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Using the Community of Practice model to shape approaches to Education for Sustainable Development across disciplines in a Technological University context: A Roundtable Podcast

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Using the Community of Practice model to shape approaches to Education for Sustainable Development across disciplines in a Technological University context: A Roundtable Podcast

Patrice Behan, Shaun Ferns, Sheona Foley, Olivia Freeman, Odette Gabaudan, Alacoque McAlpine, Cormac McMahon, Lucia Walsh

All Roundtable Participants: TU Dublin, City Campus, Park House, Grangegorman, Dublin 7

Abstract. This roundtable discussion podcast comprises eight colleagues engaged in reflective discussion of their shared experiences of being members of SDG Literacy.ie, a Community of Practice (CoP) first established in TU Dublin in 2020. This CoP focuses on and promotes the enhancement of Sustainability Literacy among student cohorts as one measure to be employed in strengthening Education for Sustainable Development (ESD) in line with the broader strategic aims of the university. Harvey et al. (2021) in a case-based paper which includes examination of the CoP discussed here conclude that teaching and learning innovation took place as a consequence of the resource-sharing, idea-generation and overall peer support that CoP members experience. The voices you will hear in this podcast discussion represent the inter-disciplinary SDG Literacy academic community who all share an interest in the sustainability domain and are acutely aware of SDG4.7 which focuses on ensuring all learners acquire the knowledge and skills for sustainable development by 2030. Discussion themes include (i) our shared understanding of ESD, (ii) how membership of SDGLiteracy.ie *shaped* our Teaching, Learning and Assessment (TLA) approaches in relation to ESD, Sustainability Literacy and Authentic Assessment, (iii) how membership of SDGLiteracy.ie *shaped* our broader personal and professional development (research, collaboration, output etc.) and (iv) our future plans in relation to ESD and the CoP model. The podcast transcript has been annotated through footnotes to direct the listener/reader to further reading on the various topics that emerge in the discussion.

Keywords: Sustainability, Sustainability Literacy, SDG, Education for Sustainable Development, Community of Practice, CoP model, Authentic Assessment.

Note: The podcast from which this transcript has been made forms a supplemental file with this paper.

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Link to Recording: [PS2022 Podcast Recording](#)

Transcribed Discussion

Olivia

Okay, you're very welcome to this roundtable discussion which we are recording for submission to the Polytechnic Summit 2022, taking place in Hochschule Darmstadt. Our discussion will focus on innovation in curriculum and pedagogy under the sustainability thematic. I'm joined today by seven of my fellow colleagues and co-authors from Technological University Dublin. As you will hear in the podcast, we work in different disciplines in the university¹. We teach diverse modules. Yet, we share an interest in education for sustainable development² and the enhancement of sustainability literacy for students and for

¹ www.tudublin.ie

² See Cebrián G, Junyent M, Mulà I. (2020)

our colleagues³. We were fortunate to receive Impact funding⁴ which we have utilized to develop a community of practice (CoP)⁵ SDGLiteracy.ie. In line with academic literature, we understand a community of practice to be a group of people who share a concern or passion for something they do and learn how to do it better as they interact regularly⁶. We are coming together today to discuss our individual and shared experiences of being founding members of this community of practice, and to reflect on the tangible outputs that have resulted from involvement in this group. Our transcribed discussion will be annotated to build connections between our experiences and existing theoretical discussion on communities of practice. We will also utilize annotations to signpost additional resources relating to our discussion today. My name is Dr. Olivia Freeman and joining me in this podcast are Dr. Cormac McMahon, who is currently leading on sustainability in the curriculum for TU Dublin, Alacoque McAlpine, lecturer in Supply Chain Management, Odette Gaubaudan, lecturer of French, Dr. Lucia Walsh, lecturer of Entrepreneurship and Business Sustainability, Sheona Foley lecturer in Culinary Arts and Food Technology, Dr. Patrice Behan, senior lecturer in Chemical and Pharmaceutical Sciences and Shaun Ferns, Education Model Project Team Leader. So, I will get started and perhaps I might first ask Cormac, to provide a little bit of background to this particular CoP, and to share with people listening the reasons why sustainability is now a strategic pillar for the university, and something we all feel very strongly about.

Cormac

Sure, thanks, Olivia, I guess, you know, higher education has been seen very much as a key instrument in the drive to pursue sustainable futures. And that dates right back to seminal reports, like the Club of Rome Report⁷, the Brundtland Report⁸ and slightly more recently, we had the "Talloires Declaration"⁹, which really sort of placed sustainability higher up the agenda on university campuses. And I think within that agenda, education was seen to have a dual mandate, if you like, it was a goal in itself to achieve better, higher quality, more inclusive education. But at the same time, it was seen as a catalyst to achieve other elements of sustainability. And we see that in the UN Sustainable Development Goals¹⁰ or the "Global Goals," as they're called, where SDG 4 is really all about education¹¹. But it's also seen within the framework of those sustainable development goals as a catalyst for other goals within the SDG framework, if you like. And I think as a result of that, TU Dublin in its inaugural strategic plan, recognize the centrality of the UN Sustainable Development Goals, and its new strategic intent to 2030 is really written through the lens of the SDGs. One of the specific KPIs in the strategic content to 2030 in TU Dublin is to shift away from having maybe pockets of excellence in sustainability across the university to an approach where all programs, that's academic, education and research programs, will have learning outcomes related to sustainability. So that's a massive shift away from just having those pockets of excellence as we might have had in the past to having a much more universal approach, where we can hand-on-heart say that our programmes are aligned to the principles and values of sustainable development. And I think in recognition of the sheer enormity of that particular KPI, a number of us in the room here who've had an interest in sustainability, either through our teaching or maybe personal interests, recognize the need to make sure that both our students and our staff are sustainability literate¹². So we set about forming this community of practice, albeit with some help and support

³ Bianchi et al. (2022) - GreenComp identifies a set of sustainability competences to feed into education programmes to help learners develop knowledge, skills and attitudes that promote ways to think, plan and act with empathy, responsibility, and care for our planet and for public health.

⁴ IMPACT is funded by the National Forum for the Enhancement of Teaching and Learning in Higher Education under the Strategic Alignment of Teaching and Learning Enhancement (SATLE) stream.

