

“AdvanceHE

# + Global Impact Grants 2024

Volume 1: Education for Sustainable Development and Building Future Leaders



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## Foreword

This collection of case studies represents the first volume of winners of Advance HE's Global Impact Grants for 2023/24, on the theme of Education for Sustainable Development and Building Future Leaders. This is the third year we have run the Global Impact Grants scheme, which shares impactful practice from across Advance HE's global membership based in over 30 different countries.

This volume presents a particularly interesting and useful set of work demonstrating how the UN Sustainable Development Goals (UNSDGs) have been put into practice by higher education providers. The UNSDGs are an excellent taxonomy of what sustainability challenges exist; this collection documents how higher education providers are trying to tackle these challenges.

Case studies in this volume include:

- + Use of chatbots for the teaching of coding skills
- + Involving children in the design of architecture in a middle eastern City
- + Embedding sustainability into the medical education curriculum
- + Involving people with disabilities in the design of services
- + Embedding sustainability into the curriculum for training school teachers
- + Partnering with students to build a Climate Ambassador programme
- + A simulation of the COP for students to participate in climate action

We would like to thank all the authors of the case studies for sharing their inspirational work.

Ian Hall, Head of Membership (International), Advance HE

Kristian Rumble, Head of Membership (Global), Advance HE

Fiona Whittenbury, Head of Partnerships (Australasia), Advance HE

Kate Weedy, Head of Partnerships (Ireland), Advance HE

# Chatbot-Powered Learning for Sustainable Education in Programming

Erick Purwanto, Na Li, Qing Zhang, Thomas Selig, Yihong Wang, Teng Ma, Filbert Juwono, and Pengfei Fan, Xi'an Jiaotong-Liverpool University, China

Student project members: Mingyuan Li and Duan Wang

Email: [erick.purwanto@xjtlu.edu.cn](mailto:erick.purwanto@xjtlu.edu.cn)

## Introduction

At Xi'an Jiaotong-Liverpool University, a transnational Sino-British university in China, where the student body comprises predominantly Chinese students along with individuals from Indonesia and Korea, learning programming poses challenges for English as a Second Language (ESL) students (Guo, 2018). The abstract nature of algorithms can further exacerbate these difficulties. Traditional teaching methods often struggle to engage a diverse range of learners and effectively convey complex algorithmic concepts. As a result, students, especially beginners, frequently encounter difficulties in understanding abstract ideas and intricate details of algorithms, hindering their progress and interest in computer programming (Lahtinen et al., 2005; Gomes & Mendes, 2007).

To address these challenges, we have developed a chatbot-powered tutoring tool, VisualCodeChat, which integrates coding concepts and exercises into a conversational environment. This chatbot not only explains algorithms in simple English, but also visualizes algorithm steps through animated demonstrations (Figure 1).

By breaking down each step and illustrating it to aid understanding, the chatbot helps students grasp abstract concepts more easily (Cetin & Andrews-Larson, 2016). Additionally, the accessibility of a web-based platform with multilingual capabilities ensures that a wider range of students can benefit from our chatbot.

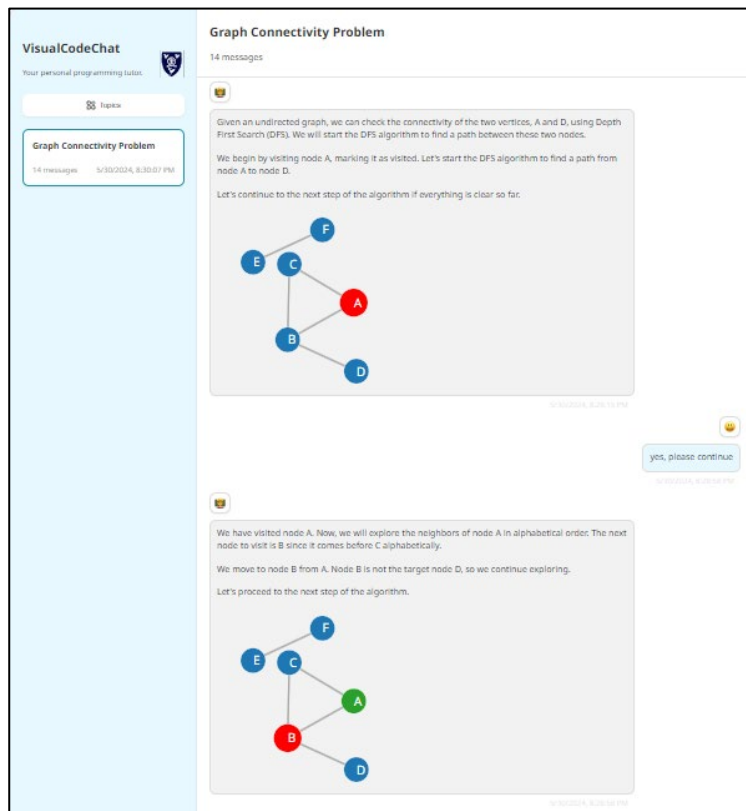


Figure 1. Step-by-step visualisations of algorithms in VisualCodeChat

Furthermore, the chatbot offers examples and exercises related to real-world sustainability challenges, promoting critical thinking and problem-solving skills. For example, a sorting algorithm assists in organizing produce based on freshness, optimizing the distribution of food to grocery stores to minimize food waste (Figure 2).

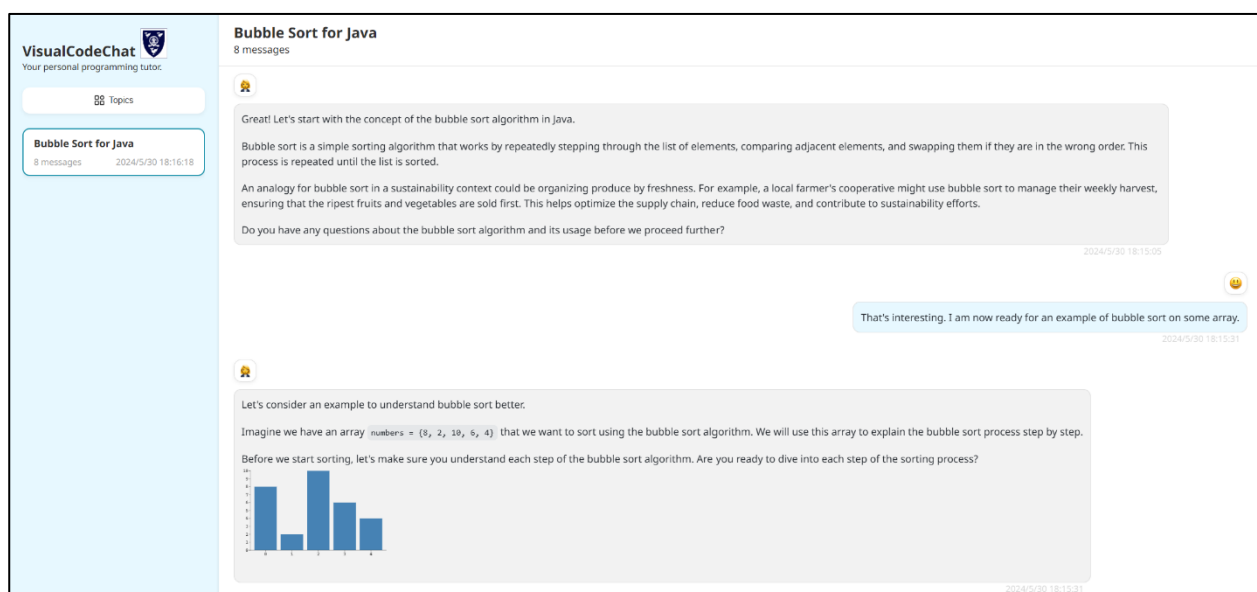


Figure 2. VisualCodeChat assists a learner in understanding Bubble Sort algorithm

