METHOD ARTICLE

The design and delivery of a workshop to support curriculum development, education for sustainability and students as partners: Sustainability in your curriculum – identify, improve, inspire! [version 1; peer review: 1 approved, 2 approved with reservations]

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Abstract

Embedding citizenship and sustainability into higher education curricula is vital for ensuring that curricula remain up-to-date and support students with the skills and knowledge they need for our ever-changing world. But the conceptualisation of the term 'sustainability' radically affects its perceived relevance for curriculum design, and hence the recognition of where education for sustainability is already embedded within a curriculum. Here we present a student-designed, freely accessible workshop, which can be used by colleagues off-the-shelf to challenge workshop participants to reconsider their understanding of sustainability and recognise its vast scope. The workshop is provocative yet encourages collaboration, drawing on participants' prior experiences to identify sustainability concepts already embedded within their course, and opportunities to further enhance the inclusion of sustainability in the curriculum. The workshop is also fully supportive of the increasing recognition of the value of engaging students, and others, as partners in curriculum development.

Keywords

Sustainable development goals, curriculum development, student engagement, sustainability, citizenship, students as partners, education for sustainability

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Introduction

Embedding citizenship and sustainability into higher education (HE) curricula is an area of curriculum development that continues to gain traction. It is seen as an opportunity to support students with development of knowledge and skills that will inspire them to respond to the global challenges we currently face, and that we will continue to face in the future. We need to encourage and empower students to be able to enact change. Stirling (2001) introduces his key text *'Sustainable Education: Re-Visioning Learning and Change'* by poignantly stating: *'The key to a more sustainable and peaceable world is learning'*. Moreover, students really care about sustainability. The National Union of Students (NUS) carries out annual research into students' perceptions of sustainability, finding that *'For nine years in a row, around 80 per cent of students have told us that they want their institutions to be doing more on sustainability, and around 60 per cent want to learn more about it'* (NUS, 2019). Research also highlights how employers are increasingly conscious of the need to employ graduates with sustainability skills and awareness (Drayson, 2015). Globally, the declaration of the United Nation's Sustainable Development Goals (UN SDGs) set a precedent for joint action to address major social, environmental and economic issues, with many universities across the world using this framework to guide their activity, as evidenced by the *Times Higher Education Impact Rankings* (2019) and the alignment of courses to the UN SDGs (e.g. at *University of the West of England, Bristol*).

Sector guidance also continues to be developed around education for sustainability. For example, Advance HE signposts practitioners to guidance, including *The Future Fit Framework* (Stirling, 2012) and the *Sustainable Development Toolkit*, which both provide practical suggestions for teaching and learning for sustainability. Education for Sustainable Development guidance from *The Quality Assurance Agency for Higher Education* (2014) further emphasises the importance of sustainability as a key aspect of HE curricula, defining education for sustainable development as:

'...the process of equipping students with the knowledge and understanding, skills and attributes needed to work and live in a way that safeguards environmental, social and economic wellbeing, both in the present and for future generations.' (p.5)

The design rationale, development and suggested delivery of a workshop to support curriculum development linked to sustainability will be presented in this article. The work was undertaken at a research intensive, non-Russell Group higher education institution in a provincial city. This institution aims to embed citizenship and sustainability into all taught courses as part of a wider curriculum review project, so as to align with its own institutional, but also sector, priorities. As part of the curriculum review project, a student engagement ambassador (SEA) was employed to work in the institution's Centre for Learning and Teaching to support the Centre with its work around assisting staff with the embedding of citizenship and sustainability into curricula. The SEA was a full-time undergraduate student enrolled at the institution, studying on a course which

had an integrated placement year. The SEA took on the role in the Centre during their placement year. The involvement of students in the institution's curriculum development work is supportive of rapidly emerging trends around the value of students as partners in their higher education experience. A commonly cited definition of students as partners comes from Cook-Sather *et al.* (2014, pp.6-7):

'A collaborative, reciprocal process through which all participants have the opportunity to contribute equally, although not necessarily in the same ways, to curricular or pedagogical conceptualisation, decision-making, implementation, investigation, or analysis.'

