently integrated into the curriculum.

Literature on the experiences of students and staff in such partnerships shows that the benefits to our staff, student partners and students are in agreement with others' experiences. The review of Mercer-Mapstone et al. (2017) discusses how student partners develop discipline-specific knowledge, confidence and an awareness and appreciation of pedagogical design and implementation, as expressed by our student partners in Theme 1. In addition to the development and implementation of new teaching materials and procedures into our curriculum that these projects afforded, there were also many semblances with the positive reflections of staff in Theme 2, such as being enthused by the student partners input; enthusiasm, knowledge, professionalism and dedication.

Mercer-Mapstone et al. (2017) also looked at examples of negative outcomes of staff-student partnerships as cited in the literature but there is little evidence of these themes being replicated in the reflections discussed here in Theme 4 relating to challenges in the three projects. They mentioned, "increased anxiety" exhibited by student partners. This is not a feature that was obvious from our student partners except that some did mention that they had to balance project work with other commitments such as part-time work.

One of the most common negative outcomes they noted was that some student partners reported "…that partnerships reinforced pre-existing power inequalities." Interestingly, it was noted from our student partner feedback that this, "power inequality", when it occurred, was between themselves and other students taking part in the project rather than with staff. This has not been widely reported and adds to the body of those summarised in said review (Mercer-Mapstone et al., 2017), but we equally note that the number of challenges was very few in comparison to the many benefits, which provides evidence for the overall benefit of such partnerships.

From a survey of 87 students involved in partnerships, Martens et al. (2018) noted the importance of involving students in the implementation and evaluation processes, not just consultation. In all three of our partnerships, the student partners have been involved in implementation, evaluation and dissemination. The value of this to our partners is apparent in Themes 1 and 5. The changes implemented in all 3 partnerships discussed have been so successful that they have all been permanently incorporated into our curriculum, showing their value to us at a level we have not seen reported in the literature.

One area where we had different experiences to the literature was when Nichol et al. (2023) warn that the student partners' voice may not be representative of the cohort. However, we found that where student partners interacted with the wider cohort, they formed a strong

bond due to closeness in age and the fact that they had recently completed the same courses, and this gave a rich connection to the views of the wider cohort, as discussed in Theme 3. The strength of this connection was one of the most unexpected and valuable outcomes of the projects.

## Conclusion

In conclusion, this case study describes the largely positive experiences of three diverse staff-student partnerships. Many of the findings in our local context are in agreement with the literature. The main benefit we experienced that we do not feel has been fully reported previously is just how powerful student partners can be as a route to the student voice of the main cohort. We also demonstrate the impact of these partnerships by the permanent changes they have brought to our curriculum. We thoroughly recommend that students and staff engage in these mutually beneficial enterprises.

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**Ethical Approval**

Ethical approval for the research described in this paper was granted by the College of Science and Engineering Ethics Committee of the University of Glasgow.