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First of all let me explain a little about my career and how I have become an advocate for online teaching. I completed an honours degree in environmental science at Trinity College Dublin in 2001, I then proceeded to conduct my doctorate in environmental engineering by 2006. For the final year of my PhD I needed to work so I moved into consultancy for five years. In 2010 I went back to academia after working on some of Irelands largest infrastructure projects. I found myself in Irelands largest university with an extremely high teaching load, possibly the highest in the whole university. I soon realised I needed to become very innovative in the methods I employed for teaching otherwise I would have no voice left. Today I am going to talk to you about my teaching experiences and how I have utilised online teaching to benefit myself and my students, and also to explain some of the advantages and disadvantages there are associated with online teaching especially when we are trying to ensure equity and equality amongst our students. A lot of what I say may seem just like common sense, but it has taken me seven years to fully get to grips with how online teaching can help us as educators create innovative and satisfying modes of learning that the students gain benefit from. I am also very happy to talk to anyone today about the plethora of mistakes I have made with online teaching also!

We use the term pedagogy to refer to teaching methods, however the term pedagogy is specifically for teaching children, I propose we start using the term andragogy instead as that is how we teach adults, and we need to think of our students as adults and not children. This is particularly important for online learning where the student must be self-motivated and driven to learn. Over the last seven years I have developed online lecture materials to assist me in the development of flipped classrooms, facilitate distance education and part time learners, facilitate international students studying in partnership with my university but in distant countries. I have brought online teaching into my research here with DUCE. I have developed entire modules and programmes for blended online delivery for continuous professional development. It did not all happen overnight and it required a great deal of work, methodological development and trial and error.

So first of all you need a reason to utilise online teaching. You cannot just decide to convert your lectures into online lectures without having a specific reason for it. You must be able to stand over your decision to develop online teaching. There are many reasons, it could be class size, it could be distance students, it could be that you want students to learn something before coming to your classroom and instead of a textbook you provide them with a narrative. It could be economic, perhaps your online lecture materials will be sold by your university as continuous professional development educational material. It could be advertising, you could be enticing new students to your university by showcasing lecture material online. Having a reason will help you tailor it to suit your audience because the audience is critical in developing online learning materials.
MODE

So first of all how are you going to deliver your online lecture materials to the student? Student buy in is critical, many students are eager to use online learning when they see a benefit to it. Benefits can be that they can watch the material over and over again if it is pre-recorded. They can learn in a more comfortable environment than a classroom. They can watch or listen while commuting to and from the university. It’s a time saver for them.

So the delivery mode is essential. Online learning materials are easiest to deliver to students when you have an online learning management system like Blackboard or Moodle. Online materials can be uploaded by the lecturer and accessed by the students registered. However many educational institutes do not use an LMS. So the delivery can become much more problematic. But there are ways around this. Lecture materials can be uploaded to a shared folder in the online cloud like google drive or wetransfer or dropbox. Any student provided with access to the folder can download the material for their own viewing. The advantages to this are that it costs nothing. The disadvantages of this are that once your material has been downloaded by the student they can share it with whomever they desire, so effectively your work has become open source and no longer your own.

An alternative is to place the online learning materials on a dvd disc that you can add security to prevent file sharing off of the disc or even to prevent the disc being copied. The discs can then be collected by the student, or posted out to them if they are distance learners. The discs could be deposited in your institutes library for sharing and that way you can track who accesses the discs and for how long.

Alternatively if you do not have the funds available to do this you could develop your online lectures as videos to upload to Youtube or Vimeo, here you could create an online channel that you provide passwords to students to access. You have the capacity to change passwords and security settings each year so that only one cohort of students has access to the online lectures at one particular time.
ONLINE

So now that you have picked your mode of delivery, now you need to think about exactly what you are going to put online and also will it be standalone or supported by class room activities. Purely online teaching in the form of pre-recorded online lectures and online specified learning activities such as online tests and online discussion have the benefit of removing you as the educator from a class room. You can do all of your teaching from your desk in your office or even your kitchen table at home. There are numerous types of software that can assist with the development of online pre-recorded lectures. I use both Articulate Storyline and Camtasia for software which is incredibly easy to use. I would be happy to demonstrate to anyone later. All you need is a good webcam and a good microphone and a nice quiet office and away you go. It is quite easy to convert your old PowerPoint slides into an actual online lecture that the students can interact with.

