Exploring the use of a tutor-briefing labcast to support associate lecturers in a level 2 Physical Sciences module

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Executive summary

Tutors who work in distance education often have less opportunities to participate in important, practical science experiences with colleagues. Using synchronous technologies to facilitate real-time, simultaneous interaction and communication between individuals can help to replicate face-to-face teaching and promote peer interaction and collaborative opportunities.

This project evaluated the use of a live, interactive web broadcast (known as a labcast) as part of a tuition strategy to introduce associate lecturers (ALs) to a new planetary science experimental investigation and to explore the extent to which the briefing would fit with their tuition. We also investigated whether such an intervention would encourage more routine AL involvement in labcasting alongside the module team; fostering a sense of community and enabling ALs to promote labcasts to the student body more effectively.

The report found that ALs generally perceived that the labcast would help enhance their knowledge of the experiment before the live event. In addition, the majority felt optimistic that they could apply the information presented to their teaching. However, post-evaluation feedback revealed mixed attitudes as to how well the labcast aligned with their expectations. Focus group data further revealed some misunderstandings of the affordances of labcasts and tutors' preferred environments for briefings.

The report recommends that ALs are given requisite training in the use of web broadcasts before a live event. Module teams that plan and deliver labcasts should prepare Stadium Live introductory videos to guide tutors through the platform and to demonstrate the differences from Adobe Connect. An opportunity to submit questions before a labcast should be offered as a way for the moderator and presenter to engage more effectively during the live event. Audience polling or widgets should reflect real, contextualised questions that are appropriate for the audience. Encouraging AL involvement earlier should be factored into the labcast design. The standard practice of tutor-briefings via Adobe Connect may be more useful in most instances. However, where experimental investigations and demonstration of apparatus are being introduced, the video resolution and quality available in labcasts are more superior.

Aims and scope

The project's objective was to explore the extent to which a tutor-briefing labcast supported ALs own tuition strategy. There were several aims to investigate: (1) whether the intervention of web broadcasts would encourage ALs involvement in labcasting alongside the module team; (2) whether using labcasts in this way foster a sense of community and (3) whether the intervention help ALs better promote labcasts to their student groups.

SXPS288 'Remote Experiments in Physics and Space' is a practical science level 2 module for students on the physical sciences qualification in either a BSc in Physics or a Natural Science degree with an Astronomy and Planetary Science pathway. The module was rewritten and first delivered in its current form in the academic year 2019/2020 and includes a new planetary science experimental investigation. There were ten Associate Lecturers (ALs) and 210 students at the start of the module.

Four main phases were conducted: (1) a pre-labcast evaluation questionnaire to survey tutors on prior labcast experiences and motivations to attend, (2) observations of tutors' interactions within the live event, (3) a post-labcast evaluation questionnaire on experiences and attitudes after the event, and (4) focus groups to explore the experiences and perspectives of the labcast. All ten ALs were invited to participate in the questionnaires and focus groups. Quantitative and qualitative data were collected from both online questionnaires (n=6) in the form of Likert scales and open-ended comments, and a thematic analysis was conducted on tutors' experiences and perspectives during a focus group discussion (n=3). System data logs were collected and analysed for interaction patterns.

Background

There has long been a recognition that developing teachers' content knowledge, skills and collaborating with others can lead to more collegial relationships and a sense of community (Karam *et al.*, 2018); better problem-solving (Babinski, Jones and DeWert, 2001) and improved student learning, motivation and achievement (Knight, Tait and Yorke, 2006). However, the nature of part-time tutoring is often intersected with issues around integration into the broader teaching environment (Beaton and Gilbert, 2012), which can make peer interaction and collaborative opportunities for learning challenging. Distance education tutors often have fewer opportunities to engage in meaningful, practical experiences (Rienties, Brouwer and Lygo-Baker, 2013) and may participate across multiple communities of practice (CofP) and learning environments to learn new knowledge and expertise in an area (Wenger, McDermott and Snyder, 2002). Nonetheless, there is a need to bring geographically separated central academics and tutors together to build cohesive teams for online teaching (Baxter, 2019).

Video is often used in experimental instruction, especially where the observation involves equipment that is large, expensive or dangerous (Bates, 2015). Educators emphasise the value of video in facilitating 'narrative visualisation' and 'dynamic modelling' (Laurillard,

1993; Shephard K, 2003). However, conventional video has been critiqued as a narrative medium, often resulting in passive learning if not used with other pedagogically designed tools (Laurillard *et al.*, 2018). Several studies have reported that real-time communication such as live-streamed video, instant messaging and audience polling systems can help foster engagement and understanding, active participation and a sense of learning community (Hrastinski, Keller and Carlsson, 2010; Martin, Parker and Deale, 2012; Morrell and Joyce, 2015; Freguia, 2017; Haresnape, Aiken and Wynn, 2020).

Context

Labcasts are large-scale, live, interactive web broadcasts from the OpenScience teaching labs at Walton Hall. They can accommodate hundreds of students, live-stream high-definition video and audio, incorporate interactive audience polling (widgets) and real-time text-chat function. The webcasts were set up to allow students to observe and engage in practical science through an interactive experience with the module team and subject experts. The Stadium Live platform hosts the labcasts. A production team mix the live stream and integrate slides, video and live feeds of remote instruments and experiments.

On the SXPS288 module, students carry out three experimental investigations: Astronomy (either radio or optical astronomy), Physics (a quantum mechanics experiment involving the scattering of X-rays) and Planetary science (Mars atmosphere and surface). For the latter, students use space instrumentation technology to analyse samples of gases representing planetary atmospheres. To carry out the Gas Cell remote experiment, students book slots in advance for a calibration activity and an infrared spectroscopy activity. Each experiment is introduced through a labcast, presented by the module team and selected experts and researchers. These labcasts are popular and student cohorts across schools in STEM have reported positive attitudes on engagement, perceived learning outcomes and a sense of community (Brown, Collins and Braithwaite, 2021).

Typically, the labcasts have been produced and filmed centrally in the OpenScience laboratory and studios, making it difficult for ALs to participate or present directly. However, some do join online and contribute to sessions by answering student questions in the chat. While the ALs were familiar with the Astronomy and Physics projects from previous module versions, the Mars atmosphere project was new for the 2019J presentation, with both the project materials and the remote Gas Cell experiment being designed entirely from scratch.

Adobe Connect (a video conferencing platform) and Stadium Live (a web broadcast platform) can support module-wide events and tutorials in STEM modules. Both offer integrated interactive tools. The use of either platform is determined by the affordances and the pedagogical purposes and aims. Table 1 below outlines some contrasts between the different properties across both mediums.