Student involvement also takes into account considerations raised by Dunne & Zandstra's (2011) theoretical model for students as change agents, whereby various factors should be considered when integrating students into educational change: are students being given the opportunity to be evaluators of their experience, participants in decision making processes, true partners, co-creators and experts, or change agents? The balance between these aspects leads to various emphases, ranging from emphasis on student voice to emphasis on student action. Students can provide unique perspectives that help inform further development of courses and as such can be empowered to become change agents if provided with the opportunity.

Preliminary and anecdotal evidence collected by the SEA and staff members of the Centre for Learning and Teaching at the institution suggested that students and staff would benefit from an intervention that aimed to develop a common understanding of the scope of sustainability and its relevance across all curricula. Additionally, this intervention would provide an opportunity to challenge views linked to a limited conceptualisation of sustainability, focused around the environment, leading to claims that sustainability is absent from, and potentially irrelevant to, particular courses. The concept of sustainability extends far beyond environmental issues and is therefore relevant to most, if not every, discipline. Broadening understanding of the remit of sustainability would enable more staff and students to recognise the applicability of the sustainability lens in their own course context – going beyond the environmental aspects, but importantly also recognising how the environmental aspects of sustainability are inextricably linked with the social and economic aspects.

As such, the SEA designed a workshop with the aim of challenging workshop participants to reconsider their understanding of sustainability and recognise its vast scope. Subsequently, participants use this understanding to reflect on their curriculum and the extent to which sustainability issues are already embedded, but also to identify opportunities to embed more sustainability aspects into the course in future. The intention is that this off-the-shelf, student-designed workshop can be run by staff or students, for staff or students, to provide a valued space for reflection and formulation of ideas. Little knowledge of curriculum initiatives around sustainability is required to run the workshop, as the intention is that the conversations that the

workshop scaffolds relate to and build on the prior experiences of the participants and their motivators. This allows the conversation to be relevant for participants' specific contexts, whilst still encouraging collaboration and sharing of ideas between participants.

The aims of the workshop relate to the institution's aim of embedding citizenship and sustainability into curricula in line with the curriculum review project. The aims currently also relate to running the workshop with students, but the intention is that these aims could be modified to suit the context of any institution and workshop participants, e.g. staff. The aims of the workshop have been determined as:

- To help you engage your students with the curriculum principle of Citizenship and Sustainability.
- To enable your students to identify where Citizenship and Sustainability already exist within your course.
- To enable you and your students to identify where Citizenship and Sustainability might be further embedded.

The remainder of this article will focus on presenting the methodology of the workshop in the subsequent Methods section. This will detail the workshop and its utility as a tool to scaffold discussions around sustainability for curriculum design, as well the underpinning pedagogy and rationale behind the design of the workshop. Additionally, the article we present here signals a model for a collective endeavour in curriculum development around education for sustainability, rooted in collaboration and sharing: by engaging with the subsequent methodology and discussion we envisage the reader to be equipped to adopt and adapt the workshop to support work in this area in their own contexts.

Methods

Before running the workshop

Resources: The workshop has been designed as an 'off-the-shelf' resource, with ease and simplicity of use at the forefront of its design. The workshop resources are freely accessible from <https://teachinghub.bath.ac.uk/curriculum-development/citizenship-and-sustainability/sustainability-in-your-curriculum-identify-improve-inspire/> and are archived in the University of Bath Research Data Archive: <https://doi.org/10.15125/BATH-00901> (Angus-Cole *et al.*, 2020).

The data resources available include:

- A PowerPoint presentation.
- A workshop guide, complete with checklist, facilitation tips and a minute-by-minute breakdown of the workshop process.
- Print-in-advance resources (*workshop collage resource* and *workshop support resource*) that are used in the workshop to scaffold discussions.

Running time: The suggested running time of the workshop is 45–60 minutes. This enables pace to be maintained in the

workshop, but also enough time for productive discussion between workshop participants. Follow-up workshops could be scheduled to continue fruitful discussions.

Number of participants: The workshop can be used with staff and/or students, and is generally suited to a total number of between 10 and 50 participants to allow the facilitator to engage with groups and circulate during the discussion periods.

Format: If running the workshop as a face-to-face event, participants should be seated around a table in small groups (around 3–5 participants per group) to enable discussion and sharing of ideas. Participants will also need to be able to see the projector screen at points during the workshop, so the flexibility of the furniture and space of the room would need to be considered when making a room booking for the workshop. The workshop was designed with face to face delivery in mind, and has not yet been delivered as an online event, however, the workshop could easily be adapted for online delivery by organising participants into small groups that then move to breakout rooms for discussion.