### **Interactive and visual approaches**

The learner begins by selecting a lesson topic, such as Bubble Sort, a popular sorting algorithm. The chatbot then explains the problem that the Bubble Sort algorithm aims to solve—specifically, sorting a list of elements in ascending or descending order. Next, the chatbot outlines the main idea behind Bubble Sort in clear and simple English. It follows this explanation by demonstrating the algorithm on an example, visually illustrating each step of the process. For instance, the chatbot might start with an unsorted array and show how adjacent elements are compared and swapped until the entire array is sorted. This step-by-step visualisation helps learners understand the mechanics of the algorithm.

Throughout the explanation, learners can interrupt to ask questions or request alternative explanations, enhancing their comprehension and engagement. Once the algorithm's steps are clear, the chatbot provides the corresponding computer code in a programming language such as Java or Python, demonstrating how the theoretical steps translate into practical code.

To reinforce learning, the chatbot then presents various exercises, including multiple-choice questions, fill-in-the-blank tasks, and coding exercises. These exercises are designed to test the learner's understanding of all aspects of the algorithms. Based on the correctness of the learner's answers, the chatbot offers detailed explanations to clarify any misunderstandings.

### **Study methodology and impacts**

Pilot studies were conducted in programming courses at our university and an international partner high school in November 2023 and March 2024. Over 100 students and four teachers participated. One teacher remarked, "The tool greatly enhances my explanations as the chatbot can generate new exercises instantly and illustrate the steps of sorting algorithms!" An Indonesian university student praised the clarity of the Indonesian responses, suggesting it could significantly benefit non-native English speakers learning programming. Several high school students completed exercises even before instructions were provided, indicating the high usability of our chatbot.

We then proceeded to conduct a controlled experiment with more than 300 students from our programming course in Spring 2024. Students were divided into control and experimental groups, with the control group using ChatGPT 3.5 and the experimental group using VisualCodeChat in eight separate computer laboratory sessions. Throughout these sessions, we gathered detailed feedback through a robust questionnaire designed to measure multiple dimensions of the learning experience. The questionnaire included in total 50 items on five dimensions, namely, usability, effectiveness, efficiency, satisfaction, and emotional support (Figure 3). This multi-dimensional approach ensured that we captured a holistic view of the chatbots' impact on the students' learning experience.

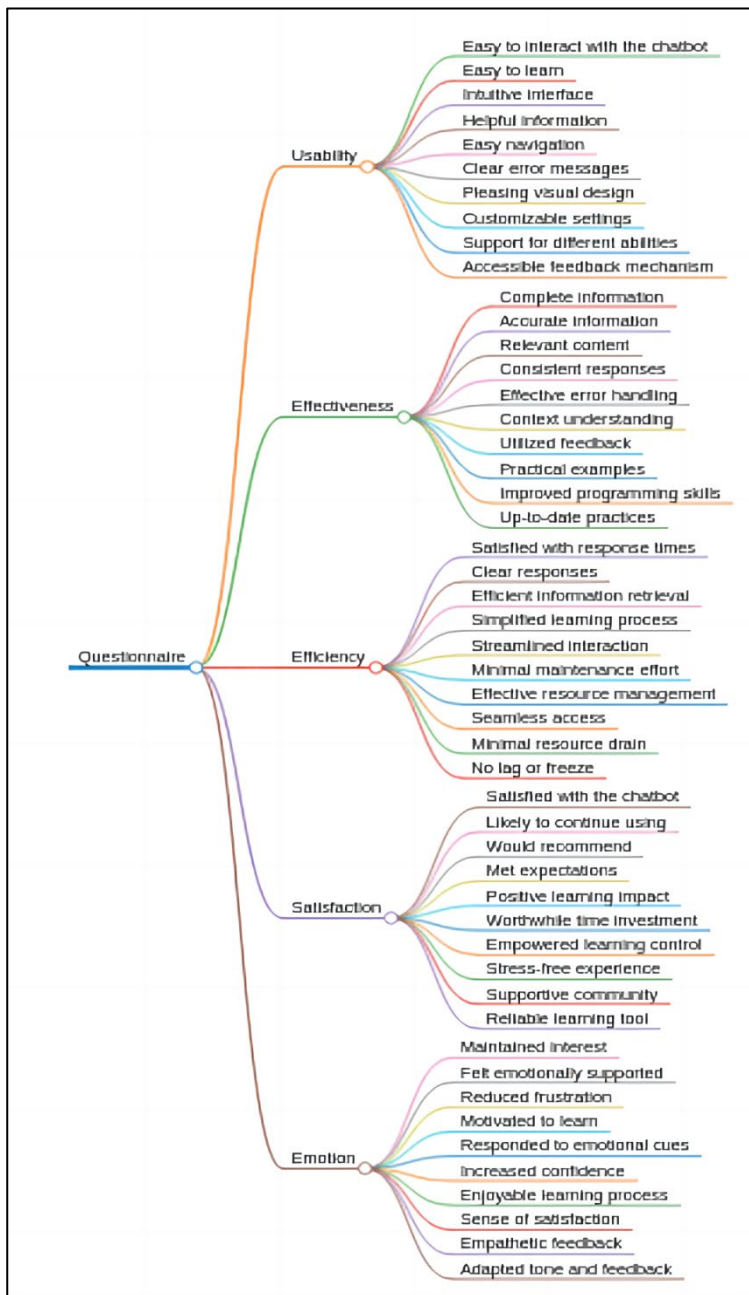


Figure 3. Questionnaire Structure

## Results and discussion

The results from the experiment were highly encouraging. The data indicates that VisualCodeChat consistently outperforms ChatGPT across multiple dimensions (Table 1). For each dimension, the mean scores are higher for VisualCodeChat, suggesting that learners find it more usable, effective, efficient, satisfying, and emotionally engaging than ChatGPT. The statistical tests conducted (t-tests) support the significance of these differences, with all p-values indicating that the observed improvements are unlikely to be due to chance. This shows that our chatbot not only improves students' understanding of complex algorithms but also enhances their overall learning experience.

