

The mentored mentoring approach to lecturer- and peer-led inter-institutional instruction among undergraduate biomedical science students: a case study.

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Abstract.

Biomedical science undergraduate students of accredited biomedical science programmes in Ireland are training to become professional medical scientists who diagnose disease. Hence, there is a strong emphasis at undergraduate level on practical laboratory skills, scientific writing and continuing professional development. In October 2020, a student-led webinar was held whereby one fourth-year and one third-year undergraduate student, having engaged their lecturer-mentor, conducted a webinar for first- and second-year undergraduate students with the intention of demystifying the art of writing a high quality laboratory report. The webinar consisted of four elements, namely a presentation by each of the three organisers; the fourth element was a questions and answers session. A total of 86 undergraduate students attended the webinar from two separate programmes of biomedical science.

A follow-up evaluation occurred via a voluntary, anonymised survey provided to participants at the end of the webinar. A total of 35 undergraduate student responses was received (40.7% of participants); 85.7% indicated that they would rate the event at least a 4/5; 91.4% of respondents indicated that they would participate in another such event. While the primary aim of the webinar was to improve the laboratory report writing skills of the attendees, this approach to learning benefited the student-mentors by allowing them to enhance professional and mentoring skills and increasing self-awareness. The lecturer was shown the students' perspectives in sharper focus than would otherwise have been possible.

The novelty of this study lay in this being a joint effort by students and their lecturer to provide real-time instruction to more junior undergraduate students nationally, using a webinar-based approach.

Keywords: inter-institutional; lecturer-led; mentoring; peer-led; undergraduate students.

1. Introduction.

A study of peer assisted learning (PAL) reported it as being significant, as it not only demonstrates a high level of acceptability among tutors and learners for PAL but it also indicates the reciprocity of educational exchange that appears to occur within this setting (Glynn, MacFarlane, Kelly, Cantillon and Murphy, 2006). Complementing this, peer-led instruction has also been shown to be an effective way of teaching in a study involving medical students (Baqal, Soheib and Saadallah, 2020). Another (10-year) study by Crouch & Mazur (2001) has shown augmented student mastery of conceptual reasoning and quantitative problem solving by implementing PAL for Physics (non-major) students. A more recent meta-analysis study by Huisman and colleagues (2019), of published studies on the effect of peer-feedback on third-level students' writing, reported that engagement in peer feedback resulted in larger writing improvements compared to (no-feedback) controls and compared to self-assessment. Peer feedback and teacher feedback resulted in similar writing improvements (Huisman, Saab, van den Broek and van Driel, 2019). According to Boud (2001), reciprocal peer learning emphasises students simultaneously learning and contributing to other students' learning. In the same report, Boud also points out that peers have faced the same challenges in the same context, talk the same language and can be asked what might otherwise be feared to be 'silly' questions.

When an attempt to quantify the effect of peer learning was undertaken in a UK-based study of marks attained by students pre- and post-peer coaching, it was found that there was an average increase of 10% in student marks after peer coaching (Moore, Westwater-Wood and Kerry, 2016). Feedback from that study was not all completely positive, however, with recipients citing social loafing, dominant personalities and feelings of inferiority, among other perceived disadvantages. More recently, Hsieh and colleagues (Hsieh, Lin, Liu and Tsai, 2019), in a study of the effect of peer-coaching on science teachers, concluded that the peer coaching model may improve science teachers' teaching practice and their students' scientific competencies. Peer coaching involved reflective practice in that study and the students' perceptions of their teachers' abilities were greater towards the peer-coached teachers. This suggests the benefits of mentoring or coaching and these terms have often been used interchangeably in the literature. Lu (2010), in a review of publications discussing barriers to the use of peer-coaching in teacher training, identified problems of scheduling, increased educator workload, time constraints, and importantly, the lack of skills of the educators.

Mentoring has been described as an action that focuses on the needs of the mentee rather than the mentor (Klasen and Clutterbuck, 2002). More recently a mentored mentoring model has been described (Lucey, O'Sullivan, Collins and Ó'Céilleachair, 2018) in which a senior mentor provides mentoring and other support for junior mentors, with the intention of maximising the junior mentors' potential to mentor others while being mentored themselves. A seminal paper on mentoring by Kram (1983) identified two primary functions in mentoring: psychosocial support, including role modelling, and career or instrumental support, including providing challenging work toward skill development. It has been stated that effective mentorship occurs when mentors and mentees develop trust, share strengths and limitations, all while identifying with and authentically engaging with one another (Blake-Beard, Bayne, Crosby and Muller, 2011).

It is estimated that 70% of all health care decisions affecting diagnosis or treatment involve a pathology investigation (Badrick, 2013). For a student of biomedical science, effective laboratory report writing is an essential skill and submission of laboratory reports counts significantly towards the total marks accrued by the student. The ability to write scientifically and accurately by a medical scientist underpins the effective reporting of findings from their investigation of patient samples for haematological, biochemical, microbiological, histopathology- and transfusion-related conditions or diseases. This writing skill is needed for generation (daily) of effective patient reports. Furthermore, there is potential for improvements to healthcare from analysis of large amounts of pathology data, which necessitates the ability to write scientific papers and to publish them.

