

An argument for mathematics education papers to address global sustainability

David Wagner, July 20, 2023

This is the text of my 10-minute initial presentation in the plenary panel discussion at the conference of the *International Group of the Psychology of Mathematics Education*, in Haifa, Israel, July 20, 2023. I include here:

- the description of the panel
- the introduction I gave Roza Leikin to read when she introduced the panelists
- the text of my 10-minute opening comments (including my time stamps so that I could adjust if I was too slow or too fast).

After each panelist presented their opening comments we responded to questions from the audience. There were some great questions, so I encourage scholars in our field to ask their friends/colleagues who were present about those questions and the dialogue that ensued.

Description of the panel:

The Plenary Panel will consist of editors of mathematics education journals and its topic is: A manuscript's relationship to global sustainability (e.g., The U.N. Global Sustainability goals, <https://sdgs.un.org/> should be a criterion in determining its acceptance for a mathematics education journal.

The panel will follow the structure of an Oxford style debate, hosted by a moderator, and will take place between two teams, the “proponents” and the “opponents” of the claim.

The Plenary Panel will include the following editors of mathematics education journals:

- Rina Zazkis, chair of the debate, editor of *Journal of Mathematical Behavior*
- Pat Herbst, debating against the proposition, editor of *Journal for Research in Mathematics Education*
- Gabriele Kaiser, debating against the proposition, editor of *ZDM Mathematics Education*
- Despina Potari, debating for the proposition, editor of *Journal of Mathematics Teacher Education*
- David Wagner, debating for the proposition, editor of *Educational Studies in Mathematics*

My Introduction (written by me, read by Roza Leikin):

David Wagner is co-editor-in-chief of the journal *Educational Studies in Mathematics*. His research focuses on human interaction in mathematics and mathematics learning. He is politically active at home, active in the Green Party. But he says life is complicated for him. He has had a big carbon footprint—for example, he has flown in or out of 124 different airports. He lives on land stolen from the Wabanaki people, whom are Indigenous to the region, in Canada.

My 10-minute opening comments:

Good morning everyone. Thank you for coming to participate in this important conversation. My name is David Wagner. Roza introduced me in the way I wanted to be introduced. Yes indeed, I have to navigate complicated tensions. But many people have much more challenging tensions.

And thank you, colleagues, for your careful reflection on our proposition.

I feel a little awkward debating this question in this style.

- We are talking about an existential crisis for humans.

- I am confident that our so-called opponents know it is an existential crisis.
- My experiences of this Oxford style of debate is that they are often fun and entertaining. But I do not feel motivated to have fun with this question about the viability of our environment and our species.
- These Oxford debates also focus on the ideas, and separate them from the people and the places. This is how we can be opponents while we probably have similar goals. This separation of ideas from the material realities of people and their environments is also a separation that has allowed us humans to destroy our environments.
- But this is the context we have. I am thankful for the International Committee for giving this question the prominence it deserves. And I am thankful for my colleagues for participating because their attention also supports the significance of the dialogue.

(1:27)

The argument against the proposition is fear—fear for how this will change our work, maybe how it will change the field.

- Of course, fear is sometimes warranted.
- For example we should fear the impact of the gross environmental changes we as a species have imposed on our world. If we do not address this fear, people will say that we are out-of-touch with reality, and they will be correct.

The argument for the proposition is “you need not fear”

- We should not be deterred by fear because this change may not be as big as we imagine.
- To avoid undue fear, we can visualize what the change can look like for us.

So I will focus my contribution on what we can do:

- Our choices for action impact our decisions about what to research and how to write about our research.
- Our choices for action impact how we review and assess the work of our colleagues.

Whether or not we fear the proposition, I argue that the proposition is inevitable.

- Our field will have this criterion sometime soon—I’d say 10 to 15 years.
- The existential crisis is becoming increasingly obvious and increasingly recognized, except among political and religious fringes.

- The question for me is how we get there:

- Probably we should be there already.
- We should have had this debate 15 years ago.
- Natural scientists knew what was coming. And now, here we are, after years of doing virtually nothing. In politics and in our field, we are slow to act.

(3:03)

How do we get to the point of taking the sustainability crisis seriously in our field?

- We have an opportunity for ethical action—the necessity, of justifying our research decisions (and other decisions) in terms of sustainability criteria.
- Acting on this opportunity will also have personal benefits. As others start to justify their work in terms of sustainability, they will cite the research that carefully explains how certain kinds of research address sustainability. I think they will be cited a lot when the criterion is established in the field.

