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## Article

# Teaching Complex and Controversial Issues: Importance of *In-Situ* Experiences in Changing Perceptions of Global Challenges

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**Abstract:** Engaging people with controversial and emotive issues that are inherently complex is challenging, especially when those issues are multifaceted or multidisciplinary, span environmental, economic, social, and political contexts, are global in scope, or where circumstances and implications differ spatially. Teaching such issues requires teachers and learners to navigate a challenging landscape of nuance and conflicting perspectives; immersive place-based learning might facilitate more meaningful exploration of such issues, but this has not previously been studied. In a multi-institution international study, we surveyed 164 participants (12 groups; 9 institutions) before and after an immersive fieldtrip in South Africa to assess perceptions on contentious issues. Wilcoxon signed-rank tests showed that participants had statistically significant opinion shifts for 17 of 18 statements, including those where change was likely due to improved knowledge or indicative of deeper attitude shifts. Generalised Linear Modelling revealed that propensity for opinion shifts was not influenced by demographics (age, gender), location (country of origin) or trip type (formal or informal). We conclude that in an increasingly complex world, context-relevant immersive experiences that facilitate deep learning by providing opportunities to explore contentious issues in situ are an ever-more valuable tool, not just for attainment but also for developing personal perspectives and as a catalyst for societal transitions.

**Keywords:** wildlife management; sustainability; contentious issues; global challenges; ethics; opinion shifts; disruptive pedagogy; context-relevant teaching; residential fieldwork



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## 1. Introduction

Teaching controversial and emotive issues presents educators with considerable challenges. This is especially true when issues are either global in scope or change spatially over large scales, such that whilst the challenge is international, the context and implications differ nationally, regionally, or locally. Such issues are often inherently complex, involving nuance, conflicting opinion, and uncertainty. Facilitating development of the critical thinking and reasoning skills that are necessary to engage with these globally relevant concepts in a meaningful and constructive way is vital, especially when they are central to a specific discipline [1,2]. Within environmental and sustainability contexts, global challenges that require nuanced and sensitive teaching include the climate emergency [3,4], evolution and extinction [5,6], impacts of natural disasters [7], and issues relating to conflict, race, and slavery [8–10]. When teaching emotive multidisciplinary issues such as these, individual perspectives and professional values frequently diverge to create “potentially perilous pedagogies” that challenge teacher and learner alike [11–13]. Support must be carefully considered, especially when the issues being discussed are potentially triggering or overwhelming [14–16].

Narrowing the focus, the cognate disciplines of ecology and wildlife management often involve issues beset by complexity, nuance and emotionally charged opinion, many of which overlap with wider concepts of sociological and economic sustainability [17]. This includes the ethics of fencing and culling animals, wildlife crime (including local subsistence poaching in economically impoverished areas as well as international trade in animal products), and sustainable use of wildlife, including trophy hunting and farming of “wild” animals. Trophy hunting is where people pay to hunt animals, taking their skin, horns or some other “trophy” as a souvenir. In many cases, the money raised generates local employment, pays local salaries, and funds conservation. However, there is no denying that the concept of killing animals for recreation is emotionally charged and controversial [18]. It also attracts considerable traditional and social media attention, not all of which is evidence-informed [19]. In popular opinion, it also often involves politics, social inequalities, and echoes of colonialism with white people from the global north exploiting resources and removing trophies from the global south. Another example is “farming” species for products that are financially rewarding, such as farming rhino for their horn. Horn grows continuously and can be harvested from living rhino [20], but the concept of farming an animal usually inherently viewed as “wild” elicits strong opinions that are often driven more by emotion than objective consideration of facts.

As was evident in debates about vaccines, face masks, and lockdowns during the global COVID-19 pandemic, responding to complex international challenges evokes strong opinions, which can differ spatially [21,22]. In some cases, exposure to factual information and accurate data means the opinions that someone forms are objective, evidence informed, and justifiable. Alternatively, opinions can be driven by subjective views or emotional engagement with an issue, with an intellectual rationale either being absent or formed post-hoc. In this way, moral judgement (“heart decisions”) can precede or replace considered reasoning (“head decisions”). In some cases, people can be unable to articulate a rational explanation for a moral judgement [23]. Teaching on such issues clearly presents a challenge, and one that is exacerbated if prior or concurrent exposure to false narratives and misinformation (so-called fake news) must be overcome [24–26].

One way to reduce the challenges faced in discussing complex and emotive issues in higher education settings is through active learning [27,28]. An especially valuable approach is to create a disruptive pedagogy where more contact time is devoted to discussion, debate, critique, and developing informed opinion than facts *per se* [29–31]. Ideally, disrupted learning should be immersive. This can be achieved via hands-on activities—including those involving technology or virtual/augmented reality—or by bringing first-hand experience into the classroom [29,32–35]. However, perhaps the ultimate way to flip learning, and thus to create an immersive disruptive pedagogic experience, especially for issues where the context differs spatially, is to teach *in-situ* [36]. Teaching in spaces (both physical and emotional) that are relevant to the issues being considered means that complexities become more tangible. This provides opportunities where those complexities can be interrogated and explored in deeper and more meaningful ways, thereby helping learners mature as critical thinkers [36,37].