Table 1. Comparative Analysis of Control Group and Experimental Group

| Dimension     | ChatGPT Mean | VisualCodeChat Mean | t-statistic | p-value |
|---------------|--------------|---------------------|-------------|---------|
| Usability     | 4.2          | 4.5                 | 2.1         | 0.037   |
| Effectiveness | 4.0          | 4.3                 | 2.3         | 0.022   |
| Efficiency    | 3.8          | 4.1                 | 2.0         | 0.045   |
| Satisfaction  | 4.1          | 4.4                 | 2.2         | 0.031   |
| Emotion       | 4.0          | 4.3                 | 2.4         | 0.018   |

These insights underscore the strengths of VisualCodeChat, highlighting its ability to provide a superior user experience, which in turn enhances the overall learning process for students. This suggests that users not only interact with our chatbot more effectively but also have a more positive and engaging experience, leading to greater satisfaction and emotional connection with the educational content.

The chatbot's ability to break down complex concepts into simple, visual steps was particularly appreciated by the students. They reported feeling more engaged and supported throughout the learning process. Altogether, this approach benefits learners by providing an interactive, visual, and supportive learning environment, with step-by-step illustrations and personalized feedback that promote a deeper understanding of algorithmic concepts. The flexibility to ask questions and receive real-time explanations fosters active engagement, and builds confidence in programming, making complex concepts more approachable and comprehensible.

## Conclusion

In this case study, we demonstrate that leveraging chatbot technology to provide clear, step-by-step visualisations and multilingual support, effectively addresses the challenges faced by ESL learners and students with diverse educational backgrounds. The positive feedback and improved performance metrics from our pilot studies and controlled experiments underscore the chatbot's potential to enhance programming education. This approach not only fosters critical thinking and problem-solving skills through real-world examples but also ensures a more inclusive and engaging learning environment. Ultimately, VisualCodeChat exemplifies how innovative educational technologies can support sustainable development goals by providing equitable learning opportunities and breaking down language barriers in education.

#### **Funding**

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# Sustainability, Architecture and the City

A collaborative workshop between Abu Dhabi University and the British International School Abu Dhabi.

## Apostolos Kyriazis, Abu Dhabi University, United Arab Emirates

Email: [apostolos.kyriazis@adu.ac.ae](mailto:apostolos.kyriazis@adu.ac.ae)

[www.apostoloskyriazis.com](http://www.apostoloskyriazis.com)

Children are the most demanding and unpredictable judges of our architectures, public spaces and cities. Their biggest weapon: galloping imagination. This is what the workshop “**Sustainability, Architecture and the City**” has been trying to harness. It is a collaboration between the Department of Architecture in Abu Dhabi University (ADU) and the British International School Abu Dhabi (BISAD), a first of its kind that combines forces from educational institutions of different levels.

This workshop was developed by Dr. Apostolos Kyriazis’ belief that architecture could be introduced much earlier on the education pathway and thus promote its wider role of social agency. The idea was met with enthusiasm by the school’s leadership, namely Mr. Mike Wolfe. The original programme outcomes were:

- + to promote architecture to our community,
- + to raise awareness about the need to invest in education, aesthetics, creativity, imagination and social cohesion,
- + to enhance students’ natural and innate sense of architecture and urbanism,
- + to enhance students’ spatial cognitive abilities.

Following a round of discussions with Year 6 teachers and their leader Ms. Sas Clarke, the workshop kickstarted in the academic year 2018-2019. Year 6 students were tasked to regenerate a deteriorated parking area within a superblock in downtown Abu Dhabi. Each class section was divided into three distinct groups: architects (that would design the new public space), engineers (that would propose all supplementary sustainability technical features) and builders (that would construct the physical models). Following two presentations by the professor and one workshop session for all sections, all students were invited to exhibit their work output (an A0 poster and a physical model at a scale of 1:1000) at the main lobby of Abu Dhabi University. Parents and leadership from both ADU and BISAD celebrated the event, while one of the sections was awarded as the best team, following an ADU faculty voting.

The following year (2019-2020) started with a change on the participating class (Year 4 instead of Year 6) due to a major internal reshuffling of the syllabus and term topics. Despite the two-year educational difference, the workshop’s scope remained the same. However,

the workshop itself was forced to cancellation due to the Covid-19 lockdown and consequent switch to online learning.

The workshop resumed the year after (2020-2021) with Year 4 students, a new leader, Hayley O'Connor and a new project site: an urban courtyard within a superblock at the Shabiya low-income neighbourhood in Abu Dhabi. That new site posed similar questions albeit with a clearer necessity for solutions. Some of the output was simplified (no 3D models were asked) and new material was added instead (to incorporate both passive and active systems and water treatment). Students showcased their work within their school.

The years 2021-2022 and 2022-2023 (the third and fourth cycles respectively) built up on the same project brief and site. James Burns took over as Year 4 leader on the last cycle and only adjusted the brief in terms of incorporating the use of hydroponic urban farming systems.

Reflecting at the aftermath of those four cycles conducted, it is the students' action that transcends all scopes and expectations. Children discussed solutions on re-activating public space, passive and active strategies for shadow, water management and solar/wind energy. They were encouraged to a critical view towards human scale, social inclusion, public space qualities and sustainability. They openly participated in a pedagogy that allows interaction with space, hands-on approaches and digital tools. This way, children build up their confidence and leadership skills and associate team work with true professional projects. Remarkably, as reported by teachers, students' engagement peaked during those sessions!

Following four successful years in a row, the workshop is now embedded in the Curriculum of Year 4 and has already been internationally awarded twice. First, it received the 1st Award at the International Schools Award for Community Initiative (ISA) in 2020 in London UK. Second, it has been awarded/selected by the Greek Chapter of the International Union of Architects (UIA) to represent Greece at the "Golden Cubes" Award (for children and Architecture) at the 2023 UIA World Congress in Copenhagen, Denmark. Furthermore, this has allowed Dr. Apostolos Kyriazis to eventually become a member of the work group named "Architecture and Children" of the UIA and showcase the workshop at the recent UNESCO global summit for Culture in Abu Dhabi. Lastly it was presented at COP28 in Dubai, UAE at the UAE Ministry of Education Pavilion.

However, as mentioned, above and beyond all those achievements, it is the smile and dedication of children that stands as the most rewarding and promising of all.



