



Fusion teaching

Report from a workshop on 25 May 2021

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Introduction

The Edinburgh Futures Institute provides an excellent opportunity to think imaginatively about the design of programmes and courses that will be delivered across different locations and modalities. Our student community will be made up of learners located within the physical space of the EFI building, working alongside peers who will synchronously and asynchronously engage with lectures, workshops and tutorials online. This challenges us to work creatively in order that all of our students enjoy a fulfilling and high-quality learning experience. On 25 May 2021 we assembled online as a group of educational developers, learning technologists, lecturers, online students and researchers to explore how this might be achieved. Across a two-hour workshop, and with a strong emphasis on collaboration and speculation, we explored how technology, pedagogy and space could be brought together to:

- enable fully online students to feel actively present in the physical classroom and campus
- * support interaction and collaboration between students located in different settings
- * assist teachers as they engage with learners across different locations and modalities
- * establish intimacy and emotional engagement

To consider these questions we divided into three sub-groups, each including a learning technologist, an educational developer, an online member of our student community, and academic staff from three disciplines. We moved together through three EFI spaces that are being created to support contrasting approaches to teaching: a flexible teaching space, a lecture space, and an ideation studio. Conscious that university life and learning seeps through the walls of the classroom, our conversations also ventured into the foyer, corridor and café as we sought to imagine whether and how these settings might support community and connections between students and spaces. We followed this with a short plenary session where contributors used the chat function to share 'headlines' – emergent themes they personally felt to be most significant. In order to accurately capture all the generated ideas, conversations were recorded, before being discussed and then distilled into the report that is presented here.

Using this report

The original purpose of the workshop was to generate practical approaches to fusion teaching within the EFI. Our event achieved this, however it also provoked conversation that can more broadly inform how we combine technology, pedagogy and space. The main body of this report is therefore divided into two types of output:

Propositions, which are broad and sometimes philosophical principles than can guide our thinking around fusion teaching

Practical ideas, that propose specific ways of bringing together pedagogy, technology and space within specific areas of the EFI building

Although the presentation of these propositions and practical ideas has involved summary and synthesis, we have sought to remain true to the suggestions as they were discussed during the workshop. In writing this report we have been careful not take a position on the feasibility or significance of any individual suggestion. Neither have we attempted to prioritise ideas in terms of their importance. Instead we leave this to be decided by the following groups, who can decide how to work with those areas of the report they find most relevant:

The EFI Teaching End-user Group, which is specifically concerned with the physical teaching spaces of the EFI building

The EFI Tech Learning Group, which is overseeing the adoption of appropriate technologies to support the physical and digital learning environment

The EFI teaching fellows group, which comprises academic staff responsible for designing programmes of study

The propositions and ideas presented here are intended to provoke reflection, conversation and then action around technology, pedagogy and space. They are not, though, intended to be a strict set of rules to be followed. We would also recommend flexibility in considering how individual practical ideas might translate across different teaching spaces: for instance, although 'nudging a neighbour' and 'establishing eye contact' emerged in conversation around the lecture environment, these and other ideas might equally apply to the ideation studio and other settings. Finally, although our group of lecturers, students, researchers, technologists and educational developers generated a considerable number of ideas, this will not represent an exhaustive picture of what fusion teaching could look like. Nevertheless, there is a great deal here for us to work with in the coming months as we design pedagogy, platforms and places of learning within the EFI.

A few words about terminology

Within increasingly digitally-mediated educational environments, designating students either as 'on campus' or 'online' fails to recognise the complex and interwoven nature of teaching practices and spaces. After all, a student seated in the library, laboratory or lecture theatre will often also be interacting online with fellow learners and learning materials. However, for the purpose of this report we have found this to be a useful way of distinguishing between students who will register to be physically present in the EFI building, and their peers who will attend classes online. Therefore in the pages that follow we interchangeably use 'on campus students', 'classroom-based students' and 'classroom-located students' when referring to learners attending classes in the physical building. Meanwhile, 'online student' refers to an individual who is engaging from a location outside the EFI. The meaning of the term 'campus' has also become more nuanced amid the growth in online education. It has evolved to take into account people, practices and platforms, as well as those places located within the perimeter of the university estate. Again, though, it remains a useful way of referring to physical learning environments, therefore in this report we use 'campus' and 'classroom' to designate bricks-and-mortar buildings and their immediate University surroundings.