Within environmental sciences undergraduate and postgraduate provision, fieldtrips are an integral part of course design. Trips, which can vary from short local visits to longer residential field courses overseas, provide an ideal way for students to develop crucial field skills that promote deep learning, enhancing attainment [38,39]. Fieldtrips can also improve student retention [40] and increase resilience [41], as well as foster relationships that bridge the teacher–learner divide to facilitate discussion of complex issues openly and with mutual trust [37,42]. In theory, fieldtrips to locations that are context-relevant could be used to immerse learners in geographical and cognitive spaces where contentious issues previously viewed as abstract can be unpacked safely and productively. To date, this aspect of fieldtrips has not been explored.

In this multi-institution international study, we explore two linked research questions. Firstly, how does participation in an immersive field experience in a novel location develop

and change learners' perception of, and opinions about, complex issues within ecology (and wider environmental, economic, social, and political contexts)? Secondly, do participant demographics, such as age gender, and country of origin, and the type of immersive experience affect the propensity for opinion shift? The issues we explore, including trophy hunting, farming "wild" animals, wildlife crime, and international trade in animal products, are all emotive and challenging to explore *ex-situ* where complexities are abstract. Although we are fundamentally exploring whether *in situ* experiences can help learners make sense of global challenges in ways that allow them to change previously held opinions, we also consider how similar immersive experiences could be created in other disciplines that are not traditionally associated with fieldtrips.

## 2. Materials and Methods

### 2.1. Study Location and Setup

The focal site was a 47 km<sup>2</sup> wildlife reserve in Northwest Province, South Africa. The reserve is set within a savanna landscape of grassland and scrub that supports >40 species of large mammal and >350 species of birds. The reserve has hosted educational groups for 25 years in a camp in the middle of the site (Figure 1a). Groups either comprised students from a university or college studying ecology (henceforth termed a formal educational group) or people attending a volunteer expedition run by the Earthwatch Institute (henceforth termed a special interest group). Earthwatch has run trips to the Reserve for over 20 years and works with people who, while not enrolled on a formal educational programme, want to learn about wildlife management and engage with hands-on conservation internationally and in real-world contexts.



**Figure 1.** The focal wildlife reserve, South Africa, showing: (a) an aerial view of the Reserve, with an inset showing the camp where participants stay; (b) campfire social event; (c) driven mammal transect with white rhino *Ceratotherium simum* (right of image); and (d) walked mammal transect with four giraffe *Giraffa giraffa* (background).

Between mid-2017 and the end of 2018, the reserve hosted 12 residential groups. Of these, eight were formal education trips and four were special interest trips. All trips were 8–12 days in duration and were fully immersive, with groups living, working, and socialising in the African bush (Figure 1b). Whilst the content of trips did vary to some extent, they all focused on real-world contentious issues, such as management of fenced animals, rhino poaching risk driven by global demand for horn, local anti-poaching measures, and trophy hunting. Moreover, many field activities were common to all trips, including participating in game drives (Figure 1c), undertaking walked mammal surveys (Figure 1d), using camera traps to survey elusive species, and undertaking vegetation assessments. Data collected related directly to reserve management or ongoing research studies [43–46]. In addition to the subject content of the trips, groups experienced day-to-day life on the reserve, including undertaking controlled burns for habitat management, being involved in species translocations, and assisting with rhino dehorning to reduce poaching risk.

## 2.2. Participants and Ethics

The 12 trips outlined in Section 2.1 were attended by a total of 164 participants. Of these, 31 were male and 133 were female; nobody identified as non-binary. Ages ranged from 16 to 81 (median = 21 years; mean = 26 years; minimum = 18; maximum = 81). There were 9 countries of origin recorded: UK = 125; USA = 29; Australia = 2; Brazil = 2; Japan = 2; and one each from Ireland, France, Hong Kong, and South Africa.

Participants were given a consent statement to sign (approved by the ethics gatekeeping team at University of Gloucestershire, who deemed that a full ethical approval process was not necessary given: (1) the demographics of the participants as non-vulnerable adults; and (2) the questions being asked not being of a personal or sensitive nature). Participants could withdraw from the study at any time until the point at which data were anonymised as described in Section 2.3.

## 2.3. Questionnaire and Data Collection

A two-page questionnaire was created covering a range of relevant contentious issues that operated at different spatial scales, as shown in Table 1. There were 18 questions presented in four blocks covering: (1) general management of wildlife including contentious issues, such as fencing, culling, and the ethics of putting a monetary value on species (4 questions); (2) wildlife crime including local poaching at subsistence levels and as part of global organized crime (5 questions); (3) national rhino ownership and the ethics of local dehorning to reduce global poaching threat (4 questions); and (4) trophy hunting by international visitors and local harvesting of animals for meat, and how these activities link to conservation (5 questions).

All questions took the form of statements with answers given on a Likert-type scale, whereby 1 = strongly disagree; 2 = disagree; 3 = neither agree/disagree; 4 = agree; and 5 = strongly agree. To reduce extreme response bias and acquiescent bias [47], some statements were positively phrased (e.g., “Rhino horn **should** be sold legally and openly worldwide”), while others were negatively phrased (e.g., “Trophy hunting **has no part** to play in conservation”). Basic demographic information (age, gender, country of origin) and group type (formal educational group, special interest group) was also collected.

To examine existing attitudes on the focal issues at the start of the trip, all participants were given a questionnaire to complete immediately after arrival at the reserve; this administration of the questionnaire was henceforth termed “before”. To establish any changes in attitudes by the end of the trip, participants completed an identical questionnaire on departure; this administration of the questionnaire was henceforth termed “after”. Participants wrote their names on questionnaires to allow matching of before and after responses. When questionnaires were computerised—a process undertaken by a member of reserve staff who was not involved in subsequent analysis—a unique number was allocated that did not identify the participant; subsequent analysis was thus anonymous.



