Section 4.
Teaching ethics

Teaching protein futures — A cross-disciplinary approach

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Abstract

This paper examines the role of education in addressing global challenges related to sustainable development through the lens of the agrifood system. We report on the development and testing of a flexible educational approach aimed at engaging primary school pupils in Wales and teacher students in Norway in the complexities of sustainable and ethical food production. Utilizing different protein sources, such as plant-based products, edible insects, and laboratory-grown meat, this study highlights the effectiveness of using specific food items to facilitate the understanding of broader sustainability challenges and demonstrates how such educational methods can foster a sense of agency among young people, enabling them to make informed food choices and engage with ethical dilemmas. The findings suggest that this pedagogical approach can be a viable means to achieve educational goals related to citizenship, participation, and sustainability, while also raising concerns about the normalization of fast-food culture and utilitarian ethics. Further research is recommended to explore the integration of more diverse ethical frameworks and the expansion of the approach to include other food types and educational settings.

Keywords: citizenship, education for sustainable development, jigsaw method, proteins, student-active learning

Introduction

Global challenges related to sustainable development are becoming increasingly important in education systems and for pupils themselves (International Commission on the Futures of Education, 2021). The global agrifood system offers an important entry point through which children and youngsters might engage with the complexity of sustainable development. For instance, according to the United Nations (UN) Food and Agriculture Organisation, agrifood systems were responsible for 31% of global greenhouse gas emissions in 2020 (Food and Agriculture Organization of the United Nations, 2022). Alongside these emissions, the biomass of food animals is nearly double that of humans and more than ten times as high as the combined biomass of wild mammals and birds (Bar-On *et al*., 2018); and food systems are central drivers for malnutrition and obesity and other diet related diseases that are more harmful than smoking, drinking and drugs combined (Global Panel on Agriculture Food Systems for Nutrition, 2016). In addition, concern over animal welfare has raised questions relating to the ethics of farming and meat consumption with growing numbers reducing their intake through promoted activities such as Veganuary (eating only plant based protein through January), No Meat Mondays etc. (Jones, 2019). Consequently, societal attitudes to food, individuals' food choices, and the organisation of food provisioning are crucial for the ecosphere and for our quality of life. In this paper, we explore the role of education in helping young people to engage with, and act on, such challenges.

The paper reports on the development of a flexible educational approach to protein choice in primary schools (7–11-year-old pupils) in Wales and with student teachers (18 + years teacher students) in Norway. Our goal is to show how using a specific food item/dish can engage students and pupils in complex challenges related to sustainable and ethical food production through information gathering, critical thinking and democratic processes and how these skills are transferable to wider themes. The approach was developed for the Welsh schools and tested for adaptation to the Norwegian school system by engaging teacher students.

In both the Norwegian and Welsh examples, we used the availability of different protein sources as a route to exploring the wider challenges raised by the global agrifood system. In recent years, a greater variety of so-called 'alternative proteins' have emerged that claim to hold benefits over various meat-based proteins. These alternative proteins include widely-available plant-based products but also sources such as edible insects and laboratory-grown meat (Rønning *et al*., 2024; van Huis *et al*., 2013). These 'alternatives' have been promoted as healthier, better for animal welfare, and as having fewer environmental impacts – directly addressing significant concerns over conventional meat proteins. However, the claims made about these products and protein sources are highly contested and raise scientifically, socially and ethically challenging questions. Deciding what source of protein to eat, when, and under what circumstances, can provide a route to engaging young people to consider complex questions that relate both to global and local realities.

The explicit ethical dimensions of this teaching approach were that the students analysed various protein sources (insects, beef, cultured meat and plants) as the basis for a meal in relation to values such as animal welfare, climate friendliness and human health. These values can be seen as specifications of impacts on livestock, the climate and humans (Kaiser *et al*., 2007). Of course, these can be substituted and/or supplemented with other relevant values (or specifications of these) such as inhabited countryside, workplaces/employment, the environment, distributive justice etc. By focussing on select specifications, pupils and students become aware of the nature of ethical dilemmas, reaching agreement through discussions of conflicting norms, and more practical problems, where there are non-ethical factors that induce conflict with the norms (James, 2003).

Through this, the paper also explores the role of education in enabling young people to act on what they learn about, providing them with the resources to develop a sense of agency as well as actual agency (Glover and Sumberg, 2020). This is especially significant as young people have often been portrayed as passive receivers of food, rather than as holding agency, using critical thinking and acting on their knowledges and beliefs. In contrast, the studies reported on here take the agency of young people seriously, both in directing classroom activities, and being able to act on what they have learnt once they leave the classroom (Ares *et al*., 2024). The paper, therefore, asks how a specific pedagogical approach works for teaching young people about the place of animals in the food system while enabling them to act on what they learn.

