Project Title: Can an asynchronous student conference in OpenStudio develop students' critical evaluation skills?

Keywords: student conference, peer feedback, supporting students, learning design, innovative assessment

Report authors: Catherine Halliwell and Jenny Duckworth

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Key staff:

Jenny Duckworth, Associate Lecturer, STEM
Catherine Halliwell, Associate Lecturer, STEM

Contact: catherine.halliwell@open.ac.uk

Executive summary

The level 3 module Evaluating Contemporary Science (S350), helps students learn, develop and apply important key skills such as evaluation of current science research and communication of these findings to different audiences, along with professional skills such as time-management, giving constructive feedback to peers and reflecting on learning practices. TMA3 requires students to take part in an asynchronous online student conference, creating a poster and audio presentation that can be viewed by all students on the module. Students are also asked to give feedback to their peers and comment on feedback they received. The scientific content of the posters is developed further for the EMA, so participation in the student conference can have a significant impact on module outcome.

Whilst many students enjoy the conference and achieve relatively good marks on the style and presentation aspects of the poster, it was not clear to us to what extent students develop and recognize deeper scientific understanding and critical evaluation skills that are needed for their EMA and final project modules. We wished to investigate how students approached learning through peer-to-peer feedback in an online environment. Initially this was so that student experience and success could be enhanced through improved understanding of the purpose of this activity and through improved support from the module team and their tutors. However, the latter stages of this scholarship work fell in the Spring-Summer of 2020 during the first UK-wide pandemic lockdown. During and since then, other HE providers have worked at pace to move to online teaching, support of students and assessment, so this project also has significant implications for the wider HE sector in developing online asynchronous learning activities and their assessment.

We analysed a random sample (n = 100) of posters submitted in the 18J student conference, looking at a number of quality descriptors covering presentation and evaluation skills. From this analysis we came up with a set of 'quick fix' recommendations for both students and for tutors to use when giving preliminary feedback to students in 19J. After the 19J student conference we repeated the analysis to see if there were significant changes in student performance in the quality descriptors.

Our results showed that following the quick fixes of 19J there was a statistically significant improvement in a number of quality measures, namely application and evaluation. The overall quality of poster presentations also showed a significant improvement.

We conducted a number of student-led focus groups and one AL focus group to gain insights on student and tutor perceptions of the conference. Four main themes emerged from the student focus group discussions: constraints, academic challenges, skills and experiences, and personal development. Students recognised that the student conference helped their development of key skills such as higher-order cognitive and communication skills, and that it was a very 'real' and relevant experience to how scientific work and research is conducted.

Aims and scope of project

Participation in academic conferences provides an opportunity for undergraduate students to expand their knowledge, develop skills in communication and networking, and allows them to contextualise their own learning. As part of their studies of S350 students participate in an online asynchronous conference and present to fellow students a poster on a contemporary science topic.

Students are free to choose any of the topics regardless of their academic background, though they are expected to use and demonstrate their knowledge and understanding of their own scientific discipline in their posters. The posters are accompanied by a pre-recorded 'talk-through' in the conference.

The topics students can choose from are: Nuclear Legacy, Rare Earth Elements, Antibiotic Resistance, Diesel and Moons and Asteroids. Whilst the topics are open to all, students are instructed to ensure that the focus is on science (rather than economic or societal impacts) and this tends to skew students studying particular disciplines to particular topics. For example, Q71 'Health Science' students might favour antibiotic resistance and Q64 'Natural Science (Planetary Science and Astronomy)' students might favour moons and asteroids.

To our knowledge S350 is the first module that has used the OpenStudio (OS) platform for an asynchronous conference, though it has been used by a number of modules in different disciplines as a means of students sharing visual or design work that forms part of an assessment, for example in a religious studies module (Sinclair and Maiden, 2020). Previous scholarship (Lotz *et al*., 2017) has investigated the progress of learner interactions using OS across a qualification, but with OS used in its original purpose as a shared design space. They found that peer-to-peer interaction and socialization was important at level 1 but engagement with peers tailed off at higher levels.

Thomas *et al*. (2016) reported that students enjoyed the visual elements of OS and the opportunity to give short comments but lacked confidence in giving feedback to peers. Kear *et al.* (2016) reported on the use of OS in an online digital photography module. Again, students enjoyed the visual elements and social aspects of OS but were reluctant to critically evaluate the photos of others and/or were reluctant to rely on the feedback of peers. This reluctance to critique peer work is concerning for educators wishing to promote the known values of active learning (Freeman *et al*., 2014). However, these and other studies, e.g., Smith and Smith (2014) indicate some learning gain by students that take a more passive approach to OS and other interactive learning platforms.

Our original aim was to identify how students engaged with the conference and linking this to their module outcome and satisfaction, we wanted to identify issues that might act as barriers to engagement and the development of deeper learning and higher-level skills. We wanted to support students in the asynchronous conference by suggesting interventions, teaching activities or improved guidance to aid students to engage with the conference, develop higher-level evaluation skills and reflect on their development.

Prior to the conference students select two recent academic articles on an aspect of the topic they wish to present. Students are advised to obtain feedback from their tutor about their choice of articles before creating a poster. Guidance on poster style and content is provided on the module website and also in a tutorial. We thought that this feedback and guidance offered an opportunity for tutor interventions that could support students in their approach to the poster and to participation in the conference.

Our main aims of the project were: to investigate student perceptions of the online asynchronous conference, to see if they understood the rationale for it and how the aim was to demonstrate higher skills of evaluation of science, communication and presentation; to come up with a set of 'quick fixes' that would be easy to implement to improve student performance in the conference (and assessment) key areas:

Our research questions were:

- Can a student conference using OS lead to a positive impact on module success through supporting a deeper engagement with critical evaluation of contemporary science?
- What 'quick fixes' can we put in place to help promote student engagement in deeper learning and reflection?

This project fitted well the eSTEeM priorities of **supporting students** by suggesting interventions or teaching activities to support active participation, and **learning design** by evaluating how students approach peer-to-peer conferencing in an online environment and also how this can inform assessment design.