Propositions

Exploring and experiencing the campus and classroom

Online students should be able to explore the EFI building, and experience the classroom, in a way that is broadly equivalent to their campus-based peers. We should begin from a position of enabling online students to choose what they see, rather than deciding what they need to see. After all, we know that some online learners place great value on seeing the physical space of their university, even if they might never attend 'in person'. The ability to see and explore the EFI could help online students to feel actively present in class, while establishing meaningful connections with their university.

A shared online space

As well as enabling online learners to feel actively present in the physical space of the University, we need to provide ways of ensuring that classroom-based students make positive use of any online spaces we create. The online environment is a shared space where students in different modalities can assemble together and build connections and community. This can only happen if the online space is attractive to those situated in the physical campus.

Reciprocal presence

Although a major consideration of fusion teaching is in enabling online students to feel actively present in the physical classroom and campus, opportunities might exist where these same learners are able to invite campus-based peers into their own spaces. In order to establish connections and friendships across modalities and spaces, we might develop ways that students can positively enhance and feel present in each other's surroundings.

An on-campus student is also an online student

Although for convenience it is helpful to refer to students as being either 'on campus' or 'online', in fact this refers to a mode of study rather than an individual. Classroom-located EFI students will inevitably use online resources during the (campus-based) intensive component. On other occasions the same students might, for convenience or other reasons, choose to attend classes online, possibly even while located within the EFI building. Fusion teaching can provide flexibility for all our students.

Virtual reality

Whether for the purposes of recreating the EFI building in digital form, or enabling students to travel through a circuit within a design class, virtual reality provides an opportunity to bring our online and on campus students together in an alternative shared space. In virtual reality, the distinction between 'on campus' and 'online' dissolves, as students instead assemble in an entirely different dimension.

A culture of community and connectedness

Encouraging students to connect across modalities, and to feel part of a single cohort, is a cultural issue that can be nurtured across the EFI, rather than solely being the responsibility of individual course design. The way we communicate with students, construct our physical spaces and configure our online platforms can help to normalise the idea of working intimately with students (and staff) who are physically apart.

Pairing students

Online students could be 'paired-up' with campus-based peers from the same course. Whether for the purpose of building connections, or to support particular learning activities, individuals or groups of students could be matched across modalities. This could prove particularly valuable in the ideation studio and other contexts where there is an emphasis on practical work. Through conversation and negotiation, the classroom-based student might perform actions suggested by their online partner. In the lecture theatre meanwhile, the classroom-based student could ask questions on behalf of their online colleague. This approach might provide the online student with a feeling of presence and voice in the physical classroom, while more generally nurturing collaboration, social connections and community. Developed further, this approach could support a buddying scheme across modalities.

University life extends beyond the classroom

Although online students cannot participate in the full range of extra-curricular activities that take place on campus, we can still provide ways of helping them to benefit from some of the social experiences that happen between and beyond classes. After all, university life is much richer than simply moving from lecture to lab to library. We need to create spaces and moments where online and on-campus students can come together for coffee, conversation and other forms of informal interaction outside of class time. As we construct the EFI, let us imaginatively consider how technology and space can coalesce to celebrate and engender playfulness and social interaction. The digital resources for enabling these conditions should be designed to be low friction, making it easy for students to connect in impromptu and serendipitous ways.

Adapting pedagogy to modality

There will be occasions where a single teaching approach will not adequately meet the needs of online and on-campus students. We should embrace these instances as an opportunity to work imaginatively with pedagogy. This could, for instance, involve students engaging or contributing differently towards the same workshop. A 'one-size-fits-all' approach might work on some occasions, however we should be open to online students participating differently — but always positively and productively — compared with their classroom-based peers (and vice versa). Fusion teaching should never be solely concerned with what is happening in the physical environment, however we equally need to avoid diluting the classroom experience in pursuit of convenience or a single approach. Instead, we should explore ways of students having an alternatively rich and connected learning experience, irrespective of location.