The purposes of the current study, which was peer-initiated and peer-led, were twofold: firstly, to demystify the laboratory report writing process for first- and second-year biomedical science undergraduate students using an experimental strategy that combined near peer-peer learning and their lecturer's perspective on how to maximise performance; secondly, to enhance the professional and mentoring skills of the facilitators of the webinar.

The peer-learning was inter-institutional between two third level colleges and facilitated via a webinar platform provided by the professional body for professional medical scientists in Ireland (the Academy of Clinical Science and Laboratory Medicine/ACSLM). Participants were surveyed after the event and findings are discussed in this paper.

2. Methodology.

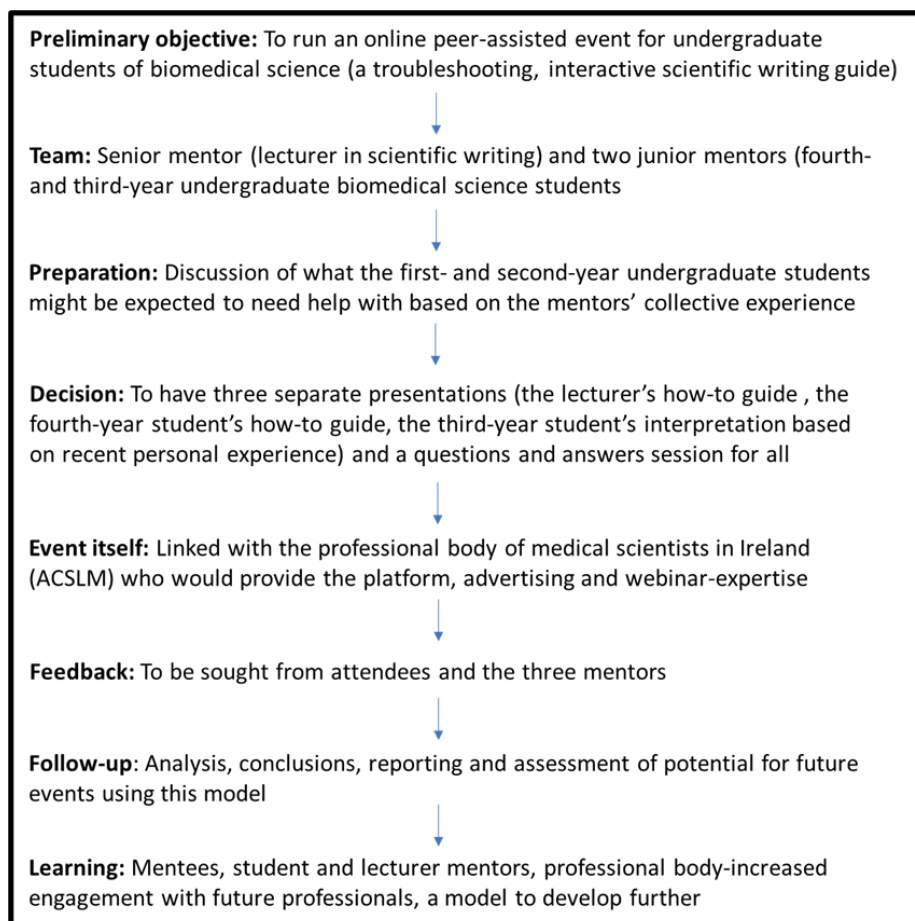
2.1 Ethics.

The study was conducted according to the Declaration of Helsinki (64th WMA General Assembly, Fortaleza, Brazil, October 2013). Ethical approval was granted by the Munster Technological University (MTU) Ethics committee.

2.2 Setting for the Event.

The overview of the event is presented in Figure 1, whereby the intention, the planning, the engagement with the professional body, the gathering of feedback/reflection on the event and the analysis of this method to use in the future instruction of students is outlined.

Figure 1: Overview of the mentored mentoring approach used to design and execute a webinar on laboratory report writing skills, constituting lecturer- and peer-led inter-institutional instruction among undergraduate biomedical science students



In October 2020, two undergraduate students of biomedical science approached their lecturer, with a view to having this trio of presenters at an online event to promote good report writing skills (RS, a third-year student, KO'B, a fourth-year student and BL, a lecturer in biomedical science).

For the preliminary objective and the preparation stages shown in Figure 1, there were two pre-event meetings between the three presenters. The purpose of the first meeting was twofold, namely to explore the possible motivation and feelings of the students for running such an event and to ascertain which approach might be expected to make the event most effective.

The purpose of the second meeting was to plan the finer points of running the webinar, regarding the chairing of the meeting and the order of speaking. All three presenters used a narrative-based approach. Finally, RS oversaw the questions and answers session following the presentations, which all presenters were prepared to answer, depending on the question being asked.