⁵ See Wenger, E, (2011).

⁶ See Lave and Wenger, (1991).

⁷ <https://www.clubofrome.org/publication/the-limits-to-growth/>

⁸ See Keeble, (1988).

⁹ <https://ulsf.org/wp-content/uploads/2015/06/TD.pdf>

¹⁰ <https://sdgs.un.org/goals>

¹¹ By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development, <https://unstats.un.org/sdgs/metadata/>

¹² Décamps et al. (2017) define sustainability literacy as the knowledge, skills and mindsets that help compel an individual to become deeply committed to building a sustainable future.

from National Forum and HEA funding. It's really allowed us to come together and explore ways in which we can raise the level of sustainability literacy within both our staff and student cohorts. And really the community of practice that has emerged since then has gone on to develop a wide range of activities and initiatives. So I'm delighted to hand back to you, Olivia, to engage in this discussion with our colleagues.

Olivia

Thanks, Cormac, that's really interesting. Good to have, I think, a background in terms of where this community of practice sits in the bigger university context. The community of practice is called SDGLiteracy.ie¹³ So, I might ask Alacoque to explain a little bit about where that came from. It seems an unusual name for a community of practice.

Alacoque

Thanks, Olivia. Well, I suppose the story in brief is probably like many communities of practice, we didn't sit down one day and decide to form one. The group started when some like-minded colleagues within the Faculty of Business received funding to work on the enhancement of sustainability literacy among students. And we use the Sulitest, sustainability literacy platform¹⁴. Specifically, the Sulitest awareness quiz¹⁵, as a stimulus to start the conversation around sustainability, and then build additional assignments around it to provide opportunities for students to deepen their knowledge and understanding. And we shared our reflections on this activity in various university wide forums and began to make connections with colleagues outside of business and to think about how we might be able to work together¹⁶. The initial group formed in 2020. And I'll never forget Olivia calling me and asking me if I'd like to be involved because it was at the end of the first lockdown. And despite my exhaustion, I was delighted to connect with colleagues over sustainability education. Other meetings and presentations on our work happened on MS TEAMS and there was certainly an advantage with this as you have a captive audience and colleagues from across the university could attend as logistics wasn't an issue. I have to say for me, this was a big positive of community of practice: getting to work with amazing colleagues from across the university and having an opportunity to see their work in the sustainability space. We were successful in achieving additional funding to grow the team. And we quickly found ourselves in need of a website, which would serve as a virtual home for this growing group. We had a number of student members in our community of practice, and they brainstormed some names. And we voted for SDGLiteracy.ie, which is appropriate as our understanding of sustainability is encapsulated by the UN 17 SDGs. And we were very fortunate that we had Shaun Ferns on the team who could build the SDG Literacy website for us.

Olivia

Absolutely, yes. Okay. Thanks, Alacoque. So, so in terms of the timeline, the smaller group began working in September 2020, as you said, and then the larger group assembled in early '21. So perhaps I might turn to Patrice, now, to ask you, please, can you share how you became involved with the group, and how it has impacted your own professional practices?

Patrice

Sure, Olivia. Like Alacoque was saying, most meetings happened on Teams, and that's true. And that was the advantage for me, that most of those meetings were happening virtually throughout the COVID pandemic. Because if we were trying to meet in person, I'm not sure I would have attended as many meetings as I did. When I started attending the SDG Literacy, I was struck by the expertise of everybody at that meeting in different areas of sustainability across the different disciplines. So, I took guidance from you guys on the Sulitest and the reflective writing. I'm an environmental chemist and I got my chemistry students to take the Sulitest and to write that reflective writing piece afterwards. And really what I was finding was that my chemistry students were seeing sustainability as an environmental issue only and weren't seeing the bigger picture of sustainability. So, we had to do something about that. And actually, it was Alacoque's passion for sustainability and her

¹³ www.sdgliteracy.ie

¹⁴ www.Sulitest.org

¹⁵ The Sulitest is a multiple choice quiz. It's hosted on an online platform, which is supported by the UN. The quiz is designed to measure and improve people's awareness of the SDG framework, and the interconnectedness of the Sustainable Development Goals.

¹⁶ See Freeman et al. (2021) for a roundtable podcast published in *Irish Journal of Academic Practice*

knowledge of fast fashion and her expertise in supply chain management that made me think one day, do you know what; chemists have a big role to play in the fashion industry. Like, for example, there are 8000 synthetic chemicals used in the fashion manufacturing process¹⁷. Now, a lot of these chemicals, where do they end up? Unfortunately, they can make their way into the environment. And they're extremely toxic. We call them persistent organic pollutants and they're very slow to degrade in the environment and I teach my chemistry students a lot about that¹⁸. But by being able to bring in the fashion industry and Alacoque's expertise, we came together and actually, we ran a very successful seminar that coincided with World Water Day in March 2021¹⁹. And what we did was, we tried to raise awareness of the global water crisis and the role that we all have in achieving all of the SDGs. And my students got so much out of it. Like, for instance, it takes, about 7000 litres of water to make an average pair of jeans and that can support an African family for an entire year²⁰. What they were able to see throughout this seminar, was the societal pillar of sustainability and how it did relate to them as scientists. So that was wonderful. And following that, the quality of the reflective writing pieces that were submitted by my students certainly improved. And another thing actually Olivia, I have a colleague here in the School of Chemical and Pharmaceutical Sciences who uses gamification as an active learning strategy. And that's Dr. Sarah Rawe. And she's very successful at this in first year science tutorials, to teach simple concepts of science. But what we did was that Dr Sarah Rawe and Dr. Eoin McGillicuddy and I, we came together, and we designed an escape room for our students around sustainability literacy²¹. And actually, we designed it in such a way that it supports the UN's Sulitest. And what we have found from our students is that it enhanced their learning and definitely their engagement has increased. Their enthusiasm and their communication skills have all really improved by running this alongside the Sulitest, and then, asking them to write the reflective piece. So, we've come a long way in terms of sustainability in our school, and we're now sharing it out across the faculty of science. I can see changes happening, which is wonderful. And that's all thanks to our community of practice SDG Literacy.