Equipment: If running the workshop as a face-to-face event, the following equipment is advised:

- A **computer, projector and projector screen** so that the PowerPoint slides can be displayed to the workshop participants.
- An **internet connection** to run the live poll at the start of the workshop. Participants will also need a device (e.g. mobile phone) connected to the internet to partake in the poll.
- As stated in the *Resources* section above, there are two **print-in-advance resources** needed for the workshop. It is best to print these on A3 paper so that they are large enough for a few participants in each group to engage with. Depending on group size the facilitator may need more than one copy of each handout for each group. If the facilitator is planning on running the workshop regularly, it is suggested that these resources are laminated so that they can be easily reused. Alternatively, workshop participants could be asked to bring devices with them and the facilitator could then share digital versions of the resources for participants to access at the appropriate point of the workshop, thus reducing printing.
- **Pens** for participants to record ideas.

Workshop design and delivery

The workshop will now be described by presenting a series of annotated slides. The annotations associated with the slide images support the facilitator to visualise how the workshop would be managed at each stage, but also importantly explain the rationale behind the design of the overall workshop and its constituent activities. Images of the slides and associated information have been organised into a series of sequential tables which can be read in totality to understand the workshop design and delivery.

Workshops allow participants to obtain immediate feedback, share experiences and learn from peers, with the facilitator able to adapt to the needs of the participants by altering the direction of the workshop. These aspects all have high effect sizes for learning (Hattie, 2008), hence our decision to design and use a workshop. Table 1 provides a brief commentary on considerations for commencing the workshop to establish trust and develop a sense of community throughout the remainder of the workshop. The workshop proceeds by moving into the first interactive activity. By conducting an interactive poll, and drawing on our pedagogical knowledge of assessment for learning, the workshop supports the facilitator to gather feedback about participants' prior knowledge and understanding around the concept of sustainability (Table 2). The results of the poll then feed into the amount of time that the facilitator needs to spend on the next

section of the workshop, where time is dedicated to explaining the breadth of the concept of sustainability and the interlink between the three pillars of sustainability: social, environment and economic (Table 3). Table 3 also explains how we applied our knowledge of various learning theories to design the workshop to disseminate this information to participants in a meaningful way. Table 4 addresses the subsequent workshop activity, explaining how and why participants themselves are provided the opportunity to apply their new knowledge and understanding of the breadth of the concept of sustainability, and the three pillars and the UN SDGs frameworks to more familiar contexts, again drawing on learning theory for the workshop design. Having provided a scaffold for participants to develop their understanding of the scope of the concept of sustainability in a meaningful and concrete way, the workshop proceeds to support discussions about

Table 1. Commencing the workshop. A brief commentary on considerations for commencing the workshop that aim to establish trust and develop a sense of community that will support the effective implementation of the remainder of the workshop.

<p>Slide 1</p>
<p>Design rationale</p> <p>The first slide provides an opportunity to welcome participants, introduce the workshop context by explaining its purpose and the process, as well as address any housekeeping issues. The start of the workshop is incredibly important for setting the scene and tone for the subsequent 45 to 60 minutes. Just as it is important to establish trust and build participants' confidence when conducting interviews and focus groups with students and other stakeholders (Wilson & Fox, 2013), this workshop will function best if participants feel that they can contribute honestly and openly throughout, with a sense that their contributions and the time they are committing to the workshop are valued. The main premise of the workshop and its utility lie in the opportunity for participants to voice opinions and ideas about sustainability and its relationship with the curriculum in a relatively informal setting, and share ideas with others by establishing a community feel.</p>
<p>Slide in practice</p> <p>Welcome participants as they arrive at the workshop. Direct them to tables as they enter so that they end up seated in groups of 3 to 5 participants, allowing for ease of discussion.</p>

Table 2. Assessing participants’ prior knowledge and understanding. By conducting an interactive poll, and drawing on pedagogical knowledge of assessment for learning, feedback can be gathered about participants’ prior knowledge and understanding around the concept of sustainability.