2.3 Attendees.

The intended participants were first- and second-year undergraduate students of biomedical science programmes, to provide a targeted peer-led training to them by fellow students who had preceded them by between one and three years.

2.4 The setting and structure of the webinar.

This live event occurred on 12 October 2020 using a Zoom™(zoom.us) platform. Questions were submitted by participants before and during the webinar by using the booking form on the ACSLM website at the time of registration and using the chat function while the event was being held. These questions were read and answered in the final stage of the event by the presenters.

2.5 Basis and key content of each presenter's talk showing the empirical basis of the webinar.

KO'B: Welcomed the attendees to the webinar and introduced the panel of speakers, before going on to give a presentation whose aim was to provide the attendees with all of the components that were necessary to construct a laboratory report.

Overall, the main message from this presentation was to make sure students have the fundamentals right, to learn from mistakes and that with time comes improvement.

RS: Started with the narrative of her experiences, including the considerable challenges of entering third level and discovering that classwork counted towards one's final grade. The main aim of this presentation was to explain how to go about this aspect of the students' education, including awareness that making and learning from mistakes was necessary. RS also gave an example of a laboratory session that involved a case study where the laboratory experiments had gone wrong but that the discussion of why they had gone wrong, the provision of the true values from an acknowledged source, allowing her to "*solve the case*" and the comprehensive report that followed yielded the highest mark that RS had been awarded for any laboratory report.

BL: This element contained salient points of writing up each segment of the report, a summary document of the (many) most common mistakes made in scientific report writing and why the mark for any report should always be written or considered only at the end of the report feedback. BL also mentioned that in professional life the analysis of patients' samples requires an accurate report of what was observed, rather than what one thinks should be present.

In preparation for the follow-up evaluation (shown as a stage in Figure 1), there was a post-event meeting to discuss the presenters' perspectives on how they felt immediately after the webinar.

2.6 Post-event survey of the attendees.

Participants were invited to take part in an evaluation survey following the event, using a Google docs form (<https://docs.google.com/document/create>). All participants were assured that participation was voluntary and anonymous. It was indicated at the beginning of the survey that their responses might be used in a case study report afterwards. The following questions were asked:

1. What college do you attend?
2. What year of college are you in?
3. What do you study in college?

4. Would you attend a student-led event like this again?
5. If the answer to Q4. was yes, what topics would you like to see covered?
6. What key messages have you taken from this session?
7. How will you use the information from this webinar in your future practice?
8. What remains unclear?
9. What could be done to help with your understanding of the topic(s) which remain unclear?
10. How would you rate this event on a scale of 1-5?

3. Results.

Analysis of the evaluation after the event had two main thrusts; in the first case, the opinions of the attendees were explored regarding how useful they found the report-writing webinar, what take-home messages they had and what type of events they might like to have in the future, if any. In the second case, it consisted of an exploration of the motivation of the three mentors in running the event.

3.1 Survey results from participants of the scientific writing webinar.

A total of 86 undergraduate student participants registered for the webinar. After the event, there were 35 survey respondents, all biomedical science students (40.7% response rate), 20% of whom were first year college students, 77% were second year students and 3% were in their third year. When asked to rate the webinar, of the survey respondents 45.7% rated it 5/5; 40% as 4/5; 11.4% as 3/5, 2.9% as 2/5 and 0% as 1/5. A total of 91.4% of respondents said that they would attend another such event and some suggested they would like a webinar to teach them how to do referencing properly or further scientific writing. Not all students were quite as science-based in their responses; among the suggestions for future webinars were suggestions of having a webinar on how to balance college work with having a social life or how to study effectively. The preponderance of second-year student attendees was influenced by the active encouragement, of second year students, to attend by one of their medical scientist lecturers (in the other institution).

Figure 2 shows the stated intentions and post-event feelings of encouragement for future scientific writing of some respondents following the webinar.

Figure 2: Undergraduate survey responses, post-peer-led webinar on laboratory report writing, detailing how attendees would utilise the information provided in their future laboratory report writing

1. I'm going to improve my reports
2. I'm going to re-check my work more
3. I'm going to note the mistakes that others have made and try to avoid them
4. I'm going to write correct lab reports
5. This is going to make it easier for me to write my reports
6. I'm going to write up my lab reports in a timely manner
7. I now know how to correctly take results from other scientists to incorporate in my lab reports
8. I'm going to use this information as a template for my future lab reports
9. I'm going to try to avoid making the same mistakes more than once
10. This is going to make writing of lab reports less intimidating
11. I'm going to use the information to consciously improve my lab reports
12. This is going to help me to improve my grades and make my reports clearer
13. I'm going to continuously develop my lab report skills
14. I'm going to apply it to my own lab reports
15. I'm going to apply this to all my scientific writing in the future

Figure 3 shows a compilation of the key messages attendees took from the webinar.