Table 1: Contrast of properties in Stadium Live and Adobe Connect tutorials or module-wide events

Properties	**Stadium Live Lab-based Broadcasts**	**Adobe Connect Online Tutorials**
Number of students	Up to ~ 1,000	Up to ~ 100 (depending on license)
Focus	Lab-bench demonstrations, and experiments, field site	Whiteboard, shared screen
Interactive affordances	Pre-prepared Q&A widgets, text-chat box	Break-out rooms, polling, raise hand, text-chat box, microphone, camera
Instructional strategy	Direct instruction, interactive instruction	Interactive instruction, differentiating instruction
Technology	Multiple cameras and audio, video mixing desk, multiple uses of assets - e.g., live video feeds, slides	Restricted camera on device, external webcam, USB camera
Buffering delay	30-sec buffer delay - allows for higher resolution video	No buffer - dependent on local area network
Logistics	Production team, presenter(s), chat moderator	Tutor and assistant

The decision to use labcasting was due to its technological capabilities. The Stadium Live platform allows for video to be streamed and broadcast at a higher resolution. To stream video, the system needs to encode every frame, send it through the network and decode it again. The delayed buffer allows the computer time to manage that process. During that buffer time, question-and-answer widgets can be utilised to create an interactive experience. Although Adobe Connect can accommodate streaming video, issues around bandwidth are common. In Adobe Connect (and other video conferencing tools) the speed is not always managed (i.e., no buffer) so video can speed up or slow down depending on the level of network traffic. Even the most capable users can often have trouble webcam

streaming with sophisticated cameras and capture devices, resulting in bad and grainy video, according to Adobe Connect's user community forums.

The technology and expertise available in labcasting allow viewers to have a rich, visual experience of tightly framed and close-up shots of experiments and demonstrations while interacting via the widgets and text-chat function.

The ALs were invited to two labcasts presented by the designers of the experiment - the first of these, for ALs only, was intended to introduce them to the equipment and serve as a follow-up briefing for the Mars project experiment. Secondly, the ALs also took part in the main labcast for students, involving a live presentation of the Gas Cell experiment. Both labcasts were available as recordings. In this way, the labcasts served both to introduce the new experiment to the tutors and give them the experience of taking part in a labcast session to understand the student experience better.

The project's main aim was to explore the extent to which a tutor-briefing labcast supported ALs tuition and whether it could support a sense of community. The main research question for the project was:

- How does a labcast support module tuition strategy and promote a sense of community across the ALs and module team?

Research activities

Several research activities were carried out prior to the labcast event. This section discusses the planning and production process, recruitment and data collection phases.

Labcast planning

Before the main phases of the project could be executed, the production team were tasked with the three-stage production process. That is, the setup and scripting, filming, and subsequent editing of the labcast. The labcasts were designed and produced by a media producer from the STEM, Web and Interactive Media (SWIM) Team; a vision mixer from the Knowledge Media Institute (KMi); the module team chair and two presenters from the School of Physical Sciences.

The 30-minute tutor-briefing labcast was planned and coordinated alongside the student one, which was a more complex and extended production. Storyboard production, planning of studio layout and rehearsals are iterative processes. The script of the labcast can be seen in Appendix C.

Planning took place several weeks beforehand. The project leader was not involved in the overall planning process but attended the last planning meeting and observed the rehearsals and the live event. Figure 1 below shows the Gas Cell equipment and vision mixing during rehearsals.

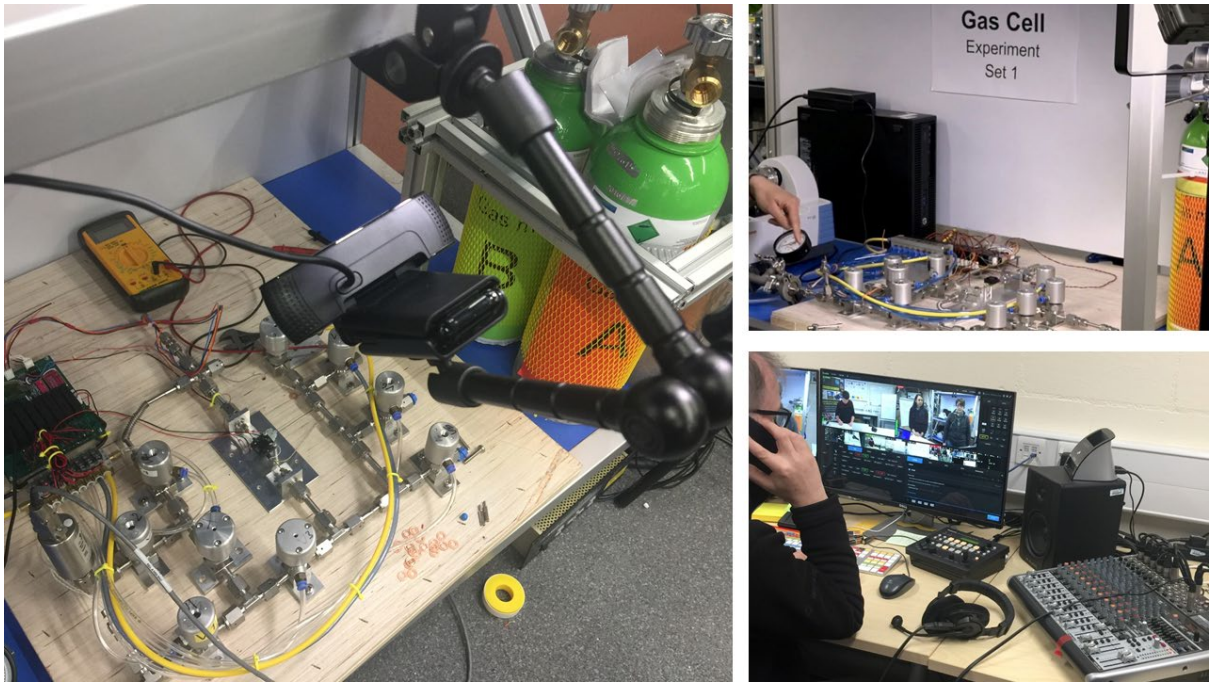


Figure 1: (left) birds eye view of gas cell experiment; (top right) presenter demonstrating valves; (bottom left) coordinating and vision mixing across labs

Recruitment

Ten ALs were invited to participate in the study and six ALs were recruited to the study. ALs were asked to complete the pre-labcast questionnaire; attend the live tutor-briefing labcast or watch the recording; complete the post-labcast questionnaire and attend a 45-minute online focus group. The labcasts ran just before the national lockdown. The lockdown inevitably impacted the data collection points and availability of the six ALs for the focus group discussion.