Slide 2

Design rationale

Preliminary and anecdotal evidence collected by the SEA and staff members of the Centre for Learning and Teaching suggested that students and staff often harboured a limited conceptualisation of sustainability, focused around the environment. However, we cannot assume this will be the case for all workshop participants. Drawing on the embedded formative assessment approach to assessment for learning advocated by Wiliam (2011), whereby teachers find out where students are in their learning in relation to the intended learning outcomes, we therefore thought it important to ascertain what participants already know and understand about the breadth of the concept of sustainability. To this end, the workshop embeds an interactive poll asking participants ‘What is the first word/phrase that comes to mind when you hear the word ‘sustainability?’’. Knowing that one purpose of the workshop is to ensure that participants have deeper awareness of the scope of the sustainability concept beyond the environmental aspects, the results of the poll support the facilitator to gather feedback about what participants *already* know and understand about the breadth of the concept of sustainability. Additionally, all participants can partake anonymously (technology dependent) in the poll activity and its interactive nature immediately encourages participants to actively engage in the workshop, further setting the scene for the future activities.

Slides in practice

The poll activity can be embedded in the workshop slides and conducted via any polling software that the facilitator or institution prefers or supports. The key question asked is ‘What is the first word/phrase that comes to mind when you hear the word ‘sustainability?’’. Participants are invited to respond, and the facilitator can choose whether to have the responses populate as they are received, or to wait until all responses are received and then display these. We suggest waiting for all participants to respond before displaying the responses, as seeing the responses populate may influence an individual participant’s response and the aim is to obtain an accurate representation of the participants’ current understanding. When conducting the workshop ourselves, we have presented the participants’ responses collectively via a word cloud, where the size of the word displayed indicates the number of times that word was recorded. This quickly allowed us to note the most common words entered by the participants, and whether or not these were biased towards words associated with the environmental aspect of sustainability.

sustainability in the curriculum. This is the main activity of the workshop. Table 5 illustrates how participants are guided to apply their understanding to the curriculum and reflect on aspects of sustainability that already exist. It also shows how workshop participants are encouraged to identify any further opportunities they now recognise for embedding the concept of sustainability within the curriculum, including but also beyond

environmental issues. Finally, Table 6 presents a potential means of closing the workshop.

Discussion

The design of this workshop and its inherent aims mean that this single approach aligns with a number of sector priorities: the tool supports collaboration for curriculum development,

Table 3. Addressing the breadth of the sustainability concept. The scope of the sustainability concept is much broader than just the environmental pillar.

Slides 3-7

the 3 Pillars of Sustainability

- Social (People)
- Environment (Planet)
- Economic (Profit)

Social

- Ability to achieve a social well-being
- Treating everyone fairly and with respect
- Global citizenship – people have rights and civic responsibilities

Environment

- Living within our means
- Natural resources – the need to consider material scarcity and damage to the environment
- Extinction of species

Economic

- Business/country uses its resource efficiently and responsibly
- Operational profit
- Without efficient and effective uses of resources, a business cannot sustain its activities in the long term

the UN Sustainable Development Goals

1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE AND JUSTICE	17 PARTNERSHIPS FOR THE GOALS	THE GLOBAL GOALS

Design rationale

These slides deliver the content that the participants will need to understand in order to be able to engage with the subsequent activities in the workshop. Depending on the participants' prior knowledge, the slides introduce or reinforce the relevance of the three pillars of sustainability – environmental, social and economic - and their interlinked nature. The three pillars of sustainability is a commonly used framework for considering the broad scope of the concept, and although a rigorous theoretical discussion underpinning the establishment and prevalence of the three pillars is difficult to source (Purvis *et al.*, 2019), the three areas of sustainability underpin the formulation of the United Nations' Sustainable Development Goals (United Nations, 2012). Importantly, the slides related to the three pillars explain each pillar in turn so as to avoid working memory overload, adopting the theoretical approach of cognitive load theory advocated by Sweller (1988). Furthermore, the slides show images that provide concrete examples of the pillar in the real world. This addition draws on the notion that we often find it easier to conceptualise abstractions when they are placed within a specific, concrete context (Lindsay, 2011) as well as supporting dual coding theory where images in accompaniment with verbal information aids learning (Paivio, 1971).