Figure 1: The project site of the more recent workshop cycles: A public space at Shabiya, Musaffah, Abu Dhabi (source: Apostolos Kyriazis)

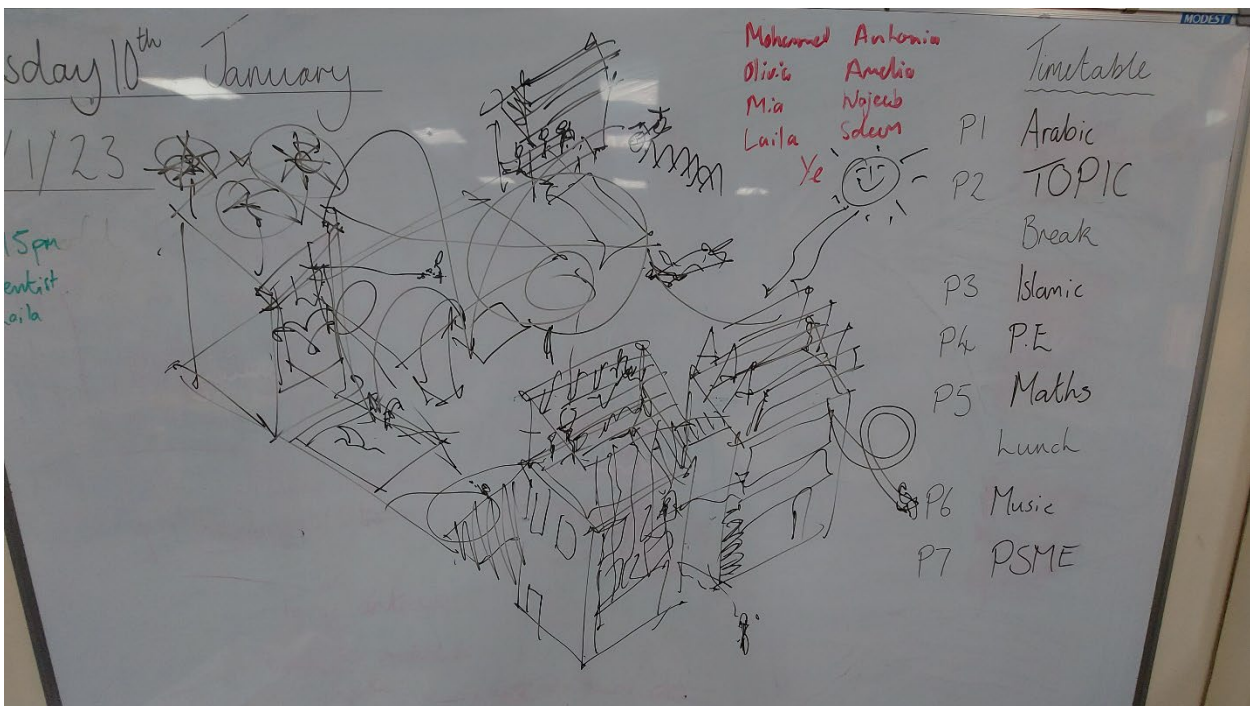


Figure 2: In-class free-hand sketching from Dr. Apostolos Kyriazis for the students to understand and visualize some of the urban interventions (source: Apostolos Kyriazis)



Figure 3: Presenting the workshop at the UAE Ministry of Education Pavilion during the COP28 Global Summit in Dubai, UAE. From left to right: Mr. Burns, Mrs. O'Connor, Mr. Cocker, Mr. Cullinan and Dr. Kyriazis (source: Apostolos Kyriazis)

[illegible]

Figure 4: The awarded poster that presented the workshop to UIA's Golden Cubes Awards and the UIA2023CPH global congress in Copenhagen (source: Apostolos Kyriazis)

# Integrating sustainability into medical education: evaluating the impact of the 'Planetary Health and Sustainability in Healthcare' module on student outcomes

Steffi Tan S.M., Maria Lee H.S. and Joanna Matthan, Newcastle University, Malaysia

## Introduction

In the evolving landscape of global healthcare, integrating environmental sustainability into medical training programmes is increasingly urgent. Traditional educational programmes in medicine frequently overlook the importance of sustainability, creating a gap that limits the potential of future healthcare professionals to address global health challenges effectively. This educational deficiency hinders proactive involvement in environmental stewardship by healthcare providers and affects the long-term efficacy of health interventions dependent on the planet's wellbeing. In March 2024 in Newcastle University Medicine Malaysia (NUMed), the "Planetary Health and Sustainability in Healthcare" module was introduced to medical students to bridge this critical gap, aiming to develop a deeper understanding and proactive attitudes toward planetary health.

## Literature review

The necessity of integrating sustainability into healthcare training is emphasised by the critical global health challenges posed by climate change. Gurbutt and Gurbutt (2020) and Walpole et al. (2019) highlight the importance of sustainable practices in healthcare education and clinical outcomes. The AMEE Consensus Statement (Shaw et al., 2021) advocates for reforms that prepare healthcare professionals to promote sustainable and planetary health. This is urgent as climate change is expected to significantly increase global mortality, with projections of up to 215,000 annual deaths by 2100 due to air pollution (Silva et al., 2017), 529,000 by 2050 from dietary changes (Springmann et al., 2016) and additional deaths from mental health issues (Liu et al., 2020). These figures highlight the urgent need for sustainable healthcare education to address and mitigate the health impacts of environmental changes.

## Objectives and scope

This research initiative was designed to increase awareness and cultivate better attitudes among future healthcare professionals regarding planetary health. This was achieved by embedding sustainability within the medical curriculum. The effectiveness of the module was assessed through detailed pre- and post-intervention surveys, which measured shifts in student awareness and attitudes.

**Methodology**

The module, an evaluation project of a teaching intervention, involved interactive discussions, problem-based learning and case studies to engage third-year MBBS students at NUMed. A total of 140 students attended this compulsory session. Data collection was conducted using a mixed-methods approach, incorporating both quantitative and qualitative feedback from pre- and post-lecture surveys. Ethical approval for this study was granted by Newcastle University, UK (Ref: 46280/2023).

**Findings and Analysis**

The evaluation surveys, although receiving lower response rates with 31 out of 140 students responding pre-lecture and only 11 post-lecture, revealed a substantial improvement in both quantitative measures of awareness and qualitative changes in student perceptions regarding sustainability. The lower participation rate is likely due to survey fatigue and scheduling conflicts during a demanding academic period, factors that typically affect voluntary survey responses in educational settings.

Table 1: Quantitative Survey Results on Student Awareness and Commitment to Sustainable Actions

| Metric                                        | Pre-Lecture (n-31) | Post-Lecture (n=11) |
|-----------------------------------------------|--------------------|---------------------|
| Average Awareness Rating (Scale of 1-5)       | 2.9                | 4.1                 |
| Students Committed to Sustainable Actions (%) | 55%                | 85%                 |

Table 1 demonstrates significant improvements in student awareness and commitment to sustainable actions post-module, with a significant rise in both the average awareness rating and the percentage of students committed to sustainable practices.

The qualitative feedback further illustrates a shift in student attitudes towards sustainability in healthcare as presented in Table 2, where student perceptions before and after the module are presented, highlighting a shift from viewing sustainability as an abstract concept to recognising its critical role in effective healthcare practice.