Data collection

Before the tutor-briefing labcast, a pre-labcast evaluation questionnaire (see Appendix D) was posted to the tutor's website and closed a few minutes before the live event. Questions categories were prior experiences of labcasts, demographics, motivations, applicability and sense of community.

After the live event, interaction data logs were extracted from Stadium Live to analyse text data from chat transcripts, frequency data from widgets, viewing figures for the recording.

Following the labcast, a post-evaluation questionnaire (see Appendix E) was administered several days later. Categories of questions centred on participant reactions to the session, including motivations, usefulness and applicability, overall benefits gained, content and delivery, sense of community and commitment to future action. A few weeks later, a focus group was set up with three ALs and one moderator to gather richer data on their opinions and triangulate survey data. Focus group data were transcribed and anonymised before

analysis. Data were analysed using descriptive statistics in Excel and NVivo for thematic analysis on the qualitative data. Constant comparison was carried out to check the consistency of themes.

Findings

This section reports on the quantitative and qualitative findings to answer the research question. The data was collected across methods and include observations, questionnaire and focus group data.

Observations of interaction

Seven (out of 10) ALs logged on and attended. The remaining unique users were the senior staff tutor who helped moderate the chat, the curriculum manager and the technical production team. The duration of the labcast was 30 minutes. There were 10 chat users and 74 chat messages. Figure 2 below shows the different categories of dialogue in the text-chat and their frequency. The most frequent number of responses after salutations were chat around audio-visual (AV) support and science chat. Science chat was social in nature, for example, “Can hear the pumps and gas going!”. The least type of dialogue was the prompting of questions.

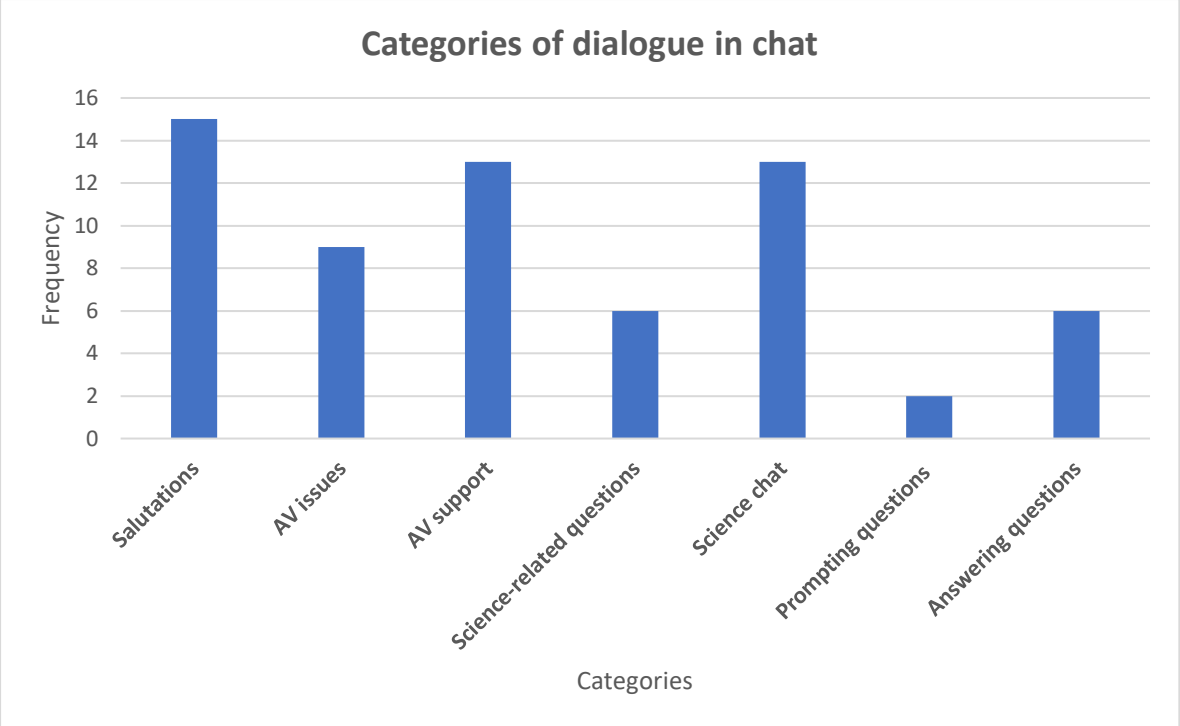


Figure 2: Categories of dialogue that occurred in the text-chat

The ALs also interacted with the widgets. Table 2 below shows the question and number of people who interacted with each question. Figure 3 illustrates a screen image of the various widget question type and interfaces.

Table 2: Number of tutors interacting with widgets

Widget 1. Where are you watching from?	Widget 2. What are the key hazards and safety consideration in lab?	Widget 3. Which gas component(s) cannot be detected in the IR spectrum of air?	Widget 4. To what extent was the labcast useful in understanding the gas cell experiment
7	4	7	7