The advantage for the student is that they can also take part online in an environment that suits them. The disadvantages are that they lose the face to face interaction with their class mates in lieu of online interaction in discussion forums and online live classrooms. One point I will say about online live classrooms where the educator provides a live lecture streamed from their office in real time is that the students do very much like them, but they are usually extremely problematic when it comes to internet connections, laptop and PC compatibility with software and ensuring that all students can actually access a live online classroom at the same time. Usually for me at least they never work properly and I have been doing this for quite a few years. So I tend to avoid live online classrooms in favour of pre-recorded online lectures that are delivered as videos with supporting online discussion where students can ask me questions anonymously in real time.

Purely online teaching with no classroom activities is advantageous for students studying at a distance from your institute, but they must be very self-driven and motivated to study on their own. With young undergraduates my experience is that they do not do well with purely online as they need a classroom setting on occasion to enhance the learning process. However, for adult learners that may be requiring continuous professional education to enhance their careers, or to achieve a new qualification online is fine as long as they receive an actual qualification at the end, rather than just for the pure love of learning.

You may have heard of Harvard’s fantastic massive open online course or MOOCs for short. They seem like fantastic ideas. A free course from Harvard, who would not want to do that. However, these online courses are entirely self-driven with no interaction whatsoever with educators or tutors, the student must push their own learning throughout. There is no qualification at the end upon completion, merely a certificate that you have completed it. Educators thought this was the future of learning, universities globally began scrabbling to create these, they thought they would be quick money generators, that educators could put all their teaching online and then devote their time to research as they would never have to interact with students again.

Which in my mind was an absolute disgrace as that is what we are here to do, to teach. Suffice it to say it didn’t work. Harvard admitted that by the end of their first MOOC they had a 98% attrition rate, so essentially only 2% of the students that signed up and started it actually completed it.
**BLENDED**

Blended online is where the majority of a module or programme is delivered online but classroom activities support that online learning and vice versa. Usually the ratio is 50 to 75% online with the remainder in a classroom at critical junctures in the learning timeline. This is my favoured mode of online teaching as it ensures that the educator gets to interact in person with the students and the students come together to network and work together.

You can use the classroom activities to introduce different forms of teaching methods. For example I utilise half day workshops where I use problem based learning to get the students into teams to work on a particular real world problem related to what they have learned online. Not only do they get to interact with each other, they get to see the application of their learning in a real life setting. The ratio that I have found works best is 10 hours of online lectures and then a three hour problem based learning workshop. So over the course of one module a student will be exposed to approximately thirty hours of online lectures and then nine hours in a classroom with me and their fellow students. The workshops also mark milestones, for example a workshop is usually held one week before an assignment is due and therefore the students have an opportunity to ask me questions on their assignment that they may not have wanted to discuss in the online discussion forums. For distance learning, blended online requires that the student either comes to your institution periodically or you may wish to set up tutorial centres in convenient locations away from your institution. This requires the training of tutors to facilitate workshops in those locations, but it does have the advantage of allowing your online learning cover a larger audience. One of the aims of the sustainable development goals is to ensure education for everyone, and online teaching like this can go a long way to achieving this. By having small classroom centres around a country supported by online lectures, a whole programme can be delivered to a wider audience remotely at a much lower cost than having students travel many miles to your institute to partake in classes and seek accommodation. They can learn in their own homes and still interact with fellow students and tutors in distributed classrooms around a country.

In my centre we have done this successfully for a variety of different programmes. For twenty years every Friday morning a lecture was delivered live in Dublin via television to nineteen different educational centres around Ireland. In each centre was a tutor that facilitated a question and answer session after the live lecture. So students did not have to travel to Dublin, they could just travel to their local centres. When online teaching came about we transferred from the television format to having the lectures delivered online on a Friday morning instead, but with periodic tutorial sessions to ensure students can still meet and have a tutor. For the last year I have been doing this. I currently have fifty students taking a blended online module in Dublin at UCD but also a group of twenty students taking the same module in Penang Medical College in Malaysia. The students in both centres interact with me online and with each other, they have the same assessment strategy and the same cycle of learning but they undertake their workshops in different locations in different time zones. In Malaysia I have a tutor conducting the workshops that I devise and I provide extra videos for the students there so that they have the benefit of me introducing the learning process to them, which the students in Dublin get in person. Even with the time zone differences, the cultural differences and language differences, the students all have equivalent learning in the same module.
and so far, there has been no discernible difference in the standard of their learning in order to achieve their learning outcomes.