The Covid-19 pandemic impacted on this project as the first national lockdown began at the same time as the 19J student conference (March 2020). Whilst this might have impacted student participation it was unclear if this was a significant factor. However, in recent months this has made the work here more relevant in the HE sector as well as the internal OU audience. Other universities have needed to plan online alternatives to traditional campus-based activities

Activities

Overall approach

We chose a mixed methods approach for this research (Cohen *et al.* 2001). Firstly, to assess understanding and critical evaluation skills we analysed data on student participation in the 18J student conference which took place in March-April 2019.

We had originally intended to collect data on when students engaged with the conference, the scope and depth of that engagement (particularly in relation to feedback from and to peers), and whether students reflected or acted on that feedback. However, we soon revised this as it was not possible to collect reliable data on when students engaged with the conference (in particular uploading their posters) as minor amendments made after poster upload over-wrote the original poster upload date. Therefore, we collected quantitative data on poster content, quality and feedback only.

We initially both analysed the same five posters to help us develop a set of criteria to assess in a quantitative manner a larger set of posters. The criteria we assessed posters on covered practical issues (fulfilling the brief), such as date uploaded, uploaded to correct slot, clear research question, introduction, methods, results and conclusion. These were simple yes/no questions enabling us to collate quantitative data.

We also used a set of eight criteria to provide measures of quality information, on how well the student had interpreted, evaluated, demonstrated good practice using the CREATES framework (Collinson, 2016), deeper knowledge and drawing together of text and visuals. Each criterion was assigned a scorefrom 1 (very poor or no attempt) to 5 (excellent). Finally, we observed what feedback from other students focused on and whether it demonstrated evaluation of the science presented. A copy of the criteria is provided in Appendix C. In total there were 31 questions.

Later we grouped these eight criteria into three overarching sets related to scientific understanding ('understanding'), application of subject knowledge ('application') and critical evaluation ('evaluation'). We chose these overarching sets to reflect Bloom's taxonomy with understanding preceding application, and application preceding evaluation, which ranked highest (Bloom 1956).

One hundred posters were randomly selected from approximately 200 posters that were uploaded to ensure fair and appropriate coverage of all topics and academic disciplines/backgrounds.

Based on our measures of quality we proposed some 'quick fix' interventions and actions for the 19J student conference. We developed and shared these 'quick fixes' with S350 ALs (n=10, across 2 focus groups of 7 and 3 participants) during an AL-focus group discussion and in the module forum. These 'quick fixes' became a set of top tips (listed below) that were shared with students by tutors on tutor group forums and also in the module wide poster preparation tutorial.

Six 'top tips' for the S350 poster
Here are some tips regarding scientific content to help you prepare your poster.

1. **Choose your two papers very carefully**. Try to ensure that your papers are similar to each other so that you can make a useful comparison. For example, two studies investigating the effectiveness of phages as an alternative to antibiotics but using different experimental techniques would enable a more focused comparison than one on phages and another on 'natural' antibacterial agents.

2. **Use figures to demonstrate your understanding.** Focus on the key points you want the reader to see and refer to the figures in the poster text. This could involve redrawing any graphs so that you are only showing the results you discuss. This may also make it easier to compare the results of the two studies. You could also consider annotating graphs and figures to highlight key points.

3. **Compare the two studies in a meaningful way.** Make sure you compare the studies rather than treating them as separate entities and aim to do this throughout the poster.

4. **Demonstrate your critical evaluation skills.** You are asked to consider the benefits and limitations of the research in your poster. This should include a brief evaluation of the studies themselves as well as the more general considerations.

5. **Suggest clear and specific future research.** Think carefully about logical next steps for future research. Try to make this as specific as possible in terms of following on from the two papers. You'll need to suggest specific future research in the EMA itself, so this is an opportunity to develop this skill.

6. **Make sure your poster covers everything that's required.** Refer back to Block 3 Section 2 and TMA03 Q1 as a check. Don't forget to proofread your poster before submission.

We then repeated our evaluation process for another 100 randomly selected posters presented in the 19J student conference, which took place in March-April 2020, and compared the 18J and 19J evaluations to see if these quick fixes had led to improvements in student outcomes. This was done for the overarching 'understanding', 'application' and 'evaluation' sets of criteria and all criteria combined for each poster using the Mann-Whitney U test, with a normal approximation applied due to the large sample size (Zar, 1996, pp.151-152).

A coordination exercise was undertaken before analysis of the 19J posters to minimise researcher bias. This involved both researchers, together with another S350 AL, analysing the same 10 posters and comparing scores and feedback. This AL was from a different academic discipline to us and was

an experienced tutor on S350. In this way, we checked that our scores were broadly consistent and worked out how to double-check posters that might be radically different in scope or content from those we had encountered previously.

We obtained approval to recruit students to a number of student focus groups to discuss in detail particular issues we identified from our evaluation of posters. However, in Spring of 2020, nationwide lockdown began in response to the COVID pandemic. Many students suffered additional stresses at this time so we decided it was inappropriate to email students with non-essential requests. Therefore, we placed an open invitation for students to volunteer on the module website immediately after the EMA cut-off date. Student focus groups were held in June 2020, after exams and EMAs were completed but before module results; student facilitators were used as this was thought that it would present a non-hierarchical, honest environment than an AL-led focus group.

Findings

Analysis of posters from the S350 19J student conference and comparison with 18J

Poster topic and study discipline

Antibiotics was by far the most popular topic in 19J, accounting for over 80 % of posters (Figure 2a). Nearly 75 % of posters covered biology/life sciences or health (Figure 2b). This is an increased proportion of posters covering antibiotics and biology/life sciences and health compared to 18J (Figure 1a, 1b), perhaps reflecting the makeup of the 19J student cohort.

