



## **Solving a paradox: can learning about climate change and sustainable healthcare be fun?**

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### ***Abstract***

Climate change and education for sustainable healthcare are important and essential topics to address in higher education, but which have the potential to be anxiety-inducing. In our medical school, we have used a ludic pedagogy with a solutions-based framework to deliver a student selected component addressing sustainable healthcare and climate change. This involved the use of serious games, flipped classroom model, formative ungraded presentations, interprofessional learning, experiential learning and community links, summative engagement, and the creation of individual action plans in an aim to deliver transformative learning. In this case study, we will outline the various techniques used for this approach; our reflections on the effectiveness, benefits, and limitations; and finish with recommendations for educators and suggestions for further research and pedagogical developments to support joyful transformative learning of potentially anxiety-inducing topics.

**Keywords:** ludic pedagogy; sustainable healthcare; climate change; sustainability; transformative learning; solutions-based pedagogy; serious games; flipped classroom model; experiential learning; interprofessional learning.

## ***Introduction***

With an increasing focus on improving the student experience at our institution, adopting a ludic pedagogy (Lauricella and Edmunds, 2022) and infusing fun into our teaching module proved an attractive proposition. We also hoped this could lead to an improved educator experience as well. This case study describes our ludic teaching approach, our experience, and our tips for ludic educators.

In 2022, Lauricella and Edmunds introduced a new pedagogical framework entitled ludic pedagogy, which includes four key elements: fun, positivity, play, and playfulness. According to their model, fun is supported by the other three elements, so we ensured that positivity, play, and playfulness underpinned our pedagogical approach for our module on sustainable healthcare.

Education for Sustainable Healthcare (ESH) has now become a mandatory requirement of medical curricula in the United Kingdom, following the publication of the Medical School Council's ESH curriculum (Tun and Martin, 2022), the inclusion of sustainability in the latest Good Medical Practice (GMC, 2024a), and the publication of the GMC's position statement (GMC, 2024b). There have been a number of frameworks developed for integrating this topic in the medical curriculum, such as infusing it throughout (Bevan and Roderick, 2021) or including it as quality improvement audits (Marsden et al., 2021). At the authors' medical school, we have integrated ESH in a number of different ways, including the design of a new student selected component (SSC) entitled 'An introduction to Sustainable Healthcare and Climate Change'. SSCs in our medical school are five-week-long blocks of teaching in years 2, 3, and 4, when students must select a topic to delve in depth into. The aim of our particular SSC was to emphasise the relevance of sustainable healthcare, stimulate engagement, and create a positive outlook. However, learning about climate change, its impact on health, and the health professionals' own impact on climate change through their future work can cause climate anxiety (Hickman et al., 2021). In this case study, we explore how to solve the paradox of making learning about a potentially anxiety-inducing topic a fun and positive experience.

As well as ludic pedagogy, our pedagogy was underpinned by socio-constructivist learning (Vygotsky, 1986), experiential learning principles (Yardley et al., 2012), self-determination theory to engage our students' intrinsic motivation (Ryan and Deci, 2020), and transformative learning (Mezirow, 1997). Socio-constructivism underpinned our use of small group discussion, and experiential learning our use of field trips and shadowing activities. Self-determination theory led us to allow student choice in topics, partners, and shadowing site, as well as introducing ludic pedagogy. Transformative learning underpinned our use of personal action plans, solutions-based scaffolding for discussions, and reflection as part of the assessment.

Making learning fun was therefore an important challenge to face, especially in the context of discussing the serious and potentially anxiety-inducing topics of sustainable healthcare and climate change (Schwaab et al., 2022). Making learning fun in this context required a holistic approach, not a simple injection of a few fun activities spread throughout the module, as our aim was to deliver transformative learning. In our curriculum design, we therefore introduced gamification, flipped classroom model, formative ungraded presentations, interprofessional learning, experiential learning and community links, summative engagement, and the creation of individual action plans.

## ***Our ludic pedagogy elements***

### **Serious games**

To include the element of 'play' from the ludic pedagogy framework, we introduced a sustainability card game as an icebreaker activity during the introduction session, which served to set the playful tone of the learning environment for the module. Students self-allocated to small groups, and played this collaborative card game, which is aimed at improving carbon footprint literacy of everyday items and activities. The use of serious card games as an icebreaker activity has been used by Cohen in the anxiety-inducing field of statistics. She found that the use of the game stimulated interest, helped reduce anxiety, and encouraged critical discussion (Cohen, 2014).