Table 2: Qualitative feedback from students on sustainability

| Survey Phase | Student Quotes                                                                                |
|--------------|-----------------------------------------------------------------------------------------------|
| Pre-Lecture  | "I know sustainability is important, but it feels distant from everyday medical practice."    |
|              | "Sustainability seems like an added topic, not a necessity in medical training."              |
| Post-Lecture | "I now understand how crucial sustainability is in my daily medical decisions."               |
|              | "This module made me realize the direct impact of sustainable practices on patient outcomes." |
|              | "Sustainability is not just theoretical; it's essential for the future of healthcare."        |

The combined quantitative and qualitative data highlights a significant enhancement in student knowledge and engagement with sustainability. The average *awareness rating* improved from 2.9 to 4.1, indicating a deeper understanding of sustainability issues. Moreover, the percentage of students committed to adopting sustainable actions rose from 55% to 85%, demonstrating an increased willingness to integrate these practices into their future medical careers. These findings reveal not only improved awareness but also a shift in how students perceive the role of sustainability in their professional lives, suggesting the module's effectiveness in bridging theoretical knowledge with practical application in healthcare settings.

**Discussion on the impact of the module**

The module has significantly increased students' awareness and proactive engagement with sustainability, reinforcing the critical need for such education as discussed by Gurbutt and Gurbutt (2020). Qualitative feedback indicated a transformative shift in perceptions. For instance, one student remarked, *"Before the lecture, sustainability seemed theoretical; now, I see its crucial role in my future medical practice."* These sentiments align with findings from Walpole et al. (2019), which connect sustainability directly to improved patient outcomes in clinical settings.

Another student highlighted practical implications, stating, *"This module has equipped me to integrate sustainability into my future role, which I now understand is vital for global health."* This readiness to apply sustainable practices in professional lives reinforces the module's effectiveness in bridging theoretical knowledge with practical application, resonating with the educational approach advocated by Shaw et al. (2021).

The urgency and relevance of incorporating sustainability into healthcare training are further highlighted by UNSDG Goal 13, which emphasises the need for urgent action to combat climate change and its impacts (United Nations, 2021). Additionally, the World Health Organization highlights the critical connection between climate change and health, stressing that addressing these challenges is pivotal for future medical professionals (World Health Organization, 2021).

### **Implications and recommendations**

These findings stress the urgent need for systemic reforms into all aspects of medical education. To strengthen the long-term effectiveness of health interventions and resilience against global challenges, it's crucial to embed sustainability principles at every level of medical training. This involves integrating sustainability-focused modules across all years of study, enriching traditional subjects with interdisciplinary approaches that combine clinical practice with environmental health. Future research should explore the lasting impacts of these strategies, ensuring healthcare professionals develop robust skills to implement sustainable practices effectively.

### **Conclusion**

The "Planetary Health and Sustainability in Healthcare" module has significantly improved students' understanding and commitment to sustainability, pointing towards a valuable model for educational initiatives. It is vital to continue refining and broadening these educational frameworks to better prepare healthcare professionals to manage sustainability challenges effectively. Highlighting the urgency of these issues within the medical curriculum is essential; this could be achieved by incorporating mandatory modules on planetary health, deepening students' engagement with this crucial topic. Moreover, upskilling faculty and staff is critical, ensuring they can convey the severe implications of environmental neglect in patient care and develop a proactive stance toward this global crisis. Such measures will ensure that future medical professionals are thoroughly equipped to address and mitigate environmental health impacts.

### **Acknowledgements**

The authors sincerely thank all the students who participated in the "Planetary Health and Sustainability in Healthcare" module evaluation project.

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# Pre-service teachers linking quality education to sustainable development in authentic local and global contexts

Kate Ferguson-Patrick, Senior Lecturer and Primary Specialist  
School of Education, University of Newcastle, Australia



Figure 1: Gurtle, the Garbage Turtle.

A group of Year 5 students from Toukley Public School in NSW, Australia have created a piece of sustainable art, Image 1, after a lesson on plastic pollution. Inspired by their teacher, Miss Dillon, a recent graduate from the University of Newcastle, the class collected plastic waste from around their playground and with the use of wire mesh and the plastic waste, they have created the sculpture that now serves as a reminder of the devastating impact of plastic pollution on marine life. The hope is that it also inspires students to reduce their usage of plastic and dispose of any they do use carefully.

This is an example of the outcomes of a course developed and delivered by the University of Newcastle, K-6 Curriculum Contexts: Integration and Inclusion in the School of Education, to address professional skill development in curriculum design through professional engagement, reflection and action.

This initiative demonstrates how Education for Sustainable Development (ESD) has been incorporated into higher education's teaching curricula providing practical knowledge and strategies to equip the next generation of teachers and students. Pre-service teachers (PSTs) are required to complete this undergraduate course for the Bachelor of Education (Primary) degree, prior to their final 10-week school-internship. The course assessment, of an authentic unit of work, builds skills for internship and beyond, being linked to authentic local school contexts, service learning and community engagement, and global contexts through the Sustainable Development Goals (SDGs). It uses an effective pedagogical approach to foster education for sustainability using a project-based learning approach.

Certified by the UNITAR CIFAL Newcastle centre, and now in its fourth year showing both relevance and longevity, the course has enabled more than 600 teachers to grow their understandings of the SDGs and incorporate them into their planning (using SDG 4 Quality Education as a way to bring to life all SDGs).

Education is the key that will allow many SDGs to be achieved, empowering people to live more healthy and sustainable lives. Education is crucial to fostering tolerance between people and contributes to more peaceful societies. Wider adoption of this initiative would help address the 2023 call to action from the UN on SDGs (UNESCO, 2023). The initiative's impact is often realised in their final 10-week internship with responses from previous students in the course like:

“You aren't going to believe it but the school I'm at for internship uses integrated units in their planning and their focus for this term is exactly what we looked at in the course! It's all about plastics and the effect on the environment.”

“Prior to course commencement, I didn't know what an SDG was. I really enjoyed exploring all the different ways I could implement them in my learning activities. I enjoyed learning how to integrate the SDGs into Key Learning Area lessons. I practiced this on internship by using community assets for science lessons.”