Figure 3: Undergraduate survey responses, post-peer-led webinar on laboratory report writing, detailing key learnings formulated by attendees

1. I've got some lab report writing improvement tips
2. Using references in your lab reports improves them
3. I need to read over my lab results
4. Learn from mistakes
5. Perfection is not necessary
6. Take your time
7. Answer effectively – be clear and efficient in your reporting
8. Proper structure is important in lab reports
9. No references go in the conclusions section
10. It's ok to make mistakes so long as they are accounted for
11. There is a correct format for a lab report
12. Don't repeat mistakes
13. Make a plan when writing a lab report
14. Explain the experiment as if to someone who has no idea about the experiment
15. Reports are an important learning tool
16. Everyone struggles with report writing at times
17. A 7 or an 8 out of 10 is a good result
18. Use references when making a factual statement
19. Don't stress too much over getting a "good" grade
20. It was very beneficial to hear both the students' and lecturer's points of view

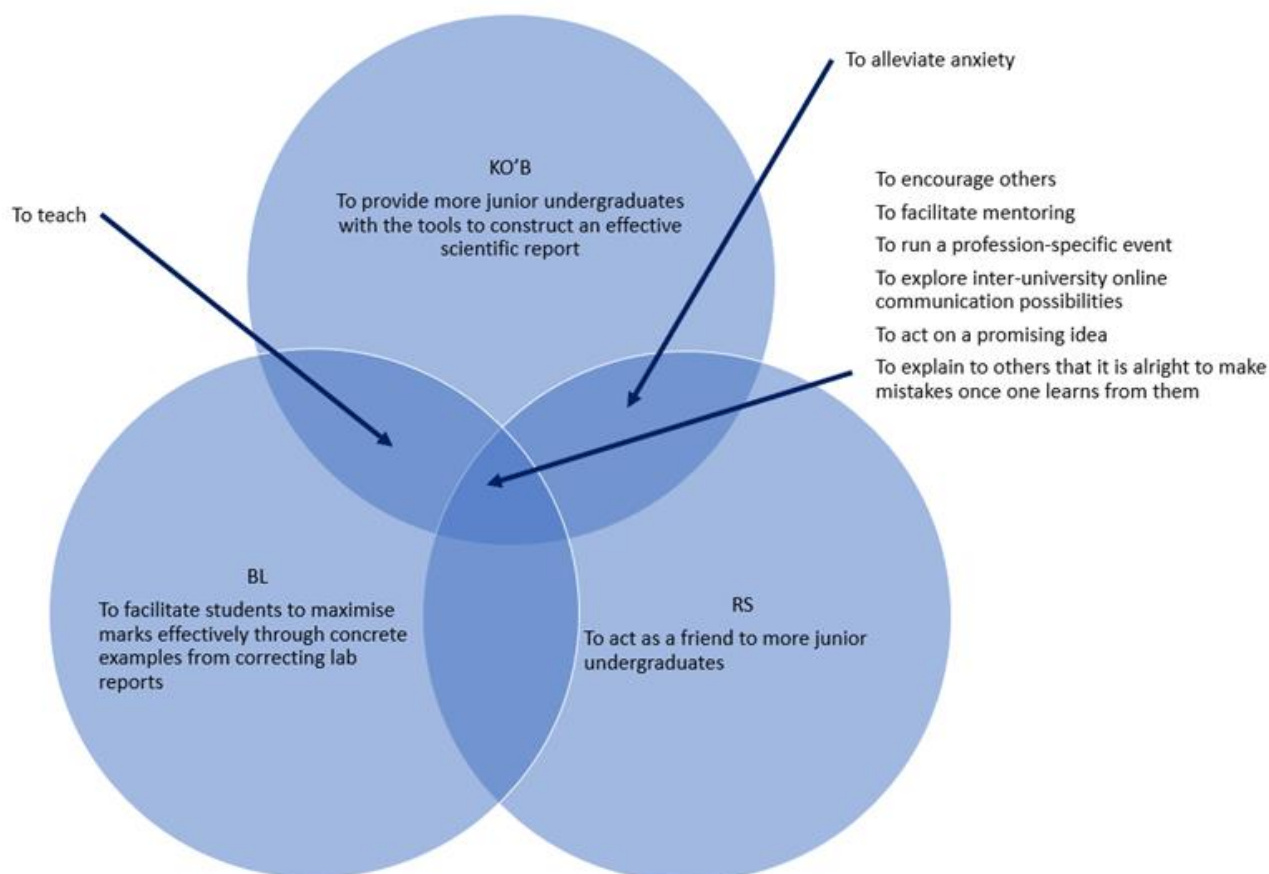
Figure 4 shows the motivation of RS and KO'B to run the laboratory report-writing peer-peer webinar.

Figure 4: Motivational reasoning reported by KO'B and RS (undergraduate students) to design a webinar for early-stage undergraduate students of biomedical science programmes in Ireland.