**FLIPPED**

A flipped classroom is the same concept as blended online but this is where the ratio of online to classroom is much lower and you are utilising online lectures to direct students before they come to a classroom for a specific activity. So usually the online component may be about 10 to 20% of the entire learning in the module. I find this very useful for the delivery of theory or something that’s quite difficult that I need the students to know before they come to class. The advantages for the student is that they can watch the online lecture as many times as they need so that they can fully understand the concept of theory so that they come to the classroom prepared and ready to undertake whatever exercises or tasks I need them to perform or simply to listen to me talk about some examples and practicalities that have arisen from the theory.

For students with learning difficulties or physical impairments of sight or hearing, the use of online teaching has distinct advantages and can readily be applied for the universal design of our teaching methodologies. Online learning materials can be produced to assist students with visual impairments, enhanced to create greater audio quality or even the addition of written transcripts of a recording to benefit students with hearing impediments. The fact that students can watch or listen to online lectures repeatedly can help students with dyslexia or dyspraxia.

I also find flipped classrooms beneficial when it comes to ensuring that both my male and female students come to the classroom equally prepared and eager to learn. I have found that my female students participate more in the classroom after there has been an online lecture in advance. I need to investigate this further, but I find that my female students speak up more and participate more in the classroom when they have completed online learning activities and had online discussion with me and their fellow students in advance of coming to class. I teach predominantly in areas that are male dominated with male students making up around two thirds of the student body. It could be that the online learning environment provides the female students more diversity to participate, or even perhaps embolden them to participate more in the classroom after they have successfully participated online.
**CYCLE**

The cycle of learning for online teaching is crucial. Whether this is for purely online, blended online or flipped classrooms. Students need to be aware of how the online materials will be released online, when they will be accessible, how long they will be accessible for, at what point will discussion forums open online to ask questions, at what point will they close and will they need to move on to the next lecture. Routine is essential, students need to be able to understand the cycle and understand why the cycle exists in the first place.

So for my online programmes I utilise a weekly cycle. Each Friday at 1pm the students receive a video from me outlining what they are learning for the week and how they will be learning, how the learning will help them achieve their learning outcomes and how it is related to the assessment strategies. The online lectures then become available for the students to watch, accompanying the online lectures are copies of the slides and a summary document providing them with weekly learning objectives, questions to ask themselves about what they are learning, further reading resources and links to learning materials ranging from journal articles to online textbooks to national guidance documents. On Monday morning the discussion forums can open so they can ask me questions based on the online lectures which they were able to access from the previous Friday. I enter the discussion forum each morning to answer any questions which have been asked and I provide answers for the whole class to read. The discussion forum closes right before the next lecture opens the following Friday. So we have one complete cycle of learning and interaction in one week before moving to the next. When you have a cycle like this, all students are aware of their obligations as well as the educators. All students can adapt their learning to the cycle and contribute when they wish to do so. There is no pressure on the student to interact online in discussion but they all have the opportunity to do so.

**PACE**

By having a cycle like this, students can learn at their own pace and this is really a distinct advantage. Many studies have been conducted on how male and female students study at different paces and how some require more time to process information than others. By having a transparent cycle of learning all students can learn at their own pace without any pressure from fellow students or their educators. They must be self-motivated but also can actually rely on the cycle to adjust their pace of learning. One of the most common comments I receive from students from evaluations of my modules is that they benefitted from being able to watch the online lectures as many times as they want but also that they could pause and rewind the lecture to go back and connect with what they were learning. This is something that cannot happen in a classroom, educators do not have pause and rewind buttons and we are all on deadlines to complete a lecture before moving on to another class or a meeting. So when you have an established cycle of learning online, all students irrespective of gender, or age or abilities can learn at their own pace in their own environment which makes it a much more relaxed experience.
VOICE

Your voice is the most powerful tool you have when it comes to online learning. One of the most consistent comments I receive from students is that quite often they will not sit and actively watch an online lecture, they instead prefer to listen to it and print off a copy of the slides which they then write notes upon as they hear your voice narrating and expanding on the ideas you are presenting. So listening is the key mechanism that students are using when it comes to online learning. Ensuring your voice is strong and that you speak in a natural tone is essential. Writing a script is a good thing but actually staying on script and reading it word for word does not sound natural. You need to be able to translate how you talk in a classroom setting into a recording to accompany your slides. This requires a lot of practice. One word of advice is leave mistakes in, do not edit out minor mistakes or pauses, it comes across as much more natural and less polished and students actually prefer it. One key thing to do is also to slow down somewhat. We have a tendency in our classrooms to speak at our own pace, but if you are developing online lectures to assist students learn at their own pace or who may have learning difficulties or physical impairments, being cognisant of that and slowing down your narration can really help them. If you do write a script for your online lecture, make the script available as well, this is of huge benefit to students that may have learning difficulties or who have hearing impairments.