As well as after the PSTs start their teaching careers, in responses like:

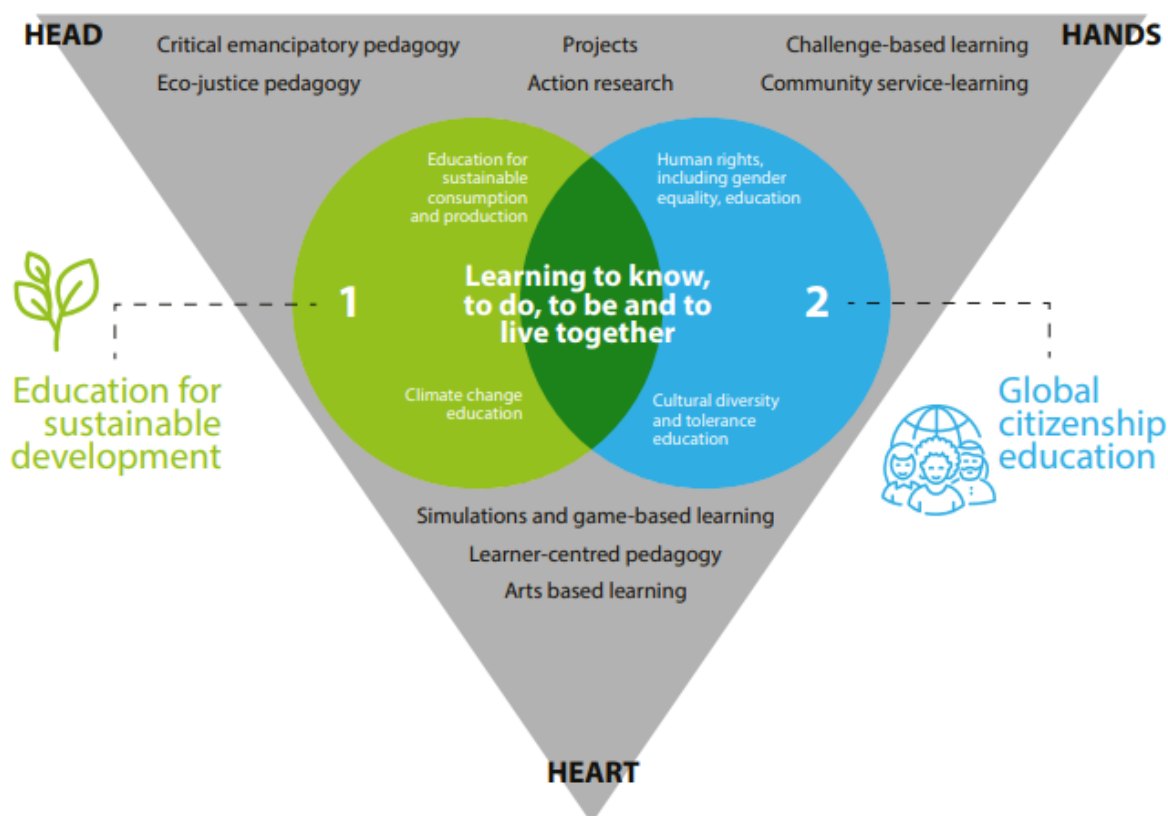
“What we were exposed to in terms of seeing the SDGs in practice and in classrooms, seeing the impact they have on students and their learning, seeing students actively engage in collaboration through completing authentic cross-curricular projects and seeing students take action against local and global issues of significance was extremely powerful!”

According to UNESCO (2023) ‘work on ESD focuses on five main areas: Advancing policy; Transforming learning environments; Building capacities of educators; Empowering and

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mobilising youth and Accelerating local level action'. This course focuses on two of these being building capacity of educators and accelerating local level action. One in four teachers do not feel ready to teach themes related to sustainable development or global citizenship and peace (UNESCO, 2021) and this course prepares students to feel more supported and have the capacity to teach sustainability confidently.

The following figure (UNESCO, 2021, p.21) shows one of the ways of looking at aspects covered in the course, with a particular focus on community service-learning approaches, projects and learner-centred pedagogy.



Source: Created by the Public Policy and Management Institute (PPMI Group). The triangle of the head, heart and hand as metaphors for the cognitive, behavioural and socio-emotional learning dimensions was inspired by Sipos et al. (2008), while the four dimensions at the centre refer to the Delors report (UNESCO, 1996).

Note: The positioning of pedagogies in the triangle does not imply that the pedagogies exclusively deal with one learning dimension, nor that this is an exhaustive list of pedagogies. These are good examples of what research and practice suggest for triggering learning. Ideally, learning should occur in all learning dimensions.

Figure 2: Visualisation of some relevant ESD and GCED pedagogies for effective teaching.

In the course PSTs select an appropriate SDG that links to primary curriculum (for example Life Below Water (SDG14) which links to the NSW Science and Technology and Geography curriculums) and join a small peer professional learning network (PLN) who also selected that SDG. The PLN then assisted PSTs to develop their next assessment task, to plan a multidisciplinary teaching unit for a specific local school context, as they collated ideas

relevant to their chosen SDG, using the knowledge and resources gained through the PLN. Hence, there was an authentic purpose for the PLN task.

Examples of their PLN blog posts is shown in Figure 3, as they gathered relevant teaching resources, show their deep understanding of the course concepts which include sustainability, equity and diversity; curriculum contexts and assets; culturally responsive pedagogies and global contexts. Responses to peers show their reflective practices developing a deeper understanding of the course.