1. To develop scientific writing skills appropriate to the needs of first- and second-year biomedical science students
2. To provide advice during a period of restricted classroom activities (the SARS CoV-2 pandemic)
3. To provide a profession-led event for students who are being educated in a professionally accredited programme
4. To facilitate peer-mentoring
5. To encourage the poorly-performing student to keep trying and not to give up
6. To make the newer or more junior students' lives easier – to facilitate them in their learning
7. To show that individual students are not alone in their anxiety about not doing very well
8. To alleviate anxiety in students about the process of scientific writing
9. To encourage students to remember that the stakes may be comparatively low when submitting individual reports

A summary of the motivation of the students and their lecturer to run this event is shown in the form of a Venn diagram (Figure 5). This figure highlights the similarities and differences in motivation by each of the three mentors.

Figure 5: Overview of motivation of KO'B and RS (undergraduate students) and BL (lecturer) to design and execute a laboratory report writing inter-institutional training webinar for undergraduate biomedical science students (and the key messages in each of the facilitators' narratives).



4. Discussion.

The state registration of medical scientists by CORU (<https://www.CORU.ie>), the Irish state regulator of allied healthcare professionals, has become mandatory from 31 March 2021. For the CORU-accredited undergraduate programmes that graduate medical scientists, there are 96 proficiencies that need to be taught, including the understanding of the principles of teaching others. Many medical scientist graduates will ultimately be employed in teaching hospitals, whose duties include that of training others *in situ*, in conjunction with the colleges that run the accredited programmes. The exploration of PAL opportunities for both undergraduate trainers and trainees has much longer-term consequences than the immediate

instruction with the intentions of, for example, dispelling worry or anxiety and constructively assisting the author of laboratory reports. This is true for medical scientists in the making, or for those in other science programmes, whose expected journey might, for example, be to industry.

Figures 2 and 3 offer evidence that attendees learned from the webinar. Figure 2, which shows the stated intentions and post-event feelings of some respondents indicated that the webinar was motivational to them in causing them to want to improve. It enhanced their understanding that early improvement would have compound benefits for their scientific writing and in their marks into the future. Figure 3, which contains the key messages taken by the participants from the webinar, shows that learning was not only science-based, but also appeared to be psychologically beneficial – for example, it showed that other people feel intimidated and afraid of the writing tasks and that there is nothing wrong with making mistakes once you learn from them. The myth that one's report must be perfect was disabused, and students reported that they were given to understand that 7/10 or 8/10 is a good result. It was interesting to note the differences in what individuals took from the webinar, suggesting that the webinar spoke to different needs among the attendees, ranging (for example) from recognition by one participant that there was a need to take one's time when writing a report, to the very specific detail learned by another who now knows not to put references in the conclusion section, both of which were very different from the internalisation by a respondent of the message telling the students not to stress themselves over getting a good grade.

The feedback from the attendees in Figures 2 and 3 suggests that there are currently many gaps in the conventional teaching of students. Through analysis of this feedback, it appears that webinar events such as the one described in the current study have the potential to facilitate both enhanced skills and enhanced psychological wellbeing, and that the empathy of the student mentors towards their junior cohorts is very beneficial. Carragher & McGaughey (2016) have found that peer mentoring builds connections and promotes academic excellence by supporting students transitioning into higher education, thus supporting the findings of the current study. Burgess, Dornan, Clarke, Menezes and Mellis (2016) have shown that PAL provides an opportunity for student tutors to practice and improve both their knowledge and their teaching skills. It might be noted that KO'B, as a fourth-year student, has undertaken

more advanced scientific writing training in third-year, than RS, who at the start of her third year when the seminar was held, had not. RS felt that the aims of the workshop, from a contributor's point of view, was to allow students to learn from their peers, become comfortable with the fundamentals of scientific writing and to encourage the students to ask questions.

The undergraduate mentors chose the outlined format (and the services of their professional body) because they felt it would be the best collaboration when trying to meet the needs of biomedical science students. They also utilised the support of their college society in promoting the event, which was seen as a unique opportunity to allow students to learn from one another in an inter-institutional way but also to learn simultaneously from an experienced scientist. KO'B mentioned that this was not something that she had experienced in her time as a student and went on to say that: "*Something I have learned over the years is that there are a number of approaches to effective learning and teaching but very few are utilised in third level education*" (KO'B).

Findings from this work suggest that a larger study of methods might be conducted at third level; it was useful that two participants are students of a jointly run programme between MTU and University College Cork and that this opinion was held after experiencing education in both colleges, one a Technological University and the other a member of the National Universities of Ireland. For example, "*throughout primary and secondary education many teachers used different methods to try to suit every learner, however, in third level, there is less of this – if the lecturer's teaching style doesn't suit a student, the student has to work harder to make it suit them*" (RS). Also, "*the majority of learning is focused on a lecturer-student relationship. A number of students have peer-assisted learning systems in place, but I have found that these are mainly targeted at first year students and the system never seems to advance further than that*" (KOB). Their lecturer was in agreement saying, "*I think that we are missing opportunities for peer-support – the student mentors might be expected to gain as much as the mentees*" (BL).

