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# Exploring environmental value action gap and education research: a semi-systematic literature review

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**ABSTRACT**

Despite rising levels of interest in global environmental challenges, progress towards the widespread adoption of pro-environmental behaviours remains slow and inconsistent. Previous literature identifies the importance of education for working to address this inconsistency between the environmental values people hold and their behaviours, commonly described as the value-action gap. To examine current knowledge in this area we conducted a semi-systematic review of published literature which explicitly brings together value-action gap thinking and environmental education research. Our findings reveal that major areas of focus across this literature are either on the role of specific pedagogical approaches or broader policy and institutional structure. Based on our analysis of the literature, we suggest five priorities for future research. This includes research which contextualises educational visions within existing curricula, research which examines intergenerational learning, research which considers possibilities for collective action, research which studies a greater diversity of global locations, and research which examines the whole school approach.

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## Introduction

In December 2021, the film *Don't Look Up* was released on the streaming site Netflix. The plot centres around two scientists who, having realised that a comet will hit Earth in a matter of months, do their utmost to change the comet's course and save all living species. Yet, through a combination of political barriers and mass inaction, the comet still hits Earth. As an open metaphor for our inadequate response to environmental and climate catastrophes, the film has divided critics. Although it has been criticised for its arguably crass tone (Bramesco 2021), the

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exasperation experienced by the scientists who are trying to stop the comet hitting Earth resonates with many; it speaks to the deep sense of frustration that many feel about the fact that actions in response to environmental challenges remain inadequate (see: Gewertz 2022; Kalmus 2021).

Writing in the mid-2020s, as extreme environmental events occur with increasing intensity and frequency across the globe (IPCC 2021), public awareness of environmental issues is growing considerably (Calculli et al. 2021; Flynn, Bellaby, and Ricci 2009). Essentially, we are living in a moment of time where pro-environmental behaviour and action is no longer a personal choice, but an absolute necessity.[1] Yet, when it comes to climate change, 'the science-society contract is irrevocably broken' (Glavovic, Smith, and White 2021, 1): the science is clear, but actions supporting the science remains desperately slow. In many ways, pro-environmental action at both individual and societal levels is increasing. As Gifford (2015) acknowledges, many people and communities are trying to take steps towards a more sustainable future: plant-based diets have become more popular, rewilding projects have seen a growth in support, and there is a global decrease in plans for coal plants (Ambrose 2021; DiGirolamo 2021; Harvey 2022; Pendergrast 2016). Yet, as a collective, people still lack the impetus and too often the choice to engage with environmental actions. We are conceivably at the point in the story of humanity where we have realised that there is indeed a comet heading towards Earth, and yet we remain paralysed in our actions. To draw on the language of Val Plumwood (2002, 16), we – by which we mean those who command the greatest degree of influence over the global environmental status—remain rooted in an ecologically irrational society.

Although there are those who persist in either denying or dampening the urgency of ongoing environmental crises (Schraer and Devlin 2021), our continued rootedness in an ecologically irrational society does not exist *purely* due to the pervasiveness of these views. Rather, for some time, it has been acknowledged that a key driver of environmental inaction is the gap that exists between the values people hold and the behaviours they exhibit, whether by choice, capacity, or resource availability (Kollmuss and Agyeman 2002). This bridge, between people's values and their actions, is commonly referred to as being the 'value-action gap' (Barr 2006; Blake 1999).[2] A useful definition for this term is provided by the Sustainable Consumption Roundtable (2006, 63), who refer to the 'value-action gap' as being the 'observed disparity between people's reported concerns about key environmental, social, economic or ethical concerns and the lifestyle or purchasing decisions that they make in practice'. Although genuine pro-environmental change can only be achieved in combination with fundamental systemic shifts across all levels of society (particularly industry and government-led policy), change at the scale of the individual remains critical for mitigating environmental issues (Maartensson and Loi 2021). In recognising the existence of the value-action gap, we do not suggest that there is no correspondence between people's values and their actions; as Maio (2011) discusses, the perception that this gap is unbridgeable has become a paralysing cultural truism. Rather, we understand the value-action gap as one which, despite its continued existence, both has been, and can be, bridged.

Literature examining the value-action gap is vast (Franco and Ghisetti 2022; Grandin, Boon-Falleur, and Chevallier 2021), and much of it focuses on strategies for overcoming the observed disparity between people's values and actions (see by example: Blake 1999; Chai et al. 2015; Croteau, 2019; Gould 2020; Tomkins et al. 2018). Environmental education is recognised as one (but not the only) key space through which the value-action gap can be bridged (Grandin, Boon-Falleur, and Chevallier 2021). In their seminal paper analysing the reasons for discrepancy between people's values and actions, Kollmuss and Agyeman (2002, 240) outline that the intention of their work is to provide environmental educators with 'a feel for some of the broader research findings which have informed current environmental education theory and practice. In doing so, we do not want to prescribe or constrain, but to open up a dialogue regarding

the most effective ways environmental educators might help develop pro-environmental behavior at all levels in society'.

In similar recognition of the links between education and individual perspective, there is a range of work which explores educational practice as a force for shaping people's environmental values, attitudes, and subsequent actions (Clark et al. 2020; Marcinkowski and Reid 2019). Theoretical work (from psychology mainly) highlights the relationship between values and behaviours, for example through the Norm Activation Theory (Schwartz 1977) and the Value-Belief-Norm theory (Stern et al. 1999), and these have been used in environmental education research. They are however beyond the scope of this current paper.

Despite the breadth of work investigating the role of educational initiatives in supporting behavioural change (Gralton, Sinclair, and Purnell 2004; Leal Filho et al. 2020), work addressing *how* educational practices might support people to bridge the value-action gap needs to be expanded. The paper to hand incorporates a semi-systematic methodological approach (Snyder 2019) to review relevant literature exploring how research examining the intersection of the value-action gap and education could be meaningfully extended. We ask, how has education been explored within value-action gap literature? To that end, the paper is structured as follows: firstly we provide an overview of the two key areas informing the paper, namely value-action gap research and environmental education research; secondly, the authors outline the methodological approach inherent to a semi-systematic review (as adapted from Snyder 2019); thirdly, the results of the semi-systematic review, exploring the intersection of value-action gap research with environmental educational research are explicated. Finally, as a result of this process, five priority areas for future research in this intersectional field are outlined. The need for this paper arose through the authors review of literature as part of the 'Challenging the Climate Crisis: Children's Agency to Tackle Policy Underpinned by Learning for Transformation' (CCC-CATAPULT) research project, which examines young people's experiences of and learning around the climate crisis. Although this paper has particular relevance for people working within environmental education research, our findings have implications across broader fields of study, including, but not limited to: environmental psychology, geography, and educational research.

## Contextualising value-action gap and environmental education research

### *The value-action gap*

It is no great secret that the possession of environmental knowledge or care does not necessarily motivate action (Kollmuss and Agyeman 2002). Indeed, in Moser's (2016, 345) reflections on climate change communication research and practice, helping people transition 'from awareness and concern to action' is identified as one of the key challenges faced by climate communicators. More broadly, despite it being widely agreed that having a degree of concern or understanding about an environmental issue is a prerequisite for action (Geiger, Geiger, and Wilhelm 2019), it is extensively demonstrated that there often remains a discrepancy between the knowledge and attitudes someone holds, and the behaviours they exhibit (Babutsidze and Chai 2018; Davies, Fahy, and Taylor 2005; Barr 2006; Flynn, Bellaby, and Ricci 2009; Owens 2000; Kollmuss and Agyeman 2002).

There are various of iterations of the term 'value-action' gap' which, although sharing a common root of meaning (i.e. the distinction between how one thinks they should or might act, and what they in fact do in reality), use different specific wordings to describe this. Firstly, we might look at the use of the word value which, as expressed by Blake (1999) is a term which causes terminological confusion, with researchers referring to various iterations such as 'attitudes', 'opinions', 'concerns', 'worries', or 'beliefs'. In addition, the term 'value' has been defined in a number of ways, for instance, as 'a conception, explicit or implicit, distinctive of an

individual or characteristic of a group, of the desirable which influences the selection from available modes, means and ends of action' (Kluckhohn 1951, 395). Equally, others have attempted to quantify the number of values we hold as individuals, ranging from five universal values (Hofstede 1980, 2001) to 36 individual values shaped by contextual factors (Rokeach 1979). Thus, in a review of literature which focuses on studies which consider value-action gap, one understanding of value will not be used universally.

The latter word in the phrase, that of the term 'action', is also understood in multiple ways across the literature. Indeed, the definitions of environmental action are diverse, with the distinction between 'action' and 'behaviour' remaining blurry. In literature on the value-action gap, authors employ the word action in varied ways, often bringing in references to both individual behaviours, explored by Kothe et al. (2019) and Stern (2000) as behaviours that seek to help protect and support natural environments, and broader environmental actions, understood by Jensen and Schnack (1997) as actions which explicitly seek to address an environmental concern, under studies of the value action gap. Similarly to above, studies which draw on the concept of the value-action gap may therefore be drawing on a wide of activities and choices when describing human action.

