

Peer Review Report

Review Report on Critical Engaged Pedagogy to Confront Racism and Colonialism in (Geo)science Education Through a Historical Lens

Original Research, Earth Sci. Syst. Soc.

Reviewer: Steven Rogers

Submitted on: 21 Mar 2024

Article DOI: 10.3389/esss.2024.10114

EVALUATION

Q 1 Please summarize the main findings of the study.

The paper presents an approach to embed decolonial and anti-racist ideas and concepts to students by exploring the history of a subject area, investigating past and present biases and looking at how behaviours and practice can perpetuate these issues. There is a really nice exploration of literature centring on several key issues in geoscience/science in general. In its current format the work is more of a "professional practice" piece – I think there is huge potential for this with some additional analysis...

Q 2 Please highlight the limitations and strengths.

Strengths sit in the context in which the paper is presented. Many issues highlighted are accompanied with historical examples that I feel many geoscientists would find useful/help some geoscientists begin to recognise that the discipline is indeed colonial

The main limitation of this work is that there is no evaluation of the intervention – in its current format it is essentially a reflection piece – I think this work has so much potential if it were to incorporate data from staff and students. Box 3 indicates that some of this data already exists – if there is access to (for example) the online assessments where students share insights – this is the data that needs interrogating and including into the work (you could thematically analyse it?)

There is a slight feeling whilst reading that this is a more biological/ecological example rather than one of geoscience – there are some examples of geoscientists and geoscience activities that have been colonial/impact on the discipline today – but the really good examples, and what the students explore, tends to be more bio/ecology? Could more context be drawn between these areas?

I think this is potentially and incredible example for STEM disciplines on how these topics and issues can be embedded into courses, but I do feel that some rigorous analysis on how the intervention "worked" is important.

Q 3 Please comment on the methods, results and data interpretation. If there are any objective errors, or if the conclusions are not supported, you should detail your concerns.

The literature based arguments are sound and provide excellent context to the paper. The intervention itself is reasonably explained, but key elements about the students, staff, and their experience are missing. What is the demographics of the student body taking the course, and what are their thoughts about these issues – did the intervention have an impact (i.e. change how they saw scientific data/theory, change how they 'felt' about their discipline, understand how power imbalance has lead to the status quo of today etc.)

Q 4 Check List

Is the English language of sufficient quality?

Yes.

Is the quality of the figures and tables satisfactory?

Not Applicable.

Does the reference list cover the relevant literature adequately and in an unbiased manner?

Yes.

Are the statistical methods valid and correctly applied? (e.g. sample size, choice of test)

Not Applicable.

If relevant, are the methods sufficiently documented to allow replication studies?

No.

Are the data underlying the study available in either the article, supplement, or deposited in a repository? (Sequence/expression data, protein/molecule characterizations, annotations, and taxonomy data are required to be deposited in public repositories prior to publication)

No.

Does the study adhere to ethical standards including ethics committee approval and consent procedure?

Not Applicable.

If relevant, have standard biosecurity and institutional safety procedures been adhered to?

Not Applicable.

Q 5 Please provide your detailed review report to the editor and authors (including any comments on the Q4 Check List):

Check the article for spelling – Author guidelines indicate that international spelling is used for Stratigraphic terms, but British English elsewhere (could the editor please clarify on this point – wouldn't want unnecessary work of correcting American English to British if it is unnecessary!).

Use of "geosciences" in title and elsewhere. I think some consideration should be given to how well a biogeography course represents the "geosciences". How representative of the geosciences is this particular course? Could it also be used as a good case study for the biosciences and wider science in general? (I would argue yes). Would a title along the lines of "Confronting racism and colonialism in Higher Education: Integrating critical pedagogy in science curricula" be a fairer description of the work?

Line 24/25 – is it worth including a line indicating how these fields are also struggling to reconcile this issue – and then work toward this work acting as a case study for how decolonial/antiracist work can be done?