**Table 1.** The questionnaire contained 18 statements in four thematic blocks, of which 10 were phrased negatively (red text) and 8 were phrased positively (green text) to reduce extreme response and acquiescent bias.

Question Block 1: Wildlife Management	Question Block 2: Wildlife Crime	Question Block 3: Rhino Horn	Question Block 4: Hunting and Harvesting
Enclosing wildlife within fenced areas has no place in conservation.	The illegal killing of animals (poaching) is wrong and completely without justification.	Rhino should not be owned by private individuals but belong solely in national parks, such as Kruger.	Trophy hunting of any animal is morally wrong. Trophy hunting has no part to play in conservation.
It is not necessary to manage a reserve because nature will find its own balance.	Subsistence poaching for meat is morally different from poaching for products such as ivory/horn.	Dehorning rhino is justifiable if it prevents poaching.	Hunting species such as impala or wildebeest for meat is fine as long as they are harvested sustainably.
Culling animals to manage population size is always wrong.	“Shoot to kill” policies against poachers are acceptable.	Rhino horn should be sold legally and openly worldwide.	Hunting for meat has no part to play in conservation.
Putting an economic value on species does not help conservation.	Poaching is a major problem in South Africa. Anti-poaching is a war we can win.	Farming rhino specifically for horn harvest is acceptable.	I have no problem with hunting even if I would not like to hunt.

#### 2.4. Data Analysis

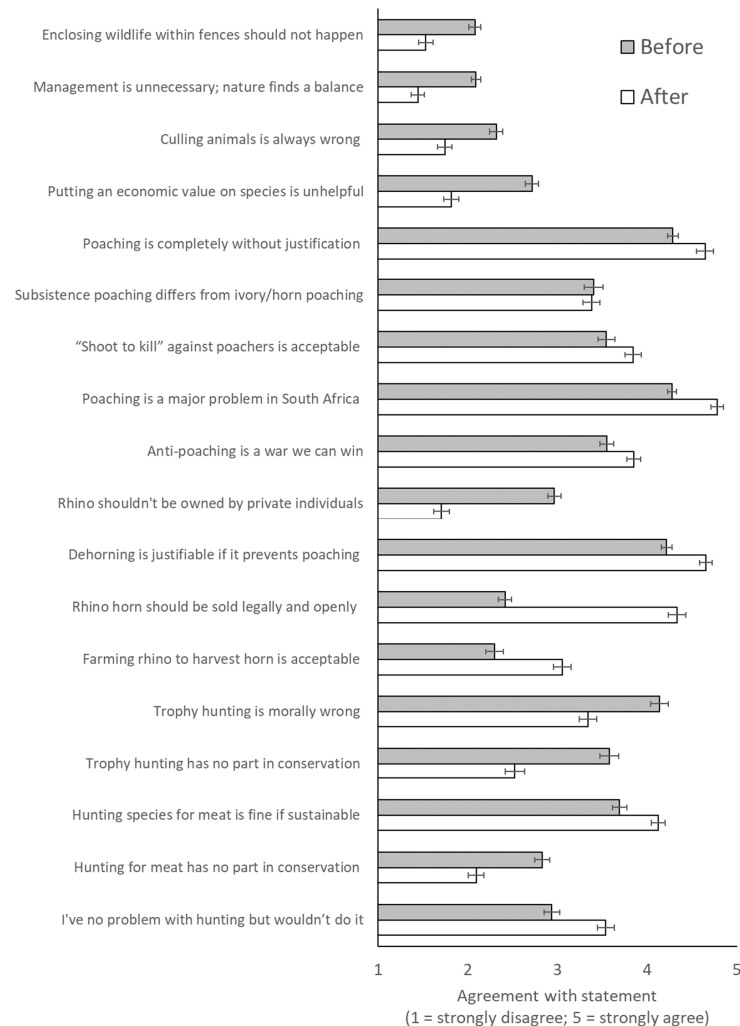
Data from the Likert-type responses from the before and after surveys were graphed to show the average direction and magnitude of any attitude shifts. To establish the significance of any change, 18 Wilcoxon signed-rank tests were performed (one test for each of the 18 questions). Wilcoxon signed-rank tests were appropriate given that the data were ordinal ranks (Likert-type responses, which meant parametric analysis was not appropriate) and were paired (before versus after). Because the questions were presented in four thematic blocks (Table 1), an individual’s response to each of the 4–5 questions within that block could not be considered independent. Accordingly, Bonferroni corrections were used to correct for family wise errors in responses to related questions, such that  $p$  values from the Wilcoxon tests were multiplied by either 4 or 5 (depending on the number of questions within the block) before being compared to a critical significance value of  $\alpha = 0.05$  as per Fowler and Cohen’s protocol [48].

To identify any demographic or educational factors that were significant predictors of propensity to change opinion, a Generalised Linear Modelling (GLM) approach was used. Separate binary variables were created for each of the 18 statements on the questionnaire; we used the before and after data from each participant to indicate whether attitudes had changed (1) or not (0) between the two surveys. Each binary variable was then used as the dependent variable in one of a series of 18 GLMs. In each GLM, age was added as a continuous covariate predictor; gender, country of origin, and group type were then added as categorical fixed factors (because of the low numbers of participants from some countries, only UK and USA were coded, giving 154 cases with origin information and 10 cases without). To account for the data being binary, a binomial distribution with a logit link function was used in all cases. Bonferroni corrections were applied in the same way as for the Wilcoxon signed-rank tests.