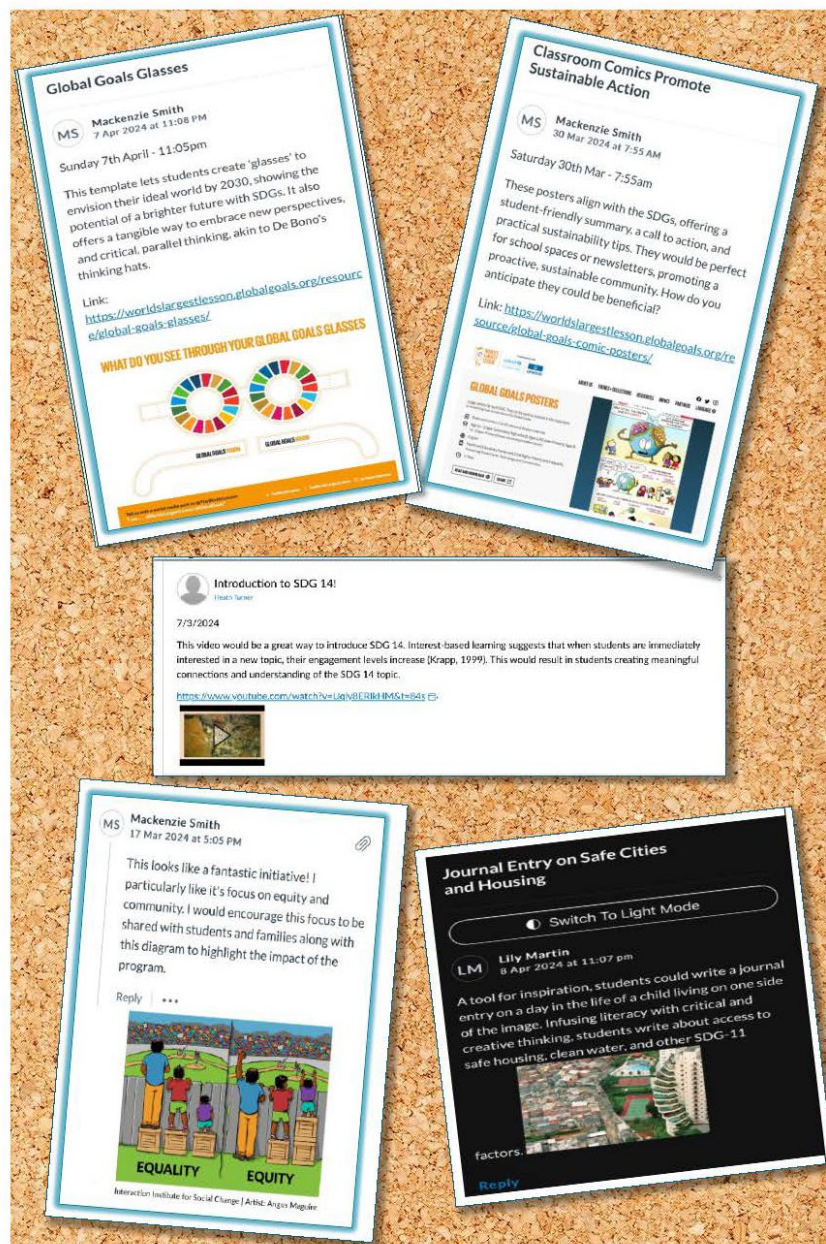


Figure 3: PST Blogs

The complexity of the subject matter needs to be considered when teaching primary aged students about sustainability and students need to feel empowered to know they can make a difference by taking action to reduce the issues found within the SDG focus. In their planning the PSTs include a school/community project-based activity which links local community assets in the unit. It is important for PSTs to use methodologies to enable their students of all ages to take action and make culturally appropriate decisions to address the challenges jeopardising our shared future (ACARA, 2024). Teaching and Learning for a Sustainable Future using the SDGs, but also in local contexts, equips educators to design learning opportunities that empower students to envision and assess diverse pathways toward sustainability.

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# Partnering with students in climate education: HKU Climate Ambassador

Janet Chan, Kathy Fok and Sunny Chiu, The University of Hong Kong

## Introduction

Climate education is recognized as a crucial tool in tackling the pressing climate challenges, with the United Nations emphasizing its importance (United Nations, n.d.). Hong Kong has integrated environmental education into its curriculum since 1999 (CDC, 1999). However, the current focus of environmental education primarily revolves around theoretical knowledge, lacking practical application and meaningful experiences (Ma, 2019). Various research suggests that providing information alone is insufficient to inspire action and long-term engagement with climate change (Bak 2001; Wibeck 2014; Wolf and Moser 2011).

To bridge the gap between academia and action, and enhance student success, the HKU Climate Ambassador Program aims to implement the "Students as Partners" approach. The programme emphasizes collaboration and co-creation of knowledge with students, moving away from traditional teacher-student dynamics.

The expected outcomes include the development of a climate education programme which echoes the United Nations Sustainable Development Goals (UNSDG), including Targets 4.7 Education for Sustainable Development and Global Citizenship, 12.8 Promote Universal Understanding of Sustainable Lifestyles, and 13.3 Build Knowledge and Capacity to Meet Climate Change. It also aimed to develop a teacher-student partnership model under environmental sustainability contexts and higher students' ownership and students would gain better understanding of climate-related initiatives and create impact within and beyond HKU communities.

## Works conducted

Around 50 undergraduate (UG) students from different faculties, who were the target of this project, have been trained as Climate Ambassadors. Additionally, 10 postgraduate students and alumni were involved as mentors for these ambassadors. The objective is to empower UG students to collaborate on various climate-related issues and create meaningful impacts through inquiry-based learning.

The recruitment of students and mentors began in February 2024 and they were firstly engaged in the project in subsequent month. To equip the students with the necessary knowledge and skills, the programme included workshops (Figures 1 and 2) and field trips (Figure 3). These training activities encompassed a series of talks on environmental issues, experiential field visits, and team-building activities, to be delivered in March to May 2024 (Table 1).



Figure 1: Program kick-off workshop

DATE :  
9 MARCH 2024  
9:00 - 17:00

**HKUCLIMATE**  
AMBASSADOR  
TRAINING WORKSHOP

VENUE :  
LE1, HKU

EMBARK YOUR ENVIRONMENTAL JOURNEY WITH OUR STAR SPEAKERS



WITH :  
**Prof. Leung Wing Mo**  
Former Assistant Director,  
The Hong Kong Observatory, HK



**Prof. Ir C F Lam**  
Former Senior Environmental Protection  
Officer,  
Environmental Protection Department, HK



**Prof. Wong Kam-sing, GBS, JP**  
Former Secretary for the  
Environment, HKSAR



**Dr. Xoni Ma**  
Founder and Education  
Director at OWLHK



**Dr. Billy Hau**  
Principal Lecturer, School of  
Biological Sciences

Figure 2: Training workshops



Figure 3; Field trip to Mai Po wetland

Table 1: A summary of workshops and field trips

| Activity                  | Event Details                                                                                                                                                                                                                                                 | Delivery Party           |
|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Program Kick-off Workshop | Program introduction, mentor briefing and team building                                                                                                                                                                                                       | Program Team             |
| Workshops                 | Five lectures covering key environmental issues: <ul style="list-style-type: none"> <li>• Climate Change 101</li> <li>• Waste Management</li> <li>• Low-carbon Living</li> <li>• Environmental Education and Communication</li> <li>• Biodiversity</li> </ul> | Field Experts            |
| Field Trip 1              | Visit two yard-waste management facilities operated by government and private sectors                                                                                                                                                                         | Y-Park and HK TimberBank |
| Field Trip 2              | Field trip to Mai Po wetland                                                                                                                                                                                                                                  | WWF-Hong Kong            |

After completing the workshop and field trips, undergraduate students were provided with opportunities to develop their own climate-related projects, enabling them to make a positive impact on wider communities. To showcase their project experiences and achievements, a student-led sharing session will be organised in June.

### Project impact

As of the writing of this case study, the programme is still ongoing, and the progress made so far is very encouraging. Students reflected that the training workshops and field trips provided new insights on climate issues:

“Hearing these speakers share their insights was a useful exercise in keeping an open mind to understand the underlying reasons for solutions, especially when implementing one that may not be popular with the public.”

“.....I was pleasantly surprised to hear about how Hong Kong was not only a key area for migratory birds, but also had longstanding practices that harmoniously integrated industrial productivity and nature.....As a whole, I really enjoyed the birdwatching segment of the trip because I hadn't had the opportunity to do so before, but am quite keen on exploring it further on my own, especially since ecology and biodiversity is not something I have much experience with in university.”

To measure the programme impact and to share the programme activities with a wider audience, various social media platforms were utilized, including LinkedIn, Instagram, and Little Red Book. As of May 30, 2024, the cumulative number of views amounted to 23,240 and 718 likes were received. These posts successfully reached both local and international communities and industries, encompassing sustainability professionals, higher education academics, environmental services, financial services, business consulting services, and non-profit organisations. In addition, the program had 167 participant visits for the activities conducted.