Line 25 – college in USA different to UK – might want to clarify

Keywords (Line 38) – include "Science"

Line 43: not all areas of STEMM everywhere struggle with this (medicine can be one of the most diverse cohorts), perhaps reword to indicate certain fields?

Line 45 – would "historically marginalised" be more useful than students of colour? As indicated on Line 50, other identity-based exclusion is rife (issues around gender diversity in the geosciences and its colonial origins jumped straight to my mind)

Line 54 – dominant pedagogies uphold agendas of those in power – yes, generally white, but settler colonialism is a complex mix including individuals from other colonised regions – "white elite" might be a more accurate to use here (see Tuck and Yang, 2012 – I do acknowledge the critiques of that paper!)

Line 56 – "Many" students... (there are some courses that have history of science well embedded – New Zealand seem to be leading here, for example)

Line 60 – interesting wording here – are these diverse curricula "outside" of the discipline? Rather than inflexible degree programmes, is it not (again...) the colonial attitude towards what a subject "is" that influences this? I feel some rewording to indicate that these themes and ideas should be recognised as part of the discipline, and not "borrowed" from social science and humanities?

Line 67 - "geology" appears - again, I think an earlier sentence or two just exploring the idea of what is meant by "geoscience" in the context of the work would be useful

Line 73 - is this a direct quote?

Line 80 - does this direct quote need a page number - can the editor provide guidance here - cant find it in author instructions

Line 84 - college - level of education

Line 90 - this is really important - I think this needs highlighting in the abstract

Line 97 - Again, consider a more intersectional group - your work is relevant to many people that are historically marginalised

Line 97 - STEM is used rather than STEMM

107 - quote - page number?

125 - I think most of these interventions look to reduce all power imbalance, including, but not restricted to racial disparities.

142 - Tuck and Yang isnt in the ref list (which is why I pointed it previously....)

162 - really nice point, could include something around how these histories directly influence the present - its not "just" a violent history, but a violent present!

167 - this needs a reference

169 - is HEAL based at a single institution or is it a wider project? A bit unsure from this description. Or is HEAL the project being reported on!? In the case of the latter this needs explaining nearer the start of the introduction.

184 - are you using whiteness as an attitude/behaviour rather than the phenotype (like Tuck and Yang do?) Might need outlining if so (could add "whiteness" to box 1?)

BOX 1 - Scientific racism needs a reference.

203 - modern distribution or through deep time too? (I guess most geologists would want to know!)

202 -210 - assumption that the educational structure of the USA is understood elsewhere...

210 - emphasise the interdisciplinary nature of the course?

212 - include information on how many students are typically on the course, and some information about them - what is the diversity of the cohort; race, gender, discipline background etc...

232 - could do with a reference/example

240 - an interesting point, it might be worth exploring the purpose of many "expeditions" - none were solely geological in nature, there would be anthropological and ecological aspects too - its not just the rocks they were looking to exploit....

260 - incomplete sentence

262 - 264 - sentence doesn't make sense? What is the good example?

262 - I wonder if this section would be better starting with the examples of what students have done, and then link to geology examples?

287 - settler colonial powers rather than white societies?

307 - also called parachute science/research

311 - the concept of postcolonial might need explaining

340 - I like this section, really clearly outlines what was done with the students, suggest it works better at the start of the case study section - introduce what you did with students, then what the themes were?

394 - these are the places where student data would make such a difference - how many students include information on decol, for example? Maybe include quotes from the work indicating engagement?

400 - amazing - how did this go? what sort of topics were explored?

436 - socialised? would trained be more fitting?

455- this is whats really missing from the work at the moment - an outline/evidence base of this work!

QUALITY ASSESSMENT

Q 6	Originality	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Q 7	Rigor	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Q 8	Significance to the field	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Q 9 Interest to a general audience



Q 10 Quality of the writing



Q 11 Overall quality of the study