Findings from the current study reveal that "*this approach to learning can be beneficial not only to the students who are learning, but also to those students who are teaching and that this type of webinar gives students an opportunity to improve presentation skills, share*

knowledge and become comfortable with public speaking" (KOB). This accords with the findings of Bugaj and colleagues (Bugaj, Blohm, Schmid, Koehl, Huber, Huhn, Herzog, Krautter and Nikendei, 2019) that student tutors also benefit from PAL and that they are able to improve their individual knowledge, skills and attitudes while practicing interaction and leadership competencies, in turn enabling student tutors to become better learners themselves.

The primary motivation of the student mentees, as shown in Figure 4, was to facilitate the learning of their more junior fellow students, to make their time easier than their own had been and to alleviate any feelings of stress. Figure 5 is a Venn diagram of the three presenters' motivation in running the event, showing that there were areas of commonality for all three, but that there were also motivational reasons that were either individual or not shared by the three mentors. For example, based on her own experience "*the early bad mark (4.5/10) may either encourage the student to improve or may act as a disincentive or increase feelings of anxiety or hopelessness*" (KO'B). The benefit of running this type of session during a pandemic is that having already been forced to move online for a lot of activities that were traditionally held face to face, it facilitated reaching a wider group of people in unconnected colleges.

RS and KO'B were at different levels of undergraduate education in the same programme and they saw their roles as being different from one another's because of this. The more junior mentor (RS) saw her role in the webinar nearly like a friend to the attendees and stated "*I didn't want to be preachy or telling people what was right or wrong. I wanted to offer my experience in an open and honest way and allow them to take from that what they could, so that they could learn from my mistakes*".

There was a peer's understanding of how the attendees might feel. RS had previously learned that "*one should not be afraid to ask your demonstrator or lecturer questions if one doesn't understand something*" and that "*the ability to learn from one's mistakes comes with experience and practice*".

The lecturer had previously learned from one of her students that the idea of "*good enough*" might actually prevent the student from improving continuously and thereby wrongly facilitate

them (albeit unconsciously) to make the same mistakes in their scientific writing over and over and to keep losing marks for the same reasons. The event provided the lecturer with a reminder *“of how students feel when they are learning the skill of scientific writing in a way that would not have been evident had my co-presenters not shared their fears and conclusions from their own experience of scientific writing as undergraduate students”*.

“Over the past two decades, a paradigm shift has led to reframing mentoring relationships previously seen as benefiting the mentee, as reciprocal, and dynamic” (National Academies of Sciences, Engineering and Medicine; Committee on effective mentoring in STEMM, 2019), a finding which was mirrored in the current case study, not only for the lecturer-mentor, but for the peer-mentors also.

An analysis of the survey respondents or mentees (35) showed that attendees found the webinar to be helpful – one respondent mentioned that *“it was very beneficial to hear from both the students' and lecturer's point of view. I liked how the common downfalls in lab reports were highlighted in order to prevent people from making these mistakes”*.

When asked how they felt after the webinar, both presenting students reported feeling very proud that they had run this event, despite feeling nervous. RS mentioned that receiving the feedback was extremely positive also. These feelings are similar to those reported in another Irish study of peer mentoring in a nursing programme (Seery, Andres, Moore-Cherry and O'Sullivan, 2021).

Both students are keen to repeat the experience, finding it *“quite special that students are given an opportunity to learn from other students. I see no reason why students shouldn't be given more opportunities to learn from their peers”* (KO'B). KO'B is also predicting professional career-based benefits when she comments that this type of event allows students to form connections with like-minded individuals who can be a source of support to one another as they progress through their careers.

RS would have preferred that the questions (of which there were 10) asked by the attendees would have been spoken rather than written via the chat text function, to ensure that the question had been interpreted correctly by the three presenters. When asked how this type of

event might affect the undergraduate mentors' careers, RS said that she chose to study science, and biomedical science in particular because she wouldn't have considered herself a "*people person*", thinking that she would have been much happier in a laboratory role with limited interaction with other people, but now would consider a future that includes giving training sessions or lecturing. KO'B has learned recently that organisation is not only something that she enjoys but it is something that she is good at. The success of this event has shown her the importance of mentoring in science, and she would like to see her career follow a path where mentoring is at the core of the work that is being done, whether in a laboratory setting or in a management-based role.

When asked whether the experience might have affected their own feelings or behaviour as a student, RS explained that she now has more of an appreciation of the work that goes into preparing lecture content. Secondly, she has become more conscious now of the way she does things and the reasoning behind it. The development of more self-awareness through mentoring others is evident to both peer-mentors. "*I think it is unfortunate that we were not given as many opportunities to learn from other students, to receive clear advice on the options that are available to us, and how to take full advantage of them. Furthermore, in the (non-pandemic) real-world, it would be nearly impossible to have students from different third level institutions come together at one event.*" (KO'B).