Layout, power relations and pedagogy

The way we configure a classroom, including the choice and arrangement of furniture, and the selection and placement of technologies, enacts particular assumptions around power relations, pedagogy and epistemology. Therefore, when we propose a classroom layout we need to ask whether it will privilege the campus-based learner, and if it more generally aligns with the types of fusion teaching and learning that we hope will be performed in that space. Providing online students with natural sightlines, for instance over a technician's shoulder or seated in a room, can also be used to enhance emotional engagement.

Post-digital objects

It might prove helpful to think about objects as being digital and physical. For instance, when a student sketches a drawing in the flexible teaching space, can it also be viewed and adapted by the online learner? And when groups collaborate within an online whiteboard space, can we make it possible to manipulate this content in the physical classroom?

Paced learning

As we deliver hybrid teaching we should pay close attention to the pace that online and on campus students are working at. In some instances we might find online students are able to work more (or less) quickly than classroom-based colleagues, perhaps through the absence of being in close physical proximity to learners who can be a source of encouragement (or distraction). We should respond to these moments during class and then use them to inform subsequent course design.

Accessibility

We need to bring together technology, pedagogy and space in a way that attends to issues of accessibility in order to meet the needs of all our students. In fact, fusion teaching might prove more accessible compared with experiencing the physical classroom or online platform in isolation.

Arrival, orientation and expectations

Before students arrive for the intensive component of an EFI course – and 'arrival' works in the online and physical space – we need to find ways of orienting them to the particular fusion teaching and spaces they will experience. This will involve establishing expectations around working across modalities. Students will need time to adapt to what is, for many, going to be a radically new way of learning. This can be supported by clear communication with students around technology, in order that these resources are used in ways that contribute towards a fulfilling and high quality experience.

Exploring the potential of sound

Can we tap into the considerable power of sound and music? This might include, but not be limited to, ensuring that online students can hear and be heard in the classroom. We can also explore ways of using ambient sound to positively shape the surroundings of our students as they sit down to compose, create or engage in other forms of learning activity. There will certainly be ways of using sound to make connections between the spaces and practices of online and on campus students.

Showing face (or not)

Although online students should not be required to switch on their cameras during class, they should be given the choice of doing so. Where a student prefers not to show their face, they might instead be encouraged to use an avatar that conveys something of their personality.

Privacy and surveillance

Where fusion teaching makes use of video, we need to think carefully about privacy and surveillance. This particularly affects students who might be seen and heard when we broadcast sessions taking place in the physical classroom, however we also need to take care not to be intrusive when engaging with learners who are studying from home or other settings beyond the campus.

Practical ideas for the flexible teaching space

Freedom of movement

Online students should have the freedom to position themselves where they wish within the physical space of the room. If classroom-based students are able to stand up, walk around and join other groups, this should also be open to their online peers. This might be achieved through telepresence robots, which would also have the benefit of enabling the online learner to turn and face a group member who is speaking, while at the same time being seen and heard. Some, but not all, of the same benefits could be achieved through the use of 360-degree cameras, which would enable the online learner to survey the space in which they are working.

Digital displays

Where students are working in groups, are there ways that they can collaborate by using a digital pinup board or white board space? A resource of this kind would enable in-classroom and online students to share and comment on the same content.

Acoustics

Room layout and group size should be guided by the requirement of making conversation audible to online students, and that they can in turn be heard amid competing sounds from other areas of the room. Carefully positioned screens and directional microphones could go some way to achieving this, however it will also require the input of academic staff in creating and briefing groups appropriately.

Leaving a lasting trace of activity

For the benefit of all students, but particularly those participating asynchronously, there should be a record of activity (including conversation and physical work) that extends beyond the end of the scheduled class. There is an opportunity here for fusion teaching to go further than what can be easily achieved in the conventional classroom.

Practical ideas for the lecture space

Fusion through layout and furniture

The decisions we make about furniture, and then how we choose to set up the lecture area, can go some way to reiterating that this is a fusion teaching space. Conversely, arranging the room in a conventional way might convey the message that this is essentially a traditional lecture but with online students looking in. Swivel chairs with space dedicated for laptops could go some way to projecting this environment as a fusion space.