Olivia

That's great, Patrice. I think the interconnections of the SDGs are so important. We know that they don't exist in isolation, they're all interconnected. And we can almost use that then to find opportunities for ourselves to interconnect.

Patrice

Yeah.

Olivia

...and to potentially grow the cross faculty work that is beginning to take place in this area.

Patrice

That's true Olivia, that's important that cross disciplinary nature of sustainability. We're starting to get to grips with it. And we have a lot more work to do and I believe we will get there. And I think this group is going to help us facilitate that for sure. But definitely, you're right the cross disciplinary nature of sustainability is so important.

Olivia

And really nice to sort of hear of your students recognizing that and, and I suppose maybe engaging in assessments that they might not have, styles of assessment that they might not have engaged in before, like the reflection. Now I know that yourself, Alacoque and Sheona have also developed an open education resource for SDG 1 'No Poverty'²² and I am going to come to that in a minute. But if it's okay, I might first bring in Lucia. We've heard a little bit about assessment, Lucia, but do you think

¹⁷ <https://www.greenamerica.org/program/toxic-textiles> [accessed 25 April 2022]

¹⁸ See van der Veen I., Hanning A-C., Stare A., Leonards P.E.G., de Boer J., Weiss J.M., 2020.

¹⁹ <https://sdgliteracy.ie/2021/03/24/631/>

²⁰ <https://www.rte.ie/brainstorm/2021/03/19/1204928-water-save-consume-value-ireland/> [accessed 25 April 2022]

²¹ See Qureshi, S. M. Q. (2020) for a discussion of the importance of technology as an enabler to sustainable literacy

²² <https://sdgliteracy.ie/goal1/>

that the, that this community of practice has had an impact on assessment strategies around education for sustainable development? Can you talk us through a little bit about that?

Lucia

Yeah, for sure. It's great to hear reflections of the colleagues on how beneficial they found this community of practice. It's the same for me and I have really gained not just knowledge and friends, but also confidence in venturing into more non-traditional assessments and linking them to sustainability. We found Sulitest to be a really excellent tool for contributing to enhancing of sustainability literacy but not as a standalone tool. Students often take MCQs but without pausing and reflecting, the awareness may be only superficial and then they just forget and move on to something next. So we incorporated three steps in connecting Sulitest to reflection²³, and then to authentic assessment²⁴ pieces. All of our students at Faculty of Business took Sulitest and they didn't get any grade because it was just about their own knowledge and skills. Then they reflected on their experience using the DIEP²⁵ framework, which was structured around describing, interpreting, evaluating, and planning. And we also provided some prompts to guide the students. The last part was linked to the authentic assessment piece, which was discipline and module specific.

Olivia

Ok.

Lucia

We all adjusted this approach also to suit our individual disciplines but also individual cohorts of students. We have had run these assessments with undergraduate, postgraduate but even executive learners, and some of these authentic assessments that we have developed, included: creation of short videos aimed at practitioners and shared on LinkedIn; podcasts; content development for Instagram with sustainability activists; student activism; development of e-portfolios using Wix; but also some of the other innovative ways like Patrice's escape room and other types of assessment. Just to give one example of what I have done - in one of my modules called International Management, the students completed Sulitest, then they reflected on it, and then they worked on a piece that was authentic assessment linked. This involved creating a video around one SDG issue that the students found of relevance, then they related it to a particular industry and in the last part of the video they made actionable recommendations for practitioners. For example, one student focused on gender equality in construction industry and made some really good call to action with recommendations that could be actually implemented. They shared the videos on LinkedIn, for many of them setting up LinkedIn profile was quite new, so again, they learnt something new there as well. And they created engagement and impact. I think some of those videos had over 2,000 views and lots of comments, which was really empowering for the students. This assignment I just spoke about was an integrated assignment with Supply Chain Management module that is led by Alacoque. The students didn't have to do Sulitest reflection again but instead, they created another authentic assessment piece that was linked to student activism. Alacoque, do you want to add more to this?

Alacoque

Yeah, so the student's kind of with, with their supply chain piece, they debated, who ...where responsibility in the supply chain lies with for sustainability.²⁶ And then having identified where they think responsibility lied, they were tasked with using their own voice, and to contact a policymaker, a TD, or even a brand. And I think using activism in assessment is quite a new concept. But the fact that global citizenship is being recognized as such an important skill for graduates, we hope that activism will be incorporated into authentic assessment strategies across the university. And that civic engagement and student activism will be supported within this community of practice.²⁷

²³ See Boud, Keogh & Walker (1985) and Closs & Antonello (2011)

²⁴The key principle of authentic assessment is that “authenticity” helps students understand the complexity of work, contextualise their own skills and allows students to develop new work ready skills & soft skills (such as reflection) (Mueller, 2005; Ashford-Rowe et al., 2014; Villarroel et al., 2018)

²⁵ See Boud, Keogh & Walker (1985) for DIEP framework.

²⁶ See Boström, Magnus, et al. (2015).

²⁷ See Killick,(2013)

Olivia

So Shaun, perhaps you could tell us a little bit about how this community of practice has shaped approaches to education for sustainable development across the university? Like what, what are your thoughts on I suppose the wider impact of some of the work that we've heard Patrice and Lucia and Alacoque discuss?

Shaun

Brilliant, Olivia, and thanks for this. I suppose when Cormac aligned the work of the community of practice to the strategic intent of the university. And we see sustainability and practices being, I suppose, one of the three pillars of the university. As we speak now the university is developing its education model²⁸, and probably central to that is putting ownership for the learning and the teaching in the student's hand and allowing them to take responsibility but also seeing the university as a larger kind of learning community. We're engaged with the wider community as part of that learning. We see that straight through with the SDGs around the quality or "Number 4 Quality Education," and the part that plays so the building of the community of practice in particular around sustainability and SDG literacy kind of helps the university fulfill its roles and its obligations under the strategic plan. But I think it helps inform and engage with the wider community. And it brings that wider community into the university. So both parts of that community grow because of that interaction and collaboration.

Olivia

Okay, very good, very interesting Shaun, thanks. Lucia did you want to come in there...on that one?

