

UNIVERSITY OF WARWICK
DEPARTMENT OF CHEMISTRY

BUBBLING UP: FUTURE OF THE STEM COMMUNITY

Termly collection of wellbeing stories
shared by staff and students, because we
care

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We are looking for 2 student editors, so if you are interested in joining the team please express your interest by e-mailing chem.experience@warwick.ac.uk.

If you'd like to supply feedback, or submit a piece for the upcoming issue, please get in touch via a form at warwick.ac.uk/bubblingup or by emailing Dr Bo Kelestyn at bo.kelestyn@warwick.ac.uk

FROM THE EDITORS

BO KELESTYN AND ADAM ALCOCK

In this issue we're looking at the future of the STEM community and challenging the norms associated with community. During the past year, things have moved almost exclusively online (albeit with fluctuation as and when we've seen Covid-19 peaks and troughs) and we wanted to draw on our experiences of just how our community has adapted, challenged and moved forward, tearing down barriers that we never thought would fall. Typically when we use the word community, we envisage in-person groups and gatherings, chatting and drinking coffee whilst discussing common issues that bring us together, but what community has looked like in the past 12 months challenges what we have always perceived as 'normal' and that's okay. We've made strides in our online communities and learned a plethora of skills on new platforms and knowledge that has allowed us to continue to learn and work online, together. Which makes us wonder what the post-Covid world will look like? Can we take the bits that have worked amazingly well and merge them with how we've traditionally operated in the past? Will community ever look like it used to? Or will we emerge a stronger, more resilient community having challenged and learned new (and possibly more efficient) ways of working?

Our contributors this issue have shared their stories of new ways of thinking, whilst demonstrating how community has existed throughout. Just because we don't obviously recognise community in its new form, certainly doesn't mean it doesn't exist.

If you require signposting to wellbeing resources, then we'd suggest: <https://warwick.ac.uk/services/wss/topics/> as a great starting point.


BILLY DYER

FINAL YEAR MCHEM STUDENT

Well, term two is undoubtedly off to an interesting start! This situation is one that I never expected to be in and I'm sure you all feel the same. I want to leave our current situation and think forward into the near future. Let's explore the future of the STEM community and the role VR learning could have in this.

Now STEM is unique in that the majority of learning and research occurs in a practical environment. One of the most obvious effects of the pandemic has been the inability for students to attend labs, specifically undergraduates who need this experience to build up their practical skills and confidence in a lab environment. A paper recently published in the Journal of Chemical Education has explored the potential for a VR lab experience. They studied the running and analysis of IR experiments, and compared results from students in the VR and physical lab environments. The results showed that as a teaching and learning resource VR is comparable to traditional teaching. Having been through nearly a full integrated masters in chemistry I would say that the first year of labs is largely building up these fundamental skills, such as IR analysis and interpretation. If the learning outcomes are similar, this seems like a viable option. However, another aim of the early-year UG labs are to build up confidence in handling and setting up lab equipment, as well as running experiments. More studies are needed to investigate the potential of VR in teaching practical experimental techniques rather than analysis techniques.

This research is nonetheless exciting and the technology could replace some aspects of in-person experiments, in-turn mitigating some cons associated with lab work such as the high cost of in-person lab work and the risk of accidents. The potential to mitigate the negative effects of pandemics on students' education is also huge! This research opens doors to remote learning.






If, for example, a term was focused on building up analytical lab skills this would allow many students to stay home for this entire term, preventing congestion around university campus' and decreasing travel miles. There is potential here.

This VR experience may be useful in teaching some fundamental lab skills, but research is a different matter. It often requires constant attention to the experiment at hand, and to find new results it is simply impossible to perform virtual experiments..but is this true?

Computational modelling has come a long way since the development of efficient computer technology in the 1940s (Alan Turing's 1936 paper On computable numbers was the first conception of the modern computer). Combining computational chemistry with virtual reality could provide a VR environment in which novel research could be conducted.

This could take the form of a virtual lab environment, in which chemists perform virtual experiments and the computational program works in the background to produce some results. Or, perhaps more interestingly, we could create a VR world in which users could interact with 3D molecular models, moving atoms around to investigate how they interact with each other. Journey inside a cell is a related installation, in which users can immerse themselves inside a cell using VR, exploring the biological and chemical processes behind the functioning of a cell. Now imagine this, but on the purely molecular level.

It's an exciting prospect, and one that may be realised in the near future. For now, let's just take it day by day. I hope everyone reading this is taking that little bit of extra time to check-up on your mental health, and for those struggling know that it takes courage to talk about it when you are. Far from being a bad thing, it's incredibly brave. We have a great community here in chemistry and the university also offers support. Failing this feel free to drop me a message.



DANI PEARSON

TEACHING FELLOW

In light of everything that has happened over the last year, staying at home and not seeing many people face to face, it can almost feel as though time has stopped.