Early studies of this well-established idea—of the 'value-action gap'—find their roots in work published in the 1960s: a period when, led by writers such as Carson (1962), environmental challenges began to emerge as key issues of the modern world. Writing in 2022, one would not, in the words of Croteau (2019, 18–19), 'be blamed from believing that with the current and projected ecological outlook, with generally predicted high certainty by the scientific community, there would be great impetus for change'. Yet, despite compelling evidence for environmental disaster (Glavovic, Smith, and White 2021), coupled with mounting feelings of concern amongst the public at a global level (ONS 2021; Hickman et al. 2021), extensive international research highlights that the value-action gap remains a stubbornly persistent challenge (Grandin, Boon-Falleur, and Chevallier 2021; Rahmani, Wijaya, and Hirawan 2021; Renz and Böhm 2020; Townsend and Niemtzow 2015).

Work examining the discrepancy between the values a person holds and their *actual* behaviours began to develop in the 1950s. For instance, Festinger's (1957) *Theory of Cognitive Dissonance*, placed emphasis on what happens when new information is presented to us as we are leading of life of relative stability, which this new information may disrupt. According to the theory, introduction of new information along with pre-existing beliefs creates more than one form of 'cognition' or how we think and interact with the environment around us. This results in a 'dissonance' or contradiction of what we knew and what we now know might be significant in the future (Aronson and Festinger 1997). According to Gruber (2003, 242) dissonance 'refers to the personal tension or stress experienced when an individual's actions contradict or are inconsistent with his or her values or beliefs'. In response, individuals would then react in several ways with a view to return to the original state of consistency or what Festinger refers to as 'consonance' (Aronson and Festinger 1997).

Later, in the 1970s, there was renewed interest within social psychology. This is cited as the period of time when models for pro-environmental behaviour broadly assumed that enhancing people's environmental knowledge would directly influence their values and, as a result, actions. However, Kollmuss and Agyeman (2002) argue that whilst some relationship between understanding, attitude, and behaviour does exist, these models did not hold up well in practice. Not only was the link between attitudes and behaviours shown to be broadly fractured, but it was realised such models pay little credence to wider situational, social, and cultural factors, and that they are reliant on understandings of humans as fundamentally rational: an understanding which does not translate into reality.

Fishbein and Ajzen (1975) went some way in progressing earlier simplistic models of attitude-behaviour models with their *Theory of Reasoned Action* (TRA). This theoretical model considers that if an individual is to engage with a specific behaviour, they must also have the

*intention* to engage with that behaviour. Furthermore, a person's intention to engage with any one behaviour is not only influenced by their attitude towards a behaviour and their beliefs about the outcomes of engaging with it, but also by wider social norms and pressures associated with that behaviour. Fishbein and Ajzen's TRA model was later expanded by Ajzen (1985, 1991) into the *Theory of Planned Behaviour* (TPB), which sought to overcome a limitation of the previous model by recognising how a person's agency to engage with a behaviour influences their intention to engage with it. This updated model went some way towards recognising the impact that external factors play in determining a person's behavioural intention. Yet, despite this, the TPB model continued to assume that humans are essentially rational beings, whose behaviours follow relatively sensible pathways of thought.

A scholar who critiqued this rational mode of thinking was James Blake (1999, 264), who criticised models 'where reasoned human agency is viewed as the key determinant of action, and where social and institutional constraints, if included at all, are considered only for their effects on individual attitudes'. Blake considered that such approaches do not adequately account for wider cultural, structural, and institutional systems which constrain people's capacity to engage with pro-environmental behaviours and thus behave in an entirely 'rational' way. It was similarly recognised by Stern (2000) that, although people's values and beliefs play an influence in determining their behaviour, people's choices are also determined by ingrained habits or factors such as income, time demands, or infrastructure. Stern (241) thus made some headway in moving past linear rationalist thinking through advocating for the perspective that 'environmentally significant behaviour is dauntingly complex, both in its variety and in the cultural influences on it'.

Following in the footsteps on Blake (1999) and Stern (2000), in the early 2000s Kollmuss and Agyeman (2002) published their influential work on barriers to pro-environmental behaviour. Kollmuss and Agyeman's article examined how there are myriad, complex factors which can be responsible for creating barriers to pro-environmental action. These factors broadly fall into three central categories, including: demographical factors, such as age and gender; external factors, such as economic or cultural constraints; and internal factors, such as an individual's values or perceived sense of agency. Kollmuss and Agyeman considered that there are not only vast and often intersecting factors which shape people's behavioural choices, but that also the intersection of these factors can lead people to engage with seemingly 'irrational' actions which potentially contradict their individual values and attitudes. Today, writing around pro-environmental behaviours has largely moved beyond considering behaviours as within the full control of the individual. For instance, in his article on how one might independently engage with pro-climate choices, Gifford (2015, 28) acknowledges the influence of wider structural systems, writing that not everyone 'can afford to buy solar panels, rural residents cannot commute by subway, and people who live in cold climates cannot go without heating'.

Over the past two decades, many studies of the value-action gap centre around identifying the gap's existence and considering ways to overcome this gap in a range of relatively specific contexts. For example, in their study of public engagement with hydrogen energy, Flynn, Bellaby, and Ricci (2009) observe that, despite high levels of environmental awareness, people remained reluctant to change their behaviour in connection with energy use. This was attributed to factors such as individual action being perceived as insignificant, or climate change and its impacts still being viewed as a far-off, distant issue that remained disconnected from people's everyday contexts, routines, and problems (see: O'Neill and Nicholson-Cole 2009). In addition to offering insight into people's specific behaviours with regard to energy use, through this study Flynn, Bellaby, and Ricci (2009) emphasise that to support people to bridge the value-action gap we must take a multi-layered, multi-factorial approach by recognising the role of wider social contexts in determining choice, agency, and action.

The relevance of value-action gap theory has not gone unchallenged. Grandin, Boon-Falleur, and Chevallier (2021), for instance, contemplate the continued focus on overcoming the

value-action gap phenomenon, arguing that, because people's behavioural choices are the result of multi-layered external and internal factors, the gap between people's beliefs and their actions should be considered as an expectation of humanity. The understanding of behaviour as the synthesis of myriad complex factors is indeed supported by decades of research (Blake 1999; Kollmuss and Agyeman 2002; Essiz et al. 2022; Flynn, Bellaby, and Ricci 2009; Gifford and Nilsson 2014). However, the suggestion of the value-action gap as an expectation of humans, and thus hard to overcome, may be considered more controversial. This work could be argued as sitting in conflict with research which highlights both the need to see values as important for shaping behaviours (Maio 2011), and fruitful possibilities for aligning people's values more closely with their actions (see by example: Babutsidze and Chai 2018; Croteau, 2019).

### *Connecting environmental education with values and actions*

Environmental education in its broadest sense refers to such education, teaching, and facilitated learning that is related to 'environment'. Environment, on the other hand, can be understood in more than one way: it can be described neutrally as the environment around us and a target of science-based observations (how things are), or as the value-laden environment of environmental problems and conservation, where debates related to values and politics (how things ought to be) can take place (Willamo 2005). When the latter aspect is included, it inevitably brings value-laden content and dilemmas to the research and praxis of environmental education.

Environmental education as a field of education already has a history of more than fifty years (Gough 2013). As a concept, it is closely related to other 'educations' such as education for sustainable development, environment and sustainability education, and climate change education. In this paper, we chose to use the term with longest historical roots. However, we do not exclude research that discusses environmental learning under these other concepts. Providing a window into the practice of environmental education proves challenging, for it is a continually shifting field of thought and practice that is consistently being adapted or expanded as society encounters ever-growing and changing environmental issues. Moreover, as an education field it is not limited in its interaction with different pedagogical approaches and teaching practices: depending on context, environmental educators might draw on a range of different pedagogies to achieve their aims, such as transformative learning (Singer-Brodowski 2023), place-based and localised learning (Chaichana, Srijuntrapun, and Rawang 2019; Chineka and Yasukawa 2020; Sobel 2004), intergenerational approaches (Ballantyne, Fien, and Packer 2001), active learning (Whitmarsh 2022), and more. Environmental education might also take place in a range of spaces, expanding beyond the typical classroom environment to workplaces, public spaces, or even within people's private home lives.

While environmental education brings together many different approaches to and influences on learning, what *broadly* brings environmental education together as a field is a central focus of the use of educational tools to engage people with their environments and with learning around environmental protection. However, during past decades, there have been many definitions of environmental education goals. Mainly, they tend to be diverse: on one hand the purpose of environmental education is to support learning of environment related knowledge, values, attitudes, and skills, whereas on the other hand environmental education is needed to support the learners' environmental responsibility and agency. For example, the highly cited Tbilisi declaration (UNESCO 1978), mentions both development of environmental values and orientation towards action as aims of environmental education. Moreover, environmental education is expected to support a connection to nature (see: Clark et al. 2020), which points towards addressing values and attitudes as well as emotional connections.

Consequently, both values and action are important aspects of environmental education. However, the relationship between values and environmental education is not simple: researchers

have debated whether values should be discussed in a pluralist manner (see: Sund and Öhman 2014) or whether the intrinsic value of nature ought to become the centre of environmental education (see: Kopnina 2012). Teachers and educators differ in their strategies in dealing with environmental values and may consider teaching value-laden content challenging (Činčera et al. 2020; Sund and Wickman 2011). In an empirical study completed in Finland, Aarnio-Linnanvuori (2018) recognized several perspectives to teaching value-laden content: neutral, normative, pluralist, and educational. According to Aarnio-Linnanvuori, teachers expressing confidence and in-depth educational views seemed more eager to embrace the more pedagogically sound approaches of pluralism or educational advocacy.