In addition, one pair of students also created a serious card game as their module project, one of the summative assessments within our SSC, where students explore a particular

topic of their choice in pairs. This card game was specific to the carbon footprint of various healthcare activities and resources, and encouraged learning of ESH as well as stimulated discussion around our topic of interest. The creation of a serious card game as a summative assessment stimulated student creativity and allowed them to research serious topics while maintaining their joy of learning and discovery. This card game has since been updated and used with acclaim at public engagement events.

## **Flipped classroom model**

Learning about our topics requires the reading of sometimes alarming and lengthy policy reports from a variety of national and international institutions and organisations. Engagement with these documents was encouraged through the use of the flipped classroom model (Moffett, 2014). In this model, students are issued pre-class activities, which they can do at a time and pace that suits them. Class time is used for critical discussion and application of the knowledge learned in the pre-class activities. This can then be followed by post-class activities, such as quizzes or exercises to allow students to consolidate their learning.

To align with the positivity element of the ludic pedagogy framework, in our SSC, we created short reading lists of sections of these various documents on specific themes with a structured solutions-focused reading framework. The focus on solutions allowed students to look positively at the future and discuss ways forward creatively, rather than focus on the at-times alarming facts being learned. We offered scaffolding in the shape of questions students should answer or reflect on as they went through each document. In class, students chose small groups to discuss the questions with, and ended with flash presentations of the group discussion to the whole class. Post-class activities were built into the summative assessment, as students were required to include a summary of these topics in their reports.

## **Formative ungraded presentations**

In a large medical school such as the authors', students get some opportunities to develop their presentation skills, but a small class module such as an SSC provides an excellent

opportunity to develop these skills further, and to do so with a sense of fun. Over the course of the SSC, students were asked to prepare a number of formative presentations and were allowed to choose a different partner for each of these. The choice of partner allows students to choose peers with whom they will enjoy working, aligning with the playful element of the ludic pedagogy. The presentations were ungraded, but students received some generic and formative feedback to help improve their presentation skills. Formative feedback is particularly effective if it fulfils three criteria: motive, opportunity, and means (Shute, 2008). The structure of our module achieved effective formative feedback since the feedback was immediate, and a summative presentation took place later in the module, and student feedback indicated that 100% of our students found these helpful.

In one presentation, students were given a sustainable development goal (SDG) to present with a positive structure framework in order to align with the positivity element of ludic pedagogy: students were asked to discuss the trend of their SDG's performance to acknowledge progress achieved so far, despite the fact that most SDGs are not on track to achieve their targets by 2030 as anticipated. According to Rosling et al. (2019), it is important to acknowledge that SDG performance can be poor, but better or improving, as this allows discussion to be accurate but optimistic.

During their presentations, students were asked to give examples of initiatives that are currently effective – this ensures a positive research attitude and fun critical discussion of each SDG. Students were also asked to discuss the positive feedback that action to improve their allocated SDG has on other SDGs.

In another formative presentation, students could choose any innovation linked to ESH to present, using a positive forward-thinking framework. Formal scaffolding was provided by a series of questions students needed to address about the innovation, which made them reflect on the future of the problem addressed or innovation itself. Students found very creative ideas, such as sustainable cities on all continents, public engagement strategies, or the use of body heat in a train station to heat an adjacent block of office buildings, and suggested how these could be further developed, improved, or upscaled.

## **Interprofessional learning**

Interprofessional learning between medical and nursing students has been shown to provide four key benefits, as listed by Homeyer et al. (2018), which are: development and promotion of interprofessional thinking and acting; acquirement of shared knowledge; the promotion of information and knowledge exchange; and the promotion of mutual understanding. To highlight the relevance of ESH for all health professionals, and to demonstrate the network of support available, we set up a creative solutions-focused interprofessional workshop with nursing students, which aligned with the positivity element of ludic pedagogy. In the workshop, medical students had experienced four weeks of ESH learning, while the nursing students were in their first week of ESH learning. The workshop was therefore designed using a near-peer teaching pedagogy. Near-peer teaching is the use of student tutors only slightly more educated than their peers to deliver teaching, and it has been shown to improve the knowledge of the student teachers, as well as their teaching and presentation skills (Hall et al., 2018), and to be instructive to the junior students (Naeger et al., 2013). The overwhelming finding in Naeger et al.'s (2013) near-peer teaching study was that the vast majority of students reported that they 'enjoyed' or 'really enjoyed' the experience, making it an ideal teaching method for a fun pedagogy. From our experience, we certainly enjoyed working as an interdisciplinary team, and it has led to further unrelated collaborations and co-teaching.