Channels of interaction

If we want the lecture to truly reflect the potentialities of fusion teaching and technologies, it should be broadened beyond communicating a body of knowledge to an audience. This does not mean dispensing with the long-standing tradition of the lecturer addressing a group of learners, but instead could see the introduction of simultaneous channels to support interaction between students across modalities. For instance, as a lecture is delivered, students could use an online discussion space,

potentially alongside the streamed video of the session, to respond to ideas and to pose questions. This 'chat' dialogue would be captured within the video recording, thereby providing asynchronous students with a richer sense of the thinking that took place within the lecture.

Teaching assistants

A valuable role could be performed by teaching assistants as they oversee some of the technologically-mediated elements of a class, thereby enabling the lecturer to focus on delivery and engaging with the student audience. For instance, the teaching assistant could monitor 'side channel conversation', clustering questions together and ensuring that the ideas raised by online students are surfaced within the class. More practically, the teaching assistant might ensure that the configuration of technologies is correct at the beginning of class, while addressing any technical issues or questions that arise, further enabling the lecturer to focus on delivering a high quality lecture.

Arriving early for class online

There is every reason to assume that some EFI students will enjoy the ritual of arriving early for classes in the physical campus. This might be to catch up with friends, find out how peers are approaching the course assignment, or to secure a favoured seat in the lecture theatre. We need to find ways of providing a comparable experience for our online learners. This might be achieved by starting to broadcast the video and audio stream a little while before class begins, thereby enabling early-arrivers - irrespective of modality - to strike up conversation, see who else is present, and generally orient themselves to the class ahead. The alternative, of confronting online students with a holding screen as their campus-based peers enjoy each other's company, would be akin to locking them out of the room until class begins.

Synchronising the mapping of physical and virtual spaces

Would it be possible to synchronise the mapping of the lecture area with an equivalent space online? Could the online space be used to record who is present in class and where they are seated? And from there, might we create 'virtual seats' by designating gaps between chairs in the physical space, thereby enabling online students to choose where they would like to sit. These approaches could help to normalise the idea of a single cohort, help online learners to feel actively present, and more generally enable students to make connections and friendships irrespective of modality.

Nudging a neighbour

Within our online platform, can we enable students to send direct messages to individual members of the class? This would go some way to recreating the benefits experienced in the physical classroom where a learner can gently elbow, whisper or pass a note to a fellow student in order to check their understanding of a particular idea. This is another way of recognising that the lecture is a learning experience, rather than simply being concerned with the business of conveying a body of knowledge.

Choosing to be seen in class

Online students should have the choice of being seen in class, most feasibly via dedicated screens in the lecture space. Although it will not be compulsory for them to do so, and many students may prefer to keep their camera off during lectures, they should nevertheless have the choice of being visible alongside their classroom-based peers.

Choosing what to see in class

Whereas video conferencing typically provides a single view of the classroom, we can offer our online learners a fuller representation of the lecture by positioning cameras in different parts of the room. Students would be able to switch between views, thereby providing a more cinematic lecture experience than is provided by a single, static camera.

360-degree attendance

Online students could enjoy a considerably richer and more immersive lecture experience if we broadcast lectures using 360-degree video. If we are serious about providing equity with campus-based learners, we need to move beyond the 16:9 aspect ratio lecture experience provided by the static camera. Instead, 360-degree video would provide students with agency as they could alter their view in order to cast an eye over who is present, follow the lecturer around the room, and turn to face the audience member as they ask a question. They would also have the freedom to gaze out the window, admire the fashion sense of a fellow student, and exercise other choices that come easy when attending in the physical classroom.

Establishing eye contact across modalities

To help the lecturer achieve eye contact with students across modalities, we should consider the positioning of cameras (through which the online student sees) and screens (through which the online student is seen). These resources should be situated within the lecturer's natural eye-line, meaning that whenever the member of staff addresses the classroom-based audience, they always inevitably make eye contact with the online group. This is preferable to the lecturer needing to (remember to) turn and face the side walls, ceiling or other place where these cameras and screens are situated. More generally, if we wish to normalise the idea of a single body of learners, it is important that we do not 'other' online students by pushing them to the margins of the class, whether on side walls, or worse, on the front wall where they will be spotlighted for the audience, yet unseen by the lecturer.