Furthermore, promoting action for the environment has been a much-debated topic in environmental education literature for decades. According to the classic paper of Jensen and Schnack (1997), environmental action can be defined as individual or collective action that aims to solve an environmental problem and is decided by those who actually carry out the action. In environmental education, a central aim may often be encouraging individuals to embrace certain behavioural habits.[3] A significant behaviour or action can be defined by its impact: to what extent does it save material or energy resources or help conserve living environments (Stern 2000). However, learners may be less willing to commit to significant actions, such as changing their travel or dietary habits, than to less significant actions, such as recycling, in case they feel these to be difficult or unpleasant to obtain (Tolppanen and Kärkkäinen 2022).

Many authors note that environmental education should actively encourage collective action instead of focusing on individual action. For example, Chawla and Cushing (2007) suggest that private actions have only limited impact unless they are combined with collective public change. Kennedy and Boyd (2018) argue that focusing on individual action may mean gendered environmental responsibility, since women are often more active in this kind of responsible behaviour. Therefore, emphasising on individual environmental action might dampen progress towards promoting domestic gender equity.

All in all, environmental education literature has had high interest in both environmental values and action. Based on a Delphi study with environmental education professionals and leaders, Clark et al. (2020, 391) define the core outcomes of environmental education this way, stating that 'Environmental education works to move people to action for the tangible benefit of the environment and humanity. To realize these benefits, people must connect experientially with the environment, learn needed skills, and understand the complicated social and cultural connections between humanity and the natural environment.' In other words, action for the environment is at the heart of environmental education, and to encourage action, environmental education must support people to connect with nature, and value and understand the complexity of environmental issues.

This is not a simple task. To reach these outcomes, we assume that a transdisciplinary and holistic approach is needed, for example such as Cantell et al. (2019) present in their model for holistic climate change education. Understanding the nature of the value-action gap is essential to achieve this.

## Methodology

The authors approached this study by determining the central objectives of this review and agreed that a semi-systematic approach to the literature was an appropriate method given the inter-disciplinary and international nature of the research team. The semi systematic review approach was considered suitable as it advocates for an examination of a theme or a topic that straddles research across a variety of disciplinary boundaries. A semi-systematic review incorporates transparent research strategies to provide an overview of how a topic has been engaged across research traditions, whilst acknowledging that it is not possible to engage all

literature from each of the disciplines involved as per a systematic review (Snyder 2019). This approach is largely accepted in research stemming from the disciplines of Business and Medicine and provides an opportunity to highlight the prominence of interdisciplinary work (or lack thereof) on a particular theme. Obviously if this paper engaged a single disciplinary perspective (as per a systemic review), the review would lend itself to very different literature base, one stemming from a single subject area. However, what is novel about the semi-systemic approach is its capacity to create a space for discussion across subject areas and thus drawing together common themes and issues addressing the value-action gap and how it manifests in climate change (environmental) education.

The first step to implementing a semi-systematic review approach was the selection of keywords. These were chosen in connection with our research question, questioning how value-action gap literature engaged themes in environmental educational research (and vice versa). However, from the outset of these search parameters, initial engagement pointed towards a dearth of literature explicitly focused on the intersection between these research areas. Secondly, to ensure the keywords were as comprehensively as possible, a Boolean search was conducted (see Table 1); this provided optimal search functionality, through the inclusion of variations of identified keywords throughout the search phase. For example, in searches relating to the value-action gap, articles that referred to common variations of this phrase (value action gap OR attitude behavi* gap OR intention behavi* gap) were accounted for. We purposefully did not input the terms 'values' or 'actions' independently, as our interest is in studies which specifically refer to and link the concept of value-action gap to education. This is a limited search around a particular concept, and we stress that there is a much broader pool of literature which will span knowledge across education, values, and actions which may not be represented here. Due to the rich meaning attributed to the word education, our final keyword (education) search remained limited to the single word.

The process of identifying relevant literature across the various phases of investigation is mapped out in Figure 1. Relevant literature was identified through running our Boolean search through three rigorous and well-established research databases of academic, peer-reviewed literature (Academic Search Ultimate (EBSCO), Scopus, and ProQuest Central). Whilst we sought to keep our search parameters as consistent as possible across all three databases, available options challenged each search's capacity to replicate the *exact* same search across all three databases. Where possible, we limited our search to academic, peer-reviewed publications. In the interest of stringency and efficiency search records focused on topics within the scope of interest for the paper. We also limited the scope of our keyword search to abstracts, titles, and keywords; in EBSCO, we did not search in the full text, in Scopus, we searched the 'Article Titles, Keywords, and Abstracts', and in ProQuest Central we searched 'Anywhere except full text'. We did not set time boundaries, and we conducted our search in September 2021. Our initial database searches returned a total of 154 records. This list was reduced to 78 records after we

**Table 1.** Boolean search.

| String 1[a] | Boolean Search Operator | String 2 | Boolean Search Operator | String 3 | Content Searched | Limitations |
|---|---|---|---|---|---|---|
| Value Action Gap<br>OR<br>Attitude Behavi* Gap<br>OR<br>Intention Behavi* gap | AND | Environment*<br>OR<br>climate*<br>OR<br>sustainab* | AND | Education | Keywords<br>Titles<br>Abstracts | Peer-reviewed |

[a]In our ProQuest database search we added additional quotation marks around the keywords in String 1. This was to limit the results to records which directly matched the searched terms, due to the large volume of records our initial search produced.

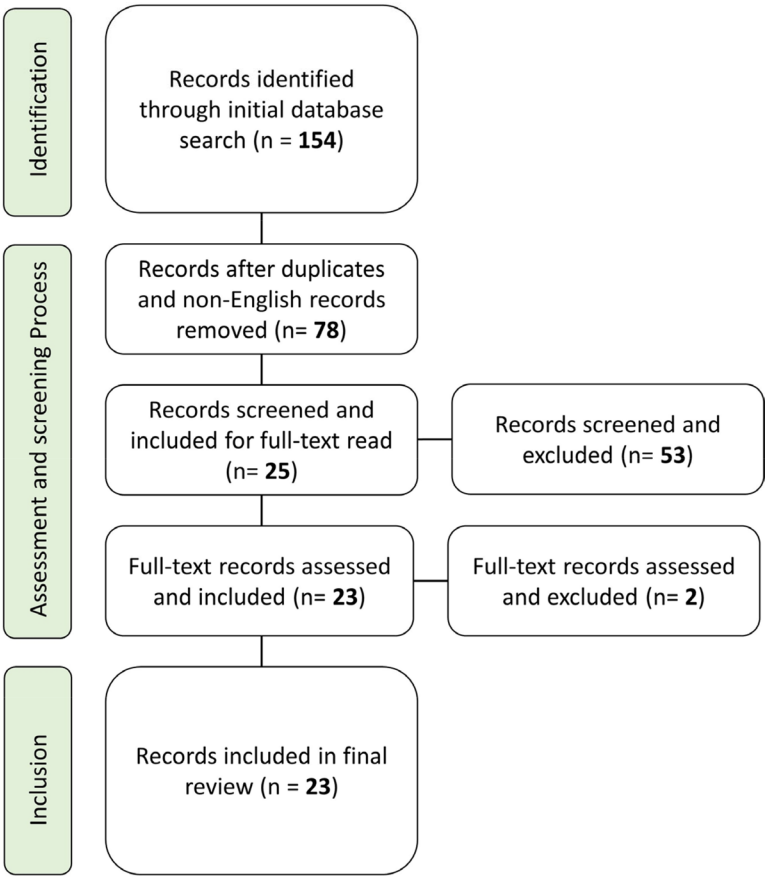


**Figure 1.** Process of identifying relevant literature (using model developed by Page et al. 2021).

removed duplicates and any records that could not be accessed in English. These records were extracted from a total of 60 journals.

Our next step was to assess the abstracts of the 78 identified records; for inclusion the abstracts needed to pay attention to both the value-action gap and educational research Once this step was completed the sample resulted in 25 texts, and a final screening of this list to ensure focus and quality resulted in 23 texts for inclusion: a number which we considered surprisingly low. Despite our initial expectation that our search terms would result in a broader sample of studies, as we were specifically interested in texts which use the term 'value-action gap' (or iterations of it), our search likely excluded papers which bring in knowledge around values and actions in connection with education, but which do not specifically refer to the concept of the value-action gap. Our interest in focusing on literature which crosses thinking around the value-action gap and education links to the focus of CCC-CATAPULT, which has a particular focus on educational strategies for bridging the value-action gap. The included texts were published across 19 journals, representing different, diverse, and at times interdisciplinary research areas – reflecting the ethos of a semi systematic review approach.