To further stimulate interprofessional collaboration, each mixed group of students delivered quick formative flash presentations on the health condition that they had researched and its relationship to climate change.

## **Experiential learning and community links**

For a fully transformational, experiential, and joyous approach, we linked with community organisations related to ESH and arranged field trips. Experiential learning is authentic, derives knowledge from a collective experience, and encourages the development of transferable learning (Yardley et al., 2012). Experiential learning has also been shown to increase medical students' positive attitude to learning (Koponen et al., 2012).

One example of experiential and playful learning included a hill-walk as a form of self-administered nature prescribing. The theory of the benefits of nature prescribing had been discussed in the classroom setting (Adewuyi et al., 2023), and this knowledge was consolidated by experiencing this form of prescribing. Informal feedback during the walk indicated that many students were surprised at the extent of the positive impact this activity had on their mood.

We also visited local community groups providing social prescribing activities (Wakefield et al., 2022). Social prescribing had been explored in depth in the classroom setting through some of the above-mentioned pedagogies, but experiential learning was used to further contextualise this solution, a new concept to many of our students. During these visits, students were required to take part and engage with participants of these programmes, including a chair aerobics session with older socially isolated adults. Putting the theoretical perspective from the classroom into practical learning was fundamental to our fun solutions-focused approach, and some students volunteered to return in their own time.

### **Summative engagement**

Alongside our formative approach, we used summative grades to encourage student engagement in all sessions. A record of individual student engagement in class was kept throughout all teaching events, recorded in a very deliberately visible manner, to give immediate positive reinforcement. This encouraged most students to take part in discussions, and to ask questions during peer presentations. However, it must be noted that in a study assessing contributions to online discussion forums, marking contributions had an impact on behaviour but not learning (Oliver and Shaw, 2003). The aim was to create a safe and fun learning environment for our students. Importantly, the quality of the contribution was not recorded, only each occurrence, thereby removing one of the barriers to contribution. This pedagogy aligns with that of continuous short summative assessments, which can enhance extrinsic student motivation (Trotter, 2006).

Summative assessments also comprised of a final report and presentation. We ensured this would not deter from our pedagogy by providing opportunities to practice presentations, as mentioned above, and providing formative feedback on presentation and reports drafts. Both assessed components were structured using a positive solutions-

focused framework to ensure the continuity of our pedagogy. A hard scaffold was provided for both submissions which included the requirement to identify innovations and positive future perspectives.

### **Individual action plans**

Reflection can be incredibly transformative to practise and has been linked to motivation (Thompson, 2010). In line with our positive solutions-focused pedagogy, we therefore implemented a reflective exercise, requiring students to reflect on their own behaviours and place themselves on the transtheoretical model of change (Prochaska and Velicer, 1997) in relation to a sustainable activity. Students were then asked to generate an achievable action plan for positive future behaviour. The aim of these action plans was to promote transformational learning and, if implemented, authentic and experiential learning.

### ***Reflections on effectiveness, benefits, and limitations of our pedagogy***

Although our SSC was designed prior to the publication of Lauricella and Edmunds' new pedagogical approach (2022), our SSC pedagogy aligns with all four elements of ludic pedagogy in a holistic integrated fashion. Positivity is achieved through specific, hard scaffolding in task instructions, and soft scaffolding in positive discussions in class. Some of our activities, such as the innovations presentations, was entirely aimed at developing positivity. Play, as described by Lauricella and Edmunds (2022), is an action. In our SSC, it is represented by the use of games and field trips. Playfulness is an attitude which builds community (Lauricella and Edmunds, 2022). Playfulness was developed in our SSC through frequent group work, changing partners for formative presentations, and through the interprofessional workshop.

Our use of the ludic pedagogy allowed us to deliver an SSC module on a potentially anxiety-inducing topic in a sustainable and transformative fashion. In agreement with Lauricella and Edmunds, we believe that the use of a ludic pedagogy has enabled us to improve engagement with the topic, and therefore learning outcomes, improved attendance, and improved the student outlook on their future profession. However, studies are required to ascertain these reflections.

The ludic pedagogy is a very active pedagogy, and therefore work-intensive for the faculty. The flipped learning method requires prior preparation of material; games need to be designed, tested, and produced before class; field trips and interprofessional education necessitate coordination to arrange; and numerous formative presentations and feedback require time. However, some of the benefits of the ludic pedagogy apply to the faculty as well. Engaged students take part in more critical discussion of the topic, creating a truly stimulating teaching environment. Presentations which incorporate positive innovations contribute to a positive outlook for staff as well as students. Field trips were enjoyed by the staff as much as by the students. Interprofessional learning enabled networking between staff which led to further co-working opportunities. A ludic pedagogy can therefore support the academic attainment of students, the outlook of students and staff, and the working and learning environments in academia. Due to these benefits, we will continue with this pedagogy for future iterations of this module, despite its work intensive nature.