When addressing the United Nations Sustainable Development Goals (UN SDGs) in the final slide of this section, it is important to explain that the three pillars sit beneath the goals, and each UN SDG will map to at least one pillar, with the UN SDGs themselves also being interdependent. The aim here is to seize the opportunity to highlight to participants the complexity of the concept of sustainability, but also the fact that the breadth of the sustainability concept indicates its relevance to almost every single curriculum.

Slides in practice

Ensure that participants are able to see the collage of images (*workshop collage resource*) within their small groups. Participants are then invited to discuss which of the images represents something that could be considered sustainable, being encouraged to relate this to the three pillars of sustainability and the UN SDGs framework introduced in the previous section of the workshop. The images depict scenarios that range from considering sustainability at an individual level (e.g. sleep) through to a worldwide issue (e.g. pollution). The reflective prompts will guide participants' discussions. The discussion from each of the individual groups can be brought together by inviting each group to share their reflections as part of a whole group discussion. This will also give the facilitator an indication of how deeply the participants are engaging with the breadth of the concept of sustainability and their progress, as well as another opportunity for participants to learn from one another.

Table 5. Reflecting on the curriculum in relation to sustainability. Participants are guided to apply their understanding to the curriculum and reflect on aspects of sustainability that already exist within it, as well as identify further opportunities for embedding the concept of sustainability within the curriculum, including but also beyond environmental issues.

Slide 12

Activity: In groups think of...

- Ways in which sustainability is already embedded in your curriculum (If any)
- Ways in which you would/could embed sustainability into the curriculum of your course (e.g. Course add-ons, coursework based on a world wide issue, guest lecturers, projects etc.)

Design rationale

This is the main activity of the workshop, which brings together key priorities in the HE sector: curriculum development, students as partners and education for sustainability. Participants are guided to apply their understanding of the scope of the sustainability concept to the curriculum. First, they are invited to reflect on aspects of sustainability that already exist within the curriculum within their small groups. Subsequently, they are encouraged to identify any further opportunities they now recognise for embedding the concept of sustainability within the curriculum, including but also beyond environmental issues.

It is important that participants spend time applying the frameworks and models presented earlier to the curriculum as this allows them to identify aspects of sustainability that are already embedded in their course, but which they may not have previously recognised as related to sustainability if they had carried a narrow understanding of the term. Furthermore, being aware that academic staff work in pressured environments and new pedagogical content and approaches are suggested for their curricula regularly, including embedding sustainability, it is vital that participants can recognise existing examples of sustainability in their course so that they do not feel that they need to find space for extra content and skills development in order to meet this priority. Again, this activity harnesses the power of scaffolding, learning via social constructivism and assimilating new knowledge within existing schema (Bruner, 1961; Piaget, 1971; Vygotsky, 1978), as we continue to find these well-established approaches to learning highly effective in a workshop context.

A very important feature of this activity is that it enables participants, in this case students, to commence a journey of co-creation related to curriculum development for sustainability. We can empower students to become change agents by involving them in the process of curriculum design, adopting Dunne & Zandstra's (2011) theoretical model for students as change agents, which focusses on students being collaborative partners with decisions for action being promoted by students.

Slide in practice

This is the main activity of the workshop and should be given sufficient time for productive discussions to ensue between participants in their small groups. The activity can be scaffolded by using the *workshop support resource*. This allows participants to record the key ideas that emerge from their discussion around the two key foci:

- Ways in which sustainability is already embedded in your curriculum
- Ways in which you would/could embed sustainability into your course

By asking participants to physically record their ideas, the facilitator has a tangible record of the discussions and ideas, which can be referred to after the workshop and inform the next steps of the curriculum development process.

The key thoughts of each of the smaller groups can be brought together in a whole group discussion, if time permits, as this may inspire further ideas amongst participants.

Table 6. Closing the workshop. A potential means of closing the workshop.