Having identified the relevant literature sample, we proceeded to conduct a preliminary analysis of article content. This allowed for the identification of the following key areas of focus across the literature: *Value Action Gap* (texts which closely study value-action gap and only briefly consider education); *Informal Education* (texts which look at closing the value-action gap through informal educational experiences); *Formal Education* (texts which link formal

teaching or curriculum studies with strategies for bridging the value-action gap); *School Setting* (texts examining ways of bridging the value-action gap by *anyone* operating in an educational setting with a focus on practices within that space i.e. recycling procedures of school campuses); *General Environmental Education* (texts focusing on educational research within a range of settings with only a brief mention of value-action gap studies). Based on this preliminary analysis, a full qualitative analysis for each text was conducted. The following questions were asked of each text:

- What are the main themes and points of the paper, and what is its value for bridging connections between the value-action gap (or equivalent) and education?
- Does the article have any bearing for pedagogical thinking and if so, how?
- If the article is based on empirical data, what is the context of this research, how were participants selected and involved, and what research methods were followed
- Of the following themes, which does the text best fit to? *Value Action Gap*; *Informal Education*; *Formal Education*; *School setting*; *General Environmental Education*.
- What kind of action(s) is the article discussing? i.e. direct individual action (individual behaviour changes), indirect individual action (i.e. campaigning and communicating), community action (i.e. eco-clubs, community gardens), policy-based action (action by larger bodies i.e. universities)
- What recommendations does the article suggest as a means to bridge the gap?
- Does the paper discuss values, and what influences does it discuss in connection with values?

Following the deep analysis of each paper, the lead authors assessed the presented conclusions and drew on these to determine the major trends (or themes) evident through the literature. The multiple themes the lead authors induced through this assessment, which were distinctive yet often overlapping, came to reveal the literature as falling into two broad categories of thought: pedagogy and policy. The analysis of each article in conjunction with these guiding questions, as well as the lead authors review of the presented analysis, was used to assess the state of research in this area, and create a space to identify key research gaps and potentially new avenues for inquiry (as per the outcome of a semi-structured review). The outcome of this analysis is presented in the Results section of this paper.

## Results

### *Overview of review dataset*

The overview of our review dataset, shown in Table 2(A–C) is revealing of several important findings. Firstly, all but one of the papers were published after 2000 and only three were published between 2000 and 2010. A large number, fifteen, conducted research in countries of global privilege, including Australia, Israel, the United States or countries across Europe. Of the other papers, three focused on countries in Asia (China and Thailand specifically) and five did not have a specific country of research focus. The journals are representative of diverse disciplinary traditions and very few journals appeared multiple times. The only ones appearing even twice were the *International Journal of Sustainability in Higher Education*, *Sustainability (2071–1050),* and *Environmental Education Research*: further investigation into the major themes addressed in this journal list may reveal more broad work in these publications spanning topics in values, actions, and education, but the focus on value-action gap as a concept cannot be determined as being commonly linked to specific publications. The majority of the papers draw on empirical data in some form, whether through secondary or primary sources. Finally, we draw attention

**Table 2.** (A–C): Data overview.

| Article | Date | Methods | Research Participants (if applicable) | Country of Research Focus | Theory of Planned Behaviour Referenced? |
|---|---|---|---|---|---|
| Tilley (1999). The gap between the environmental attitudes and the environmental behaviour of small firms. *Business Strategy and the Environment, 8*(4), 238–248. https://doi.org/10.1002/(SICI)1099-0836(199907/08)8:4<238::AID-BSE197>3.0.CO;2-M | 1999 | Interviews | 60 interviews with owners-managers of mechanical engineering and business service small firms located in the city of Leeds, West Yorkshire. | England | No |
| Kagawa (2007). Dissonance in students' perceptions of sustainable development and sustainability: Implications for curriculum change. *International Journal of Sustainability in Higher Education, 8*(3), 317–338. https://doi.org/10.1108/14676370710817174 | 2007 | Survey | 1889 students at Plymouth University, UK | England | No |
| Pitt (2009). Blurring the Boundaries – STEM Education and Education for Sustainable Development. *Design and Technology Education: An International Journal, 14*(1). | 2009 | Literature Study | n/a | England, Wales, and the Netherlands | No |
| Pitt, J., & Lubben, F. (2009). The social agenda of education for sustainable development within design & technology: The case of the Sustainable Design Award. *International Journal of Technology and Design Education, 19*(2), 167–186. https://doi.org/10.1007/s10798-008-9076-2 | 2009 | Interviews | 30 interviews with teachers in England, Wales and the Netherlands | England, Wales, and the Netherlands | No |
| Fröhlich, G., Sellmann, D., & Bogner, F. X. (2013). The influence of situational emotions on the intention for sustainable consumer behaviour in a student-centred intervention. *Environmental Education Research, 19*(6), 747–764. | 2013 | Quasi-experimental design | 176 fifth graders in total (with a control group of 56 fifth graders) from three secondary schools in Upper Franconia, Bavaria. | Germany | No |
| Chaplin, G., & Wyton, P. (2014). Student engagement with sustainability: Understanding the value–action gap. *International Journal of Sustainability in Higher Education, 15*(4), 404–417. | 2014 | Surveys and focus groups | 396 students at UK universities were surveyed. Two focus groups took place, with numbers of participants not specified. | England and Scotland | No |
| Swaim, J. A., Maloni, M. J., Napshin, S. A., & Henley, A. B. (2014). Influences on Student Intention and Behavior Toward Environmental Sustainability. *Journal of Business Ethics, 124*(3), 465–484. https://doi.org/ 10.1007/s10551-013-1883-z | 2014 | Survey | 178 students in the college of business of a large public university. | United States (unconfirmed but implied) | Yes |
| Van den Noortgaete, F., & De Tavernier, J. (2014). Affected by nature: A hermeneutical transformation of environmental ethics. *Zygon, 49*(3), 572–592. https://doi.org/ 10.1111/zygo.12103 | 2014 | Literature Study | n/a | United States | No |

(*Continued*)

**Table 2.** Continued.

| Article | Date | Methods | Research Participants (if applicable) | Country of Research Focus | Theory of Planned Behaviour Referenced? |
|---|---|---|---|---|---|
| Velasco, I., & Harder, M. K. (2014). From attitude change to behaviour change: Institutional mediators of education for sustainable development effectiveness. *Sustainability (Switzerland), 6*(10), 6553–6575. doi: 10.3390/su6106553 | 2014 | Secondary data-set analysis, of datsets which included a mix of methods. Primary methods included surveys and interviews. | n/a | Global | No |
| Carmi, N., Arnon, S., & Orion, N. (2015). Seeing the forest as well as the trees: general vs. specific predictors of environmental behavior. *Environmental Education Research, 21*(7), 1011–1028. | 2015 | Survey | 1160 students at Tel-Hai College, Israel | Israel | Yes |
| Fletcher (2017). Gaming conservation: Nature 2.0 confronts nature-deficit disorder. *Geoforum, 79,* 153–162. https://doi.org/10.1016/j.geoforum.2016.02.009. | 2017 | Researcher Engagement with two digital games | n/a | n/a | No |
| Redondo, I., & Puelles, M. (2017). The connection between environmental attitude–behavior gap and other individual inconsistencies: a call for strengthening self-control. *International Research in Geographical & Environmental Education, 26*(2), 107–120. | 2017 | Secondary data-set analysis of a survey | 10,001 residents of Spain aged 14 years and older. | Spain | Yes |
| Wynes, S., & Nicholas, K. A. (2017). The climate mitigation gap: Education and government recommendations miss the most effective individual actions. *Environmental Research Letters, 12*(7). https://doi.org/10.1088/1748-9326/aa7541 | 2017 | Literature Study | n/a | n/a | No |
| Fink, L., Ploeger, A., & Strassner, C. (2018). Participative Processes as a Chance for Developing Ideas to Bridge the Intention-Behavior Gap Concerning Sustainable Diets. *Sustainability (2071-1050), 10*(12), 4434. | 2018 | Six all-day workshops which engaged participants with a range of applied methods | 82 participants took place in workshops across the cities of Dortmund, Kassel, Hamburg, Berlin, Münster, and Freiburg. | Germany | Yes |
| Vigors (2018) Reducing the consumer attitude–behaviour gap in animal welfare: The potential role of 'Nudges'. *Animals, 8*(12). https://doi.org/10.3390/ani8120232. | 2018 | Literature Study | n/a | n/a | No |
| Chaichana, D., Srijuntrapun, P., & Rawang, W. (2019). An integrative framework of environmental education for environmental crisis transformation. *Pertanika Journal of Social Sciences and Humanities, 27*(4), 2475–2494. | 2019 | Interviews, survey and integrative framework development and evaluation | Study involved three research phases: (1) interviews with 63 individuals connected to environmental sector, (2) a survey of 449 individuals connected to environmental sector and (3) framework examination with 5 experts in the field of environmental education. | Thailand | No |
| Liu, Y., Liu, R., & Jiang, X. (2019). What drives low-carbon consumption behavior of Chinese college students? The regulation of situational factors. *Natural Hazards, 95*(1–2), 173–191. https://doi.org/10.1007/s11069-018-3497-3 | 2019 | Survey | 451 college students from four cities in Jiangsu Province | China | Yes |