Current assessment methods are not fully compatible with a ludic pedagogy. For consistency across the various SSC modules available to students in our institution, summative assessment of our SSC was composed of 20% supervisor assessment, 20% presentation, and 60% report and reflection, with pre-determined marking criteria. We were able to incorporate the summative engagement as part of the supervisor assessment, as it matched those descriptors closely. Our students delivered summative presentations, which were much improved from their previous engagement with formative presentations. However, their structure was dictated by the marking criteria, which limited the creativity which we could offer students, apart from requiring an additional section on positive innovations. Finally, the written reports were suitable for most student projects, but the student pair who created a game could not present their game as their output. These students were required to write a report, describing the process and justification for their choices, for example. For a truly holistic ludic pedagogy, fun, play, playfulness, and positivity need to be constructively aligned into the intended learning outcomes (ILOs), teaching, and assessment.

## ***Tips for educators***

**Aim to be holistic.** Students are not familiar with a ludic pedagogy at university level and may be hesitant at first. It therefore needs to be integrated throughout to ensure students engage with the activities without reservation. Being holistic will also allow for a fully transformative experience. Adding play and fun in just a couple of lessons is likely to engage students in a more superficial manner.

**Adapt in stages.** Having given the aim of being holistic, normal workloads can make it difficult to change a module or implement a new one entirely using ludic pedagogy. Our SSC change in pedagogy took place over two academic years, with some changes appearing in the first year, and complemented by further changes in the second.

**Constructive alignment.** Ensure that your ILOs, teaching, and assessment are aligned with a ludic pedagogy, if possible.

**Engage with students.** Students are well versed in having fun and can help co-develop games or ideas for field trips, which will be of relevance to your cohort.

**Engage with the community.** There are numerous community organisations who are very enthusiastic about sharing their knowledge with adult learners. Have a discussion with these providers prior to the field trip to ensure that it will complement the classroom teaching well.

**Include positivity in all tasks.** Review all your tasks, whether formative or summative, and ensure that there is an element of authentic positivity required in each through scaffolding.

**Engage with colleagues in other disciplines.** Interprofessional learning and peer learning are tools which can help bring enjoyment and fun into a course, as well as improve networking.

## ***Suggestions for further pedagogical developments***

Although no single element we used in our pedagogy was novel (field trips, serious games, interprofessional learning, and flipped classroom are well-used teaching methods), the combination of these elements to serve a ludic pedagogy in a medical SSC module was experimental. Now that the curriculum for the module has matured, the impact of the various elements to the overall pedagogy needs to be studied in order to establish which of our teaching methods contributes to the joy of learning, and what the strengths and limitations of each are.

We also suggest several other development directions for a ludic pedagogy in higher education:

- If institutional regulations allow, it is also important to study the impact of adapting our assessments to a ludic curriculum. In particular, it would be important to know if using a ludic curriculum affects the validity, reliability, or educational impact of formative and summative assessments.
- As a group of faculty, we enjoyed delivering a ludic curriculum. Therefore, the impact of using such a curriculum on staff would also be interesting to investigate.
- A longitudinal study looking at the maintenance of the transformative pedagogy is also required to establish whether the learning and positive outlook is maintained once students return to a traditional pedagogy.
- Education for sustainable healthcare is a difficult topic to teach, as it necessitates an attitude shift rather than a collection of facts to memorise. It would be interesting to evaluate whether a ludic pedagogy is particularly effective in teaching attitudes or other types of knowledge.

In a wider context, there is a need to establish whether a ludic pedagogical approach can provide an appropriate alternative to the 'hypervigilant, restrictive and punitive culture of higher education' (Edmunds and Lauricella, 2021). For example, mandating attendance to teaching events can leave students disengaged (Lamb et al., 2020), whereas delivering teaching that is enjoyable can lead to intrinsic motivation according to self-determination theory (Ryan and Deci, 2020).

## **Conclusion**

We have created a teaching module which, we hope, makes learning about sustainable healthcare and climate change fun. This was achieved by incorporating a range of existing teaching methods using a ludic pedagogical framework and holistic approach. Whilst our experience and reflections suggest this as a valuable approach, much further research is required to establish the strengths and limitations of this approach. In the meantime, we will continue to play and produce games with our SSC students, have fun on field trips, and continue to strive for positivity in class.

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