### 3. Results

Analysis of average Likert-type responses to each statement on the questionnaire revealed substantial changes in opinion between the before and after surveys, as shown in Figure 2. Change was evident for all statements except whether participants considered there to be a difference between (local) subsistence poaching compared to (globally driven)

poaching for products such as horn or ivory, where before and after scores were almost identical (mean before =  $3.402 \pm 1.316$  SEM; mean after =  $3.380 \pm 1.316$  SEM); it was also notable that these means were very close to the intermediate “neither agree nor disagree” score of 3.



**Figure 2.** Mean agreement with the 18 questionnaire statements immediately upon arrival at the focal wildlife reserve (“before”) and immediately prior to departure (“after”), showing direction and magnitude of attitude change at group level. Error bars show standard error. Statements have been paraphrased without altering their sense for ease of display; full statements as presented to participants are given in Table 1.

Wilcoxon signed-rank tests, which allowed for direct pairing of before and after surveys at the level of the individual participant rather than restricting analysis to consideration of group averages, showed statistically significant differences between before and after responses for 17 out of 18 statements ( $z$  values = 3.327 to 9.604; Bonferroni-corrected  $p$  values = 0.005 to  $2.76 \times 10^{-21}$ ). The only statement where there was no significant change was “subsistence poaching differs from ivory/horn poaching” ( $z = 0.047$ ,  $p = 0.963$ ), which was the same outlier noted above.

Despite substantial and significant attitude shifts for 17 of 18 statements, when GLMs were created to consider what factors (group type, country of origin, gender, age) predisposed people to change their opinions on these contentious issues after the *in-situ* fieldtrip relative to before, no model was significant. Moreover, no models contained any significant terms (Table 2). This suggests that while there might have been individual-level differences in opinions on contentious issues before the trip, and individual-level differences in

opinions on those same issues after the trip, the measured demographic factors did not influence the likelihood that a participant changed their opinion.

**Table 2.** Detailed results of Generalised Linear Models run on binary variables describing change between Likert-type scale responses at the end of the immersive trip versus before (1 = change; 0 = no change). In total, 18 models were run, one for each questionnaire statement. Statements have been paraphrased without altering their sense for ease of display; full statements as presented to the participants can be seen in Table 1. Bonferroni corrections were undertaken for all *p* values by multiplying the original *p* value by the number of questions in that category (4 or 5) to allow for non-independence and family wise error (these were truncated at 1.000 as per [48]). Reported Chi values are likelihood ratio for overall models and Wald for terms within each model.

Category	Question	Overall Model (d.f. = 4)		Group Type (d.f. = 1)		Country (d.f.= 1)		Gender (d.f. = 1)		Age (d.f. = 1)	
		Chi	<i>p</i>	Chi	<i>p</i>	Chi	<i>p</i>	Chi	<i>p</i>	Chi	<i>p</i>
Wildlife management	Enclosing wildlife within fences should not happen.	6.865	0.572	0.641	1.000	1.254	1.000	0.428	1.000	0.014	1.000
	Management is unnecessary; nature finds a balance.	4.165	1.000	0.258	1.000	0.402	1.000	0.065	1.000	2.263	0.528
	Culling animals is always wrong.	9.393	0.196	0.056	1.000	0.626	1.000	1.231	1.000	4.211	0.160
	Putting an economic value on species is unhelpful.	2.937	1.000	1.456	0.912	0.032	1.000	0.060	1.000	0.711	1.000
Wildlife crime	Poaching is completely without justification.	4.039	1.000	0.627	1.000	0.770	1.000	0.117	1.000	2.366	0.620
	Subsistence poaching differs from ivory/horn poaching	3.218	1.000	1.008	1.000	1.594	1.000	1.033	1.000	0.029	1.000
	“Shoot to kill” against poachers is acceptable.	2.170	1.000	0.101	1.000	0.012	1.000	0.012	1.000	1.297	1.000
	Poaching is a major problem in South Africa.	11.771	0.095	0.390	1.000	2.922	0.435	1.014	1.000	3.841	0.245
Rhino horn	Anti-poaching is a war we can win.	1.030	1.000	0.332	1.000	0.005	1.000	0.104	1.000	0.831	1.000
	Rhino should not be owned by private individuals.	4.249	1.000	0.016	1.000	0.145	1.000	0.004	1.000	2.051	0.608
	Dehorning is justifiable if it prevents poaching.	5.485	0.964	0.056	1.000	2.257	0.532	1.439	0.920	0.002	1.000
	Rhino horn should be sold legally and openly.	4.113	1.000	0.122	1.000	0.637	1.000	0.105	1.000	0.920	1.000
Hunting and harvesting	Farming rhino to harvest horn is acceptable.	3.425	1.000	0.976	1.000	0.225	1.000	0.795	1.000	2.289	0.520
	Trophy hunting is morally wrong.	6.430	0.684	0.039	1.000	0.035	1.000	1.029	1.000	2.701	0.400
	Trophy hunting has no part in conservation.	0.842	1.000	0.129	1.000	0.010	1.000	0.533	1.000	0.328	1.000
	Hunting species for meat is fine if sustainable.	5.392	1.000	0.879	1.000	0.305	1.000	3.383	0.370	0.175	1.000
	Hunting for meat has no part in conservation.	2.567	1.000	0.957	1.000	2.062	0.755	0.494	1.000	0.551	1.000
I have no problem with hunting but would not do it.	7.496	0.560	0.295	1.000	1.677	0.975	0.001	1.000	3.572	0.295	