Lucia

Yeah, like, Cormac and Shaun mentioned, we see ourselves as grassroots activists of community of practice, and really growing, we also see students are looking for more on this. And before we get there, with regards to having sustainability as part of all programs, and all of the modules and everything that we do, we have been engaging in these interesting activities in the meantime, and it is supported by the university strategy, we now also have a VP for Sustainability, we have been engaging with them. And we see our collaboration is growing as sustainability becomes more embedded, as I said earlier. Some of us are also part of the Green Campus Committee so we are strengthening those connections. We are also engaging with students societies like Enactus²⁹, which runs really interesting social innovation projects and there is also an emerging student led sustainability society. All these activities are happening across the whole of university, and across different stakeholder groups and disciplines.

Olivia

Yeah, and I can see the way as we're discussing it, it's, it's, I mean, the Sulitest itself is all about awareness. But all of this activity is really contributing to an expansion of awareness for staff, as well as students across the university context. So I'm going to turn now to Odette. So, Odette, you're coming to education for sustainable development. From a languages perspective, you're probably closer to ideas about global citizenship³⁰ and cross-cultural experiences than many of our colleagues. And you were the first member of the community of practice to utilize the software package 'Articulate' to create an online lesson. So, I'm interested to hear about that. And to hear about how being involved in this community of practice has impacted your work.

Odette

Okay, thanks, Olivia. So when I first heard from you and from Cormac that you were setting up a sustainable literacy CoP, I was really delighted to be able to join it. Because I've had an interest in environmental issues since I was a teenager. When

²⁸ TU Dublin (2021) Education Model Philosophy

²⁹ Enactus (<https://enactus.org/>) is the world's largest student-led and student-focused experiential learning initiative which connects 35 countries, 1,8000 university programmes, over 72,000 students and 550 corporate partners. It is directly connected with addressing the UN SDGs through social innovation pursued by students-social entrepreneurs, future leaders.

³⁰ Lilley et al. (2017a, p.6) cite a UNESCO (2015) report which identified the need for forms of education that enable learners to address local and global challenges, as socially responsible, critical and ethical thinking graduates, a disposition consistent with the global citizen. See McAvinia et al. (2021) for further discussion of this in the context of TU Dublin.

back in the 80s, I was one of these activists that supported Greenpeace! So I was quite aware of Agenda 2030, but I hadn't really kept up to date with the United Nations detailed work around the SDGs. So the CoP made me realize the enormous potential of integrating SDGs in our language learning curricula. And in my case, I'm lucky to teach a year four optional French module, which is called Current Affairs in France and Francophone countries. And it's actually ideal for embedding SDGs. In fact, most if not all, current affairs issues can be connected to one SDG or another. So this year, I've systematically used the SDGs as a lens to consider our French and Francophone current affairs topics in a critical and systematic way, through all our class activities, group discussions, debates, and the assessments as well. Maybe another impact that the CoP has had on my work, and that of a colleague, in Spanish, Pilar Molina, is that we propose to edit a special issue on sustainability literacy in language learning and teaching for a journal on language learning in higher education. And we would never have come up with this idea if we have not been part of the community of practice.

Olivia

Okay, that's really, really good to hear. And I suppose it makes me think of the fact that the community of practice, it takes time out because you have to take time out to turn up and be present. But it also provides us with headspace, doesn't it? To think about, you know, kind of new and innovative things we could be doing and to make those connections, probably a connection that you already had, but then to think about something new to do together.

Odette

And very much discover new aspects to it and you know, further explore what you might be able to do with this. Yes, absolutely.

Olivia

Yeah, fantastic. And I know that you've used Sulitest with your language students, I think you used the French version of Sulitest if I'm not wrong. Can you tell us a bit about that?

Odette

Yeah, that's right. I use the French version, because as you know, there are regional versions available for the Sulitest. This means that these regional versions include questions that are relevant to the local context, and that are in the target language. So in my case, I asked our year three students who are doing French to take the Sulitest French version. So the questions are in French, and a number of the questions are of relevance to France or to Francophone countries. And I know my colleague in Spanish, Pilar Molina, again does the equivalent with her students of Spanish. And we use it as a reading comprehension exercise. And then I use it as well as a springboard for another language task that's based on SDG 11: Sustainable Cities and Communities.

Olivia

Fantastic, that's really great, Odette. So it's always interesting to hear how people are, you know, utilizing the various tools in different ways. You've also worked on producing an OER³¹ on SDG 12 isn't it?

Odette

Yeah. Yeah, I did. I always really enjoyed developing OERs for French language learning. So I kind of jump on any opportunity to do that. And this was really a good opportunity to bring together language learning and SDGs and develop a resource and make it widely available. I decided to design this in such a way that it would be not only useful for an autonomous language learner, but also to provide my colleagues teaching French, both within TU Dublin and beyond with a resource that they could adapt for their own classes. I know some of my colleagues have used the resource this year, particularly in year two. It's based on SDG 12, which is about responsible consumption and production. I thought when I was designing it, that it might be nice to have two different lesson plans for it. One lesson is on responsible consumption. And it shows how a family changed their food consumption habits. And the other lesson is on responsible production, and that one focuses on the French car manufacturer

³¹ UNESCO Commonwealth of Learning (2011 and 2015).

Renault, and their innovative sustainable processes in manufacturing cars. And each lesson is pitched at a different language competency level. Also, as it happened, one of my final year students last year did a really good presentation on SDG 12 and food consumption. So I included her presentation with her voice over as part of the lesson. Because I thought it was nice to have one of our students featured in the OER. And as well as that it's a good way of including the student voice and showing a good example for what our current students can aspire to do with their French and SDGs.

Olivia

Thank you, thank you so much I think on behalf of the Community of Practice for doing this because we as a group had discussed different software options and wanted to develop these online lessons. And you grabbed the bull by the horns and did it and I think that inspired Sheona and Alacoque and Patrice as well to develop their one. So Sheona tell us about the OER that you've been working on. And first of all, tell us how you got involved in the group.