For many this can feel very unsettling and isolating. While it may have felt as though time stood still, -luckily it didn't and lots of exciting plans were being made to adapt to our new way of life. I wanted to share with you an opportunity that came my way earlier this year which I am really excited about! Women in Chemistry:

Making the Difference, is a project designed to encourage more girls to get into Chemistry. The project is hosted by a different University each month and was launched just last week by the University of Oxford. Over each month, girls aged 10-14 who have subscribed to the project will have the chance to attend three live Teams meetings, where they can ask questions and learn about being a scientist from real women in Chemistry. Each University also has a research theme and have created at home experiments and activities that the girls can do associated with this theme. The website also has lots of extra content, such as, videos from female scientists about their journey and their work and videos from around each University. This amazing project has created an online community full of supportive women cheering each other on and enthusiastically promoting Chemistry to the next generation. I am quite honoured to be leading such a fantastic project for Warwick and am now going to take the opportunity of writing on this platform to shamelessly advertise the project to anyone who knows or works with girls aged 10-14 (years 6-9)! It isn't too late to subscribe to the project (bonus - it's totally free!), and all the fun and games from Warwick will be happening in April when we host the project- hopefully see you and your daughters/nieces/siblings/cousins for fun with lasers, molecular movies and sunscreens then!

ALEX BAKER

FACULTY REP

Is this the end of the lecture? But the beginning of something more? I was in a meeting a few days ago where a senior academic with an interest in pedagogy asked a group of students if the pandemic has dealt the death blow to the lecture. The students thought for a second and said “No.” ... Thank goodness! The more “dyed in the wool” academics on the call breathed an almost audible sigh of relief; the main method for content delivery was not dead! But is this what we really want post-pandemic?

I start with this because it shows the dialogue we are currently having as a University, “What does 21st Century teaching at an inclusive, international university look like?” Asking this question makes sense in a university that prides itself on research-led teaching and world leading research. But a dichotomy seems to develop, on the one hand we have had some big wins on the research front around Covid-19 that really pushed the boundaries in the Sciences and beyond. While on the other hand some departments have held steadfast to the idea that Covid-19 is a blip and soon we will go back to business as usual and use content delivery methods that aren’t exactly the Deliveroo of our time. So, should the lecture keep its place as the behemoth of content delivery? And is this what (all) students really want?

Well according to the students asked the other day, short answer yes, long answer no, because it was the social aspects of face-to-face in the lecture theatre and around it that mattered to the students in question. It was being together, studying together and collaborating together that matter. This highlights an important point we have often overlooked as a university - education is a social endeavour, no-one earns a degree in isolation (to paraphrase a wise SU officer). Yes, the quality of delivery mattered, but the jury was out on whether face-to-face lectures or online delivery in its myriad forms was best for this. This begs the question, is there a better way to deliver content that amplifies the social engagement of being on campus with friends, while delivering the flexibility and optionality of online approaches? In the view of the designers of Birmingham Airport’s Terminal 4, (aka the Oculus) with its 500-person lecture theatre, the answer is no, the face-to-face lecture is best! I don’t believe them though and I wonder how many people do?

Consider the face-to-face lecture for a moment. We all file into an often-cavernous room at an arbitrarily determined time (not chosen by the majority), sit down and silently listen to one person at the front dictate what “useful” knowledge in the field is, to a group of people who well outnumber them. While this raises epistemological questions around who determines what “worthwhile knowledge” is (feeding into the inclusive and decolonised curriculum debate), it also looks like the battle of Thermopylae – very one sided but not in the way we initially expect. It’s hardly surprising then that you don’t have to look too far into the pedagogic literature to find critics of this approach. Paulo Freire (think a socialist Father Christmas) sees the lecture as a bank educational approach – the students have education deposited into their accounts and off we all go. It’s a one directional educational approach that dominates our teaching methods, where is the student voice and the innovation? Yes, lectures are an efficient means to deposit knowledge by the hour for lecturers; but do lectures provide an effective way to support students in their learning. Hopefully we see this as a problem as it’s your education not the lecturers. Could we use more socially engaged teaching approaches such as workshops and tutorials? And if we can, how do we get to this new pedagogical paradise? The answer for me as a “vocal” student is by engaging the real University because ultimately the lecture isn’t the problem it’s a symptom.

I worry sometimes that we forget that the University isn’t the bricks and mortar and the leaky roof of C-Block - it’s the people. WE the people make this University succeed or fail. When I look back over my nearly eight years in Warwick Chemistry as a UG and PhD student, I see one common theme – success comes from collaboration. I remember how for a few glorious years we served Dominios pizza at ChemCafé, not our greatest achievement but certainly victory never tasted so good (and oily). Delivered through collaboration. I remember the incremental changes delivered through SSLCs across the University – from clearer exam protocols to drinking fountains outside the teaching labs. Delivered through collaboration. I remember my best learning experiences as a student and an instructor in SpecLab. Delivered through collaboration. And I remember our proudest achievements; introducing paternity/maternity leave for PGRs and pushing inclusive agendas that allow all students to achieve their potential no matter who they are or who they choose to be. Delivered through collaboration... less pithily the collaboration of undergraduates, postgraduates, postdocs, tenured staff, support staff, technicians, administrative staff, estates... in other words the proverbial “we”.

WE change the University because WE are the University – by no means are we perfect and we should never think we are, but we will do better if we work together. This then is the problem with the symptomatic lecture – it’s very one-sided, it’s very “them and us”.