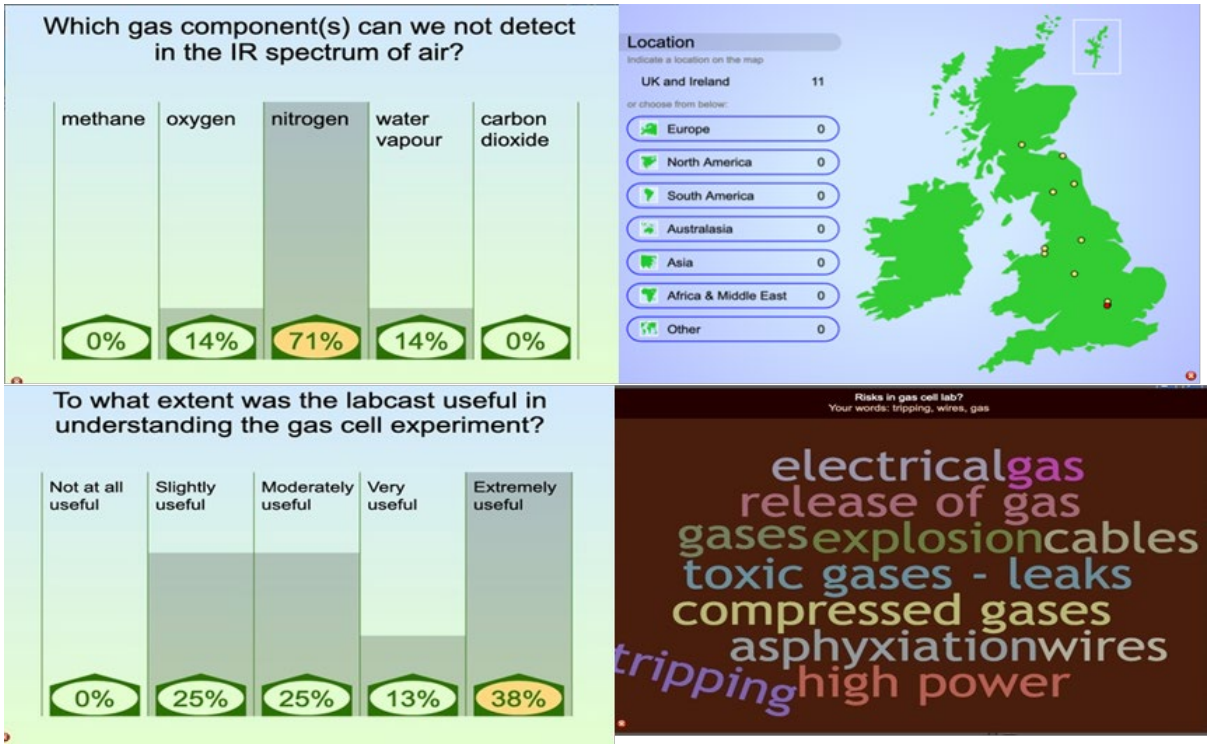


Figure 3: A screen image of the different widget interfaces

Quantitative analysis of questionnaires

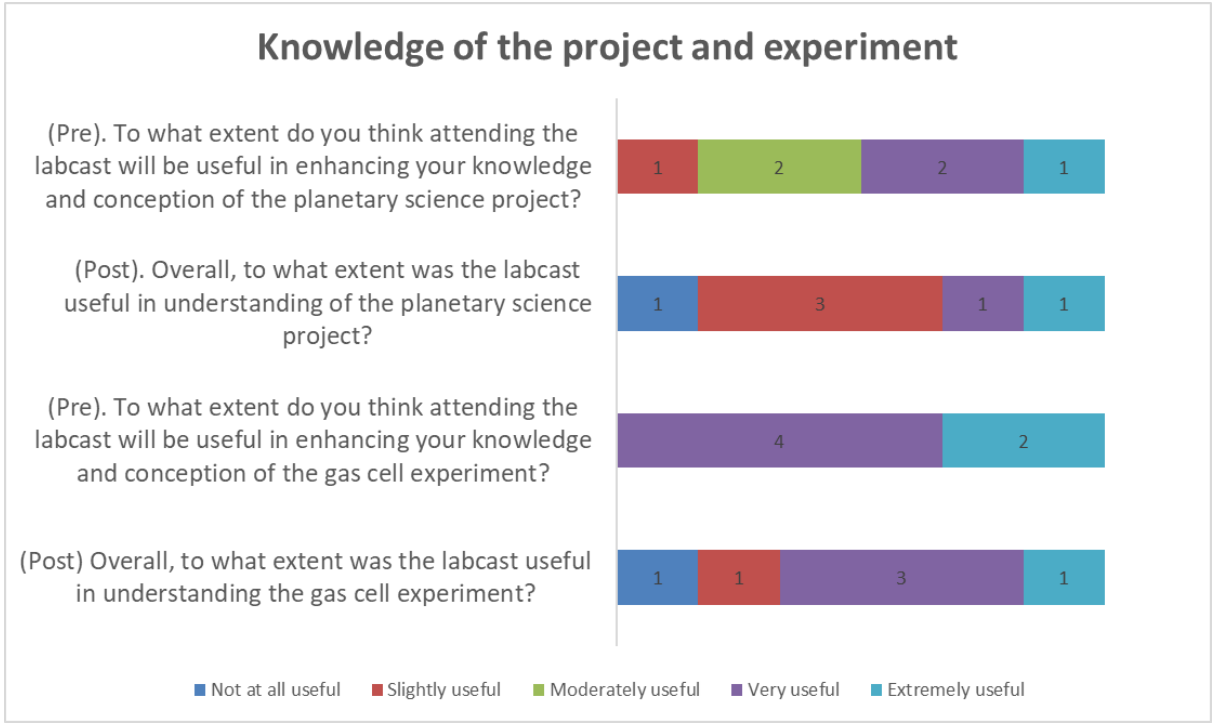
Demographic information for the respondents was collated (n=6). Five out of the six respondents identified as female and one male. Two ALs have worked at the OU between 5

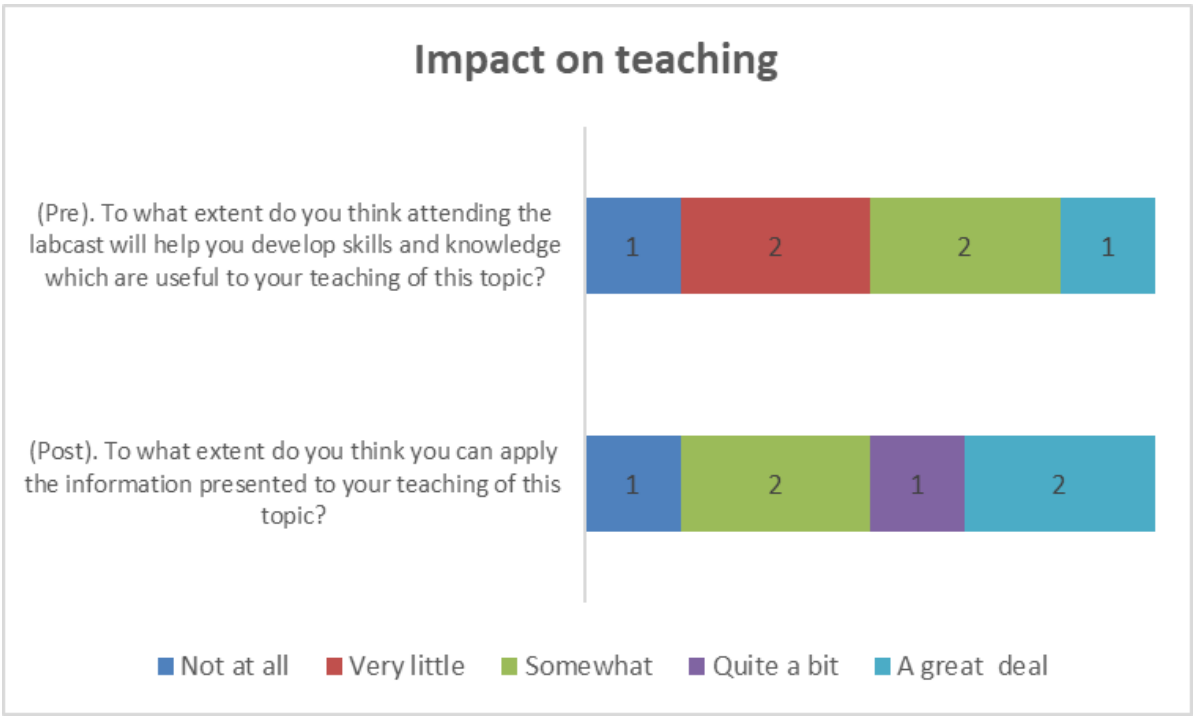
– 10 years, two between 11-19 years and two for 20 years or more. All had previously attended a student labcast.