When asked the question as to which topics might be useful if provided as webinars to themselves, RS thinks it would be helpful for someone, preferably newly in the workplace themselves, to provide a webinar to her concerning the workplace, as she keeps wondering how she could possibly know enough information to analyse clinical samples and make life or death decisions and she thinks that the fear she feels would be similar to the fear the first-year students might have with respect to the lab reports. "*Another webinar that I think would be particularly useful to medical science students is a leadership-based webinar*" (KO'B).

The feedback from the attendees was overwhelmingly positive. RS, upon analysing the responses to the survey, when asked "*what are the key messages you took from this session?*" many students had written direct quotes from her presentation and answers that she had given to their questions. RS could not believe that what she had said had resonated with so many attendees, and that she was in a position to tell them the things that she wishes

she had learned much earlier in her own college experience. Upon consideration of the potential for further use of this type of platform: *“I believe that this type of event can easily be reproduced to facilitate the learning of many STEM students”* (KO'B).

The student mentors were interested to know how the lecturer felt about working with students to develop this webinar. BL answered that *“students have a fresh perspective and can empathise more fully with their more junior fellow students”*. In support of this opinion, a recent study by Seery and colleagues (2021) suggests that motivation to participate in peer mentoring in higher education settings may be more personal, as fellow undergraduate students empathise strongly with incoming first-year students. When asked whether, as an educator, BL thought that the move to online-learning has been beneficial to students (or lecturers), it was BL's opinion that overall, STEM students (at least) do not benefit from the move to online because the person-to-person interactions that students normally enjoy and benefit from are a lot rarer.

The overall success of the initiative described in the current study is an incentive to the lecturer and undergraduate mentors to think of ways to develop the peer-peer learning in partnership with lecturers further. It is useful also in the current context to consider the findings of Aarnikoivu et al. (Aarnikoivu, Pennanen, Kiili and Nokkala, 2020) in their studies of multidisciplinary peer mentoring in higher education institutes, who viewed their investigation as a critical education praxis based on findings in a publication by Mahon and colleagues (Mahon, Heikkinen and Huttunen, 2019). Both sets of authors argue that multidisciplinary peer mentoring has a high potential to ultimately facilitate change among both individual academics and also more widely within higher education institutions. A review by Felten et al. (Felten, Bovill and Cook-Sather, 2014) suggests that partnerships tend to produce similar outcomes for both students and academic staff, clustering into three categories: (1) Engagement — enhancing motivation and learning; (2) Awareness — developing meta-cognitive awareness and a stronger sense of identity; and (3) Enhancement — improving teaching and the classroom experience.

Blake-Beard's definition of mentoring (2011), which ascertained that effective mentorship occurs when mentors and mentees develop trust, share strengths and limitations, and identify with and authentically engage with one another suggests that the mentor-mentee relationship

involving lecturer and student requires a mutual respect primarily, for the relationship to work. In the current study, the event was student mentor-led, whereby the two prospective student mentors approached their lecturer with a request for the trio to create the event, which hopefully suggests that the risk of pressure on students by their lecturer was minimised. This is something to be aware of as a lecturer, however, when heeding the findings of Kehler and colleagues (Kehler, Verwood and Smith, 2017), who have argued that power dynamics are underestimated in students as practice partners, even in well-intentioned encouragement to participate and to rise to the challenge of becoming equals.

In a recent review of mentoring in higher education with a particular focus on e-mentoring, Tinoco-Giraldo et al. (Tinoco-Giraldo, Torrecilla Sánchez and García-Peñalvo, 2020) while emphasising the benefits of mentoring in helping learners acclimatise to a new academic topic, in increasing the likelihood of academic success, and reducing attrition, discuss the scarcity of research in this field and explore the possible benefits of new methods of mentoring including e mentoring.

In the current case study, the authors propose that they facilitated accelerated learning among the webinar attendees, taking account of findings in Figures 2 and 3, while empowering students to improve their scientific writing standards and while also acknowledging that anxiety is likely to be part of the student experience. The limitations of the study include that only 40.7% of the attendees responded to the post-webinar survey and that the attendees and their lecturers were not asked before the event what they felt they most needed from the webinar, thereby restricting the mentors to an educated guess approach. These limitations will be addressed in the organisers' repeat event planned for October 2021.

5. Conclusion.

This webinar provided learning and support for not only attendees who were being taught in an alternative way but for the peer mentors who were given a unique opportunity to gain invaluable teaching experience when sharing lessons from their own past experiences. This approach to learning also benefited the mentors by allowing them to enhance personal skills. The lecturer-mentor had the privilege of being shown the students' perspectives in sharper focus than would otherwise have been possible. In summary, this webinar may be described

as an unconventional peer- and lecturer-combined learning resource run with the intention of facilitating early third-level science students to be comfortable and confident when progressing through their degrees. The authors hope that this model might be useful elsewhere also.