Sheona

Thanks, Olivia. So yes, I've been working in the School of Culinary Arts³² since 2015 and started to develop some dedicated food-focused sustainability modules for a couple of our programs. I was probably first introduced to Sulitest by Andy Maguire, who was our Sustainability Coordinator at the time, and I thought it was a great resource, so I started to use it. The way I used it was: I tested students at the beginning of the module and at the end of the module, to see if they made any kind of progress. I asked them to reflect on whether they recognised, their own gaps, and whether they then felt that they had filled those gaps over the course of the module³³. But our school is quite small and I suppose our student numbers are much lower than say, for example, in Business. So, when I heard the Faculty of Business had started using Sulitest in 2020, I thought this was great. The idea of forming a Community of Practice: I found that really exciting. So, I suppose, I felt this CoP would be able to provide the potential to scale up the use of Sulitest, and would also provide the opportunity for me and others to collaborate. So, you know, it gave us the ability to work together from different disciplines. And it was really useful in developing ideas around teaching, learning and assessment methods. Also, as you know, we haven't mentioned it yet, but we are trying to develop a regional Sulitest module, focused on Ireland. I think that it would be really useful if we could integrate that. But one of the offshoots, which you've asked me about, is the CoP on SDG 1. So as part of the larger CoP, we've kind of subdivided into clusters based on the SDGs that we each had an interest in. So, myself, Alacoque, and Patrice came together for SDG 1, 2, and 6. And I think because there was only three of us, and I think also, because as Patrice has earlier mentioned, we can do this virtually so easily on MSTeams, we were able to meet quite easily. We got together and got the ball rolling. And I think we all enjoyed it, we worked well together. My own personal interest in poverty stems back to earlier even before I was in education when I originally studied Development Economics, and what I really wanted to achieve with the OER for SDG 1³⁴ was to try and show the students the multi-dimensional aspects of poverty, and how Ireland even though we're a so-called developed country, you know, that we suffer from poverty as well, and how all this is linked to sustainable development and the economic models that our societies are based upon. Also, to try and demonstrate that food is very much a part of that space, and that sustainability can be seen, I suppose, you could argue as a Nexus issue that brings a lot of these issues together. But what really enabled our cluster to get the OER over the line was the help of another colleague, who's here today as well, Shaun Ferns. He transposed our work onto the platform Articulate Rise 360³⁵. So that is where it is now. And I suppose we see it, as you know, as a trigger for other groups to develop more OERs, as you've mentioned.³⁶

Olivia

Great, thanks. Thanks so much for all of that Sheona. Yes, I agree. We have been so lucky to have Shaun, our technology guru. And technology has been an enabling factor for this community of practice, for sure, in so many different ways. And I'm not

³² <https://www.tudublin.ie/explore/schools-and-disciplines/culinary-hospitality-tourism/culinary-arts-food-technology/>

³³ See Brekken CA, Peterson HH, King RP, Conner D. (2018)

³⁴ <https://sdgs.un.org/goals/goal1>

³⁵ <https://articulate.com/360/rise>

³⁶ See our OER on SDG 1 <https://sdgliteracy.ie/goal1/>

sure that we would have really been able to, to sort of flourish at all without the various technological enablers that we've used. So Shaun, you might talk a little bit more about that, and kind of the importance of technology for CoPs.

Shaun

Thanks, Olivia. And we've heard a lot of technology described, I suppose through the presentation. So far, and much of the work we do is entangled with technology³⁷ of various sorts, in particular, this community of practice, digital technology, seemed to play a central role. One of the first things we identified for the community of practice was a home. So if we have a community, we need a base or a home to work from, and a place to connect the large amount of work we were doing individually and collectively that was being developed. And in terms of sustainability. So in addition, and most importantly, we needed a place to share and celebrate the work. And I think when we build communities, we need to be sharing what we're doing on a continual basis, but we need to use that as a way to celebrate and celebration that and excuse the pun sustains the life, the community. So the development of the website was a key goal. And the site ended up becoming a one stop shop for the community, and it includes all the links of social media, links to the Sulitest. And for me, some of the most exciting elements is a place to host the newly developed OERs in relation to the seventeen goals. So as part of the community practice, and through our use of technology, we've seen this as an opportunity to be open and transparent with our practice, as well as to make visible so that we can all play a part of shaping that future educational, sustainable practice³⁸. And as part of the project of the work of the community, you'll have heard about the development of particular OERs through Articulate Rise. And I suppose as a group, we see them as the key educational components of the community of practice or one part of that. And I suppose from a developmental point of view, it's been great to see staff engage with the technology, develop and improve their digital skills, and then share these newfound skills not only with the rest of the community, but then their learners. And you can see that through the development of learning portfolios, they're building websites on Wix or their videos they shared on LinkedIn. The whole community, both staff and students have risen together with their digital skills. And then lastly, all of the OERs developed by the community, find a long term sustainable home in TOTAL³⁹ which is TU Dublin's institutional OER repository. And that forms part of the Arrow⁴⁰ institutional repository. So we can see, technology has been an enabler of the community of practice, but it's the community and digital plays one part of that.

Olivia

Yeah, absolutely. Alacoque did you want to add anything around that I suppose Shaun mentioned about, you know, some of the technologies that students are utilising as well, students might not be direct members of the community of practice. But, you know, staff that are part of this community of practice are bringing students in and trying to engage with technology and trying to help them be able to share their learning on a wider scale.

Alacoque

Yeah, we've used digital technology, it's been an enabler in designing our assessments, we've used our own VLE Brightspace, as well as the UN Sulitest platform. And we've also directed our students to the All Aboard higher education platform⁴¹ to encourage them to develop their digital skills such as video making. And Lucia and I, for our fourth year modules, we got our students to create different artifacts, digital artifacts, and collate them in one e-portfolio, which they built using Wix.⁴² And this allowed integration of knowledge and enabled the students to see connections across our modules. And the e-portfolio showcases their learning throughout the programme. And it contributes to building their professional identity online.⁴³ And students have reported that they're using those e-portfolios when applying for jobs.

³⁷ Fawns, (2021)

³⁸ Krznaric (2020) - *The Good Ancestor* reveals six profound ways in which we can all learn to think long-term, exploring how we can reawaken often neglected but uniquely human talents like 'cathedral thinking' that expand our time horizons and sharpen our foresight.