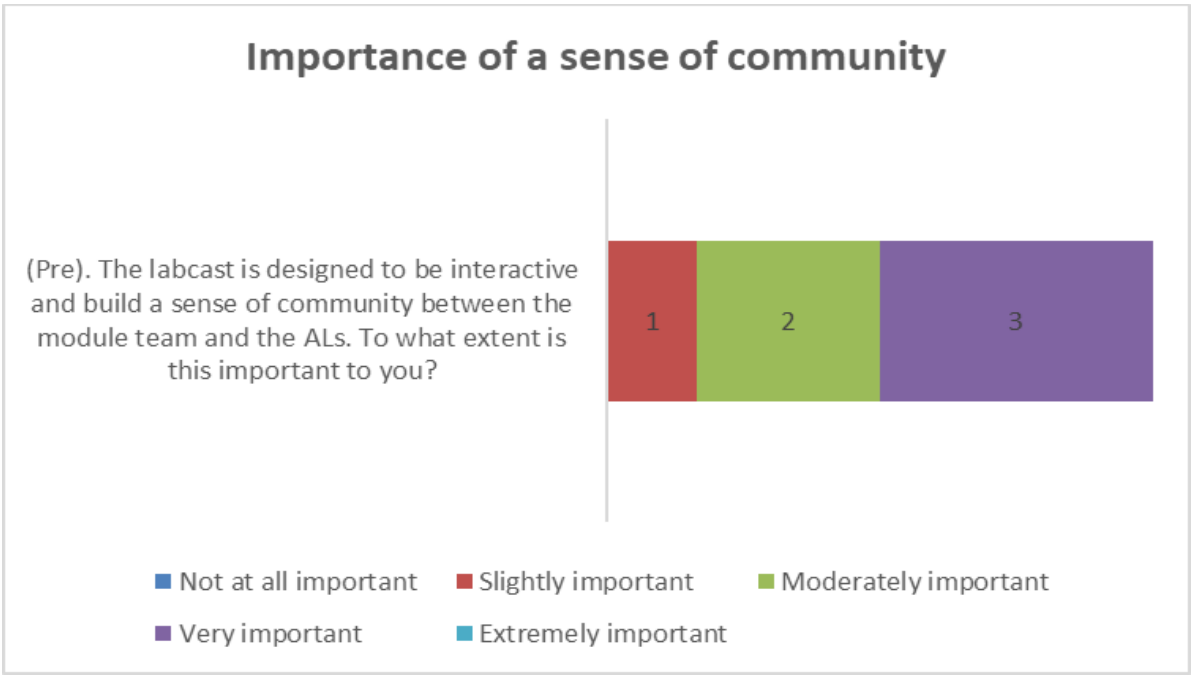
The results, summed for pre/ post surveys in Figure 4 below, show the comparative distributions of responses on questions related to perceived changes in knowledge, impact on teaching/tutoring and sense of community. The five-part Likert scale ranked from degrees of usefulness and importance.

There was a slight change in the perceived usefulness and applicability of the labcast before and after. Two tutors had higher expectations that attending would enhance their knowledge of the experiment. Three of the respondents had higher expectations that the labcast would be useful to their teaching and the other half perceived that there was no change. Half felt that the labcast would help develop skills and valuable knowledge for teaching the topic.

The majority felt positive that they could apply the information presented to their teaching after attending the labcast. All respondents indicated that a sense of community between themselves and the module team was important, but only half felt that the labcast helped achieve that.




Impact on teaching
(Pre). To what extent do you think attending the labcast will help you develop skills and knowledge which are useful to your teaching of this topic?
1
2
2
1
(Post). To what extent do you think you can apply the information presented to your teaching of this topic?
1
2
1
2
Not at all
Very little
Somewhat
Quite a bit
A great deal


Importance of a sense of community
(Pre). The labcast is designed to be interactive and build a sense of community between the module team and the ALs. To what extent is this important to you?
1
2
3
Not at all important
Slightly important
Moderately important
Very important
Extremely important

