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Exploring decolonising the curriculum using Six Thinking Hats.

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Standfirst
Decolonising physics is a scientific necessity often stalled by 'competence anxiety'. By using the Six Thinking Hats framework, educators can navigate these challenging conversations with structure and safety.

Equality, diversity and inclusion (EDI) in physics education is not a homogeneous entity. In the past 20 years, there has been a sizable increase in education research publications with variants of "accessibility" and "inclusivity" in the title or abstract, but the same cannot be said for "decolonising". Research suggests some reasons why decolonisation is falling behind compared to other EDI topics. A survey[1] in 2024 of academic staff from four science-related schools received 46 responses and found the most common barriers faced are a lack of training (41.% of respondents), a lack of understanding of the problem (32.6%), not knowing where to source ideas and advice (28.3%), and a concern about causing offence (23.9%). This finding echoes the wider literature regarding psychological safety and race talk[2], white fragility[3], performativity and EDI fatigue[4], and the fear of reprisals and negative consequences[5].

At the same time, physicists are taking action. For example, researchers in optics and photonics designed a Salon[6] to talk about social issues, recognising that scientists are beginning to understand the societal context in which their work resides. One of the actions they propose is that we need to normalise conversations around these topics While one recommendation from this Salon is to approach topics around social justice within a "…semi-casual setting…" to foster openness, we contend that such environments often lack the necessary safeguards to overcome the systematic barriers described in the wider literature.
There is, therefore, a need for a formalised and structured approach that encourages conversations while maintaining the psychological safety required for all participants to speak candidly. In this Comment we share our experience of using a scaffolding technique known as the Six Thinking Hats[7] to provide this structure, allowing us to holistically explore the idea of decolonising the physics curriculum within a supportive framework.

A Six Hats Approach

In June 2025 we ran a day workshop open to all staff involved in the teaching of physics in UK universities, part of which explored the different aspects of decolonising the curriculum. Recognising the need to provide a structured but not restrictive framework to allow for a broad discussion that allows and encourages conversations on multiple aspects of the topic, we developed a series of discussion points based on the Six Thinking Hats approach[7] . This tool facilitates structured thinking based around a set of 6 different "hats" that each person "wears" at the same time. Each hat represents a different mode of thinking that helps us explore a topic from multiple perspectives by using specific groups of prompt questions in sequence.

Hat	Mode of thinking	Example prompt questions
Blue	Process, setting the scene	What is our focus or goal for this discussion? What are our next steps and who will do what?
White	Facts and information	What do we currently know about the history of physics in our curriculum? What information or perspectives are we missing?
Red	Feelings and intuition	What are your gut feelings or initial reactions to decolonising the curriculum? What are your hopes or fears for this process?
Black	Caution and risk	What challenges or barriers might we face? Where could this process go wrong or be misinterpreted?
Yellow	Optimism and benefits	What are the potential benefits for students, our departments and the discipline? What strengths or assets do we have to support this?
Green	Creativity and novelty	What new approaches could we consider for embedding decolonising principles? What alternative ways might we look at existing topics?

Although typically employed as a corporate decision-making tool, the Six Thinking Hats offers a rigorous scaffold for deconstructing systemic curricula. In a discipline like physics, where the veneer of objective neutrality can often mask underlying biases, moving directly into sociopolitical critiques can feel intellectually uncomfortable for practitioners. By mandating parallel thinking, where every participant occupies the same cognitive space simultaneously, we bypass the adversarial debates that often stall EDI progress.

The session opened with the Blue Hat (process regulation), used by the facilitator (MM) to ground the participants in the workshop's rules of engagement and objectives. We then purposefully sequenced the remaining hats to mitigate the specific barriers of EDI fatigue and fear of offense identified earlier. By beginning with the White Hat (facts), we ground the conversation in empirical reality, such as historical timelines, citation metrics and demographic data, that appeal to the physicist's foundational reliance on evidence.

Crucially, we then transition immediately to the Red Hat (emotions and feelings). Emotions are often sidelined as unscientific, yet they drive the psychological safety (or lack thereof) in our departments. This sequence provides a safety valve, allowing participants to explicitly articulate their anxieties, scepticism or hopes upfront. By giving these emotions a designated, time-bound space, we "clear the air", preventing unvoiced discomfort from subconsciously sabotaging the subsequent analytical and creative phases.

Once these internal frictions are surfaced, the group can move with greater clarity into the Black Hat (critical risks) and Yellow Hat (optimistic benefits), before concluding with the Green Hat to generate actionable interventions for the curriculum. This method transforms a potentially polarising topic into a structured inquiry, giving scientists permission to be both vulnerable and analytical.

We first captured participant input through table-based flip-chart exercises, followed by a full-group discussion at the end of each Thinking Hat stage. Following the workshop, we reviewed these flip-chart notes and our own notes made during the discussion stages, performing a thematic analysis to synthesise the raw responses into coherent categories.