#### 4. Discussion

Immersive experiences undertaken in a relevant context are known to be valuable in terms of increasing attainment and resilience [38,41] and opening safe channels of communication that allow complex and emotive issues to be explored [37]. However, this study shows that lived experiences in the geographical and ecological environment relevant to the challenges being considered [36] also have the capacity to modify the opinions of participants in relation to controversial and challenging global, regional, and local issues. Many of the biggest shifts in opinions came from statements on the most controversial issues. For example, there were considerable positive shifts in how willing participants were to accept legal international trade in rhino horn and to accept “farming” of wild species, their view of the role of internationally driven trophy hunting in conservation, and acceptance of the importance of culling in conservation in local contexts. It is also notable that in many of these cases, the overlaps between ecology, economics, and sociopolitical considerations are especially high.

Some statements probed highly personal opinions involving individual moral beliefs. These included statements relating to culling, justification of poaching (including subsistence-level poaching amongst very poor rural communities), and the morality of trophy hunting. Such statements can fall into the realm of moral intuition or moral dumbfounding [23], which may mean a strong and emotionally charged opinion is reached



without intellectual rationalisation. We term such statements “heart” statements. On the other hand, some statements were “head” statements, where opinions are more likely to be guided by facts and data, together with the ability to use that knowledge to form a deep and objective knowledge of a situation. Examples of “head” statements included the concept of dehorning in protecting rhino from poaching risk and the importance (or otherwise) of active wildlife management. The heart–head distinction is not entirely binary and there are some questions that arguably span both categories, including the importance of fenced areas in wildlife management and putting economic value on animals; many people recognised the tension between heart (what they want to think) and head (what they realise likely needs to happen) for these issues [29].

It seems likely that, in some cases, opinion shift occurred through more informed exposure to the evidence underpinning key issues. For example, trophy hunting (usually of species in Africa, although not exclusively so) is a widely covered topic in the UK and USA media, but the topic is complex and emotive [18,49]. Media coverage is generally negative and may also contain substantial misinformation [19]. It is highly likely that anyone studying ecology and wildlife management at tertiary level will have been exposed to, and possibly influenced by, such incorrect narratives. Exposure to accurate information on the trip (but which would not have been dependent on being in that specific context) might have been solely responsible for opinion shifts. However, we consider it more likely that this change was caused by a combination of information and the process of “walking in the shoes of others”, which allowed learners to see impacts and consequences of this issue first-hand, interrogate and explore these issues in meaningful context, and gain a more nuanced understanding [27,28,36,37].

The fact that shifts occurred for statements that questioned the morality of certain actions perhaps shows that experiential learning and immersion played as much of a part in shaping opinion as the provision of additional information. This in turn indicates the value of disruptive pedagogy to help people focus on the nuances of impacts and implications of situations and decisions as much as information per se [29–31,36]. For example, the focal reserve has lost rhino to poaching on two occasions, and it was interesting that one of the biggest opinion shifts regarded the question of whether rhino horn should be sold legally. There was a large shift from strongly disagreeing (before) to agreeing (after), possibly because participants were, through their visit, able to face the realities of rhino poaching, see its effects firsthand, and discuss emotive, challenging and, complex concepts, such as legal trade in a safe, context-relevant space. We were not able to question participants about precisely why they had changed their opinion—and indeed any post hoc narratives might not necessarily have been accurate—but this is tangentially supported by reading field diaries and listening to conversations between students who attended a formal educational trip to the same location in May 2022. Many of these students opened their thoughts, written or verbal, about issues such as trophy hunting and poaching with phrases such as “before coming here . . . ” and “it’s only after seeing . . . ” rather than “now I have learned about . . . ”. Moreover, the fact that Earthwatch participants were not “taught” in the field, and yet exhibited the same opinion shifts on the same issues, further supports the notion it was the experiential aspect that was key.

Interestingly, the predisposition to change perspective and opinion was not associated with any of the demographic factors that we investigated. Type of trip (and, ergo, type of participant), gender and age did not influence whether individuals were more or less likely to change their mind for any of the 18 statements. Country of origin was also non-significant in all cases, but note the caveat that only the UK and USA had sufficient sample sizes to enable meaningful analysis. The lack of influence of demographics and location on propensity to change opinion was surprising given that previous research examining perspectives of conservation professionals on contentious issues showed that perspective was related to age, gender, and location (measured in that case by continent) [50]. However, it should be noted that the study analysed pre-existing opinions among professionals, rather than amongst participants before and after the same immersive fieldtrip.

#### 4.1. Implications

Shifts in opinions in 17 of the 18 statements showed that real-world exposure during an immersive experience can modify participant opinion relative to originally held perceptions. Through a combination of learning in a context-relevant space and better understanding issues through primary observation, opinions shifts happen regardless of whether the topic tends towards moral intuition or towards intellectual rationalisation. A similar situation has been observed previously for medical students whose opinions on contentious issues in the workplace shifted between pre-clinical and clinical stages of their degrees, where assessed knowledge did not change but opinions shifted [51], and for nurses before and after immersive placements with community mental health teams [52].