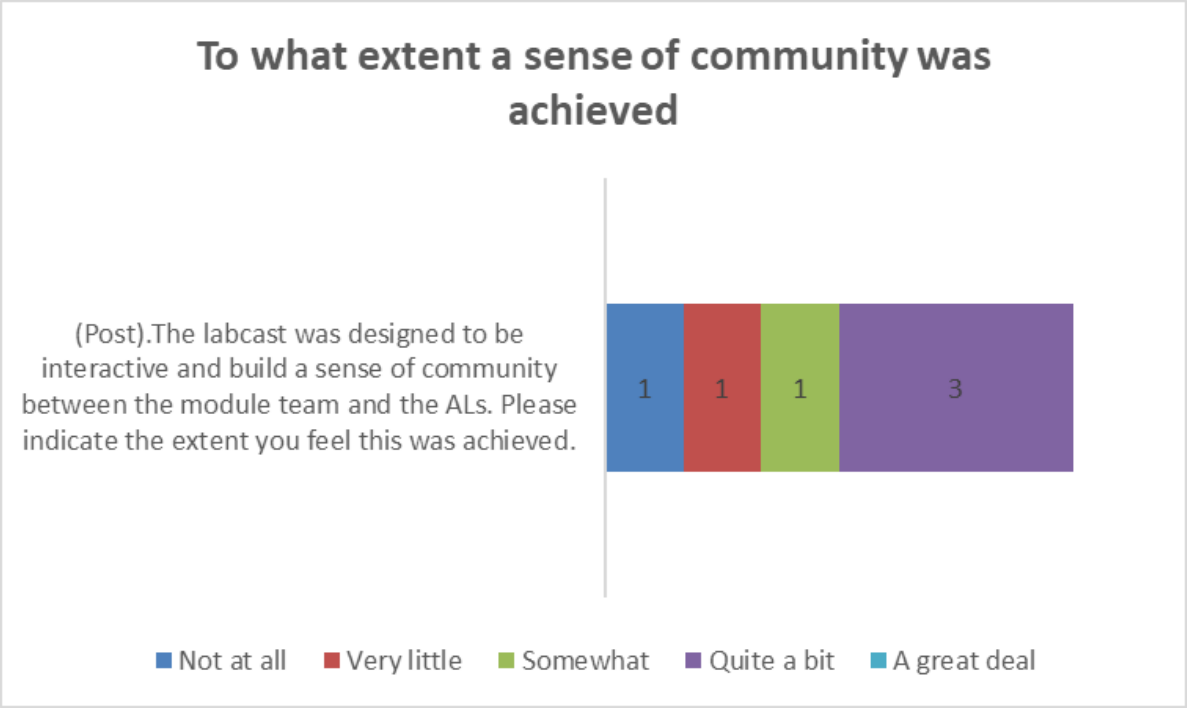
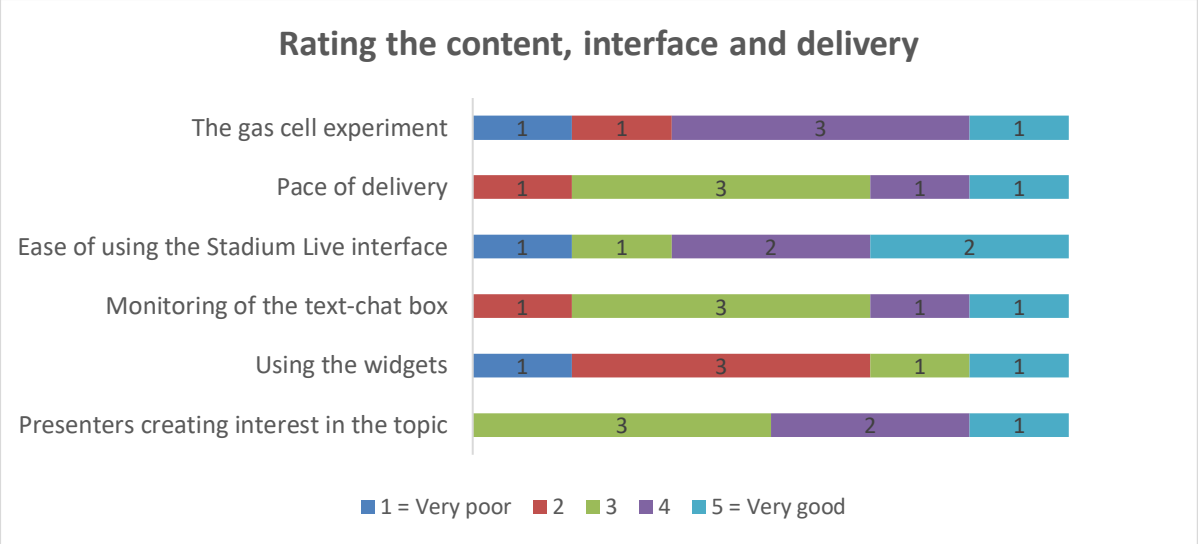


Figure 4: Pre/post responses from top to bottom for (a) perceived changes in knowledge; (b) impact on teaching; (c) sense of community

Figure 5 below shows the distributions of post-labcast responses on questions related to the content, delivery and interactivity and commitment to future action. The majority rated the tutor-briefing labcast positively. The gas cell experiment and ease of using the interface had the highest ratings. Four respondents perceived the use of widgets poorly. Regarding commitment to action, the majority would attend future labcasts on the module and promote to their tuition group. Half of the respondents would not moderate the text-chat or present a future labcast, and the other half would possibly do so if the opportunity arose.



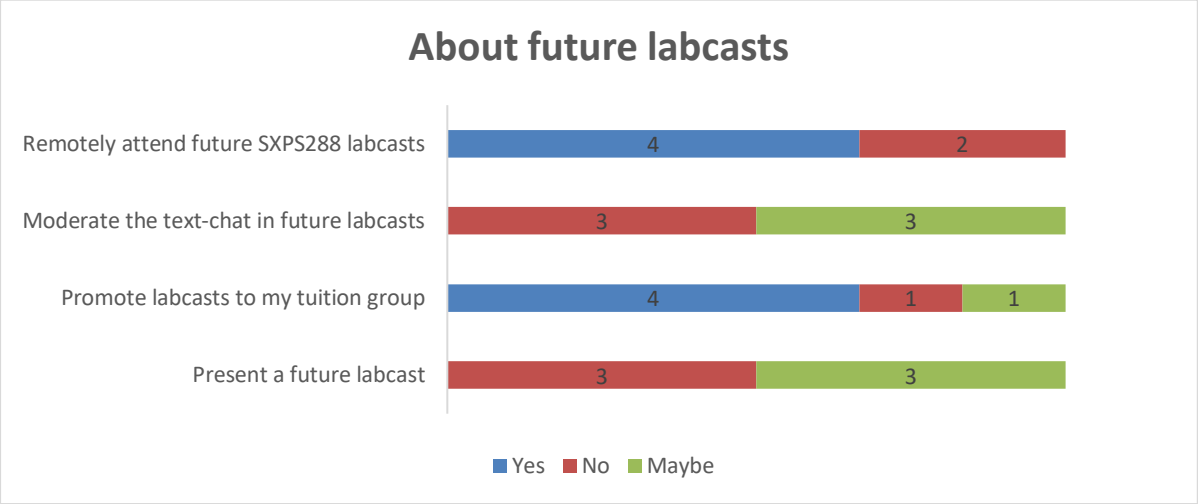


Figure 5: Post-labcast responses for (a) content, interface and delivery; (b) commitment to future actions

Respondents were asked to click as many as apply for soft impacts or benefits from the labcast. The highest-ranked were support from the module team, understanding the student experience and understanding the gas cell experiment. Generally, the tutors did not feel the event increased morale or answered their questions. However, half of the respondents felt they had gained greater confidence in the Mars project and an increased sense of community

Qualitative analysis of questionnaires

In open-ended sections of the survey, free-text comments were coded and grouped into themes using NVivo. In the pre-labcast survey, two questions were asked around motivations to attend (i.e., Q6) and student impact (i.e., Q9). All six respondents contributed answers.