**Table 2.** Continued.

| Article | Date | Methods | Research Participants (if applicable) | Country of Research Focus | Theory of Planned Behaviour Referenced? |
|---|---|---|---|---|---|
| McNicholas, G., & Cotton, M. (2019). Stakeholder perceptions of marine plastic waste management in the United Kingdom. *Ecological Economics, 163*, 77–87. https://doi.org/10.1016/j.ecolecon.2019.04.022 | 2019 | Q-methodology | 22 residents of the UK | United Kingdom | No |
| Nursey-Bray, M., Palmer, R., Meyer-Mclean, B., Wanner, T., & Birzer, C. (2019). The Fear of Not Flying: Achieving Sustainable Academic Plane Travel in Higher Education Based on Insights from South Australia. *Sustainability (2071-1050), 11*(9), 2694. https://doi.org/10.0.13.62/su11092694 | 2019 | Survey and interviews | 33 interviews took place, and 111 people were surveyed. All participants were academcis at the University of Adelaide. | Australia | Yes |
| Rhee, J., & Johnson, K. K. P. (2019). 'The wardrobe diet': teaching sustainable consumption through experience with undergraduates in the USA. *International Journal of Fashion Design, Technology & Education, 12*(3), 283–292. | 2019 | Qualitative study built around an experience-based learning activity | 36 first-year undergraduate fashion students at a midwestern US university. | United States | No |
| Fu, L., Sun, Z., Zha, L., Liu, F., He, L., Sun, X., & Jing, X. (2020). Environmental awareness and pro-environmental behavior within China's road freight transportation industry: Moderating role of perceived policy effectiveness. *Journal of Cleaner Production, 252*. https://doi.org/10.1016/j.jclepro.2019.119796 | 2020 | Survey | 243 truck drivers encountered at three service areas along the Jing-Hu Freeway. | China | Yes |
| Geiger, S. M., Fischer, D., Schrader, U., & Grossman, P. (2020). Meditating for the planet: Effects of a mindfulness-based intervention on sustainable consumption behaviors. *Environment and Behavior, 52*(9), 1012–1042. https://doi.org/10.1177/0013916519880897 | 2020 | Surveys and interviews in response to an 8-week mindfulness programme | 60 university students and 71 employees from two small-to-medium private firms and one public service employer in Germany | Germany | Yes |
| Fink, L., Strassner, C., & Ploeger, A. (2021). Exploring External Factors Affecting the Intention-Behavior Gap When Trying to Adopt a Sustainable Diet: A Think Aloud Study. *Frontiers in nutrition, 8*, 511412. https://doi.org/10.3389/fnut.2021.511412 | 2021 | Think aloud' study | 20 employees or students of Münster University, Germany. | Germany | Yes |

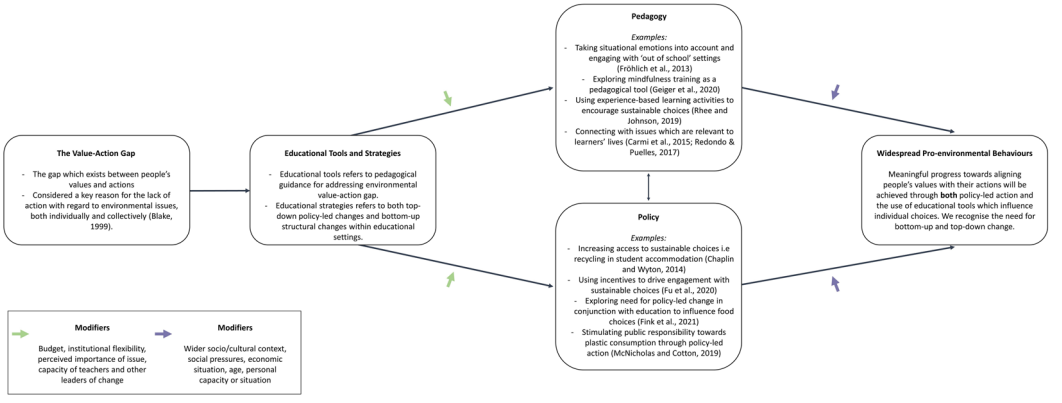


**Figure 2.** Pathways of thought, inspired from Hartig et al. (2014) review paper.

to the use of the TPB model within the paper, highlighting that despite its discussed limitation over half consider this model in their theoretical framing.

## Examining pedagogy and policy

In our critical analysis of the papers, in addition to considering aspects such as trustworthiness and rigour, we divide the sample of studies into key areas or themes of thought. Our review of the literature shows that work examining both the value-action gap and education, whilst limited in breadth, broadly considers two central areas of thought: pedagogical routes to transformation, and policy-based routes to transformation. These are mapped out in Figure 2, which takes inspiration from Hartig et al. (2014) mapping of health impacts in their review of nature and health research.[4] Under these two key areas of thought, we identified a number of core sub-themes addressed across the reviewed literature. Relating to a focus on pedagogy, we identified sub-themes of: education as a general key; pedagogical and thematic content needed to bridge the gap; pedagogical approaches; connection to the learners' own lives; and emotions and feelings. Relating to a policy focus, we identified the sub-themes of: bridging the gap through implementing policy changes; and (re)structuring educational spaces. The literature relevant to each sub-themes, which often bridges varied areas of thought and can appear in multiple sub-theme discussions, is discussed in detail below.

### *Pedagogy*

Many of the papers that we reviewed discussed pedagogical approaches or tools relevant to bridging the value-action gap. These papers describe education as a general key for bridging the gap, discuss the pedagogical content and approaches needed in the process, emphasize the importance of connecting environmental issues to learners' own lives, and/or discuss environment-related emotions and feelings. In the following section, we consider these perspectives more closely.

#### *Education as a general key*

Some reviewed papers highlight education as a general key for bridging the value-action gap, viewing education as life-long learning that is not limited to children and young people. For

example, Tilley (1999) explores the gap in environmental attitudes and behaviours through the lens of small firms in Yorkshire. Education in the workplace is identified by Tilley as one core element needed to strengthen understandings of the importance of environmentally ethical practices and perspectives, in addition to legislative and institutional reform. It is discussed by Tilley that her participants, in this instance owners or managers of said small firms, speak about the need for ongoing appeals to people's moral conscience, highlighting the requirement for life-long environmental education. Whilst the sample size of 60 interviewees is significant, the paper represents only one geographical area and would warrant further investigation globally and nationally. In their paper on sustainable diet choices, which engaged 82 participants in six workshops across Germany, Fink, Ploeger, and Strassner (2018, 11) also stress the importance of life-long learning about nutrition and the food industry, writing that people 'can form an intention without having all (necessary) knowledge about aspects concerning [their] target behavior, which can turn out to be a barrier in the course of the action'. This indicates a strong belief that without continued education people may form behavioural intentions based on limited knowledge.

The requirement of a holistic approach to education was noted in a paper by Chaichana, Srijuntrapun, and Rawang (2019), who created an environmental education framework that recognises specific, central worldviews of various stakeholders in Thailand. The holistic framework includes five components (competences, spiritual growth, participation, attitudes, and awareness) and integrates behavioural, social, and personal change, thus helping to bridge the value-action gap. The authors note that worldviews vary by region, and therefore they need to be recognised locally. The conclusions of this paper are based on a rigorous study involving a three-stage approach of investigation, accounting for the expertise of multiple stakeholders including educators, students, religious and eco-communities. This study was conducted in a specific cultural context, yet a key way other scholars might benefit from this study is to reproduce this in-depth and considered methodological approach elsewhere.

### *Pedagogical and thematic content needed to bridge the gap*

Many articles comment on the pedagogical content of environmental education. Some have specific suggestions around individual action learning that the authors consider important and/or neglected in current educational settings. For example, in their work on sustainable diet choices, Fink, Strassner, and Ploeger (2021) suggest that nutrition and sustainable food systems ought to be discussed at school in a more thorough manner, so that awareness is promoted from an early age and people become adults with knowledge of how they might individually act. This paper predominantly frames education as 'information-sharing', revealing a relatively strong belief in the power of knowledge. Although knowledge acquisition is certainly important, it is limited as a factor of influence (see Kollmuss and Agyeman 2002). Furthermore, much research points to the need for education to explore beyond information-sharing models (see Derevenskaia 2014; Leichenko, Gram-Hanssen, and O'Brien 2022; Monroe et al. 2019; Van Poeck, Vandenplas, and Östman 2023). In proposing a focus for environmental education pedagogical content, Redondo and Puelles (2017) suggest that to support bridging the value-action gap, environmental education content ought to focus around methods of self-control. According to the authors, helping students to strengthen their self-control would assist them in being more consistent in their life endeavours. While we find this perception fresh, we express caution about the argument proffered due to the emphasis on individual responsibility. Furthermore, in their work to assess pedagogical content, Wynes and Nicholas (2017) point out that often education does not concentrate on effective environmental action but promotes inefficient behaviours instead, such as comprehensive recycling and changing lightbulbs. Such behaviours have only limited impact on systemic change and personal emissions. Based on the possible cuts in annual personal emissions, Wynes and Nicholas recommend concentrating on more typically efficient

actions instead: having fewer children, living car-free, avoiding flying, and eating plant-based diet. As the authors note, their suggestions contrast with individual actions mentioned in many other papers.