Yes, clickers and instant feedback systems make it better, but the lecture is inherently not collaborative and in fact for some students quite a threatening experience. I remember being an undergraduate suffering from anxiety - walking into a lecture was terrifying. But I remember fondly the socially collaborative teaching experiences I had that (in part) helped me love my education again and move past my anxiety. I know this is not an isolated experience of me, myself and I - research shows this. What's worse is it's also an issue of social inclusion.

So, when I ask, "how do we get to an inclusive pedagogical paradise?", I firmly believe it's through collaboration, by looking to decrease the amount of one-way lecture-based teaching we deliver and by engaging the voices of the whole University to build it.

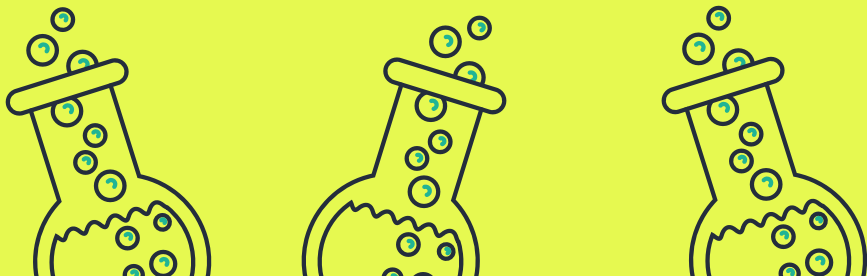
We must hear the voices of everyone at our university, and it is OUR university, not my university or your university but OUR university and our teaching (and research) should reflect this. If you are wondering how do we do this? How do we overcome the monolithic lecture? And convince people that we can do better? Well, I am reminded of three quotes from my civil rights heroes. All teach us a lot about how society and its institutions change and need to evolve. The first is about never being afraid to make "good trouble" paraphrased from former US Congressman John Lewis - don't be afraid to be the dissenting voice arguing for a better university for all, be hopeful, be optimistic - whether its parking permits or personal tutoring, change happens, it has to. These things matter to people and make their university experience better, so they need to be heard and improvements made. My second quote is from MLK about mighty streams bringing change - sometimes fighting a cause can be uncomfortable but you have to get your feet wet to make change, and change is coming, the stream never stops flowing. I wonder how many students and staff are ready to get their feet wet to reach a pedagogical paradise, but more importantly a university that works for all, all the time? Third, Ruth Bader Ginsburg reminds me (repeatedly) that good change only happens when decisions are made with all parties present and represented - "Women belong in all places where decisions are being made." I would argue this applies equally to our female students and staff, as it does to many other under-heard groups - our diversity is our strength, not our weakness.

The student voice is also our strength, which is why we are a university not a research institute - we educate people for the social good, so the student must be heard fairly and continuously. So, I would encourage all our students (and staff) who feel unheard to reach out, help us engage with you - together we must do better and by "we" I mainly mean the people who hold power and sway (such as myself). Too often people with influence (and the privilege of influence) forget that leadership often looks more like a servant than a superior. We have a lot to learn from each other, the first thing though is learning to engage with each other and hear each other.

The pandemic then gives us a chance to reassess the best of face-to-face teaching and the best of online, while allowing space to reinvigorate the voice of the University community. And for me the unequal lecture is symptomatic of some of the inequalities we see and not a fundamental part of the university anymore – it's time to move on. Imagine a course where you learned the basic content of the course before you had even entered the room (e.g a flipped classroom model). We could move away from seeing the lecture as the basic unit of a university education and rather use it as a way to provide structure and rhythm to the (online) consumption of the basics while providing more time to push into more difficult concepts in seminars, workshops and tutorials. This would not only improve the education of the many but also those who desire/require a more flexible and accessible education. Yes, this won't solve all our problems, but it will be another move towards delivering an inclusive, international and world-class university for all.

In conclusion, can we consume the foundations of our educations like we consume Netflix – just without the “chill”? Can we envision a university in which students walk into deeply collaborative and social labs and workshops already prepped and primed in the content so we can pursue harder and more collaborative content? Can we design curricula and educational spaces that are genuinely for all and built through collaboration? And by doing this can we dream and then deliver a university for all? It may sound like a pipedream especially watching content and enjoying it as much as Netflix! But should we be so willing to fall back to full face-to-face teaching and the lecture workhorse, when anyone who watches RuPaul's Drag Race knows that blending is an important thing to do with foundations – including educational ones!

Together then, let's find a happy medium between online and face-to-face fit for the 21st century student, and by the way that 21st century student is role-smashing, barrier-breaking and an asset to the community. I believe we can do this, but we must commit fully to a model of co-creation built on equal collaboration between all students and staff. It's time to get Arnstein's ladder out again and do our working at heights Moodle certificate! After all we are all lifelong learners in a (hopefully soon to be achieved) brave new post-pandemic world – lets embrace the possibilities!



NEXT ISSUE: REVISION

COMING IN TERM 3

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**If you have been affected by this issue, please
find out more about the support available on
warwick.ac.uk/bubbling-up or by speaking to your
Personal or Senior Tutor in the department.**