To extend this programme and create a continued impact, the program team succeeded to win a fund from HKU Teaching Development and Language Enhancement Grant to support 18 selected Climate Ambassadors to join a service-learning trip to be conducted in desert areas in China. This experiential trip is co-organised by HKU and the Chinese YMCA of Hong Kong, aiming to further widen students' horizons on climate issues. Students will stay at Tengger Desert, located in North-western part of China and about 1170 miles away from Hong Kong, for 7 days in July 2024. In this desert trip, students could gain further real-life experiences in climate issues, in particular, extreme weather events like sandstorms, droughts, and super sunlight, which is rarely experienced in Hong Kong. They will provide

service to local people, such as giving workshops on climate change, leading them to further apply what they have learnt from the Climate Ambassador programme.

Data on the effectiveness of the programme and student feedback will continuously be collected through questionnaires and focus groups as part of the project evaluation process. The findings related to the teaching and learning practices adopted and derived from this project will be shared with HKU Teaching and Learning Innovation Centre and other relevant teaching and learning platforms. The pedagogy and the teaching model developed through this project would benefit the development of other courses.

The programme team envisions to expand the Climate Ambassador programme to other universities within and outside Hong Kong. This initiative has been recognised by the Hong Kong Excellence Teaching Alliance which gave the Gold Award to us in their Higher Education Design Thinking Competition, demonstrating the potential impacts of this Climate Ambassador program beyond HKU.

# COPSimulation

**Sarah El-Khishin, Sahar Salama and Catherine Harper, The British University in Egypt**

The [COPSimulation](#) model is an annual youth-led international climate leadership Conference that brings students worldwide to simulate the real COP and engage with country delegates and representatives of international climate stakeholders.

Following [the British University in Egypt](#)'s highly-successful student intervention of COP27 Simulation and participation in the COP27 in Sharm-El-Sheikh 2022, The British University in Egypt partnered with the United Nations Development Programme Egypt (UNDP) and Zayed University, UAE to organise the second version of the [COPSimulation](#), COP28 Simulation.

The COP27 Simulation involved multiple sessions in both the Blue and Green Zones, and was in accordance with the university's strategic goals of supporting meaningful SDG implementation, accelerating national/global climate action, and actively engaging students as future leaders to influence and effect relevant change.

Due to its significant impact and global reach, the COP Simulation is implemented annually with the continued support of the UN Climate Change High-level Champion for Egypt, COP27 Presidency, Ministry of Foreign Affairs, Ministry of Higher Education and Scientific Research, Ministry of Youth and Sports and the British Embassy in Egypt.

Every year, a new partnership is established with a lead academic institution from the country hosting the COP Presidency. Thus, COP28 Simulation was held in partnership with Zayed University in UAE. Currently, discussions have been initiated with leading universities in Azerbaijan to prepare for the COP29 Simulation.

By adopting/adapting this model, higher education institutions can develop impactful initiatives contributing to SDGs achievement and empower innovation and leadership.

The response to the call for applications for the COP28 Simulation reached around 2700 applications, that is a 40% increase from the previous year. A total of 140 student-participants were selected, based on pre-set criteria taking into account diversity and gender balance, representing 34 universities and 32 countries to participate in the fully-funded COP28 Simulation.

The COP28 Simulation activities and deliverables included:

- + a two-week online capacity building programme offered by experts in their fields from global academic institutions and organisations on international climate literacy, youth-led climate action, diplomacy, debate and conflict resolution;

- + participants co-produced research papers on climate-related themes. They were guided by Egyptian and International mentors from relevant academic and professional background. Their research papers were graded based upon pre-set criteria which supported in placing them in relevant roles during the mock conference;
- + participants were invited to attend in-person the COP28 mock conference at the Campus of The British University in Egypt (Cairo, 2023), which underwent special preparations to accommodate mimicking the structure and layout of the real COP. Student-participants were coached on their roles and attended rehearsals on simulating country delegates, chief negotiators, and non-state actors;
- + based on their performance in the mock conference, around 35 student-participants were selected to present the outcomes of the mock conference and the resulting declaration at the actual COP28 (Dubai, 2023). They had the opportunity to stand on the podium of the sessions and discuss their learning and leadership via 3 sessions at the COP28 Blue and Green Zones. The COP Simulation delegation was identified as the largest students' delegation at COP28-Dubai.

This innovative activity is unique in many aspects. In terms of impact and outcomes: The COP Simulation is an outstanding success. It empowers youth with:

- 1 **Knowledge: through capacity building on climate literacy and international climate actions.**
- 2 **Transferable skills: diplomacy, negotiations, conflict resolution, presentation skills and policy advocacy. Delegates voice their voted resolutions in the COP Simulation Declarations.**
- 3 **Cultural exposure: Strong bonds are formed across diverse cultures and backgrounds, through interaction, shared responsibility, and focused research. Thus, widening their perspectives not only on climate change but also on cultural diversity. This bond is enhanced through a WhatsApp group that includes all participants who actively share their news, ideas, experiences, opportunities and engage in discussions.**
- 4 **Youth present their declaration in real COP sessions in the Blue and Green Zones. The sessions are entirely led by the students thus, enhancing their leadership skills and is attended by high-level figures and academics.**

As a form of engaging and linking previous COP Simulation participants, they are called upon to actively engage in the design and implementation of the project. For example, designing logos, slogans and themes, which enhances their creativity and innovation and gives them an opportunity to participate and contribute to the simulation even if they are not attending in person.

Sustainability and growth are ensured through renewing our agreement with the UNDP. Also, we are establishing a platform, [COP Simulation](#) which is a knowledge sharing and transferability hub. The platform plays a pivotal role in addressing climate-related challenges by facilitating information exchange and knowledge sharing among diverse stakeholders,

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including academics, professionals, practitioners, and youth. Additionally, the platform showcases the activities of the COP Simulation initiative to a global audience, increasing awareness and encouraging action and cooperation towards a more sustainable future. In addition to its role for collaboration and empowerment, the COP Simulation also serves as a comprehensive knowledge hub, offering valuable insights and resources, including best practices shared by youth in the COP Declaration Statement. We are also registering COPsimulation for copyrights and trademark protection.

This impactful initiative falls at the heart of the [University Strategy](#) core priorities, particularly supporting SDGs implementation and actively engaging students to become future leaders and change agents.

The understanding of international governmental and organisational advocacy and leadership of both the student-participants, and the 237 mentors/trainers/facilitators/organisers/students, was significantly enriched by this demanding and intensive approach. Student-participants undertook specific roles, conducting research on actions by nations/organisations, developing new engagements, presenting findings, and drafting the declaration taken to COP28 Dubai.

COP28 Simulation's impact is demonstrated through our university's strategic adoption of the SDGs in cross-disciplinary curricula and linkage with the localised version of SDGs: Egypt's vision 2030. This is in addition to the ambassadorial roles of student-participants in their leadership contexts and the joint efforts of the University and the UNDP to organise the third edition: COP29 Simulation (Azerbaijan, 2024); and in one future leader's words: "unforgettable...changed my perspective...inspired me to take action for a better future".

# Contact us

## All enquiries

Email: [communications@advance-he.ac.uk](mailto:communications@advance-he.ac.uk)

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