While we can aim for online teaching to be a great way of ensuring equality and equity between genders, if by doing so we make it a fairer learning environment for students with learning or physical difficulties we are really excelling as teachers and really ensuring that all of our students irrespective of abilities are being treated equally and given the same opportunities to learn.

VISUAL

While our voices are the most important aspect, ensuring that our online materials are visually stimulating will assist in the student learning experience. I have learned over the last few years that having a consistent approach to design and colour, font sizes and the amount of material presented on slides is very important. Too much text and the student attempts to read it all and ignores the narration, font size small or an unusual colour can distract the student. Instead minimising the amount of text and having a consistent approach with colour makes the online lecture simpler and easier to follow. Emphasising key points in speech bubbles is a way to direct the student to facts you want them to learn. Using images and flowcharts and video clips into online lectures will make them much more visually striking and much more like a documentary than a lecture. All of this enhances the student learning experience and keeps their attention from the start to the end of the online lecture.
Many of you may find the idea of not knowing your students personally uncomfortable. However, by knowing our students personally and being in a classroom we as educators can bring in our own unconscious biases into the classroom. Unconscious biases that female students prefer the humanities and that male students prefer science and engineering. That females are weaker than males, or that females make better caregivers and are more appropriate for nursing and teaching children. These biases crop up in our everyday lives and even the best of us in our classrooms can have them present when we teach. Trying to eliminate these biases from the classroom can be very difficult. Online teaching gives the opportunity to start this and begin to break down these distinctions in the classroom. I have already mentioned that students can learn at their own pace, that they have the opportunity to interact with their teachers and fellow students online as and when they choose and that it can embolden otherwise quiet and perhaps intimidated students to take part and interact online and then subsequently the classroom itself. Well one of the advantages of online learning environments is that you can anonymise the interactions. Instead of having the student use their name they can just use their student number online for interaction. In that way I or any other student in the class does not know the gender, age or abilities of the person they are interacting with, they merely see the question asked or the opinion expressed and there is no way for you to bring your own unconscious bias to bear in how you answer. I have found this to be particularly useful when I am dealing with students in different locations and from different cultural or ethnic or socioeconomic differences. All I see as the educator is the question or opinion and I must correspond and answer with on that basis. It reduces the interaction to pure learning, I cannot interpret is this a female student asking a question or is this a male student expressing an opinion. All I can see is that it is a student and that is it. So in this way the educator cannot bring their own biases into the interaction and nor can the fellow students watching or indeed interacting can bring their own biases in.

It is very simple, but it goes a long way to ensuring equity amongst the students.
INTERACTION

Interaction is critical with students. Quite often institute managers see online learning as a solution to free up time for their academics, so that they won’t have to be in classrooms and meeting students taking up valuable time when they could be applying for research funding or writing papers. It is a huge misconception. In order for online learning to work the educator must interact very regularly with the students online. This keeps the students engaging with the online learning materials and staying on the module. This is why Harvard’s MOOC has such a high attrition rate, without the educator acting as a guide through the learning process students disengage and do not complete their studies. Educators need to become innovative in how they engage online. I have developed specific protocols for students so that they know when and where to interact with me online, when I am available to discuss things live in a chat room versus when I am available to answer an email about an assignment. You must ensure that students expectations are met while also ensuring you are not overloaded with online communication. So my suggestion is set aside a particular thirty minutes each day to interact with students online. Provide small video messages periodically so that they can see your face talking directly to them. Set parameters as to when emails will be responded to and how long it will be for a question to be answered online. If you set the parameters of communication and interaction to students from the outset and then maintain that throughout the module you will be meeting their expectations for learning while also ensuring they stay active in their learning. Essentially you are creating a contract of learning between the educator and the student.