Development

Initially, Welsh partners developed and tested teaching materials for primary schools. Next, the materials were modified for a Norwegian context and tested in a Norwegian teacher educational college. The purpose was to explore ways of creating agency through a cross-disciplinary theme and for different age levels and settings. All participants filled in forms for informed consent.

Wales

The development of workshops in Wales was contextualised and driven by the introduction of a new curriculum, which aims to engender 'ethical, informed citizens' who are 'able to take considered, ethical and sustainable action'(Welsh Government, 2019). The complex and often competing claims made about different sources of protein offered a focus through which to explore the role of pedagogy in empowering young people's critical engagement with debate around environmental futures and the role of animals in the changing food system.

To develop the workshops, an initial online survey of primary teachers in South Wales was conducted (receiving around 30 responses), exploring teacher experiences of teaching topics relating to ethics and sustainability, along with their hopes and concerns around the New Curriculum. Following the survey of teachers, three schools with contrasting catchments (e.g. one urban, one rural, and one peri-urban) were recruited to participate in subsequent stages. These included in-depth interviews with teachers in each school and the circulation of a pre-workshop survey to all children (for whom consent had been given) in participating classes; in total, there were around 150 responses. This survey was designed to determine children's experiences of, and attitudes to, different protein sources. It also provided them with an opportunity to write questions that they would like farmers to answer about food production. A representative selection of questions was sent to an insect farmer, pea farmer and a beef farmer. Answers were then developed into a workshop that explored these different farming processes of protein through discussion, drama and critical thinking.

Norway

As the context in the Norwegian setting was a teacher training college, the Welsh approach needed adaptation to the age and to the disciplines, religion and ethics and natural science, as well as to the meeting between students from these two disciplines. In order for these students to explore each other's strengths, we selected a method of collaborative learning called "expert groups" from the so-called "jigsaw approach" where students explore parts of a subject individually or in small groups and collaborate to establish an overall conclusion (Aronson, 1997). Furthermore, the Norwegian team agreed to have the students themselves searching for information in order to discuss biased sources and to develop a critical awareness in this policy field. Lastly, the Norwegian team left the didactical and educational framing for the discussion with the students since we sought their thought and opinions.

Testing

In both the Norwegian and Welsh cases, burgers were used as the focus for the learning - a familiar protein that can be produced with different forms of protein, including beef, insects, cultured meat and plant-based.

Wales

A total of 10 workshops (each lasting 1–1.5 hours) were conducted across the three schools and began with pupils identifying which burger they would prefer to eat for lunch — beef, insect or plant-based. The sessions were then themed around three issues pupils identified in the survey as important: climate change, human health and animal welfare. Pupils were given some information about different sources of protein, but were encouraged to retrieve information through discussion and question-asking, rather than a more traditional transmission approach to teaching. The workshops included a significant proportion of role play activities, ranging from working through how different animals are farmed, through to participating in a mock parliamentary debate framed as a 'farm to fork summit' — which

related to an event held by the UK Prime Minister at around the same time. The pupils found this approach engaging, and it was successful in bringing out not only a range of perspectives on the future of food provisioning, but also in raising questions that they wanted to explore further. At the end of the workshop pupils were asked again which burger they would choose for lunch and the complex nature of choice was reflected on the impact of each protein source on climate, health and animal welfare was considered.

Following the workshops, the children, working with their teachers, wrote postcards, including illustrations, to the Prime Minister to outline their hopes and concerns around future food provisioning. These were shared with the project team prior to being posted. Responses were received and letters were read out in the schools and used as an example of Pupil Voice in action.

Norway

As in the Welsh approach, the day started with the students indicating their preference for a burger made of beef, plants or lab-grown beef. After the statement of individual preferences, the students were told to select which burger should be served in an imagined school cafeteria. The students were given brief introductions to the content of the burgers, and, as in Wales, the farming methods and supply chain involved for it to become a burger.

The students were divided into two expert groups on climate change, two groups on animal welfare and one group on human health. The expert groups were given 90 minutes to search, discuss and agree and decide upon which burger would be best according to their field of expertise (i.e. climate, animal welfare or human health). During these 90 minutes, the college teachers provided coaching and listened to the dilemmas the students discovered. One central discovery for the students was the lack of neutral sources on this topic. The students reported difficulties also with the availability of information regarding cultured meat especially regarding climate change. Given the nature of this experiment, the students were served plant-based hamburgers for lunch.