Conflict of interest

There was no conflict of interest in this work and there was no financial involvement.

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References

- Aarnikoivu M., Pennanen M., Kiili J., Nokkala T. (2020). Multidisciplinary peer-mentoring groups facilitating change? A critical educational praxis perspective. *Learning and Teaching*. 13.18-40.
- Badrick T. (2013). Evidence-based laboratory medicine. *Clinical Biochemistry Reviews*. 34(2):43-46.
- Baqal O.J., Soheib M., Saadallah A.A. (2000). Peer-Led Surgical Safety Learning Among Medical Students Using a Novel Story-Based Approach. *Cureus*. 12(9):e10242.
- Blake-Beard S., Bayne M.L., Crosby F.J., Muller C.B. (2011). Matching by race and gender in mentoring relationships: Keeping our eyes on the prize. *Journal of Social Issues*. 67(3):622–643.
- Boud D. (2001). Making the move to peer learning. In Boud, D., Cohen, R. & Sampson, J. (Eds.) (2001). *Peer Learning in Higher Education: Learning from and with each other*. London: *Kogan Page (now Routledge)*, 1-20.
- Bugaj T.J., Blohm M., Schmid C., Koehl N., Huber J., Huhn D., Herzog W., Krautter M., Nikendei C. (2019). Peer-assisted learning (PAL): skills lab tutors' experiences and

- motivation. *BMC Medical Education*. 19(1):353.
- Burgess A., Dornan T., Clarke A.J., Menezes A., Mellis C. (2016). Peer tutoring in a medical school: perceptions of tutors and tutees. *BMC Medical Education*. 16(1):85.
- Carragher J., McGaughey J. (2016). The effectiveness of peer mentoring in promoting a positive transition to higher education for first-year undergraduate students: a mixed methods systematic review protocol. *Systematic Reviews*. 22;5:68.
- CORU. <https://www.coru.ie/>
- Crouch C.H., Mazur E. (2001). Peer instruction: Ten years of experience and results. *American Journal of Physics*. 69:970–977.
- Felten P., Bovill C., Cook-Sather A. (2014). Engaging students as partners in learning and teaching (1): benefits and challenges – what do we know? Conference: *International Consortium on Educational Development*. At: Stockholm.
- Glynn L.G., MacFarlane A., Kelly M., Cantillon P., Murphy A.W. (2006). Helping each other to learn--a process evaluation of peer assisted learning. *BMC Medical Education*. 8;6:18.
- Hsieh F-P, Lin H-S, Liu S-S, Tsai C-Y. (2019). Effect of Peer Coaching on Teachers' Practice and Their Students' Scientific Competencies. *Research in Science Education*. 1-24.
- Huisman B., Saab N., van den Broek P., van Driel J. (2019). The impact of formative peer feedback on higher education students' academic writing: a *Meta-Analysis, Assessment & Evaluation in Higher Education*. 44:6, 863-880.
- Kehler A., Verwood R., Smith H. (2017). We are the process: Reflections on the underestimation of power in students as partners in practice. *International Journal for Students as Partners*. 1(1).
- Klasen N., Clutterbuck D. (2002). Implementing mentoring schemes: a practical guide to successful programs. *Butterworth-Heinemann*, Oxford, UK.
- Kram K. (1983). Phases of the mentor relationship. *Academy of Management Journal*. 26(4):608–625.
- Lu H-L. (2010). Research on peer coaching in preservice teacher education—A review of literature. *Teaching and Teacher Education*. 26:748–753.
- Lucey B., O'Sullivan S., Collins L., Ó'Céilleachair R. (2018). Staff mentoring in Higher Education: the case for a mentored mentoring continuum. *All Ireland Journal of Higher Education*. 10(3):36501-36516.
- Mahon K., Heikkinen H.L., Huttunen R. (2019), 'Critical educational praxis in university ecosystems: Enablers and constraints', *Pedagogy, Culture and Society* 27(3):463–480.

- Moore C., Westwater-Wood S., Kerry R. (2016). Academic performance and perception of learning following a peer coaching teaching and assessment strategy. *Advances in Health Science Education*. 21:121–130.
- National Academies of Sciences, Engineering, and Medicine; Policy and Global Affairs; Board on Higher Education and Workforce; Committee on Effective Mentoring in STEMM; Dahlberg ML, Byars-Winston A, editors. Washington (DC): *National Academies Press (US)*; 2019 Oct 30.
- Seery C., Andres A., Moore-Cherry N., O'Sullivan S. (2021). Students as Partners in Peer Mentoring: Expectations, Experiences and Emotions. *Innovative Higher Education*. <https://doi.org/10.1007/s10755-021-09556-8>.
- Tinoco-Giraldo H., Torrecilla Sánchez E.M., García-Peñalvo F.J. (2020). E-Mentoring in Higher Education: A Structured Literature Review and Implications for Future Research. *Sustainability*. 12(11):4344.