Table 3 shows a matrix chart of the most coded sub-themes, which are properties of the parent theme *pedagogical issues.* For example, the theme *familiarisation* referred to comments around gathering information, seeing, and understanding how to use the equipment. Comments which referred to confidence, clarity and helpfulness were categorised under the theme *reassurance,* and comments indicating the meeting of colleagues or the planning, evaluating and talking about teaching practice were coded under the theme *collegiality and collaboration.* Comments stating picking up ideas, tips and potential pitfalls to advise and support students were grouped under the theme *sharing*. The main themes to emerge were *familiarisation* and *sharing.*

Table 3: Most coded themes in pre-labcast survey

Survey questions	Familarisation	Reassurance	Sharing	Collegiaty and Collaboration
1 : Q.9. How will particpating impact student group?	1	1	4	0
2 : Q.6. What do you expect to gain from partipating?	4	1	2	1

ALs were invited to add any other comments they wished to make about the various components to support experiments on the module. Four respondents contributed answers, with one stating they did not wish to comment. The comments revealed opinions on student motivation, engagement and community. One tutor who selected the extent of the importance of SoC as 'moderately important' offered further remarks:

> *I just want to explain my previous answer. I think that a sense of community among ALs and the Module Team is very important. However, I think that already exists via the forum and module briefings. I don't expect the labcast to enhance this (RESP01).*

In the post-labcast survey, tutors were invited to add any other comment about the tutor-briefing labcast. All six respondents contributed answers. Table 4 shows attitudes on labcast value and applicability. The result is scoped at question 3: How did your experience of the tutor briefing labcast align with your expectations?

Table 4: Most coded themes in post-labcast survey

Themes	Positive	Neutral	Mixed	Negative
Familarisation	2	0	2	0
Performative over substance	0	0	0	1
Labcast comparisons	0	0	2	0
Sharing	0	1	1	0

The main coded references were at the theme *familiarisation*, showing that tutors hoped to gather information, see and understand the equipment and the labcast met that expectation to varying degrees. One tutor mentioned that the labcast had aligned well in that they had expected to get an overview and see the interface and experiment in action.

Overall, the other themes – *labcast comparisons* and *sharing* included more mixed attitudes. One tutor commented on their expectation of the tutor-briefing labcast and how it compared to the student one:

> *I had been expecting that it would be distinctively different from the student version, with more inside information for us on the analysis which the students would need to undertake; their expected results and possible pitfalls (RESP02).*

However, one comment coded under *performative over substance* revealed a negative response to the labcast and its usefulness. For example, RESP04 mentioned, "It was less useful than I'd expected. There was no materials presented that required the presenters to be in a lab".

Qualitative analysis of a focus group

A tutor focus group was conducted with three ALs and one moderator who was a visiting fellow and topic subject specialist. The discussion was held in Adobe Connect and was semi-structured around four broad themes: experiences of the tutor-briefing labcast, tutoring students in the project and experiment, a sense of community and future labcasts. Although there was a questioning route for the discussion, an inductive approach allowed themes to emerge during the analysis. Table 5 shows the main themes and sub-themes identified from the focus group. The number in parentheses are the number of coded references.

Table 5: Main themes and sub-themes of discussion with number of coded references

Theme	**Sub-theme**
Pedagogical issues	asking questions (5) tutors as students (4) administrative (3) assessment (2)

Socio-emotional	apprehensions (4) authenticity (4)
Technology	affordances (5) alternative formats (8) labcast comparisons (9)
Sense of community	sense of community at module level (2) sense of community at labcast level (1)

Pedagogical issues

Two ALs commented on their ability to ask questions during the labcast. Their comments were intersected with questioning strategies in Adobe Connect. For instance, a tutor commented:

> *I had had the impression that this was a whole new tutors' labcast opportunity, and we were going to get more dialogue with them. I felt there was a disconnect between our ability to ask any questions and the people presenting; we couldn't talk to them directly like you can in Adobe Connect (RESP02).*

Tutors did not perceive themselves as having the participant or student experience, which was one of the intended project objectives. One AL commented:

> *Previously, I had tended to go to all the labcasts. I was familiar with the labcast format, and I was slightly surprised to see that the widgets were there just like they would be for the students. I thought, oh, why do we need all that? I thought this was the tutors labcast (RESP02).*

Tutors were more critical of the tutor-briefing labcast and favoured the Gas Cell student labcast, which followed. One tutor felt the tutor-briefing was simply a rehearsal for the student labcast. Another welcomed the idea of the tutor's labcast but felt that the presenters did a better job of running the apparatus and explaining in the student one. More ALs took notes from the student labcast.

Socio-emotional

One of the module's primary objectives of the labcasts is to allay student apprehensions in doing a new experiment. ALs reported different levels of nervousness and frustrations around booking slots in advance to practice doing the experiment and supporting their students. Several comments revealed their experience. For example:

> *I was pleased that they were given us the chance to do a labcast because it's a new experiment. It is something completely new to me, so I was pretty nervous about it, and I think quite a few of my fellow tutors were also nervous,*

particularly about knowing what to expect, the problems the students might have and that sort of thing […] By the time I got home, the window (i.e., to book a slot) had shut, and I couldn't try it out. So, it would have been really useful to have gone through that sort of procedure that I know others were able to do. So, I think I was more cast adrift than some of my colleagues. I know quite a few did try it out and did sort of have a go, and I didn't even have the chance to do that, so I was really relying on the tutors' labcast to tell me something (RESP05).

I did the experiment. It was very good to get that time even though it was a tiny little window before the students were let loose on it, but it was only the first part of the experiment, the calibration part I got this experiment wrong with the bit I was doing anyway. So, I began to feel stupider and stupider because other people were quite happy, they had managed to do this, that and the next thing and it had all worked wonderfully whereas I had got myself in a tizz (RESP04).

We are all recruited into the course through various specialisms and not necessarily in this area. I think there needed to be some recognition that perhaps for some of us, it is entirely new, and we needed more of the introduction the students got to it. As tutors, we are not all completely familiar with it, and I think that was something that perhaps they underestimated how much they needed to tell us because it is something new to a lot of us (RESP04).

The data show that the ALs also perceived the labcast to facilitate authenticity. For example, tutors reported on hearing the equipment and seeing the presenters:

It was nice to hear the equipment going clunk in the room and feel that it was a lab, and it was nice to see the academics there speaking to you and get the atmosphere, but I could have got that the same just by going to the students' labcast (RESP02).