Not all reviewed papers focus *only* on pedagogical content that relates to individual action. Writing on hermeneutically oriented environmental ethics, Van den Noortgaete and De Tavernier (2014) emphasise that learning which supports people's emotional bonds with nature acts as driving force for them to see nature as integral to their own sense of identity, and thus to engage with actions which contribute to the closing of the value-action gap. This literary study resonates with wider work within the emerging field of nature connections, in which many studies are drawing connection between affiliation with nature and pro-environmental actions (Chawla 2007; Nisbet, Zelenski, and Murphy 2008; Wells and Lekies 2006). In their paper on design and technology (D&T) education, Pitt and Lubben (2009) promote learning and thinking around the wider social dimensions of sustainability through D&T tasks. The authors consider an approach to teaching sustainability which moves beyond simply inviting students to create designs which have positive environmental, social, and economic impacts, and instead emphasise the possibility for teachers to embrace social sustainability teaching as a 'frame of mind'. This is the idea that teachers will spend time encouraging students to collectively explore the different values and beliefs which shape how people relate to the bio-physical world, and use this as a starting point for thinking through D&T needs and possibilities. In addition, several articles emphasize the importance of learning about environmental ethics. Both Tilley (1999) and Swaim et al. (2014) consider a focus on developing shared ethical practices and perspectives as an essential part of environmental and sustainability education, particularly in the context of teaching current or future business leaders. Finally, in an article on students' perceptions of sustainability, Kagawa (2007) considers the need for whole campus changes that support environmentally-focused pedagogical content. Kagawa recommends that in order to support students to undertake actions which help them work towards preferable futures, university campuses should provide infrastructures which facilitate pro-environmental actions, as well as give students opportunities to engage with decisions regarding the greening of their campuses. Whilst many of the studies included in the sample consider possible content, there remains a general lack of guidance around how teachers might in reality explore such ideas in class.

### *Pedagogical approaches*

The reviewed papers suggest several pedagogical approaches and methods to be used in environmental education. Typically, the authors mention forms of experiential learning. For example, in their study of business students Swaim et al. (2014) note that students often have very little real-life experience on sustainability practices, and recommend hands-on learning projects, such as campus or community service, to enhance the (business) students' ability to apply sustainability in their future workplaces. Rhee and Johnson (2019) offered an experience-based learning activity on sustainable clothing consumption to undergraduate students in the USA studying fashion, where participants went on a 'wardrobe diet' and wore only six clothing items for an entire month. According to the researchers, the case was successful, and the participants altered their consumption habits after the experiment. Yet, as the study was focused on students who have an established interest in the fashion industry, the reliability of these results is limited and would benefit from further study with a wider diversity of students. Likewise, Redondo and Puelles (2017) consider learning activities which go beyond the classroom walls, such as outdoor classes and food cultivation projects, as an important part of environmental learning in connections. However, Redondo and Puelles do also stress that teaching students to develop their self-control is even more important for enhancing students' capacity to bridge the value-action gap in their behavioural choices. Finally, as previously mentioned, Kagawa (2007) emphasise the need for students to be actively involved in environmental

decision-making by, for example, being able to input to the greening of university campuses. Overall, what becomes clear from our reading of these studies is that, whilst experiential learning has deep value for learners' engagement with environmental topics, it represents just one aspect in the multidimensional experience needed for truly transformative learning processes (Cranton 2016).

Some papers discussed the depth and length required from educational programs to bridge the value-action gap. Geiger et al. (2020) employed a sustainability-adapted mindfulness-based intervention among two adult populations for 8 weeks. Their results showed increase in the participants' well-being and a decrease in their material values. However, they found no direct impact on sustainable consumption behaviour or related attitudes. The authors suggest further development of mindfulness-based methods, and consider that subsequent studies could examine mindfulness trainings that span a longer time period. Furthermore, Fröhlich, Sellmann, and Bogner (2013) consider long period interventions preferable but difficult to implement in practice, and therefore suggest that well-planned short-term educational programs could also increase students' engagement. Indeed, implementing in-depth, long-term environmental education that actually supports bridging the gap can be difficult. One reason for this is that teachers' understanding of environmental issues and sustainable development may vary greatly (Pitt and Lubben 2009). Pitt (2009) advocates that one way to enhance environmental education in schools is to integrate a sustainability-inspired approach across subjects, breaking down barriers between different learning areas.

Fletcher (2017) discussed a different pedagogical approach in his work to explore digital games as tools for biodiversity education. Through this research, in which the author himself reflectively engaged with two digital games, Fletcher found reasons to both support *and* remain cautious of the use of digital games for learning. Whilst on the one hand virtual nature experiences may inspire commitment to environmental causes and facilitate deeper learning through channelling it through a typically 'enjoyable' experience, they can also create a false sense of agency that discourages more direct engagement in natural resource management. Fletcher therefore concludes that these games do not necessarily help to bridge the value-action gap, but may even increase it. This poses a potentially significant finding for work around digital engagement with environmental topics, but requires further study which expands beyond individual research reflections if it is considered to be reliable and valid.

### *Connection to the learners' own lives*

Ensuring that environmental learning is meaningful for the context of learners' lives was flagged as particularly important across several of the reviewed papers. For example, in their study of environmental behaviours, Carmi, Arnon, and Orion (2015, 1024) state that 'one of the most challenging objectives of environmental education may be to transform the broad, fundamental environmental issue into one that is relevant to various environmental domains on the individual level'. In a similar vein, in their development of a framework for environmental education, Chaichana, Srijuntrapun, and Rawang (2019) stress the need to consider local socio-cultural contexts and worldviews. Whilst we agree with both stated points, practitioners would benefit from practical toolkits and guidance to help achieve these identified needs.

Writing on students' perceptions of sustainability, Kagawa (2007, 137) notes that many students recognize only 'light green' sustainability actions such as recycling and changing consumer habits even though they consider sustainability important. In other words, students cannot quite understand the complex concept of sustainable development or connect it to their own lives. In asking how we can create this connection to the learners' own lives Kagawa (2007) suggests creating a learning environment where all sorts of relatable actions – some more radical than others – can be discussed and compared. She also recommends creating local curricula that address students' needs, aspirations, and concerns for sustainability: a core factor for change which many

of the other studies represented in this paper overlook. In addition, Velasco and Harder (2014) have a pragmatic suggestion: educational programs should help overcome difficulties that their participants may meet in taking action after the program. In other words, when planning an environmental education program, educators ought to consider what happens after the participants return to their ordinary lives. Finally, Swaim et al. (2014), in their paper on business studies in higher education, remind readers that it is important for educators to recognise and appreciate the factors which may affect individual students' environmental intentions and behaviours. For example, the authors advocate the important role of peer interactions in persuading students to genuinely adopt pro-environmental intentions and behaviours.

### *Emotions and feelings*

Some reviewed papers discuss feelings or emotions related to sustainability and environmental education. In an empirical study by Fröhlich, Sellmann, and Bogner (2013), a student-centred environmental education program on food systems and sustainability was not able to alter children's consumer behaviour towards more sustainable diets, but it did influence their situational learning emotions, such as interest, well-being, and boredom, which correlated with the intention to act. Therefore, the authors suggest that situational (short-term) emotions ought to be considered in pedagogical planning: students that become interested in sustainability issues during an experiential pedagogical program may be willing to change their behaviour after the program. Likewise, Geiger et al.'s. (2020) mindfulness program was able to enhance the feeling of well-being among the participants and a decline of materialistic value orientations. Even though bridging the gap did not actually succeed in Geiger et al.'s study, they do suggest the impact on material values and well-being could influence consumer choices of participants in the long run. Both these studies have reliable research methods, drawing on extensive datasets produced over significant periods of time, and yet through their research both highlight how difficult it is to truly support people to overcome the value-action gap.

As discussed in our section on pedagogical and thematic content needed to bridge the gap, Van den Noortgaete and De Tavernier (2014) consider emotions a central issue when addressing the value-action gap. They view emotional connection to nature as central to shaping judgement and action towards nature. The authors remind readers that emotions related to environmental degradation can be distressing, which can lead to a stifling of pro-environmental behaviours. However, the authors suggest that a strong sense of connectedness with nature will tend to outweigh any negative impacts caused by feelings of distress. Furthermore, Kagawa (2007) remarks that feelings are a neglected area in higher education. According to her study, students share mixed feelings towards the future. Therefore, successful education for sustainable development requires empowering pedagogies that let students act as change agents in their own lives, as well as in society.

Supporting students to reflect on or access new emotions in connection with environmental topics is a critical, yet challenging intention for educators to engage with: whilst the authors of these papers advocate for engaging with emotions there is a need to approach emotional learning extremely carefully to ensure safety and wellbeing. A neglected yet important area of thought in this context is also the emotions of educators themselves. As Pihkala (2020) shows, educators who are working with topics such as eco-anxiety, and seeking to help students engage with these feelings, first need to practice self-reflection about eco-anxiety (and other related emotional states).

### *Policy*

There were several papers included in our review which had limited engagement with how pedagogical tools or approaches can be harnessed to achieve bridging of the gap. These papers

typically focus on either a range of policy-based changes which could help address specific value-action gap issues, or consider policies for transforming how educational spaces operate.