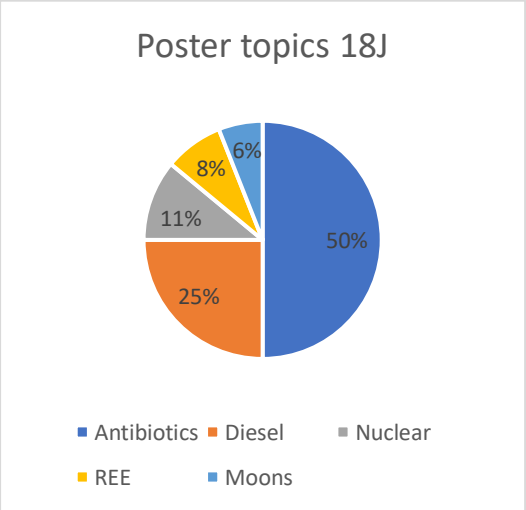

Figure 1a: frequency of poster topics from the 18J conference

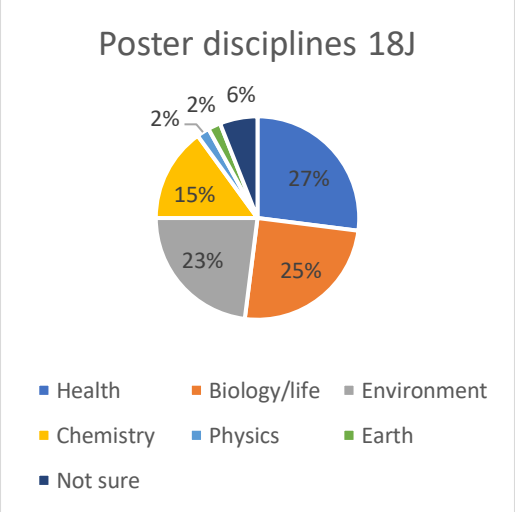

Figure 1b: frequency of poster disciplines from the 18J conference

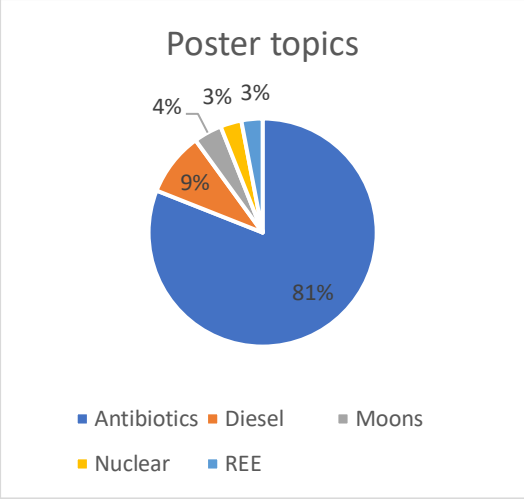

Figure 2a: frequency of poster topics from the 19J conference

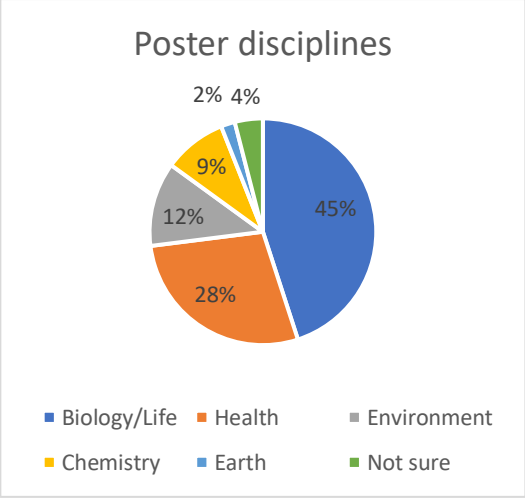

Figure 2b: frequency of poster disciplines from the 19J conference

We had initially assumed (along with most ALs in the focus group) that posters based on antibiotics with a health science discipline tended to be very frequent and often did score highly, so we had wanted to investigate if specific support measures were required for particular disciplines or topics.

However, our findings from both years could not support any firm conclusions about whether particular topics, disciplines or combinations related to outcomes; in part this was due to difficulties in categorising posters according to disciplines. Students were not required to specify disciplines based on qualification but to self-allocate in their key word selections.

Research question and methods

Most posters in 19J (81 %) had a clear research question, aim or hypothesis stated, which is a similar proportion to 18J (82 %). A lower proportion of posters in 19J (54 %) stated the methods clearly compared to 62% in 18J, but it should be noted that students are not specifically instructed to include methods in their posters. There was also a lower proportion of posters in 19J (60 %) than 18J (65 %) that compared the methods (or contexts or locations), suggesting there is still an issue with students not grasping the need to make a comparison.

Understanding, application and evaluation of science

Table 1 shows the eight measures of quality criteria grouped into three sets to reflect Bloom's taxonomy (Bloom, 1956), and the average scores for each criterion for the 18J and 19J posters.

Criterion	**Mean score 18J**	**Mean score 19J**
Understanding		
Use of Language	3.3	3.3
Use and amendment of figures	2.6	2.9
Application		
Interpretation of results	3.1	3.2
Drawing of conclusions	3.2	3.1
Suggestions for further research	2.5	2.6
Contextualisation	3.0	3.3

Evaluation		
Evaluation of individual studies	1.9	2.2
Comparative evaluation of both studies	2.0	2.2

Table 1: mean scores (from 1 – very poor/not attempted to 5 – excellent) for eight measures of quality criteria for 18J and 19J posters

The distribution of scores for 18J and 19 J posters is shown in more detail in Tables 2 and 3.

	Score				
Criterion	**1**	**2**	**3**	**4**	**5**
Understanding					
Use of Language	1	17	44	32	6
Use and amendment of figures	22	26	27	18	7
Application					
Interpretation of results	12	21	29	26	12
Drawing of conclusions	2	29	34	22	13
Suggestions for further research	19	36	30	11	4
Contextualisation	5	23	45	20	7
Evaluation					
Evaluation of individual studies	55	15	17	11	2
Comparative evaluation of both studies	48	21	19	9	3

Table 2: frequency of 18J posters scoring against each criterion (from 1 – very poor/not attempted to 5 – excellent).

	Score				
Criterion	**1**	**2**	**3**	**4**	**5**
Understanding					
Use of Language	1	17	48	22	12
Use and amendment of figures	7	30	35	18	10
Application					
Interpretation of results	2	28	31	29	10
Drawing of conclusions	4	23	38	27	8
Suggestions for further research	15	32	35	11	7
Contextualisation	1	16	45	32	6
Evaluation					
Evaluation of individual studies	36	20	31	11	2
Comparative evaluation of both studies	31	30	25	13	1

Table 3: frequency of 19J posters scoring against each criterion (from 1 – very poor/not attempted to 5 – excellent).