Slide 13

Design rationale

This final activity was incorporated into the workshop to allow participants to actively engage with tools that address their own sustainability and the impact of an individual's actions beyond the individual themselves. The activity can also be used to stimulate thinking about the portrayal of the WWF tool as predominantly focussed on environmental sustainability, thus reinforcing earlier conversations about the scope of the sustainability concept, and what changes could be made to participants' lives to reduce their impact on our world across all areas of sustainability. This provides an opportunity to empower participants to make changes, as well as close the workshop by thanking them for their valuable contributions which will also feed into change. Highlighting to the participants how the ideas generated will be used and how the participants will be involved in the future curriculum development work is necessary to ensure that they continue to consider themselves as partners in curriculum design, rather than just evaluators of the curriculum. Reminding them that co-creation is key to the success of the work and the vital role they are playing in helping to shape and change curricula for the better reinforces the value of the workshop in breaking down hierarchical structures that can sometimes act as a barrier to effective co-creation.

Slide in practice

Participants need to use a device with a camera to scan the QR code, or they can enter the website address given on the slide into their web browser, in order to access the evaluation tool. Depending on the time available, the facilitator can allow participants to discuss their results with other participants. Ensure that the workshop is closed on time, with participants thanked for their time and valuable contributions, as well as provided with the opportunity to ask questions.

supporting the ethos of students as partners and providing an opportunity for co-creation in partnerships, rather than just consultation, all within the context of broadening an understanding of sustainability that enables a deeper connection with the concept and relevance of education for sustainability for all disciplines and curricula. There is also the need for HE institutions to support their students to reach their full potential and graduate with the skills that allow them to go out into the world and be the change agents we need at a time when there are huge, urgent global issues related to all three pillars of sustainability. By enabling conversations about the curriculum and its relationship to sustainability, we can work with students to ensure that curricula are designed to equip them with the skills and knowledge they feel they need in order to address the important sustainability issues through their studies and in the future. It is also important to recognise that we live in an ever-changing world and we should realise that, in regards to sustainability, we can typically learn a lot from our students. They are the ones that are increasingly aware of the action they will need to take as our global situation evolves, and they live to face the consequences. As such, they often have a great insight into the sustainability of our planet, society and economy. The content of the workshop is therefore adept at scaffolding conversations about topics that can be embedded into a curriculum to keep that curriculum current and meaningful for the students that study it.

Notably, the premise and design of the workshop was shared at the **2019 EAUC Influence! Conference** (titled ‘It’s everywhere! Shifting perception of the scope of sustainability’). At the conference, workshop attendees also experienced key elements of the workshop as participants themselves in order to garner an understanding of the nature of the tool. The session was one of the best attended sessions of the conference and was well received by delegates. Post-workshop feedback indicated participants’ recognition of the utility of the tools beyond the original context within which it was designed, for example:

- *Great short session. Useful teaching tool, modelled well within the session and included time for discussion about the tool also.*
- *Great interactive session demonstrating the journey students go on.*

Additionally, the SEA has successfully run the workshop with a number of student groups at the institution. Students engaged well with the workshop format and it supported them to identify a range of innovative ideas that could enhance their curricula. This is a true example of students as partners, with the workshop being student-designed and student-led, as well as providing an opportunity for students themselves to change their curricula.

That said, the workshop discussed above should just be considered as a starting point. Consider the benefit of engaging with the whole spectrum of stakeholders that could and should ideally be involved in curriculum discussions to enable an effective curriculum development process. This workshop has not yet been used in this way, but it has the potential to be adapted for use in scaffolding the development of productive, meaningful partnerships and conversations involving alumni, graduate employers and placement providers as key curriculum stakeholders. We encourage others to consider how the concepts and rationale that underpin the tool could be adapted to cater for a diverse range of conversations around the scope of the concept of sustainability, and the opportunities that this could create for sustainability in the curriculum across contexts.

Finally, those working in the HE sector find themselves working to an incredible number of expectations daily. We can work collectively to ease such pressures. A key driver for the creation of this article was to seize an opportunity to share this tool more widely to support colleagues with the need to bring education for sustainability to curricula in a meaningful way. Our resources are available to use and adapt free of charge and can be accessed as explained in the Methods section of this article. We are also keen to hear feedback about the use of the workshop in your own context (contact the corresponding author), as well as the ways you may have adapted the approach for different audiences and contexts. Particularly we would like to hear about your perception of the utility of the tool for curriculum development and broadening awareness of the scope of sustainability. By sharing and collaborating, we can avoid reinventing the wheel. This in itself advocates sustainability.

Data availability

Underlying data

The University of Bath Research Data Archive: <https://doi.org/10.15125/BATH-00901> (Angus-Cole *et al.*, 2020).