³⁹ TOTAL, (2022) <https://arrow.tudublin.ie/totaloers/>

⁴⁰ <https://arrow.tudublin.ie/>

⁴¹ <https://www.allaboardhe.ie/>

⁴² <https://www.wix.com/>

⁴³ See Amaya et al. (2013)

Olivia

So it's a way to reach outside of the university, which is becoming increasingly important. And I know we have quite a strong social media presence as well, largely thanks to Cormac who does a great job in keeping Twitter in particular updated. What do any of you think about the importance of social media for the community of practice? As this group continues to expand?

Shaun

Thanks for that, Olivia. I'll jump in there, if you don't mind.

Olivia

Thanks.

Shaun

That idea of we talk and discuss what a community looks like and then what it feels like. And communities are about a level playing field for all the members of the community and social media has allowed us to communicate both the purpose, the goals, and keep each other up to date, and it's that interaction, through announcements on like, you've used the example of Twitter, sharing the work we do on Instagram or LinkedIn, that it's that interconnection of relationships, I think Foucault⁴⁴ says we all live in relationships and the interrelationship and the workings of that that makes us a strong community. And without that continual thread that Cormac has, so professionally kind of delivered through the social media. For me, that's what pulls us together and makes us unique.

Olivia

Okay, yeah. And I think it's been, you know, I suppose one of the activities of our community of practice has been around, you know, presenting some of what we're doing at conferences and inviting guests in. And I think social media really comes into its own then too, because it's a way that we can continue ongoing conversations with guests and, you know, really kind of hold on to those connections. So it's very meaningful activity, I think, and a time consuming activity. I think we're all grateful certainly to Cormac that he keeps on top of it, but it's, it's, worth it for concretizing some of those links. Okay, so another area, I suppose that I thought it would be useful for us to discuss is the area of professional development and academic literature on communities of practice suggests that CoPs can be a catalyst to encourage otherwise time constrained staff with professional development opportunities. And I think some of that has kind of come out in the discussions we've had so far. But I know Cormac and Lucia have been involved in the development of a new CPD around sustainability education. So I might turn to Lucia, are you seeing synergies between the activities of the CoP and engagement by academic staff with formal professional development?

Lucia

Yeah, for sure. We were part of a project, myself and Cormac, funded by the National Teaching and Learning Forum called "Impact." And we worked with colleagues from different disciplines from food science, pharma & biopharma, tourism & hospitality, management and business. Together, we developed a certificate - a CPD (certificate professional development) in education for sustainability, based on a pilot that ran in food science previously, and then we adapted parts of it to different disciplines. Cormac has been delivering this, and it has been really successful and impactful, because when colleagues take the program, they don't just gain the knowledge and skills, but they also gain other competencies, connections and confidence. And then they're able to embed it into their own teaching practice. We also created a Level 8⁴⁵ discipline specific modules for students and delivered them to final year undergraduate students. For example, I have delivered the business sustainability version as an option to final year business students. It was a new offering last September. I expected maybe 30 students, but we ended up with 94 of them. This really shows that there's a great interest by our students in this area. This groundwork led to audit of programmes and programme development. I'm a programme chair of Postgraduate Certificate in Business

⁴⁴ See Gilbert (1999)

⁴⁵ The Irish National Framework of Qualifications (QQI) Level 8 is an equivalent of a Bachelors Degree <https://www.qqi.ie/what-we-do/the-qualifications-system/national-framework-of-qualifications>

Sustainability Leadership and developed this programme with other SDG Literacy CoP colleagues, mainly Olivia and Alacoque. We all teach on this program as well. One really impactful element of this program is a consultancy project. Students who are working are addressing a real business sustainability issue. Apart from producing a roadmap of actions for their organizations, they are also develop pitching skills. When the consultancy project is finished, they're ready to go and involve different stakeholders and created a buy-in and real impact. We also opened up some of these guest talks and other events to others in the community of practice and other colleagues and postgraduate students. You can see how something that starts really small grows and grows and the impact grows as well with it, which is great.

Olivia

Absolutely. Thanks, thanks for shedding some light on all of that Lucia. So as we come to a close now, I thought it might be useful to reflect on one of the difficulties of any community of practice, and that is sustaining engagement, and also endeavoring to create a feeling of mutual gain. So I suppose I feel that the brand identity that we've talked about SDGLiteracy.ie, the website, the social media presence, certainly has helped to build and sustain a sense of togetherness. I suppose I've been thinking about it. And if we were to visualize our CoP, it might be concentric circles as sort of a core group at the beginning at the middle of it all, who are actively engaged and continually, continuously innovating, an inner circle who are spreading the word on our shared passions and practices and their own teaching and learning contexts. And, and engaging in CPD in this area. And then maybe an outer circle who are dipping in and out and becoming more familiar with approaches to sustainability education, without fully committing to them just yet. And I think there's fluidity between these groups, it's probably fairly typical of community of practice that it might look something like this. So before we close, I wanted to ask all of you, what are your biggest takeaways from your involvement as members of the core group? And what ideas do you have around? That? That sustenance piece? I suppose it's a question about challenges and opportunities. How do we keep the community going? How, and most importantly, how do we keep education for sustainability top of the agenda? So who would like to go first jump in to answer this big question.

Patrice

Olivia, I really think we're very lucky here in TU Dublin that our university's strategic intent⁴⁶ is built around the three pillars of sustainability. And we here in TU Dublin, call it people, planet, partnership, but it's built around sustainability. So we're very lucky that we have that high level support for sustainability. And I think that is going to help us to keep our community of practice alive and to keep sustainability on the agenda.

Olivia

Yes, I agree with you that that strategic umbrella is so important to what we're doing. Alacoque did you want to come in?

Alacoque

I agree with Patrice that having that support from above is so crucial. And I can see now from my students in supply chain management, they're telling me that, you know, employers are looking for sustainability in their CV. And looking for them to have a sustainable supply chain module. So we're developing those at undergraduate and, and at level nine. And being part of this community of practice, you know, we've been able to organize events for students that have been really impactful for them. Like the sustainable fashion event, last October,⁴⁷ where we had an ex-garment worker speak to the students, and I think support for those kinds of events and support for continuing building our OERs or other micro credentials is crucial.