Depth of subject knowledge and understanding, as evidenced through language and use and amendment of figures, was generally done well in 19J, with all elements showing a small improvement compared to 18J.

A top tip shared with students following our evaluation of 18J was to create, adapt or highlight figures rather than just inserting them into posters to better show their understanding of the science. We found that use and amendment of figures remained a weak spot, but more students

attempted to 'do something' with the figure in 19J, for example produce their own graphs or highlight a key feature.

There was a reasonable attempt to interpret results and draw conclusions, with over 95 % of posters making some attempt to do this, which is an improvement from 18J, where 12 % did not attempt to interpret results at all. The mean score for interpreting results was also higher for 19J (3.2) than in 18J (3.1). Suggestions for future research were less well done, with 15 % of posters not attempting this in 19J. However, the mean score for 19J (2.6) was still slightly higher than in 18J (2.5).

Evaluation of the academic study quality was not done particularly well in 19J (with a mean score of 2.2 for evaluation both separately and as a direct comparison). However, it represents a marked improvement on 18J, where approximately half the posters did not attempt this at all and where the mean scores were 1.9 and 2.0 respectively. Again here, our tips for students had directed them to explicitly comment on the academic study quality.

Quantitative analysis of changes in poster 'quality' between 18J and 19J

Scores for the individual criteria were combined into those for Understanding (2 criteria); Application (4 criteria) and Evaluation (2 criteria) and compared to assess whether there was an improvement between 18J and 19J. The scores for all criteria were also combined and compared to determine whether there was an increase in overall poster 'quality' between 18J and 19J.

	z	**p**
Understanding	-1.213	0.113
Application	-1.823	0.034*
Evaluation	-3.031	0.001*
Overall 'quality'	-3.121	0.001*

Table 4: comparison of poster scores for combined criteria between 18J and 19J (* denotes significant at p <0.05 based on Mann Whitney U with normal approximation applied).

There was an increase in score in all cases (Figure 3(a) – (d)), which was statistically significant for Application, Evaluation and the overall poster 'quality' (Table 4). This indicates that poster quality improved (despite the Covid-19 pandemic), possibly linked to the provision of further specific guidance on aspects of scientific content.