This project contains the following underlying data:

- Sustainability-in-your-curriculum-Workshop-collage-resource-print-in-advance.pdf. (A print-in-advance resource to support delivery of the workshop.)
- Sustainability-in-your-curriculum-workshop-support-resource-print-in-advance.pdf (A print-in-advance resource to support delivery of the workshop and reflection on the curriculum.)
- Sustainability-in-your-curriculum-Workshop-Presentation.pptx (PowerPoint slides to support delivery of the workshop.ppt)

Data are available under the terms of the [Creative Commons Attribution-ShareAlike 4.0 International](#) (CC BY-SA 4.0).

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Open Peer Review

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Version 1

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? **Brett Vaughan**

¹ Department of Medical Education, University of Melbourne, Melbourne, Vic, Australia

² Faculty of Health, Southern Cross University, Lismore, NSW, Australia

Thank you for the opportunity to review this work. Overall, the description addresses an area of higher education curricula that is receiving increasing interest. There is value in including these concepts within a curriculum. The content of the workshop is well described and the authors are to be commended for making the resources underpinning the workshop freely available.

The manuscript does however present a unidimensional view. In part, it does read like an advertisement for the workshop and in parts is overtly positive with little reflection on the process to develop the workshop or participant experience. It would be helpful to understand the training that might be required for a facilitator to deliver the workshop, as well as presenting data on the learner and facilitator experience with the workshop. Further, a 'reflexivity' section related to the authors' experiences developing the workshop could be a useful addition. Consideration could also be given to the learning that occurs in single workshops and whether this is translated into other areas of the learners' education and the long term impact of participating in such a workshop.

There are some interesting opportunities arising from the work and I look forward to seeing these as the subject of further research and dissemination in the future.

Is the rationale for developing the new method (or application) clearly explained?

Yes

Is the description of the method technically sound?

Yes

Are sufficient details provided to allow replication of the method development and its use by others?

Yes

If any results are presented, are all the source data underlying the results available to ensure full reproducibility?

No source data required

Are the conclusions about the method and its performance adequately supported by the findings presented in the article?

Yes

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Yes

Does the piece present solutions to actual real world challenges?

Yes

Is real-world evidence provided to support any conclusions made?

Yes

Could any solutions being offered be effectively implemented in practice?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Health professions education

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 06 April 2021

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Belinda Gibbons

Sydney Business School, Faculty of Business, University of Wollongong, Wollongong, NSW, Australia

Thank you for the opportunity to review this article. It is such an interesting topic that as the authors mention, is gaining traction. The authors provide not only guidance for design and delivery but also resources for implementation. Some comments from me include:

- There is a focus on citizenship and sustainability in the title and focus of the article but the discussion and resources mainly focus on the term 'sustainability'. The term 'citizenship' has equal conceptualisations and maybe worth exploring to ensure this concept has been covered enough or maybe take it out if not the focus.
- The students-as-partners ethos runs through the article. I was wondering if students helped develop the workshop and/or give its delivery? Perhaps the parts that they did could be further explained.
- It would be great to read about who is using these resources and the impact they are having and/or the impact you are aiming for them to have - how is this measured? Perhaps you can add a measuring impact to your resources so that this data can be collected.

Is the rationale for developing the new method (or application) clearly explained?

Yes

Is the description of the method technically sound?

Yes

Are sufficient details provided to allow replication of the method development and its use by others?

Yes

If any results are presented, are all the source data underlying the results available to ensure full reproducibility?

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Does the piece present solutions to actual real world challenges?

Yes

Is real-world evidence provided to support any conclusions made?

Yes

Could any solutions being offered be effectively implemented in practice?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Management, responsible decision-making, sustainable development

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 26 November 2020

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Scott Strachan

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Typo - The National Union of Students (NUS) carries (should be carried) out annual research into students.

There is much talk around embedding ESD in curricula but this work offers a practical workshop designed to support educators, working in partnership with students, primarily in the HE sector (for now), to identify where ESD exists and gaps in curricula. More open source sharing of these types of tools is extremely welcome and the authors should be commended on their efforts to do so here. The article is very useful at raising awareness of ESD and also the existence of this workshop and its availability for others to use and adapt, however, more detailed scrutiny and framing of the methodology and pedagogy employed to develop the workshop would be useful. Providing an understanding of the pedagogical theory/framework underpinning its development would provide greater reassurance of its robustness, as well as offering an opportunity for others to contribute to this with the aim of building on, adapting and perhaps enhancing the workshop.