We recommend that, where possible, teachers find ways to take students out of the classroom to engage with real-world issues in the real world. In some disciplines, including biological and geographical sciences, such experiences might take the form of traditional fieldtrips. However, we recommend that such fieldtrips embrace complex and continuous issues explicitly rather than focusing purely on fact-based teaching. Ideally, this should involve genuine collaboration with local people to ensure exposure to a range of voices and opinions and avoid the risk of “parachute science” [53]. We recognise that field teaching is traditionally associated with biological and geographical disciplines. However, any form of study visit that allows students to have immersive *in-situ* experiences outside of the classroom would act in a similar way regardless of subject, especially if there is an emphasis on discussion, debate, and critique [54–57]. If this is not possible, “creating” a locational context that differs from the classroom could be a powerful approach. One way to do this would be by bringing first-hand experiences into the classroom (possibly via live video link to metaphorically transport learners to other situations). Extending the concept of a virtual fieldtrip [58–60] to become fully immersive—ideally using virtual or augmented reality [29,32–35]—with a focus on critical thinking and debate rather than knowledge might also be a useful strategy.

#### 4.2. Conclusions

We conclude that in an increasingly complex world, in-place, context-relevant immersive experiences have the potential to become an ever-more valuable tool for environmental disciplines. This is true not just for enhancing knowledge and improving attainment, but also for evolving personal perspectives, developing responsible world citizens, and as a catalyst for societal transitions.

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**Institutional Review Board Statement:** The ethics gatekeeping team at University of Gloucestershire deemed that a full ethical approval process was not necessary given: (1) the demographics of the participants as non-vulnerable adults; and (2) the questions being asked not being of a personal or sensitive nature.

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study. No participants can be identified in the published paper and thus no written consent is necessary to publish the paper.

**Data Availability Statement:** Data are available on the University of Gloucestershire repository via this direct link: <https://eprints.glos.ac.uk/id/eprint/11298> (accessed on 3 March 2023).