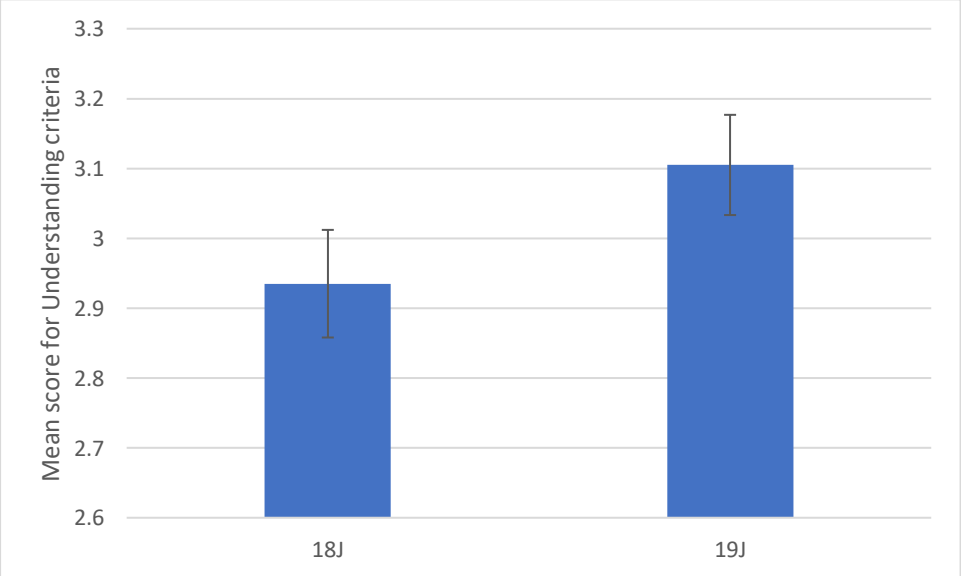

Figure 3a: Mean scores for the Understanding criteria (±SE) in 18J and 19J

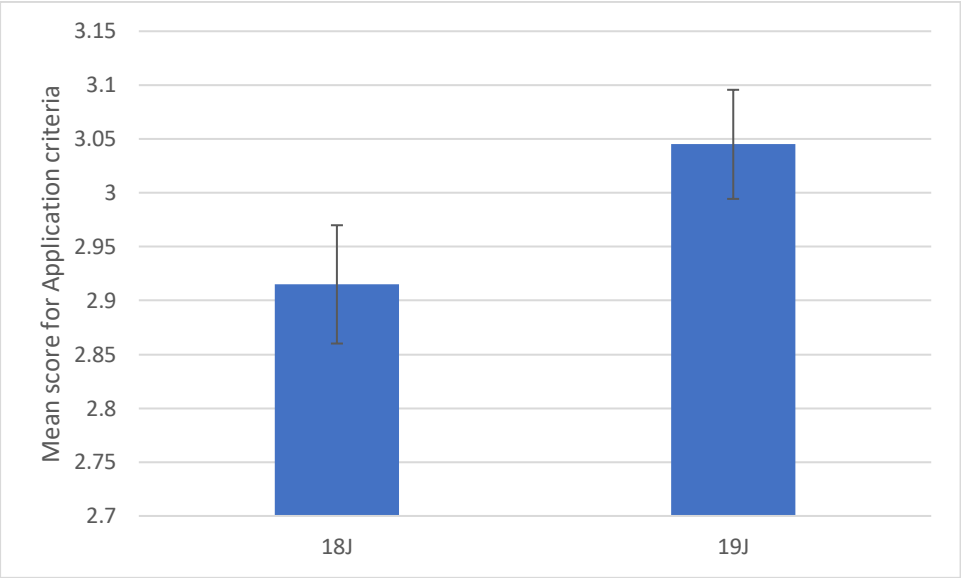

Figure 3b: Mean scores for the Application criteria (±SE) in 18J and 19J

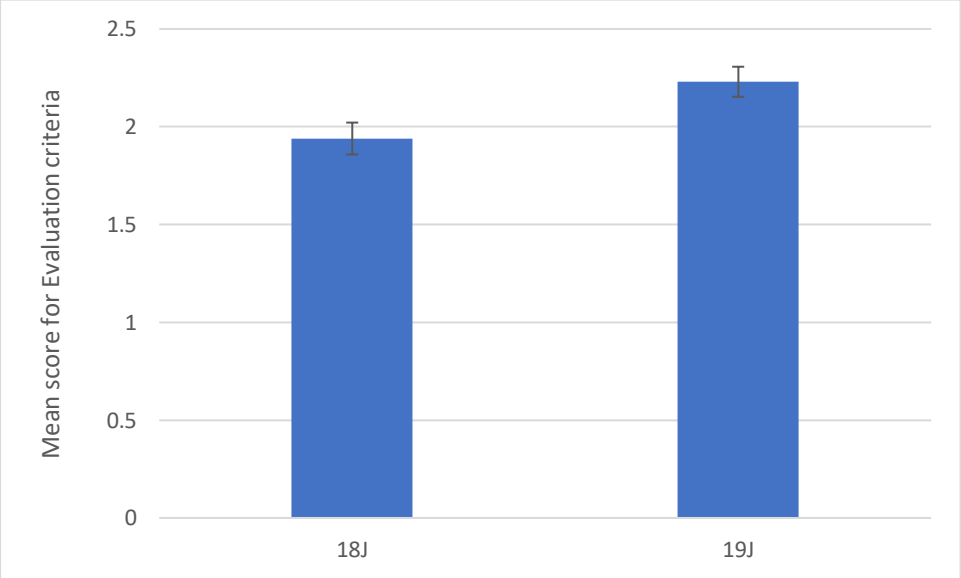

Figure 3c: Mean scores for the Evaluation criteria (±SE) in 18J and 19J

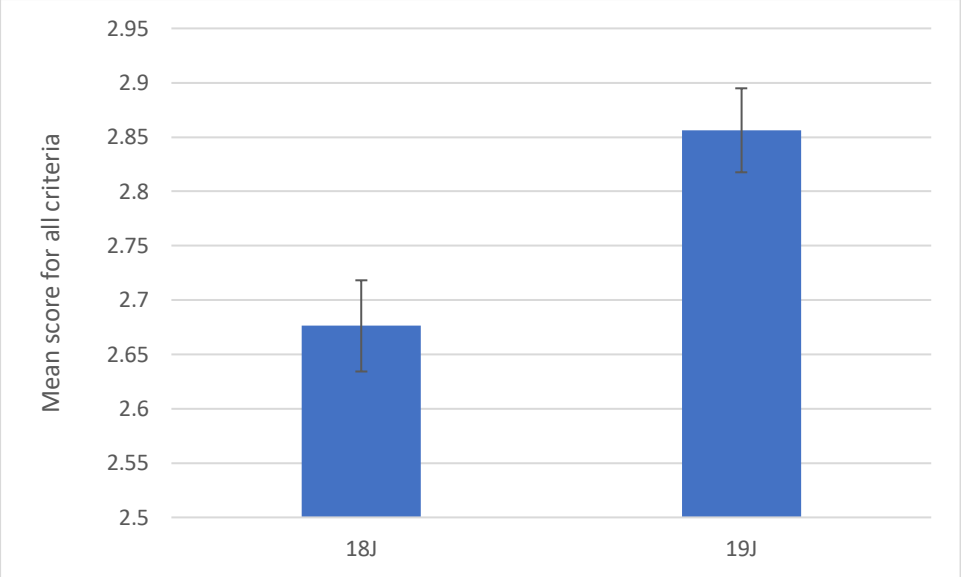

Figure 3d: Mean scores for the all criteria (±SE) in 18J and 19J

Feedback on posters

There was an improvement in feedback on poster scientific content in 19J, with 28 % focusing on appearance (rather than content) compared to 37 % in 18J. Just over half (53 %) the posters received 'effective' evaluation of scientific content, which is an increase on 47 % in 18J.. This suggests that the message may be getting through that feedback needs to consider the scientific content some more, although there is still some room for improvement.

Relationship between poster 'quality' and EMA score

There was a significant positive correlation between a student's total poster score for all eight criteria (which can be considered a measure of 'quality') and their subsequent performance in the EMA for both 18J and 19J (Figures 4(a) and (b)). Whilst this is not surprising in some respects (e.g. 'better' students perform well throughout the module), it also indicates that those students who were able to produce a 'better' poster in terms of application, evaluation and understanding, continued to apply these skills in the final assignment, where they are fundamental to success.

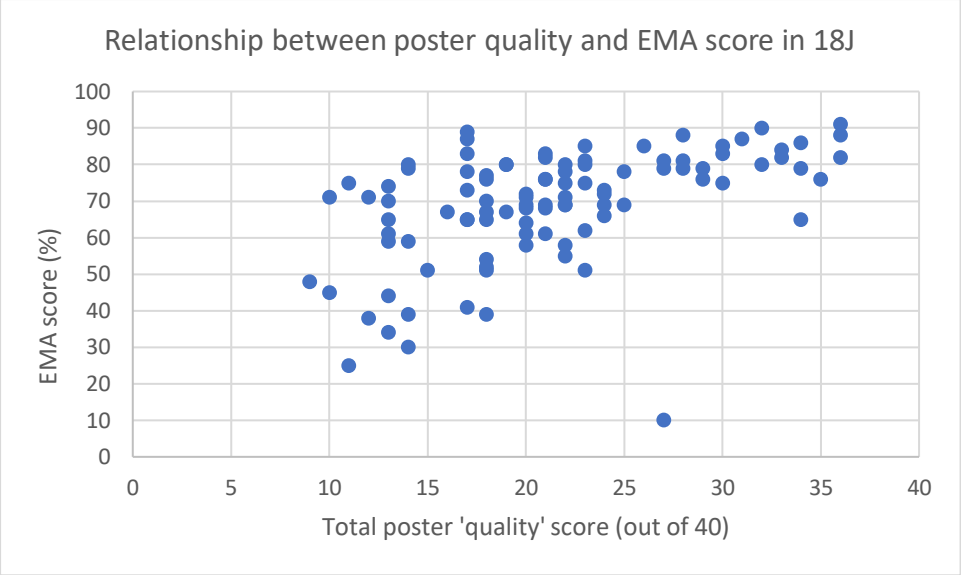

Figure 4(a): Relationship between total poster 'quality' score and EMA score in 18J ($r = 0.50$; $n = 99$; $p < 0.05$). Note that $n < 100$ as not all students who produced posters went on to complete the EMA