Olivia

Thank you. Thanks Alacoque. Odette?

⁴⁶ <https://www.tudublin.ie/explore/about-the-university/strategicintent/2030/>

⁴⁷ See <https://www.youtube.com/watch?app=desktop&v=FdBJfKthmFM> for recording of this event

Odette

Yeah, I'm just thinking that perhaps maybe another way of leveraging the opportunities that are provided by the CoP is to encourage the creation of multidisciplinary projects and collaborations between students, students of different disciplines, a bit like what maybe Patrice described earlier in the discussion when she mentioned that her chemistry students saw the relevance of SDGs when she worked together with Alacoque on the fashion industry, and maybe if that, you know, if we're getting students from different disciplines and different programs, to work together on a project or an assessment, and bringing different SDGs together, depending on their own discipline, that it could really open up new opportunities for both sustainability in TU Dublin and for a multidisciplinary project as well as for the community of practice, because it will be an enabler of all of that.

Olivia

Yeah, yeah. And I think, as the Community of Practice grows, the opportunities for finding the right people to talk to be able to do something like that, you know, that the opportunity is growing as well. And I think a lot of people are, you know, interested in, you know, breaking down the silos between disciplines⁴⁸, and looking for those opportunities to do something different and really meaningful. I think both staff and students are interested in that. So yeah, absolutely agree. Shaun, what are your thoughts?

Shaun

Yeah, thanks, Olivia. I was struck by your comments around that the idea of what a community and the concentric circles and those who are central or core and those on the external. And I'm also thinking about sustainability in terms of our individual and collective responsibilities to meet the sustainable goals. And sometimes we describe collaborations as mutually beneficial, well-defined relationships entered into by two or more groups, to achieve common goals. And I think we're moving past that kind of definition of collaboration⁴⁹. And we're really moving into this space of community. And community is about that collective responsibility about achieving our sustainable goals, and not just looking about what the individual effect of our actions are. And I think if we're going to meet our targets around sustainability, it'll be our collective effort, and our collective responsibility will become clear. And, like, I'm really fortunate enough to be part of this community of practice. And that what keeps drawing me back is a sense of community by all of the participants engaging in any way they can. And that's why I'm quite proud to be part of the SDG literacy group.

Olivia

Great, thanks, Shaun. Odette?

Odette

Yeah, I also think that, for instance, I have participated in the CoP, I've done the CPD module on sustainability. And, you know, I'm getting more comfortable with the idea of embedding the SDGs into one of my modules, but I find that engaging with other colleagues on the topic really helps me to develop and refine the teaching and learning methods that I can use to nurture the competencies that are integral to education for sustainable development⁵⁰. And I'm thinking of competencies that are quite complex to nurture such as systemic thinking, collaborative working, values thinking, and they're all really relevant to building a sustainable future, and they're the ones that will enable us all, to quote a French philosopher, Latour⁵¹, he talks about landing back to Earth and getting connected to our local context. He's doing a lot of work on the Anthropocene, and trying to engage communities into what we can do to be enablers of change in terms of sustainability.

Olivia

Yeah, excellent. And it's back to that global citizenship piece as well isn't, as you know, trying to, for us all to come to grips with what exactly does that mean? Because I don't think it's, you know, is about sort of doing an Erasmus program or, you

⁴⁸ See Freeman, Hand, Kennedy (2021)

⁴⁹ See Ferguson et al (2019)

⁵⁰ See Wiek, A., Withycombe, L. & Redman, C.L. (2011).

⁵¹ See Latour, B. (2021). *Où suis-je ? Leçons du confinement à l'usage des terrestres*. Editions La Découverte

know, going, going somewhere for three months, that's part of it, but it's about understanding how global citizenship can be nurtured and achieved, actually, in local contexts. And through having, you know, nurturing in our students, you know, a full understanding of, of the task ahead of us in terms of sustainability,

Odette

Yeah and understanding these interdependencies. And like, moving from a top-down approach, you know, from the French perspective, it's very much a Cartesian approach where, it's top down, with the dominant ideology of the economic systems, and instead, getting a ground up change and approach

Olivia

Bottom up...

Odette

...that's it, bottom up approach.

Olivia

Yeah. Thanks, Odette.

Odette

And that's where the community of practice can be very effective.

Olivia

Yeah. And it feels like a very grassroots experience, I think, certainly for me, as well. And Lucia, Sheona, do you have anything you'd like to add, before we come to a close?

Sheona

I'd agree with everything that everybody has said there. I think what is really empowering is to be able to work across disciplines and just to see other disciplines' take on "sustainability". Trying to look at sustainability just from a food perspective is too narrow. I think also it empowers my teaching, I think just by being involved and seeing the other aspects or the others' take on it.

Lucia

Yeah, I think, as Shaun said earlier, it's not our own individual actions, but it's the collective actions of us as a community, not just us but our students and everyone else who gets involved with these initiatives. I think together we should be very proud of our achievements to date because we have done so much in so many different ways and using such innovative ways of thinking and engaging with students. One thing that we need to think about going forward is how we're going to manage this community of practice so that it continues to thrive and grow and make impact. How can we get supported in terms of, us as a rotating committee or where we can get funding too for some of us to take time out to really coordinate and focus on these activities?

Olivia

Yes, well said Lucia. Okay, well, I think we have come to a close now. I'd like to thank everybody for joining me today and for sharing your experiences and insights. And I'd like to thank anybody listening to this podcast. And if you would like to find out more about our community of practice, please do visit our website SDGLiteracy.ie. And thank you very much for your interest.