After lunch, we rearranged the groups into three consensus groups. One consensus group consisted of at least one member from each of the expert groups. These consensus groups should then select the burger that they considered the best one — and list the reasons for selecting the specific ingredient for the burger.

Two groups selected a plant-based burger for the school cafeteria and the last one chose lab-grown meat. The students primarily emphasized arguments related to animal well-being and one group focussed on them living a full life (in the tradition of virtue ethics). Two of the groups directly argued based on climate emissions, and two of the groups gave arguments from a human health perspective. In addition, one group used a resource argument that the global production of greens is already sufficient to feed the world. Furthermore, a part of the desirability was the possibility to customize the meat to the consumers.

Evaluations

Wales

Observations of workshops and follow-up interviews were conducted with four teachers who had been involved in the workshops. These lasted 30–40 minutes each and were audio recorded and later transcribed. Data was then thematically analysed, informed by Braun and Clarke (2020). Teachers recognised that using different protein sources as a focus for studying food systems offered an interesting and accessible route into complex discussions that their previous work in this area did not allude to.

In particular it was felt that issues around animal welfare from farm to fork (including slaughter) were presented in an appropriate way. Pedagogy was identified as age/stage appropriate. It was also noted that framing discussion around pupil's interests in climate, animal welfare and health mirrored the demands of the new curriculum in Wales which focuses on pupil led learning. While the sessions offered space for discussion and reflection, it was noted that teachers would want to embed tasting the different protein options in future iterations of the learning sequences. Teachers agreed that having resources and lesson plans available to rerun the sessions in the future would be useful to them and others as they were time poor.

Norway

In order to relate the teaching approach to the Norwegian school system, we asked how the teacher students perceived how this teaching approach could be applied. Their inputs were:

1. Policy areas: Respect for nature and environmental consciousness; sustainability, environment, health,
2. Interdisciplinary themes: Public health & sustainable development: democracy and citizenship
3. Religion and ethics: Reflection on existential questions pertaining to humans' lives and living conditions and the planet's future; exploring the views of others, dealing with disagreements; identifying ethical issues connected to human rights, sustainability and poverty; reflections, philosophical dialogues and imagination.
4. Science: Differences between observations and conclusions; organisation of data, identifying cause and effect arguments, drawing conclusions, estimating sources of error, presentation of findings; evaluation the quality of one's own and others' explorations; sustainability, environment and energy, inherent value of nature; give an account of global warming and addressing factors that can cause climate change

Furthermore, in order to address how the students perceived the teaching methods in relation to relevance for the schools, pupil-centred learning, and interdisciplinarity, we asked the students how they would score the teaching approach on a 1 to 5 Likert scale. Here, pupil-centred learning and interdisciplinarity scored 4.7 and relevance for school scored 4.3 (N=16).

Discussion

Endowing pupils with a sense of agency through providing them with tools for addressing complex normative challenges seems to be a central outcome both in the Welsh and the Norwegian trials. Consequently, this approach to teaching seems a viable (and not very time-consuming in delivery once planned) approach to reach educational policy goals of citizenship, participation, and sustainability.

As educators and ethicists, we have two worries concerning this approach. Firstly that it might normalize a fast-food and ultra processed cuisine. However, this approach should not be the only lesson in food, animal welfare, climate change and health that pupils receive. In addition, the intuitive engagement caused by the hamburger largely facilitated engagement. Secondly, the ethical issues in this testing were limited to utilitarian issues that also might normalize one approach to ethics. Further work is needed to investigate how more nature-centred, care-oriented or virtue-based approaches might be included.

Conclusions and further work

Further workshops, based on the approach from Wales are being run in England through Global Goals Centre, an environmental education charity. This is providing exploration of how the issues and approaches might work with different ages and stages and how resources produced can be used by and

with different groups of learners. The team continues to explore how ethical concerns in the production of protein as food are being represented and are currently undertaking a review of education material in the UK that explores farming practices including slaughter.

For the Norwegian part, there are three logical next steps. The first step is to test the approach in a relevant school setting and report on the testing. The second step is an inquiry into including other ethical issues such as the inherent value of animals and ecosystems, justice and fairness – and to consider in which school year these might be relevant. A third step is to see if the method can be expanded by using other food types that the cellular agricultural industry is aiming for. For all steps, relevant background material needs to be produced.

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