Workshop Findings

Our workshop revealed a community characterised by "cautious ambition". Although there is a robust consensus that the current UK physics curriculum is historically incomplete, substantial structural and emotional barriers inhibit progress. These findings, along with a detailed toolkit for practitioners, are documented in our full report.[8]

Through the White Hat lens, participants identified a pervasive "custodian myth" in physics history. This narrative falsely implies that non-European scholars merely acted as librarians of Greek knowledge during a supposed scientific dark age before the European Renaissance. This omission devalues the generative contributions of scholars from the Global South, such as Ibn Sahl's 10th-century derivation of the law of refraction, framing them as passive preservers rather than active discoverers.

The Red and Black Hat discussions surfaced "competence anxiety" as a primary hurdle. Physicists often feel unqualified to navigate the nuances of history and sociology, leading to a fear of cancellation or a concern that changes might be perceived as performative. Additionally, participants expressed a "burden of isolation," fearing that decolonising remains an individual workload added to a saturated schedule and content-heavy curriculum rather than a systemic priority. As one author noted while reviewing the qualitative data from the workshop, "we're often worried about getting it wrong as our education rarely included non-Eurocentric content; it feels like taking a gamble which hinders teaching confidence".

However, the Yellow Hat analysis reframed these efforts as a scientific necessity. Participants argued that a decolonised curriculum produces better scientists by teaching students to question data sources, observer bias, and the ethics of facilities. This led to Green Hat interventions:

- Visual audits: Reviewing course material to dismantle the "lone white male genius" archetype.
- Dual naming protocols: Explicitly crediting parallel discoveries (such as Snell and Ibn Sahl[7]) to ensure historical accuracy without disrupting familiar exam terminology.

- Student partners: Employing students to research diverse histories that staff may lack the time to uncover.

Call for Action

Progress requires a fundamental shift from individual, ad-hoc efforts to centralised, sector-wide resources. Relying on isolated lecturers to reform modules is unsustainable - as one participant noted the feeling is often “Great, another thing I have to do (alone).”[8]. We propose a roadmap for professional bodies and departments to transition from awareness to action:

1. Establish a case-study bank: A centralised repository of peer-reviewed, fact-checked historical context slides, examples and questions for common undergraduate topics should be developed. This directly mitigates competence anxiety and workload burdens.
2. Develop universal module frameworks: The sector should support a core "History and Philosophy of Physics" syllabus that any department can adapt, ensuring a high standard of quality across the board.
3. Incentivise curriculum evolution: Accreditation bodies should move beyond requiring a "commitment" to EDI and begin requiring evidence of a globalised curriculum as a marker of excellence.

A Scientific and Social Necessity

Decolonising the physics curriculum is not an exercise in political correctness, but an essential update to our scientific record. By acknowledging the global roots of our discipline, we replace a narrow, historically incomplete narrative with one that is empirically more accurate. A physicist who understands that scientific progress has always been a global, non-linear dialogue is better equipped for the critical thinking required in modern, international research collaborations.

This evolution is also vital for the long-term sustainability of the field. When students from minoritised backgrounds find their heritage omitted from the history of physics, it creates a belonging deficit that recruitment initiatives alone cannot bridge. By contrast, a curriculum that reflects the true diversity of scientific discovery sends a clear message: physics is a home for all. Ultimately, the success of physics in the 21st century depends on our ability to ensure that the next generation of scientists can see themselves reflected in the history of the laws they are learning to apply.

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Competing interests

The authors declare no competing interests.

References

1 Grinsted, L., Murgatroyd, C. & Burkett, J. Exploring attitudes to decolonising the science curriculum—A UK Higher Education case study. *PLoS ONE* **19**, e0312586 (2024).

2. Williams, J. D., Woodson, A. N. & Wallace, T. L. “Can We Say the N-word?”: Exploring Psychological Safety During Race Talk. *Research in Human Development* **13**, 15–31 (2016).

3. DiAngelo, R. *White Fragility: Why It’s So Hard for White People to Talk about Racism*. (Beacon Press, Boston, 2018).

4. Bhopal, K. The (un)equal university: Training programmes and the commodification of race. *Higher Education Quarterly* **78**, e12518 (2024).

5. Garvey, A., Kabuye, H. & Ajibade, B. Power, institutional protectionism and the disinclination of minoritised employees to raise complaints in UK universities. *Culture and Organization* 1–23 (2026) doi:10.1080/14759551.2026.2623996.

6. Bell, K. *et al.* Starting a conversation about social issues in optics and photonics. *Nat Rev Phys* **6**, 286–288 (2024).

7. De Bono, E. *Six Thinking Hats*. (Penguin Life, an imprint of Penguin books, London, 2016).

8. Mears, M. *et al.* Decolonising the Physics Curriculum: Workshop Findings Report. Preprint at https://doi.org/10.6084/M9.FIGSHARE.31999125 (2026).