As I mentioned previously online learning can assist students with a variety of learning impediments or even physical disabilities which could otherwise hamper them in a classroom setting. I have students that have eyesight difficulties, hearing difficulties, dyslexia and even speech impediments that thrive in an online learning environment because they can interact with me at their own pace, they can use the online learning materials as many times as they wish, they can discuss and ask questions in an online discussion forum instead of a classroom where they may be nervous of talking up, or where they may experience misogyny or racism or discrimination from fellow students. Sometimes their fellow students can create intimidating classroom environments and it can hamper a great many students. Particularly when we as educators are striving to ensure that our lecture halls are places of diversity and equity and equality, where all students can have a say and express their ideas and ask questions. If students are being intimidated by their students or even perhaps their educator, an online learning environment can actually eradicate that through the anonymous and disconnected nature of being able to ask a question from the comfort of your own bedroom or kitchen without having to face a student that may dislike you.
ASSESSMENT

Finally assessment! Having an assessment strategy that the student buys into is essential for successful completion of an online module. The student needs to see how the assessment is relevant to their learning as well as to their professional career. So, having an assessment strategy that allows them to demonstrate their learning but also that they may be able to use in the future ensures buy in from the student and usually means they perform better. I tend to avoid online examinations as they do not truly demonstrate what a student learned over the course of the module. I prefer to have the student prepare summaries, critiques, essays, reports or procedures which they may be able to use in the future. Every single assignment I provide them, I give them a rationale for why they are doing this particular assignment, how it will benefit them professionally and how they are achieving the learning outcomes for the module by doing it.

As always with any assessment plagiarism is a problem, so online plagiarism tools are needed to assist in reviewing students work and to ensure that the student is who they say they are. Some blended online modules in UCD bring the students to UCD to complete some exams as a precaution for this. There are also mechanisms to do online exams in learning management systems like blackboard and Moodle and I have used them in the past but I find that plagiarism is less of an issue with online teaching than with traditional teaching. From my perspective, it comes from the student’s self-motivation and desire to learn, a student that wants to learn is less likely to plagiarise as they want to demonstrate their learning and receive good grades. Assessment is also anonymous so you cannot bring your unconscious bias in as graders. From my experience in online teaching over the last few years I can categorically state that my female students are performing better than their male counterparts and I only find this out when I get to the examination board and I see the grades which were anonymously marked by me attributed to particular students. Again you do need to have modules set up in a learning management system like blackboard to do that.

So after all of that, what I am really trying to say is that online learning is a fantastic opportunity for us all as educators to enhance how we teach for the benefit of our students. It opens up our teaching to a much wider audience spatially but also opens it up to students of all genders and ages and abilities because it gives them the opportunity to learn in a very structured way at their own pace and in their own environment.

Online teaching is really hard work! It requires a lot of time and effort to adequately prepare online learning materials that are usable and aid students in their learning. It requires significant effort in terms of interaction, much more so than a traditional class where you can walk out at the end. So when institute managers and presidents and chancellors see online learning as way to cut costs and get academics to do more research they are completely off target. But online learning can be used to enhance student learning which will only enhance an institutes reputation as an excellent place to learn from.

Online learning is not the solution for the advancement of higher education, it is not the magic bullet that will change how we teach and how students learn, but it is part of the solution we need and it is part of how we can achieve our sustainable development goals for education and gender. If we give every single student exactly the same opportunity to learn and remove our own biases and our
students biases we create a learning environment where equity and equality are embedded in it fundamentally and where diversity can shine through.

To end I will provide you with a quote on education from a speech US President John F Kennedy delivered over half a century ago but in today’s world it is more relevant than ever. He said this with his own bias of the time when women were not treated as equals, but let’s still applaud the intention of this speech. I hope I can deliver it the same way he did:

*If the pursuit of learning is not defended by the educated citizen it will not be defended at all.*

*For there will always be those that scoff at intellectuals, who cry out against research, who seek to limit our educational system. Modern cynics and sceptics see no more reason for landing a man on the moon, which we shall do, than the cynics and sceptics half a millennium ago saw for the discovery of this country. They see no harm in paying those to whom they entrust the minds of their children a smaller wage than than is paid to whom they entrust the care of their plumbing.*

*But the educated citizen knows how much more there is to know. He knows that knowledge is power - more so today than ever before. He knows that only an educated and informed people will be a free people; that the ignorance of one voter in a democracy impairs the security of all; and that if we can as Jefferson put it, enlighten the people generally, tyranny and the oppressions of mind and body will vanish like evil spirits at the dawn of day. And therefore, the educated citizen has a special obligation to encourage the pursuit of learning, to promote exploration of the unknown, to preserve the freedom of inquiry, to support the advancement of research, and assist at every level of government improvement of education for all Americans from grade school to graduate school.*

*Secondly the educated citizen has an obligation to serve the public. He may be a precinct worker or a President. He may give his talents at the court house, the state house or the White House. He may be a civil servant or a senator, a candidate or a campaign worker, a winner or a loser. But he must be a participant and not a spectator.*