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## References

- Perkins, H.S.; Hazuda, H.P.; Geppert, C.M. Challenges in teaching ethics in medical schools. *Am. J. Med. Sci.* **2000**, *319*, 273–278. [[CrossRef](#)] [[PubMed](#)]
- Smith, P.C.; Vasquez, K. Teaching critical thinking about difficult topics. In *Teaching Critical Thinking in Psychology: A Handbook of Best Practices*; Halonen, J.S., Smith, R.A., Dunn, D.S., Eds.; Blackwell Publishing: Oxford, UK, 2009; pp. 211–222.
- Lombardi, D.; Sinatra, G.M. Emotions about teaching about human-induced climate change. *Int. J. Sci. Educ.* **2013**, *35*, 167–191. [[CrossRef](#)]
- Christenson, N.; Hindersson, E. Teaching climate change: Teachers views, methods and good examples. In Proceedings of the American Association of Geographers Conference, Washington, DC, USA, 2 April 2019.
- Moyer-Horner, L.; Kirby, R.; Vaughan, C. Education as a tool for addressing the extinction crisis: Moving students from understanding to action. *Rev. Biol. Trop.* **2010**, *58*, 1115–1126. [[CrossRef](#)]
- Wyner, Y.; DeSalle, R. Distinguishing extinction and natural selection in the Anthropocene: Preventing the panda paradox through practical education measures. *BioEssays* **2020**, *42*, 1900206. [[CrossRef](#)] [[PubMed](#)]
- Elbaih, A.H.; Alnasser, S.R. Teaching approach for START triage in disaster management. *Medicine* **2020**, *9*, 1–4. [[CrossRef](#)]
- Williams, K. *Trauma and Trigger Warnings in the History Classroom, May ed.*; The American Historian: New York, NY, USA, 2015; pp. 1–2.
- Knutson, E.M. Teaching difficult topics: The example of the Algerian War. *L2 J.* **2012**, *4*, 83–101. [[CrossRef](#)]
- Cohen, J.E.; Raynor, S.D.; Mack, D.A. *Teaching Race in Perilous Times*; SUNY Press: New York, NY, USA, 2021.
- Carello, J.; Butler, L.D. Potentially perilous pedagogies: Teaching trauma is not the same as trauma-informed teaching. *J. Trauma Dissociation* **2014**, *15*, 153–168. [[CrossRef](#)]
- Stoller, L.; Blanchard, E.; Fowler, M. Trigger topics: Where religion & health care intersect. *MedEd PORTAL* **2015**, *11*, 10007.
- Knight, S.; Papanikitas, A. Teaching and learning ethics in healthcare. In *Clinical Education for the Health Professions*; Nestel, D., Reedy, G., McKenna, L., Gough, S., Eds.; Springer: Singapore, 2021.
- MacPherson, A.; Lawrie, I.; Collins, S.; Forman, L. Teaching the difficult-to-teach topics. *BMJ Support. Palliat. Care* **2014**, *4*, 87–91. [[CrossRef](#)]
- Lowe, P. Lessening sensitivity: Student experiences of teaching and learning sensitive issues. *Teach. High. Educ.* **2015**, *20*, 119–129. [[CrossRef](#)]
- Hawley, S.; Morris, J.; Pokrywka, N.; Smith, M.; Steinhauer, J.; Stevens, T. What are some of the major challenges in teaching/designing genetics courses today? *Trends Genet.* **2018**, *34*, 82–85.
- Goodenough, A.E.; Hart, A.G. *Applied Ecology: Monitoring, Managing, and Conserving*; Oxford University Press: Oxford, UK, 2017.
- Dickman, A.; Cooney, R.; Johnson, P.J.; Louis, M.P.; Roe, D.; 128 Signatories. Trophy hunting bans imperil biodiversity. *Science* **2019**, *365*, 874. [[CrossRef](#)] [[PubMed](#)]
- Hart, A.G.; Cooney, R.; Dickman, A.; Hare, D.; Jonga, C.; Johnson, P.; Louis, M.P.; Lubilo, R.; Roe, D.; Semcer, C.; et al. Threats posed to conservation by media misinformation. *Conserv. Biol.* **2020**, *34*, 1333–1334. [[CrossRef](#)]
- Taylor, A.; Balfour, D.; Brebner, D.K.; Coetzee, R.; Davies-Mostert, H.; Lindsey, P.A.; Shaw, J. Sustainable rhino horn production at the pointy end of the rhino horn trade debate. *Biol. Conserv.* **2017**, *216*, 60–68. [[CrossRef](#)]
- Arede, M.; Bravo-Araya, M.; Bouchard, É.; Gill, G.S.; Plajer, V.; Shehraj, A.; Shuaib, Y.A. Combating vaccine hesitancy: Teaching the next generation to navigate through the post truth era. *Front. Public Health* **2019**, *6*, 381–388. [[CrossRef](#)] [[PubMed](#)]
- Ullah, I.; Khan, K.S.; Tahir, M.J.; Ahmed, A.; Harapan, H. Myths and conspiracy theories on vaccines and COVID-19: Potential effect on global vaccine refusals. *Vacunas* **2021**, *22*, 93–97. [[CrossRef](#)] [[PubMed](#)]
- Haidt, J. The emotional dog and its rational tale: A social intuitionist approach to moral judgment. *Psychol. Rev.* **2021**, *108*, 814–834. [[CrossRef](#)]
- Kincheloe, J.L. Critical pedagogy and the knowledge wars of the twenty-first century. In *Key Works in Critical Pedagogy*; Hayes, K., Steinberg, S.R., Tobin, K., Eds.; Brill Sense: Leiden, The Netherlands, 2011; pp. 385–405.
- Treen, K.M.I.; Williams, H.T.; O'Neill, S.J. Online misinformation about climate change. *Wiley Interdiscip. Rev. Clim. Chang.* **2020**, *11*, e665. [[CrossRef](#)]
- Loomba, S.; de Figueiredo, A.; Piatek, S.J.; de Graaf, K.; Larson, H.J. Measuring the impact of COVID-19 vaccine misinformation on vaccination intent in the UK and USA. *Nat. Hum. Behav.* **2021**, *5*, 337–348. [[CrossRef](#)]
- Felder, R.M.; Brent, R. Active learning: An introduction. *ASQ High. Educ. Brief* **2009**, *2*, 1–5.
- Kolb, D.A. *Experiential Learning: Experience as the Source of Learning and Development*; Person Education: London, UK, 2015.
- Hedberg, J.G. Towards a disruptive pedagogy: Changing classroom practice with technologies and digital content. *Educ. Media Int.* **2011**, *48*, 1–16. [[CrossRef](#)]
- Hutchings, M.; Quinney, A. The flipped classroom, disruptive pedagogies, enabling technologies and wicked problems: Responding to the bomb in the basement. *Electron. J. e-Learn.* **2015**, *13*, 106–119.
- Mazur, E. Farewell, lecture? *Science* **2009**, *323*, 50–51. [[CrossRef](#)] [[PubMed](#)]
- Wallace, M.L.; Walker, J.D.; Braseby, A.M.; Sweet, M.S. Now, what happens during class? Using team-based learning to optimize the role of expertise within the flipped classroom. *J. Excell. Coll. Teach.* **2014**, *25*, 253–273.
- Sheridan, N.; Dale, V. Enabling Academic Staff to Engage with Disruptive Pedagogies Using Active Learning Technologies. In Proceedings of the ALT Winter Conference, Online, 11 December 2018.