While the article is right to highlight the 'why' and the need for ESD and the benefits and successes of the workshop I'm sure it could be more than an ESD promotion and 'publicity piece' for the workshop. The authors have clearly put a great deal of effort into developing content and guidance material for prospective users of the workshop, which accompanies the article, which is fantastic. However, it would be very interesting and useful to hear more about 'how' this workshop was developed, and of any challenges that were perhaps experienced through its development and how the workshop was adapted along the way (assuming there was some iterative process to develop and tune it – perhaps this is ongoing). More discussion on the challenges faced and even shortcomings still to be met in enhancing and further developing the workshop? Essentially, what have been the problems and shortcomings? I'm sure there are lessons to be learned here, and sharing these challenges and the authors' experiences in dealing with them, as well as the workshop itself, would offer a welcome insight. So perhaps some more critical analysis would be appropriate, even highlighting 'areas for improvement' with some recommendations from the author – as an open source offering, perhaps this could lead to valuable collaborations and inputs from others.

The article refers to curriculum review and development. I'm interested to know if the workshop works at a module syllabus level and whether there are nuances in how the workshop is framed/delivered to either identify opportunities for ESD in curricula versus ESD in a given module. Essentially, is the workshop scalable in embedding ESD? This could be an interesting 'angle' to consider/promote.

A key feature of this workshop has been the partnership and co-creation with students, which is really interesting and innovative. I wish we could hear more about how that was achieved and what it involved. How did you engage students? Exactly what role/s did they play? Exactly what was their contribution?

The article seems to suggest that one of the main aims of the workshop is first to expand peoples' horizons with respect to sustainable development, to look beyond just the environmental pillar and understand that there are also social and economic dimensions and that interconnectivity exists between these. It would have been interesting to understand more about 'how' the workshop demonstrates this or leads the participants to this realisation. Was there any use of other, perhaps more contemporary, representations other than the pillars? Stockholm Wedding Cake, Raworth Doughnut? Also, many in the community talk about the differences associated with integrating ESD in different disciplines. Some sense of how this workshop addresses this (or if it does or could and perhaps how) would also be of interest. Alternatively, if this workshop is more of a high-level entry point for curriculum review and raising staff awareness, which would then require more detailed content review, etc. that's fine too, this is still a very valuable contribution but perhaps making this more explicit would help readers better understand how this workshop should be 'pitched'.

There is some acknowledgement of there being a limited roll-out of the workshop, and there are some testimonies from those attending a conference version of the workshop, which are very positive. Are there similar testimonies from your staff who have experienced the full, undiluted version of the workshop or any evidence that the workshop has led staff to redesign curricula or modules to incorporate ESD, perhaps to varying extents? If not, is this something that will be tracked? No need for detail on how here, but an indication of how the workshop fits into the 'bigger picture' of embedding ESD is important I think. While it may not be necessary to have all of this evidence to hand right now, it would be useful to at least indicate that there is some mechanism in place to track this and also to review and refine the workshop as it is rolled out more extensively, and perhaps to different stakeholder groups.

Finally, I just want to reiterate how important work like this is and can be in offering practical tools aimed at helping teaching staff embed ESD in curricula. I look forward to seeing this article indexed, perhaps with some of the feedback offered here taken into consideration, in the near future so that other HEI's (and potentially other stakeholders) can benefit from the experiences of the authors in producing this excellent workshop.

Is the rationale for developing the new method (or application) clearly explained?

Yes

Is the description of the method technically sound?

Partly

Are sufficient details provided to allow replication of the method development and its use by others?

Yes

If any results are presented, are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions about the method and its performance adequately supported by the findings presented in the article?

Partly

Is the argument information presented in such a way that it can be understood by a non-academic audience?

Partly

Does the piece present solutions to actual real world challenges?

Partly

Is real-world evidence provided to support any conclusions made?

Partly

Could any solutions being offered be effectively implemented in practice?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Energy access and education for sustainable development

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.