Making online students visible

Where lectures open up to questions, we need to ensure that online students have an equal chance of having their point addressed. This might involve exploring whether the screen-mediated 'raise hand' function is sufficiently visible to the lecturer, compared with the equivalent action by their classroombased peers. This might be addressed through pairing-up on campus and online students, or involving a teaching assistant in monitoring questions during the class.

Making online students audible

Where lectures up open up to questions, online students need to feel they have an equal chance of being heard. If classroom-based students are able to take the mic or be audible to the class, an equivalent provision should be available to online students. Although some students might prefer to submit a message via a chat channel, with a view to equity of experience, perhaps they should have the choice of their voice being audible in the classroom.

Practical ideas for the ideation studio

Providing online students with materials

For some courses it will be feasible to mail kits or other materials to students in order that they are able to undertake activities from home or another setting beyond the campus. On other occasions it might be necessary to provide students with a list of resources they need to acquire before being able to complete an activity. Where students will be expected to share video recordings of their work (or make use of other technologies) this needs to be made clear at an early stage in order that they can be sourced. In sending out this information, staff might also suggest ways of compiling these resources on a budget, for instance using a smartphone camera in place of a dedicated video recorder.

Sharing studio work through video

As practical work will feature prominently in this space, there is a need for video cameras that will broadcast teacher demonstrations. The recording would be streamed live but also made available afterwards for learners engaging asynchronously (or any students who value a repeat-viewing). These cameras might be pulled down from the ceiling or be otherwise positioned in order to provide an overthe-shoulder view as the teacher works with materials. In the case of intricate exercises there might be a need for more than one camera, so that the online student is able choose the angle that will best support their understanding of what is being demonstrated. Cameras will also be required so that online students are able to see and discuss the work being produced by their studio-based peers.

Sharing the online learner's work through video

It is also important for online students to be able to share their work-in-progress, for instance to gain feedback from tutors or to support collaboration with their classroom-based peers. Although photographs might be suitable in some instances, the video camera is generally able to provide a better representation of the work being produced and the process being performed. We cannot assume that students will have dedicated video technology therefore we should support ways of enabling them to use a smartphone to record and share what they are doing.

Pass-the-parcel

We need to accept that some studio-based activities will not be feasible for every online student. On these occasions we could use a 'pass-the-parcel' approach, where online and on campus students negotiate how to collaborate around an activity. For example, it could be that the online student suggests or explains how materials are to be manipulated, with the studio-based learner undertaking the task in the studio. As the studio-based student assembles the model or cuts the material, conversation would continue to take place, until such time as the artefact is ready to be 'returned' to the online learner for the next stage of scrutiny and development.

Connecting through the classroom printer

Online learners should be able to connect to printers within the studio, in order to share their work with staff and their peers. On those occasions where a screen-mediated representation of an object is inadequate, online students could 'send to the printer' in order to gain feedback and advance progress on a group project.

Practical ideas for non-teaching spaces

Virtually touring the building

Students should have the opportunity to make an online tour of the EFI building. The benefits for campus-based students would include being able to become familiar with the EFI building before visiting for the first time, for instance ahead of the intensive component of a course. Meanwhile, online learners would be able to get a better sense of the physical space of their university, contributing towards a sense of ownership and feelings of being actively present. This might be achieved through telepresence robots or via the Unreal (virtual reality) version of the campus. An alternative approach could involve individual campus-based students wearing a GoPro camera as they explore the building and wider city, with the recordings be shared with their peers. Other ways of touring the building could be achieved through 360-video recordings where it would be possible to hear staff and students talking about the EFI. More simply, students might be able to follow a path from the foyer, along corridors and into social areas, by switching between livestreams of these spaces. These approaches would enable the online student to cut a digitally-mediated path through the EFI building in a loosely comparable way to their on-campus colleagues.

Mixed-reality treasure hunt

Deploying some of the same approaches and technologies used to support virtual tours of the building, mixed reality treasure hunts could be staged as a way of helping orient students to their programme, course or the EFI building. Through the use of augmented reality this could involve 'Easter eggs' where students would receive some kind of reward. The hunt could be designed to be completed in pairs, with the online and on-campus student jointly negotiating a path around and beyond the building and University. Part of the activity could involve pairs of students seeking out staff or other members of the class, identifiable through augmented reality badging, with the purpose of breaking the ice and creating a sense of community.