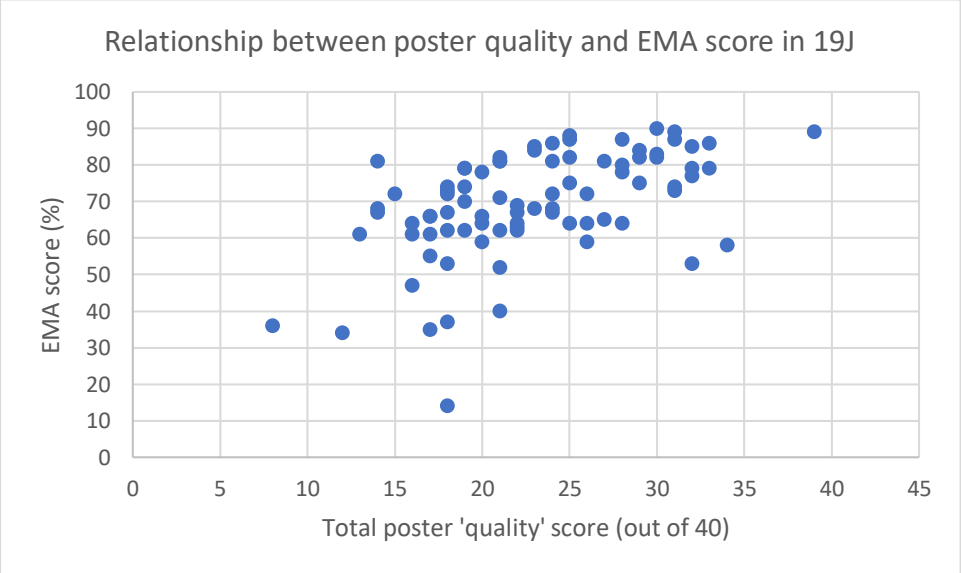

Figure 4(b): Relationship between total poster 'quality' score and EMA score in 19J ($r = 0.54$; $n = 84$; $p < 0.05$). Note that $n < 100$ as not all students who produced posters went on to complete the EMA

***In summary comparison of 19J and 18J**:*

- A high proportion (81 %) of posters in the 19J sample covered Antibiotic Resistance and most posters covered biology/life sciences and health sciences. This was an increased proportion compared to 18J.
- The research question was usually stated clearly but fewer posters described the methods and/or compared them than in 18J.
- Students still struggled with some aspects of the poster, particularly suggesting appropriate future research, evaluating quality of the scientific articles and using figures effectively to present results, but this was done better than in 19J.
- Feedback was better done in 19J than 18J, suggesting that the message that they need to focus on scientific content rather than appearance might be getting through.

- There was an improvement in poster quality and elements thereof in 19J compared to 18J, which was statistically significant for application, evaluation and overall poster quality.
- This suggests that the small changes to guidance in terms of the poster tutorial making more of an emphasis on scientific 'quality' and the 'top tips' document may have been helping students to develop these skills.
- There is a positive correlation between poster quality and subsequent EMA score.

Focus group findings

We performed thematic analysis on the transcripts of the recordings – these were coded using NViVO software. This helped us to identify groupings within our initial 'top-down' codes and helped us identify key themes and subthemes. These are summarised in Table 5, below:

Constraints • Time pressure • Assessment
Academic challenges • Researching and preparing poster • Selecting posters and giving feedback
Skills and experience • Appreciation of value of feedback • Skills development • Experience of 'real' science
Personal development • Interest and enjoyment • Building confidence • Social learning

Table 5: Themes and subthemes identified from student focus group discussions

These themes and qualitative data are discussed fully in our paper published in *IRRODL*, entitled *'Evaluation of higher-order skills development in an asynchronous online poster session for final year science undergraduates'* (Duckworth and Halliwell, 2022).

Our findings, summarised in the paper, were that S350 students recognised the role of the student conference (and poster session) in developing and demonstrating a range of skills beyond their 'academic knowledge', relating to understanding, application, critical evaluation and communication. They valued the opportunity to give and receive feedback and appreciated the insight it gave them into 'real' science and development of concepts. Students mentioned personal benefits they gained such as enjoyment and increased confidence.

Students also commented on the constraints and academic challenges they had encountered; for example on constraints some students felt time pressurised and limited in that the conference and their contributions were being assessed and would have enjoyed an informal/optional student conference. They also mentioned academic challenges in deciding what to include in their own posters and how they selected posters to give feedback on and the form of that feedback.

Impact

An impact evaluation framework for Scholarship of Teaching and Learning (Minocha, 2021) has been very useful in helping us to evaluate the impact of this work. The impact of this project has been categorised according to an SOTL evaluation framework:

Student experience
It is very difficult to assess if our work has led to any improvement in either TMA3 or EMA scores, however the statistically significant improvement in evaluation and understanding might have impact on student behaviours in their final project modules or in further studies they undertake.

Students identified the conference as being a 'high-point' of their studies and one outcome of our findings are recommendations that students have other opportunities to take part in similar activities whether assessed or optional. We provide through our studies strong evidence of the value of such interactions on learning enhancement and student enjoyment/experience on a module.

Teaching
Our project has impacted on the teaching practice of ourselves and other S350 tutors. Our 'top tips for students' has also served as guidance for tutors in how to offer practical guidance to students on how to select and evaluate research articles, how to limit the scope of posters so that they are focused, and that meaningful comparisons between articles can be made by students in their posters and audio presentations.