34. Barrow, J.; Forker, C.; Sands, A.; O'Hare, D.; Hurst, W. Augmented reality for enhancing life science education. In Proceedings of the VISUAL 2019—The Fourth International Conference on Applications and Systems of Visual Paradigms, Rome, Italy, 30 June 2019.
35. Kearney, M.; Burden, K.; Schuck, S. Disrupting education using smart mobile pedagogies. In *Didactics of Smart Pedagogy: Smart Pedagogy for Technology Enhanced Learning*; Daniela, L., Ed.; Springer: Berlin/Heidelberg, Germany, 2019; pp. 139–157.
36. Ritter, J.R.R.; Gottschämmer, E. The concept of in-site lecturing. *Int. J. Learn. Teach. Educ. Res.* **2015**, *11*, 128–140.
37. Jones, J.C.; Washko, S. More than fun in the sun: The pedagogy of fieldtrips improves student learning in higher education. *J. Geosci. Educ.* **2022**, *70*, 292–305. [[CrossRef](#)]
38. Goodenough, A.E.; Rolfe, R.N.; MacTavish, L.; Hart, A.G. The role of overseas field courses in student learning in the biosciences. *Biosci. Educ.* **2014**. [[CrossRef](#)]
39. Hill, J.; Woodland, W. An evaluation of foreign fieldwork in promoting deep learning: A preliminary investigation. *Assess. Eval. High. Educ.* **2002**, *27*, 539–555. [[CrossRef](#)]
40. Larsen, C.; Walsh, C.; Almond, N.; Myers, C. The real value of fieldtrips in the early weeks of higher education: The student perspective. *Educ. Stud.* **2017**, *43*, 110–121. [[CrossRef](#)]
41. Goodenough, A.E.; Derounian, J.G.; Lynch, K.; Hart, A.G.; Evans, M.A.; Hurley, W.J.; Roberts, H. *FOR REAL: Forming Resilience and Employability through Authentic Learning*; Higher Education Academy Research Report; Higher Education Academy: York, UK, 2015; Available online: <https://eprints.glos.ac.uk/3437/1/FinalHandbookForRealGoodenoughEtAl2015.pdf> (accessed on 28 March 2023).
42. Hart, A.G.; Stafford, R.; Goodenough, A.E. Bridging the lecturer/student divide: The role of residential field courses. *Biosci. Educ.* **2011**, *17*, 1–5. [[CrossRef](#)]
43. Penny, S.G.; White, R.L.; Scott, D.M.; MacTavish, L.; Pernetta, A.P. Using drones and sirens to elicit avoidance behaviour in white rhinoceros as an anti-poaching tactic. *Proc. R. Soc. B* **2019**, *286*, 20191135. [[CrossRef](#)] [[PubMed](#)]
44. Goodenough, A.E.; Carpenter, W.S.; McTavish, L.; Blades, B.; Clarke, E.; Griffiths, S.; Harding, N.; Scott, R.; Walsh, E.; Wilson, L.; et al. The impact of inter-observer variability on the accuracy, precision and utility of a commonly-used grassland condition index. *Ecol. Indic.* **2020**, *117*, 106664. [[CrossRef](#)]
45. Hart, A.G.; Carpenter, W.S.; McTavish, L.; Blades, B.; Clarke, E.; Griffiths, S.; Harding, N.; Walsh, E.; Wilson, L.; Goodenough, A.E. Evaluating veld condition index: How many samples is enough? *Afr. J. Ecol.* **2020**, *58*, 596–598. [[CrossRef](#)]
46. Hart, A.G.; Dawson, M.; Fourie, R.; MacTavish, L.; Goodenough, A.E. Comparing the effectiveness of camera trapping, driven transects and ad hoc records for surveying nocturnal mammals against a known species assemblage. *Community Ecol.* **2022**, *23*, 27–39. [[CrossRef](#)]
47. Jackson, D.N. Cognitive energy level, acquiescence, and authoritarianism. *J. Soc. Psychol.* **1959**, *49*, 65–69. [[CrossRef](#)]
48. Fowler, J.; Cohen, L. *Statistics for Ornithologists*; British Trust for Ornithology: Thetford, UK, 1996.
49. Webster, H.; Dickman, A.; Hart, A.; Roe, D. Keeping hunting bans on target. *Conserv. Biol.* **2022**, *36*, e13932. [[CrossRef](#)]
50. Sandbrook, C.; Fisher, J.A.; Holmes, G.; Luque-Lora, R.; Keane, A. The global conservation movement is diverse but not divided. *Nat. Sustain.* **2019**, *2*, 316–323. [[CrossRef](#)]
51. Fitz, M.M.; Homan, D.; Reddy, S.; Griffith, C.H.; Baker, E.; Simpson, K.P. The hidden curriculum: Medical students' changing opinions toward the pharmaceutical industry. *Acad. Med.* **2007**, *82*, S1–S3. [[CrossRef](#)]
52. Stuhlmeier, C.; Tolchard, B. Understanding the impact of mental health placements on student nurses' attitudes towards mental illness. *Nurse Educ. Pract.* **2019**, *34*, 25–30. [[CrossRef](#)]
53. Hart, A.G.; Leather, S.R.; Sharma, M.V. Overseas conservation education and research: The new colonialism? *J. Biol. Educ.* **2021**, *55*, 569–574. [[CrossRef](#)]
54. Wright, M.C. Getting more out of less: The benefits of short-term experiential learning in undergraduate sociology courses. *Teach. Sociol.* **2000**, *28*, 116–126. [[CrossRef](#)]
55. Rone, T.R. Culture from the outside in and the inside out: Experiential education and the continuum of theory, practice, and policy. *Coll. Teach.* **2008**, *56*, 237–246. [[CrossRef](#)]
56. Higgins, N.; Dewhurst, E.; Watkins, L. Fieldtrips as short-term experiential learning activities in legal education. *Law Teach.* **2012**, *46*, 65–178. [[CrossRef](#)]
57. Behrendt, M.; Franklin, T. A review of research on school fieldtrips and their value in education. *Int. J. Environ. Sci. Educ.* **2014**, *9*, 235–245.
58. Stoddard, J. Toward a virtual field trip model for the social studies. *Contemp. Issues Technol. Teach. Educ.* **2009**, *9*, 412–438.
59. Zanetis, J. The beginner's guide to interactive virtual field trips. *Learn. Lead. Technol.* **2010**, *37*, 20–23.
60. Goodenough, A.E.; MacTavish, L.; Hart, A.G. Developing a supportive framework for learning on biosciences field courses through video-based resources. *J. Online Learn. Teach.* **2013**, *9*, 3.

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