- I raise this opportunity because I want to encourage people to do this more—especially publishing papers that explain how established streams of research are in support of sustainability or not. Most particularly—what needs to happen in a stream of research for it to be sustainability-justified?
- Another way of looking at this: it is already expected that research reporting explain why their work is relevant. Our question today is what constitutes relevance.

(4:11)

To help us visualize what justifications might look like I made a Google doc for us to share possible wordings of justifications.

- And to discuss those.
- Here is a URL for the document, and a QR code you could use if you have a phone with a camera.
- The URL is Dave Wagner dot CA slash sustainability. CA is for Canada.
(<http://davewagner.ca/sustainability>)

When you go to the document I encourage you to try writing some sample wording for a good justification, ... or an insufficient justification. I have two examples there already. You can add examples now, or later, ...and please give feedback to each other... politely.

- The first example justification has a response saying it is insufficient.
- I will read it: “This work connects to Sustainability Development Goal 14, Life Below Water, because students worked on a word problem about a lake.”
- Well, no. If I buy a yacht, it relates to the water but it certainly misses Goal 14. A justification needs to address the details and values of the sustainability goals.

(5:19)

The second example is intended to be a good example, but I am sure that it could be critiqued.

- Research on problem posing has not usually identified its significance in addressing humanity’s shared goal to live sustainably, but here we address the connections between our work and the need for “peace, justice, and strong institutions” (SDG #17) among other sustainability goals. As noted by Scholar X (2023), problem posing is important for students to understand that any given context could produce multiple questions. Students will learn that the people who set the mathematical agenda greatly influence collective action. And their work on problem posing also gives them experience with understanding a context and addressing it with mathematics.
- Someone else asks, “Did you just invent this now? Has someone justified the importance of problem posing in this way?”
- And the example reply is like this: “Yes, I just made it up as an example of a potential format for writing justifications. But I do think that problem posing is important in this way. I’d like to see someone develop this carefully. I think that work would be cited a lot.”

(6:34)

Then I think we need to consider what the expectation does. What is the functional value of asking for justifications?

- One impact is that we will all be motivated to reflect on our decisions in terms of ecological and social imperatives.
- This has me reflecting on my own experiences with justifying my choices in research action...

I have not always written justifications of my research in socio-ecological terms.

- I have always considered the relevance or value of my research in terms of its impact on social and ecological concerns, but I have not always written these considerations in my writing.
- I ask myself now, why not?
- One reason is a fear that reviewers will not consider it valuable.
 - I think the state of urgency makes this less likely now.
 - The crises have become common knowledge.
- Another reason is that I want to draw in readers who might not share my values. I worry that if I say what my concerns are they might say, “well, these are not my concerns, so I will not pay attention to this research.”
 - As an editor, I see reviewers as first readers of research. So, again, this worry is not as much of a worry now. In fact the worry can go the other way. Will readers consider my research as relevant if I do not say how it addresses social and ecological demands?

(7:52)

I will close my opening remarks identifying some challenges that will need to be addressed:

- Whose voices and perspectives would adjudicate whether a study's justifications address social and environmental needs sufficiently?
 - Will it be sufficient to cite an article that explains criteria for sustainability justification?
- What is the role of journal editors? Do we represent the field or lead the field?
 - I think it is both, so we have a challenging role.
- I notice that these challenges are the same as challenges for other criteria in our field.
 - Whose voices count in deciding if something is methodologically sound?
 - How deep does a justification of methodology need to be?
 - We could ask these questions about other aspects too—theory, positioning of a work in the literature, etc.
 - The question about journal editor roles applies to all the criteria used in peer review too.
- Here is a more unique challenge. The SDGs will be replaced by something else soon—for example, I have heard that the term *revitalization* may soon replace the term sustainability. And the SDGs come out of the millennium development goals, which could be seen as an earlier version of the SDGs
 - If there are multiple sets of goals, which ones should be used?
 - I value goals that are established across national and sector lines (for example, the SDGs)

(9:16)

Here are some imperatives and opportunities for us all.

- Let us start justifying our work in this way, certainly in our own reflections and also, hopefully, in our research reporting.
- Consider writing an article focusing on a careful analysis of a research stream in terms of communal goals for healthy social and ecological environments.

- And when we review articles or assess academic work in other contexts, address the sustainability criterion. Remember that you do not have the final say as a reviewer, so you can at least give the editor the task of deciding how to deal with your comments. You could do it as a soft suggestions to start, saying “I would like to see...”

Thank you.

(10:00)