There is significant potential impact of our work outside the university as the assessment of asynchronous poster presentations is not limited to a specific discipline and is widely applicable. It is highly relevant to online and distributed learning institutions as an assessment format, and also in many situations when a synchronous format is not practical. The covid pandemic of the last two years has heighted HE interest in online learning, so our published findings may inform the adoption of asynchronous poster sessions across the sector.

Learning design
One potential impact on learning design that could be applicable in other modules is that a student conference involving poster presentation and the giving and receiving of feedback can be used to help students articulate key higher-level or employability skills. Students provided insights on how they approached selecting posters, often selecting what they perceived as 'middling' posters where there was more opportunity to give constructive, critical feedback and where they felt confident in their understanding of the science.

In designing conference activities in the future the shared student experiences we found could be used to help design and structure activities to encourage students to give feedback outside of their 'comfort zone' as a means to them developing evaluation confidence – making judgements about the information in posters, the validity of comparisons and the quality of work against criteria, and being able to provide constructive criticism (Bloom, 1956).

Due to module resourcing issues only minimal changes to teaching could be made to S350, but future modules might look at this work and design similar activities as part of the learning process, appropriate to the level of study.

Other impacts
Through, in part, our work on this project as scholarship leads, we have both been able to reflect on our own teaching practice and inform the practice of others and inspire other ALs to submit their own proposals to eSTEeM. We used these experiences and reflections in our submissions for Senior Fellowship of the Higher Education Academy, via the OU's Applaud scheme. Both of us were successful and have been awarded SFHEA status.

Reflection on methods

There were a number of challenges to our research, and where possible we tried to mitigate any negative impacts these had on our students first and foremost, and on the validity of our methods and findings.

The most significant challenge was due to the COVID-19 pandemic; the 19J student conference started only a few days after a national lockdown came into force in the UK. Students might have been time-pressurised or under significant stress and might not have been able to engage as much as they would have liked with the poster preparation and/or interacting with other students and providing feedback. So our additional guidance to students might not have had as significant an impact as it might have. However, we did see improvement in overall poster quality and in feedback on the scientific content of posters.

We decided that it was not appropriate to send out emails to recruit students to the focus groups, as other more essential communications were being sent to all students regarding changes to assessment and exams and we wished to minimise any stress. Therefore, we asked for volunteers to participate. Our focus group participants might therefore have not been representative of the wider student cohort and are likely to be those who were motivated and engaged with the module to begin with. However, they were academically diverse.

The COVID-19 pandemic also meant we were unable to conduct face to face focus groups; this had the advantage that students who might not have been willing or able to travel could participate. For the online focus groups the advantages of using student facilitators were that students would feel confident no one was 'assessing' their responses so they could be honest and open in their comments. Our two facilitators were experienced in using Adobe Connect and both were confident in group situations, we had briefed them on the questions and when to use prompts and discussed what we wished to achieve. However, we did not provide any formal training or practice; neither of the facilitators had studied S350. These two things resulted in unforeseen consequences in the focus groups.

In the first focus group a student made an incorrect statement about the student conference saying that it did not contribute anything to the final module outcome, when in fact the marks contribute some 10 % toward the final grade (as well as the work being developed further in the EMA). The facilitators did not realise, sympathised with the comment about wishing it did, and then carried this incorrect information into the next focus group and raised it there. In the second focus group no student corrected their error and it could have led to unintentional bias or skewing of comments. One useful outcome of this though, is the realisation that assessment strategies are poorly understood or engaged with even at level 3, where module outcomes have a significantly greater impact on degree classification than at previous levels.

Because our facilitators were confident in using AC and speaking in tutorials they were surprised that students who had volunteered for focus groups were often unwilling to talk and so would 'fill the gaps' whilst waiting for chat contributions to appear. This leads us to reflect that when face to face focus groups are not possible the platform for online focus groups needs to be considered carefully. Adobe connect is familiar to students but if all cameras are not enabled then both students and facilitators lose the visual clues and body language, so that nuance, subtlety and encouraging the contributions of shyer participants is lost. Another platform such as Teams or Zoom where cameras are usually enabled might have worked better.

Our recommendations, based on these experiences, are still that student/peer facilitators do encourage a different and more open, honest discussion but that they must have opportunity to practice and reflect on their approach and be given supportive constructive feedback after their practice from experienced facilitators. The platform to be used needs to be carefully considered and the students should have more familiarity with the module or the topic being investigated by the focus group. Maybe we should have done a quick debriefing after each focus group too. We are not sure that a true 'focus group' with minimal intervention by facilitators (and participants interact primarily with each other rather than with the facilitator) was achieved or even if it is anything other than very challenging to achieve this for any facilitator in an online environment – rather we achieved 'group interviews'. (Cohen *et al.* 2001)

For one academic conference we decided to do a poster presentation about this project, rather than an oral presentation with slides. We did this deliberately, to go through the same challenges as our students in describing our aims, methods, findings and implications in a limited space in a visually appealing manner. Through doing this we fully came to appreciate the skills, learning and effort S350 students put into their posters and feedback and we are full of admiration for their success in this difficult challenge.

Dissemination and deliverables activities

Can an asynchronous student conference in Open Studio develop students' critical evaluation skills? (Oral Presentation). 9th eSTEeM Annual Conference, 29th April 2020

Can an asynchronous student conference in OpenStudio develop students' critical evaluation skills? (Oral Presentation). Horizons in STEM HE Conference, 2nd July 2020

Student and tutor experiences of an online conference in a changing HE landscape (Poster Presentation). Advance HE STEM Conference, 28th January 2021

Duckworth, J. and Halliwell, C. "Evaluation of higher-order skills development in an asynchronous online poster session for final year science undergraduates". *The International Review of Research in Open and Distributed Learning,* vol. 23, no.3 [Online]. Available at https://www.irrodl.org/index.php/irrodl/article/view/6238/5718 (Accessed 2 Sept 2022).

Figures and tables

Figure list

Figure 4(b): Relationship between total poster 'quality' score and EMA score in 19J ($r = 0.54$; $n = 84$; $p < 0.05$). Note that $n < 100$ as not all students who produced posters went on to complete the EMA

Table list

Table 1: Mean scores (from 1 – very poor/not attempted to 5 – excellent) for eight measures of quality criteria for 18J and 19J posters

Table 2: Frequency of 18J posters scoring against each criterion (from 1 – very poor/not attempted to 5 – excellent).