Live map of the EFI community

Within a prominent social or transitory space of the EFI building, we might project a live map that displays the distribution of students across the globe. The same visualisation would also be present on the EFI online platform. To avoid issues of centring the Edinburgh campus, or more problematically around colonialism, the globe might revolve on its axis or evolve in line with student engagement. We could use an Internet of Things approach whereby student activity (irrespective of location) would in some way reconfigure the map or represent their presence on it. In this way the map would continually evolve based upon the activity of a globally dispersed, but highly connected, student community.

Wonderwalls

In prominent public areas of the EFI building, large display screens or projections could work as thematic spaces where students would share content under changing topics. The same visualisation would be displayed in the online EFI space. Content could be submitted and then aggregated via dedicated hashtags, with students sharing images, comments or reflections as part of an evolving display. Depending on the chosen theme, the effect could be to produce a kind of digital craft bombing or 'flash mob', as the walls of the EFI building would fill with student-generated content. This approach

might help online students to feel actively present in the physical space of the EFI, while at the same time bringing them together with campus-based peers to interact in an extra-curricular activity.

Displaying student work

Whether projected digitally or produced in physical form, examples of student work could be displayed along corridors and in other public areas of the EFI building. This would provide the online student with a way of leaving their trace in the physical space of the campus. In addition, placing together work by online and on-campus students would further normalise the sense of a single learner community. Taken further, augmented reality or QR codes could enable students, staff and visitors to learn more about the author, hear the story behind the work, and interact with the artefacts on display. This would be available within the physical EFI building but also within its virtual reality equivalent.

Creating space for serendipity

In the learning café or elsewhere, small areas should be assigned to enable students to drop in for a chat. This might be achieved through wall-mounted screens within reasonably enclosed public areas. Although it would be difficult to manufacture the kind of impromptu conversation enjoyed by students as they bump into one another in the (physical) corridor, it would nevertheless become possible to pause for a chat with anyone who happens to be passing (whether on campus or online). Combining space and technology in this way might encourage impromptu conversation and connections.

Taking a classmate for coffee

Building on the idea of pairing learners across modalities, campus-based students could be encouraged to take their online peers for a coffee in the learning café. This might be particularly productive during breaks between sessions within the intensive component of courses, when online students might otherwise feel distanced or isolated as they watch their class-based peers filing out of the class for refreshment and further conversation. Dedicated screens in the learning café might support this kind of interaction, however a more ad hoc alternative would simply involve the campus-based student opening their laptop once they have grabbed a coffee and a seat.

Mixed-modality office hours

In the likelihood that many academic staff will not have dedicated office space within close proximity of the EFI building, there is a need to think differently about office hours and supervision. Spaces with cameras and screens might be set aside to enable staff to host informal meetings or drop-in sessions outside of class time. Online students might attend via telepresence robots or via screen.

Tuning into the EFI soundscape

Online students should be able to experience the soundscapes of the EFI building. Depending on their mood or the academic task in hand, students might listen to the relaxed ambience of the learning café, the movement of bodies and materials through the main entrance, or the hubbub of conversation as fellow learners make their way towards class. Presented visually within the online platform, the EFI building would resemble a radio, with students able to move the dial to the space that might nurture the conditions to support essay writing, to counter feelings of isolation, or serve another purpose. The sonic character of the EFI campus should be recognised as a resource to enable online students to

configure their own personalised learning spaces, while at the same time providing them with a ready connection to the café, corridors and other corners of their physical campus.

Music for learning and pleasure

Students could be invited to contribute towards a music playlist that would be streamed via the EFI online platform, while also being broadcast in the learning café and other parts of the building. Through their musical choices, online students would thereby shape the ambience of the EFI building, while at the same having their own surroundings influenced by their campus-based peers. The shared soundtrack would also nurture the sense of being part of a single student community.

Futures Radio

Delving deeper into the possibilities of sound, we might create an EFI radio station, potentially comprising music, dedications, information, podcasts and other content. This approach would adapt the traditional idea of campus radio, to engage with an audience that includes those listening from far beyond the physical space of the university.

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