### *Bridging the gap through implementing policy changes*

A significant number of the papers consider a range of policy-based changes which may be implemented to address specific value-action gap issues. Their inclusion in the literature sample often relates to the authors' recognition that education is one aspect which can be influenced by policy, and which plays a role in achieving the bridging of the value-action gap. Critically, these educational strategies typically sit in tandem with a number of other policy-led strategies for helping connect people's values with their performed actions.

In their well-cited paper 'Student engagement with sustainability: understanding the value–action gap', Chaplin and Wyton (2014) gathered survey data with students across the UK to examine the barriers which they perceive to be standing in their way of engaging with pro-environmental behaviours. This research paper was developed in direct connection the organisation The Unite Group Plc. (UNITE), who operate halls of residence across the UK. The study itself was influenced by a claim from the Sustainability Director at UNITE, who stated that 'whilst students who live in buildings provided by UNITE are within the age group most educated and informed about environmental issues, they are in fact the group who are most environmentally profligate' (UNITE, 2008 cited in Chaplin and Wyton 2014, 405). This arguably cynical view of education as a tool for shaping students' perspectives and/or actions is echoed through the paper, with the authors taking the view that education on a topic does not provide people with *adequate* impetus to change behaviour. Indeed, whilst the authors do make a brief mention of the need to improve education so that it meaningfully responds to the needs of students today, their list of proposed initiatives only includes one fairly limited educational suggestion centred around pinpointed actions: this being the idea to have 'improved information within customer flats such as 'top tip' posters' (Chaplin and Wyton 2014, 414). Other suggested strategies centre around introducing energy efficient technologies and fittings into accommodation buildings, providing incentives to improve energy usage, and establishing energy networks.

Although Chaplin and Wyton (2014) consider education as having relatively little influence on behaviour choice, the majority of the papers which focus on policy development advocate for the significant role that education has to play in helping people connect their values with their actions. Fink, Ploeger, and Strassner (2018) and Fink, Strassner, and Ploeger (2021), who have published two papers reporting on studies exploring sustainable diet choices, encourage education on nutrition and food systems to be understood as critical to helping bridge the connection between people's intentions for their diets and their actual behaviours. In both papers, education is considered as something which predominantly occurs within school settings, but which can be continued beyond the school setting through food retailers providing their customers with relevant information about the food products. Across both studies, other contributing factors to the choices people make regarding the food they consume revolve around the availability of sustainable food products, how such products are advertised, and their price. That similar conclusions are drawn across both studies, despite differences in methods and sample (one engages with 20 adults who were predominantly students, and the other with 82 members of the general public), implies an increased validity of these findings. McNicholas and Cotton (2019), in their study of stakeholder perceptions of marine plastic waste management in the UK, similarly find that the public considers education to be a key area for policy development in connection with consumer choice. This paper considers how stakeholders identify that government policy needs to move beyond focusing on strategies such as levies on disposal items, and focus more deeply on helping people make sustainable choices through education and public awareness raising. Through examining stakeholder perceptions which, by large, view education as having a positive impact on pro-environmental behaviours, the paper recognises

sustained public education as one valuable tool for inciting behaviour change around plastic use. The above papers, although drawing on *relatively* strong empirical data to support their findings, take a relatively uncritical view of the power of knowledge to create behavioural change, doing little to account for research which challenges this understanding (Kollmuss and Agyeman 2002; Moser 2016).

Through their shared focus on the environmental behaviours of people working in professional jobs, studies by both Fu et al. (2020), who examine the choices of truck drivers in China, and Tilley (1999), who explores the behaviours of small firms, make the case for workplace-specific educational programmes which complement wider policy decisions. Through her interviews with managers and owners of small firms, Tilley's work reveals that whilst people may hold pro-environmental attitudes, there is a concern that by embracing environmental values and actions as part of their business, they will be disadvantaged in relation to their competitor. Through her research, Tilley identifies three categories of intervention possible for the sector; firstly, the weakening of resistant forces to change; secondly, the strengthening of driving forces; and finally, a twin track of strengthening and weakening simultaneously. Resistant forces for business owners are identified as poor ecoliteracy; low environmental awareness; inadequate institutional infrastructure; and limited business support. Driving forces identified include education and training; effective research; legislative regulation; and institutional reform. Therefore, in combination with a much stronger regulatory framework which inspires pro-environmental behaviour, an expansion of environmental education is considered key to bringing people's attitudes into connection with their practices. Although Tilley's paper was published over two decades ago, her work remains relevant, with a similar conclusion on the value of workplace education being echoed in Fu et al. (2020) more recent work. Fu et al.'s paper observes a strong link between education and behaviour, and advocates for environmental education which increases not just people's knowledge of environmental issues but also their understanding of their individual impact and their awareness of the benefits – both individually and collectively—of engaging with pro-environmental choices. Likewise to Tilley (1999) Fu et al. (2020) also emphasise the importance of marrying environmental awareness with effective incentive policies.

Whilst the majority of papers included in our sample offer the understanding that education is one means to close the value-action gap, Vigors (2018) offers a different point on view in her writing on the consumption of animal products. Vigors suggests that educational strategies have limited impact in this context as people do not always trust information sources and that people prioritise other concerns over animal welfare when purchasing products. Vigors focuses instead on the role of behavioural 'nudge' interventions in reducing consumption of products linked to animal harm. An example of a behavioural nudge in this context are actions such as ordering 'the supermarket so that higher welfare products are in their own specific section or aisle' or encouraging consumers 'to publicly commit (e.g. through social media) to purchase higher welfare products for a stated period' (6). Whilst a focus on nudging is a well discussed area of thought in literature examining environmental behaviour (see: Bimonte, Bosco, and Stabile 2020; Croteau, 2019), with many studies supporting strategies centred around nudge theory, Vigors' paper represents educational strategies in a notably limited way, doing little to account for education beyond a knowledge-sharing context.

### *(Re)structuring educational spaces*

There are relatively few papers which *solely* address the need for structural and cultural change within educational institutions which support pro-environmental behaviours. This area of thought is most explicitly addressed in Nursey-Bray et al.'s (2019) paper, which considers the factors which influence people within the academic community to undertake plane journeys. It is detailed that the key motivator for academics to fly centres around their need to meet institutional expectations for engagement, to network, and to be seen as active within the academic

community. According to the authors, the antidote to this issue centres around institutional and political changes which empower and incentivise individuals to make ethical and pro-environmental choices regarding plane travel. The timing of this paper, which was published only months before COVID-19 restrictions significantly limited opportunities for in-person events and plane travel, is of importance to note. Firstly, if this research were to be repeated in the present day, the study may possibly yield significantly different results regarding people's perception of the importance of flying. Secondly, it is of value to note that the forced shift to hybrid or online academic events due to COVID-19 is suggested as being one opportunity for helping inspire the cultural shifts needed within academia to reduce plane travel expectations (Kreil 2021).

In Liu, Liu, and Jiang's (2019) study examining the driving factors which motivate Chinese college students to engage with low-carbon consumption behaviours the influence of the culture and structure of school setting on people's behaviour is explicitly addressed, although educational content is also mentioned. The authors identify three central areas that schools should address to develop low-carbon behaviour choices in students: firstly, cultivating low-carbon consumption habits in students through engaging with low-carbon practices as an institution; secondly, through embedding low-carbon teaching within the curriculum; and thirdly, through actively promoting low-carbon behaviour and encouraging it to be the social norm. Unlike Nursey-Bray et al.'s (2019) paper, Liu, Liu, and Jiang (2019) suggest that internal change in educational institutions needs to be married with government-led policy changes. Recommendations for government-level policies include the regulation of high-carbon products, the imposing of environmental taxes, the provision of goals and feedback for consumption levels, and the increase of normative prompts which focus attention on low-carbon behaviour choices in public settings. This paper focuses on top-down approaches which require changes implemented by those in management or educator positions: what it neglects, however, is a consideration of how the student voice might be represented in achieving low-carbon consumption behaviours.

## Discussion

The gap between the values people hold and the actions they engage in is well-documented not only through this specific sample of studies but also more broadly across environmental research and this particular journal (e.g. Kollmuss and Agyeman 2002; Breunig et al. 2014; Bergman 2016; Marcinkowski and Reid 2019). The critical understanding which connects research across this sample is the central conviction that educational strategies – of varying natures—have an important role to play in providing the impetus for learners to bridge their values and actions.

### *Overarching critiques*

As evidenced through the overview of the dataset, visualised in Table 2(A–C) over half of the papers in the literature sample relied on Ajzen's (1985, 1991) TPB to provide the theoretical framing for their work, despite it being stated within wider literature on the value-action gap that this theory is limited in its approach. This reliance on a model of behaviour change which assumes specificity around the behaviour and not any of the more generic underlying components of values and identity that might prepare individuals for being interested in taking action indicates that a significant amount of literature writing on links between education and the value-action gap relies on the understanding that humans act in fundamentally rational ways. We suggest that work which seeks to meaningfully develop pathways towards bridging the gap between people's values and actions needs to be prepared to look beyond framings which

consider people to act in fundamentally rational ways, and take on the challenge of considering how educational strategies can become an influential part of the messy reality of people's behavioural decisions. Fundamentally, one (but not the only) element that could add depth and value to understanding would be a focus on cultural influences on decision making processes and motivations.