Table 3: Frequency of 18J posters scoring against each criterion (from 1 – very poor/not attempted to 5 – excellent).

Table 4: Comparison of poster scores for combined criteria between 18J and 19J (* denotes

significant at $p < 0.05$ based on Mann Whitney U with normal approximation applied). Table 5:

Themes and subthemes identified from student focus group discussions

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University approval processes

If your project required specific approval from university committees, please provide the appropriate information below. This is a necessary requirement for future publication of outputs from your project.

- *SRPP/SSPP – Approval from the Student Research Project Panel/Staff Survey Project Panel was obtained according to the Open University's code of practice and procedures before embarking on this project. Application number 2019/115*
- *Ethical review – An ethical review was obtained according to the Open University's code of practice and procedures before embarking on this project. Reference number HREC/*3371

Data Protection Impact Assessment/Compliance Check – A Data Protection Impact Assessment/Compliance Check was obtained according to the Open University's code of practice and procedures before embarking on this project.

Appendices

Appendix A – Metrics for: Can an asynchronous student conference in OpenStudio develop students' critical evaluation skills?
Appendix B – Poster questionnaire

Appendix A

Project staff	
Number of academic, academic-related staff who contributed to the project	2
Number of days spent working on the project for all staff involved, including the project lead(s)	30
Number of ALs and number of days contribution to the project	2 ALs project leads 30 days 1 AL coordination exercise for 19J 1 day
Number of students involved as co-researchers/co-collaborators on the project and any student incentives provided	
Student survey data (if applicable)	
Number of students surveyed	
Number of student respondents	
Student interview data (if applicable)	
Number of students interviewed	
Student focus group data (if applicable)	
Number of students involved either as interviewers or interviewees	2 student facilitators - £25 gift voucher X student participants - £25 gift voucher
AL survey data (if applicable)	
Number of ALs surveyed	
Number of AL respondents	
AL interview data (if applicable)	
Number of ALs interviewed	
AL focus group data	
Number of ALs involved either as interviewers or interviewees	10 AL participants

Appendix B – Poster questionnaire

Poster Evaluation Checklist 19J

Question #1

1

Response is required
*

Enter a Key ID (range 1-100)

Do not use thousands separators.

Question #2

2

Response is required
*

Did the student upload the poster and all required elements by deadline of 20th March?

○ Yes ○ No

Question #3

3

Response is required
*

Were all the required elements (poster, audio, image, keywords) uploaded to the correct slots?

○ Yes ○ No

Question #4

4

Response is required
*

Which topic does the poster relate to?

○ Antibiotics
○ Diesel
○ Icy Moons
○ Nuclear Legacy
○ REE

Question #5

5

Response is required
*

Which study discipline is most relevant?

○ Chemistry
○ Physics
○ Earth science
○ Environmental science
○ Life/Biology
○ Health
○ Not sure

Question #6

6

Response is required
*

Is there an introduction or equivalent?

○ Yes
○ No
○ Not sure/unclear

Question #7

7

Response is required
*

Is there a clear research question (or aim/hypothesis)?

○ Yes
○ No
○ Unclear / not sure

Question #8

8

Response is required
*

Are the methods clear?

- ○ Yes
- ○ No
- ○ Partially

Question #9

9

Optional: Briefly state any comments regarding methods (max. 100 characters)

Question #10

10

Response is required
*

Does the presenter make comparisons in methods, locations or contexts of studies?

- ○ Yes
- ○ No
- ○ Partially

Question #11

11

Response is required
*

Has the presenter included figures?

○ Yes ○ No

Question #12

12

Response is required
*

Are the figures appropriate?

- ○ Yes
- ○ No
- ○ Partially

Question #13

13

Optional: add any explanation of why figures only partially relevant or any other comments on figures (max. 100 characters)

Question #14

14

Response is required
*

Is there a results section?

- ○ Yes
- ○ No
- ○ Unclear / not sure

Question #15

15

Optional: If marked as unclear give brief explanation or any other comments (max. 100 characters)

Question #16

16

Response is required
*

Is there a summary or conclusion?

- ○ Yes
- ○ No

○ Not sure / unclear

Question #17

17

Optional: If summary unclear please explain or add any other relevant comments (max 100 characters)

Question #18

18

Response is required
*

On a scale from 1-5 (1 being low and 5 being high) how much has the student attempted to interpret results and draw conclusions?

Interpret results

Draw conclusions

Appropriate future studies

Question #19

19

Response is required
*

On a scale of 1 to 5 (1 being low and 5 being high) how much has the student attempted to evaluate the quality of the two academic studies?

Quality of each in turn

Direct comparison

Question #20

20

Optional: How has student attempted to evaluate quality of the two academic articles? (max 200 characters)

Question #21

21

Response is required
*

How is good practice (CREATES) demonstrated? Max: 200 characters

Question #22

22

Response is required
*

On a scale of 1 to 5 (1 being low 5 being high) has the presenter demonstrated a deeper subject knowledge?

Through language

Through use and amendment of figures

Through contextualising

Question #23

23

Response is required
*

How has the presenter demonstrated deeper subject knowledge? Max: 200 characters

Question #24

24

Response is required
*

Is layout of poster clear?

○ Yes ○ No

Question #25

25

Response is required
*

How is language used to communicate level 3 science? Max: 200 characters

Question #26

26

How does the presenter effectively link visuals to text? Max: 200 characters

Question #27

27

Response is required
*

On a scale of 1 to 5 (1 being low 5 being high) how effectively does the presenter relate visual elements to poster text?

Actual images

Annotation of images

Figure titles

Question #28

28

Response is required
*

What of the following does the main feedback focus on?

- ○ Appearance
- ○ Content
- ○ Both equally

Question #29

29

Response is required
*

Was effective evaluation of scientific content shown by evaluator?

- ○ Yes
- ○ No
- ○ Partially

Question #30

30

Response is required
*

How was effective evaluation of science content demonstrated by evaluator? Max: 200 characters

Question #31

31

Optional: discuss any response or follow up to feedback. Max: 200 characters

Close this window