Technology

The ALs perceived the affordances available in the labcast negatively, with many confused about what was available. For example, one tutor remarked that she could not work out whether she could speak because she expected the same tools as Adobe Connect (i.e., a microphone). Others mentioned problems with the live stream and Stadium Live interface. The data also confirms the number of audio-visual (AV) related comments in the text-chat data logs (see Figure 2, p.8). One AL commented on their preference for the use of Adobe Connect.

I feel very comfortable with the tutor briefs in Adobe because Adobe is basically my office. We are familiar with communicating via Adobe Connect; we communicate from it with our students. Because I feel so comfortable with it, I

am perfectly happy to chip in. I like the opportunity to hear everybody's voices, and I very much value it (RESP02).

Tutors offered alternatives in how the tutor-briefing could have been conducted. For example, one AL mentioned:

From the tutor's briefing point of view, we could have had a video of them in the lab to have heard the machines making the noises. If it is in Adobe Connect, they will be streaming the video in a window in Adobe Connect, we could then put our hands up and say, hang on a minute and ask them a question, and they could pause the video. We could ask them stuff directly, and they could have heard the questions, responded instantly and then started the video again. I would have thought that would have actually been better than the labcast situation where we really didn't need to see the student's widgets (RESP05).

Sense of community

The ALs had different opinions around SoC and to what extent labcasts fostered it. For example, one tutor commented on feeling a SoC at the labcast level among students. Another AL felt the labcast did not foster community:

Because we are familiar with Adobe Connect and familiar with using it and teasing each other on it, the labcast almost seems like a step backwards. I couldn't work out whether I could speak at the beginning of the first one. So, in a way, the tutor labcast un-fostered community (RESP04).

Discussion

The results of this study indicate that a labcast can support a module's tuition strategy and promote a sense of community (SoC) among ALs and the module team. This is achieved by familiarising ALs and allowing them to see, understand and ask questions on how apparatus and equipment works. The findings support previous studies, which found that OU tutors valued 'familiarisation activities' to help build confidence before using a new, web-conferencing system (Kear *et al.*, 2012). Likewise, Haresnape et al. (2020) suggested that ALs on a tutor-led online programme valued getting ideas or tips from others.

One unanticipated finding was that although ALs perceived a SoC between themselves and the module team to be important, only half felt that the labcast helped achieved that. Further discussion through the focus group revealed that the familiarity of Adobe Connect as a shared space seem to link to how ALs perceived a SoC. A possible explanation is that tutors foreground their own CofP and feel a commitment to a domain where they have a shared repertoire and resources. This finding corroborates the ideas of Rotman and Preece (2010), who suggest that online community is a virtual platform where participants interact, create content that is accessible while adhering to specific norms. It could be that the ALs

consider themselves as part of an existing CofP with established shared practices and resources in a familiar domain (i.e., Adobe Connect and the tutor forums).

Although tutors reported mixed attitudes around the labcast, findings show that some valued the authenticity of participating in a live labcast experiment which may confirm the labcasts' ability to foster a sense of social presence both through sound channels as a perception of presence and the behavioural engagement through the presenters (Lyons, Reysen and Pierce, 2012).

Tutors did not perceive themselves as having the participant or student experience which was one of the intended project aims. This might be because ALs had attended previous student labcasts. The finding further supports the ideas of Fraser et al (2007) who suggest that in socially mediated learning environments, there can be tensions in the teachers-as-learners dichotomy.

The findings show that there was salience of assumed knowledge or expertise in an area. Tutors reported different levels of anxiety around the experiment. As a note of caution, Kennepohl and Shaw (2010) argue that both students and tutors need to have the appropriate training in an experiment or technology employed. In addition, the data shows some tutors were confused around the affordances of the labcast and with the Stadium Live platform. These findings seem to be consistent with other research which found that although video streaming, as a resource, was useful to students, there was a range of prerequisite 'accessing streaming video skills' that the project team had not anticipated (Green *et al.*, 2003).

Conclusion

This project was undertaken to design a tutor-briefing labcast and evaluate its effectiveness in supporting tutors' tuition strategy in a Physical Science level 2 module. These findings suggest that a labcast can support a module's tuition strategy and potentially promote a SoC among ALs and a module team. Generally, ALs viewed the Gas Cell labcasts positively and felt that they were paramount to understanding of the project and experiment. The student labcast was perceived more positively than the tutor-briefing one. Although some tutors were critical of using the affordances of labcasting for a briefing on a new experiment, they did offer alternatives for what they perceive would work better. Adobe Connect is their preferred environment. However, it is not clear how the Gas Cell apparatus and remote interface could have been demonstrated effectively in that environment.

The three aims of the project were met, and the study has shown that half of the ALs would moderate or present a future labcast if the opportunity arose. The majority would continue to attend future labcasts and promote to their groups. Using labcasts can foster a SoC but this is likely to be subjective. The culture of a module differs across modules and schools. There are different purposes and uses of labcasts in STEM modules and some ALs may be

more aware of labcasts than others. Also, ALs and module teams inevitably form and move between different communities of practices.

Finally, there were challenges in the development of this new experiment and new labcast for students. The module team presented two labcasts in one day, which is unusual. There were issues outside the scope of this study (e.g., time constraints, booking slots to run the experiment, access to the technical manual), which may have influenced tutors' experiences of the labcast and how they reported on it later. In addition, the study was limited by the gender distribution over the sample of ALs invited to participate.

Recommendations from these findings is that requisite training in the use of the Stadium Live platform should be given to tutors to mitigate confusions between the two platforms. To promote better peer interaction and collaborative opportunities, module teams should allow tutors to submit questions before a labcast and tailor the widgets questions to engage tutors more effectively. Finally, if a module team would like to involve ALs in labcasting, bringing them on board earlier during the labcast design process is advised.

Impact

In the subsequent presentations of SXPS288, the findings of these surveys have been used to develop and improve the provision of labcasts. Specifically, for the 2020J presentation, in spite of lockdown restrictions, the known benefits to the students of this type of labcast were of value in justifying access on-site and the Gas Cell labcast was again presented live from the Perry lab.

Through the labcast, tutors have gained detailed knowledge and confidence in teaching the newly designed Gas Cell experiment. Students have used the Gas Cell as evidence in the employability component of the SXPS288 EMA.

Students on subsequent presentations of SXPS288 and on related modules also involving labcasts (including S111 and S818) will benefit from improvements in labcast planning and delivery resulting from the project.

List of deliverables

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Figures and tables

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