What remains broadly unclear from this collection of studies is the realistic possibility of 'closing the gap' through the various proposed methods: due to the typical factors which limit academic research, such as the length of time funding allows researchers to develop and continue a particular research study, studies often remained inconclusive to the long-term possibilities for change as a result of varying interventions. A fundamental gap therefore remains between what is implied and what might actually work in practice, particularly in light of other educational pressures such as examination grades and government-required curriculums.

### *Gaps of research and priorities for developing literature*

This review of literature reveals significant gaps within work spanning the value-action gap and education. To stress, this review does not comment on broader gaps within environmental education literature, but rather areas that have not been addressed by papers which specifically utilise the value-action gap theory within an education context.[5] Drawing on our analysis of these papers, we have identified five priority areas, as shown in Figure 3, for further research which meaningfully expands on current thinking around the relationship between education and the value-action gap. Due to the limited number of papers our literary search revealed, these identified areas for development are pointed to both by authors of those texts directly reviewed in connection with this literary study, as well as supported by wider environmental education literature.

The first major gap in the literature centres around the lack of focus on intergenerational learning at different stages and the broad regulation of young people, who make up the majority of student populations, to the position only of learner. Wider literature within the field of environmental education has come to recognise the value of learners, who are often although not always young people or children, as agents of change through intergenerational dialogue and influence (Ballantyne, Fien, and Packer 2001; Peterson, Stevenson, and Lawson 2019; Spiteri 2020, 2023; Vaughan et al. 2003). Yet, typically, learning was approached from a 'top-down' perspective, in which educators or influencers of education were expected to lead on initiatives to create change. There was little examination of the role that students might play in enhancing the environmental education of other members of society, both within and beyond traditional educational settings. Much work therefore needs to be done to better assess how younger members of society might act as educators themselves, and contribute to behavioural changes which actively bridge value-action gaps. This lack of focus on the possibilities of 'bottom-up' learning sits against an academic landscape which demonstrates a significant lack of knowledge regarding how to involve older members of society in environmental conversations (Latter 2022). This gap means there is potential to explore, particularly in the case of young people, possibilities for bottom-up education: possible questions of interest for future research are where does education happen outside of traditional settings and, as young people take the lead on climate action, what room is there for intergenerational learning?

While we point to importance of intergenerational learning, and the potential value of aligning knowledge around intergenerational learning with moves towards closing the value-action, it is of interest note that Chineka and Yasukawa (2020) also highlight in their study of children in Zimbabwe how intergenerational learning models developed and adopted in the Global North do not necessarily work effectively in other contexts. This leads us to our second key priority area for developing the literature: that of the inclusion of diverse


**Figure 3.** Key priorities for future research exploring the value-action gap and education.

perspectives which extend beyond a Global North context. While we may have limited access to a broader diversity of papers due to only searching for English language results, as we point to in our results section, the majority of papers reviewed here reported on research that was conducted in countries of *relative* global privilege. Needless to say, this means that the current academic knowledge on this subject is inherently limited in its capacity to be globally relevant or attuned to varied cultural contexts. Although there was recognition of the need to tailor educational strategies to respond explicitly to the worldviews and experiences of communities in varying cultural settings (see by example: Chaichana, Srijuntrapun, and Rawang 2019), an expanse of research settings is required to ensure this tailoring of educational content is achieved.

The third key knowledge gap concerns a distinct lack of focus on constraints that curricula pose, as well as how value-action gap challenges can be addressed through different subject areas. The analysed papers provide valuable ideas concerning themes like experiential learning, long-term learning programs, connecting environmental issues to learners' own lives, and discussing feelings and emotions in learning situations. Indeed, while there are many instances across the literature where ideas for pedagogical development are provided, suggestions for the use of these tools and approaches are not commonly integrated into specific curriculum contexts. What is critical to note is that, particularly in light of current concerns for teacher workload and stress levels (Taylor, Roberts, and Zarrett 2021), without access to educational toolkits that respond to the needs of the teachers who might utilise them, the research may be limited in terms of educational impact. There is therefore significant scope for future research to ask if the suggested methods are indeed working, and what kind of academic approaches might be needed to develop the impact of pedagogical research for environmental education. For instance, we suggest future research might consider the value of co-productive methods, working both *for* and *with* teachers to overcome this barrier. In addition, nonformal educational settings have interesting possibilities to support such experimental environmental education

that formal education struggles with due to said curricula constraints. Therefore, research is needed to explore the roles of formal, nonformal, and informal educational settings.

The fourth priority area revealed through this literature review is a bias towards focusing on individual pro-environmental behaviour. This focus has been much criticized in previous literature: behaviour change is too narrow to be the central goal of environmental education (Chawla and Cushing 2007; Kennedy and Boyd 2018, Robottom and Hart 1993). Despite this long-term discussion, relatively few of the analysed papers discuss action in its wider meaning, particularly in the context of collective social action and active citizenship. The impact of an individual private sphere act, such as making changes in consumer choices or recycling habits, is limited. Additional impact can be reached when individuals join for a collective change or pursue political activism. As Chawla and Cushing (2007, 438) noted already, 'if environmental educators confine themselves to fostering private sphere environmentalism, they may in fact be leading students astray'. We suggest that future research on how education can help bridge the value-action gap ought to consider especially collective action as well as meaningful private behaviours. A key way in which this might be achieved, and which is supported through wider environmental education literature (see by example Sobel 2004), is through examining the impact of more collaborative and action-based forms of learning that engage students in real-world and/or problem-based inquiries.

Finally, our fifth priority area focuses around expanding the focus on institutional change and structure to align with environmental needs. As we noted in the introductory chapters, environmental education is a broad area of education that requires transdisciplinary and holistic approaches to reach its goals. The analysed literature points towards some important areas of development, such as the needs to re-structure educational spaces and to develop formal education towards the whole school approach. In addition to these few studies, in future research more experiments and development is needed. The impact that a whole school approach may have on student perspective and choice is an important area to increase understanding around.

## Conclusion

We began this article with reference to the fictional film *Don't Look Up*, registering how the storyline speaks to the sense of frustration felt by many regarding the lack of action and support to guide people towards the adoption of pro-environmental, sustainable lifestyles in a time of ever-growing crisis. While there are many examples of people taking relevant steps to 'create hope' (Ojala 2012), what is not clear is the basis for adoption of such pro-environmental behaviour, thus necessitating an exploration of a 'value-action' gap thinking within environmental education research. Our findings present new ways of thinking about this 'gap' by revealing that major areas of focus are either on the role of specific pedagogical approaches or broader policy and institutional structure. Literature emphasizing pedagogy discusses education as a key to bridging the value-action gap, pedagogical approaches, content, and tools which support this goal, and the role of emotions and personal connection in environmental education. Literature focusing on policy-based routes to transformation discuss different policy changes that might enhance bridging the value-action gap and possibilities to restructure educational spaces. These themes are interlinked, and some reviewed articles engage with both main themes and varying sub-themes.

According to the reviewed research, education ought to engage people to become empowered in their choices, promote significant environmental action, connect environmental issues to learners' own lives, and regard environment-related emotions. Researchers recommend long-term, experimental learning projects, even though they may be difficult

to implement in formal school settings. However, pedagogy only goes so far: change needs to be supported from the top down through institutional policy and restructure. Institutions need to look outwards, becoming part of global movement to mitigate change—not just through learning, but also through doing. In addition to this, although education is an important route for achieving transformation, education also needs to be understood as just one of the routes through which change is achieved: it needs to sit in conjunction with other forms of change and action (i.e. accessible and reliable public transport). Nevertheless, education remains a fundamental route through which transformative action can developed and implemented.

Overall, the research shows change needs to be supported at different levels. Educational pedagogy and policy need to transition towards recognising individuals as part of a collective sphere: citizens of a broader society. However, what this research review also reveals is the need to still greatly expand literature examining the value-action gap in connection with education if we are to develop meaningful, supported conclusions as to how such a gap can become addressed through educational strategies and movements. Through our review of this research, we have suggested five priority areas for further research linking environmental education and value-action gap: intergenerational learning, value-action gap aware curriculum development, relevance to global south learning contexts, educational means for promoting collective environmental action, and whole school approaches towards addressing the value-action gap. Critically, education needs to be part of a movement to cultivate citizens who are supported and empowered as they face a world defined by environmental and climate emergency.

## Notes

1. We adopt the definition of 'pro-environmental behaviour' provided by Kollmuss and Agyeman (2002, 240), who write that this simply means behaviour "that consciously seeks to minimize the negative impact of one's actions on the natural and built world (e.g. minimize resource and energy consumption, use of non-toxic substances, reduce waste production)".
2. Common iterations of this phrase exist as the 'intention-behaviour gap', (Gifford, Lacroix, and Chen 2021) and 'the intention-action gap' (Gould 2020).
3. On this Heimlich and Ardoin (2008) have completed a vast review.
4. This diagram sets out the two key areas of thought which connect literature writing on the value-action gap and education tools and strategies. Based on the review of literature, the diagram sets out key limitations on transformative pedagogical and policy-based strategies, as well as the other key factors which influence on pathways towards addressing value-action gap issues.
5. We are aware there is a broader literature which examines topics linked to behaviour and education, such as within adult learning theory, without specifically referring to the value-action gap.

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