References

- (1) Amaya, P., Agudo, J. E., Sánchez, H., Rico, M., & Hernández-Linares, R. (2013). Educational e-portfolios: Uses and Tools. *Procedia-Social and Behavioral Sciences*, 93, 1169-1173.
- (2) Ashford-Rowe, K., Herrington, J., & Brown, C. (2014). Establishing the critical elements that determine authentic assessment. *Assessment & Evaluation in Higher Education*, 39(2), 205-222.
- (3) Bianchi, G., Pisiotis, U. and Cabrera Giraldez, M., (2022). GreenComp The European sustainability competence framework, <https://publications.jrc.ec.europa.eu/repository/handle/JRC128040>
- (4) Boström, Magnus, et al. (2015) Sustainable and responsible supply chain governance: challenges and opportunities. *Journal of Cleaner Production*, 107, 1-7.
- (5) Boud, D., Keogh, R., & Walker, D. (1985). Reflection, turning experience into learning. New York: Routledge.
- (6) Brekken CA, Peterson HH, King RP, Conner D. (2018). Writing a Recipe for Teaching Sustainable Food Systems: Lessons from Three University Courses. *Sustainability* 10(6):1898.
- (7) Cebrián G, Junyent M, & Mulà I. (2020). Competencies in Education for Sustainable Development: Emerging Teaching and Research Developments. *Sustainability*. 12 (2):579.
- (8) Closs, L. & Antonello, C.S., (2011). Transformative learning: Integrating critical reflection into management education. *Journal of Transformative Education*, 9(2), 63-88.
- (9) Décamps, A., Barbat, G., Carteron, J. C., Hands, V., & Parkes, C. (2017). Sulitest: A collaborative initiative to support and assess sustainability literacy in higher education. *The International Journal of Management Education*, 15(2), 138-152.
- (10) Enactus, (2022). Who we Are, Available at <https://enactus.org/who-we-are/our-story/>.
- (11) Fawns, T. (2021). *An Entangled Pedagogy: Views of the relationship between technology and pedagogy – Open.Ed.* <https://open.ed.ac.uk/an-entangled-pedagogy-views-of-the-relationship-between-technology-and-pedagogy/>.
- (12) Ferguson, C., Hickey, R., Ferns, S., & Savelle, R. (2019). International Collaborations: Inspiring Active Learning in Higher Education. *International Journal for Cross-Disciplinary Subjects in Education*, 10(3), 4120–4126.
- (13) Freeman, O., Duffy, D., McAlpine, A., Nolan Dr, C., McMahan, C., & Walsh, L. (2021). Exploring the impact of authentic assessment on sustainability literacy through reflective and action-oriented tasks: A roundtable podcast. *Irish Journal of Academic Practice*, 9(2), 7.
- (14) Freeman, O., Hand, R., & Kennedy, A. (2021). Breaking Down Silos Through Authentic Assessment: A Live Case Analysis. *Journal of Higher Education Theory & Practice*, 21(4).
- (15) Gilbert, P. (1999). The World, The Community and Michel Foucault. *Journal of Applied Philosophy*, 16(2), 187–189.
- (16) Harvey, J., Dodd, D., Deegan, C., Freeman, O., MacMahon, C. H., & Williams, H. (2021). Cultivating a Community of Practice model to support and encourage innovative T&L practices to engage practitioners and enhance student success. *Irish Journal of Academic Practice*, 9(2), 3.
- (17) Keeble, B. R. (1988). The Brundtland Report: ‘Our common future’. *Medicine and war*, 4(1), 17-25.
- (18) Killick, David. "Global citizenship, sojourning students and campus communities." *Teaching in Higher Education* 18.7 (2013): 721-735.
- (19) Krznaric, R. (2020) *The Good Ancestor How to Think Long term in a Short-term World*. Pub. W.H. Allen Penguin Rando House UK.
- (20) Lave, J. & Wenger. E. (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.
- (21) Latour, B. (2021). Où suis-je ? Leçons du confinement à l’usage des terrestres. Editions La Découverte.
- (22) Lilley, K., Barker, M., & Harris, N. (2017). The global citizen conceptualized: Accommodating ambiguity. *Journal of Studies in International Education*, 21(1), 6-21.
- (23) McAvinia, Claire; Gabaudan, Odette; Freeman, Olivia; Ryan, Barry J.; O’Kane, Colm; and Tully, Robert (2021) Foundations and scaffolding: exploring literature and practice to build a new curriculum framework for TU Dublin, *Irish Journal of Academic Practice*, Vol. 9: Iss. 2, Article 13
- (24) Mueller, J. (2005). The authentic assessment toolbox: Enhancing student learning through online faculty development. *Journal of Online Learning and Teaching*, 1(1), 1-7.
- (25) Qureshi, S. M. Q. (2020). Learning by sustainable living to improve sustainability literacy. *International Journal of Sustainability in Higher Education*. 21 (1) 161-178.
- (26) TOTAL: *Open Educational Resources | Technological University Dublin Research | ARROW@TU Dublin*. (n.d.). Retrieved April 25, 2022, from <https://arrow.tudublin.ie/totaloers/>
- (27) TU Dublin. (2021, December). *Education Model Philosophy*. TU Dublin Intranet. <https://www.tudublin.ie/intranet/education-model/education-model-philosophy/>
- (28) UNESCO and Commonwealth of Learning (2011 & 2015) *Guidelines for Open Educational Resources (OERs) in Higher Education*, United Nations Educational, Scientific and Cultural Organization, France & Commonwealth of Learning, Canada. <https://unesdoc.unesco.org/ark:/48223/pf0000213605>
- (29) Van der Veen I., Hamming A-C., Stare A., Leonards P.E.G., de Boer J., Weiss J.M. The effect of weathering on per- and polyfluoroalkyl substances (PFASs) from durable water repellent (DWR) clothing, *Chemosphere*, Volume 49 2020.
- (30) Villarroel, V., Bloxham, S., Bruna, D., Bruna, C., & Herrera-Seda, C. (2018). Authentic assessment: creating a blueprint for course design. *Assessment & Evaluation in Higher Education*, 43(5), 840-854.
- (31) Wenger, E. (2011). Communities of practice: A brief introduction, viewed 28 November 2020 <https://scholarsbank.uoregon>.

edu/xmlui/bitstream/handle/1794/11736. *A% 20brief*, 20.

- (32) Wiek, A., Withycombe, L. & Redman, C.L. (2011). Key competencies in sustainability: a reference framework for academic program development. *Sustain Sci* 6, 203–218 . <https://doi.org/10.1007/s11625-011-0132-6>