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Supporting the ‘elite’ to disrupt beliefs of elitism: A rationale for adopting a science capital lens to educational development

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Abstract

The impacts of ‘elitism’ on experiences *in* and access *to* higher education have been a sustained focus internationally. However, the specific impacts documented within a STEM higher education context in the UK need deeper reflection (Marey et al., 2021). Similarly, significant research efforts have been devoted to supporting young students to develop identities in STEM - particularly through a science capital teaching approach. But teacher education, specifically within higher education STEM settings, needs further attention.

Drawing on over a decade of research in this area, professional reflections and observations of practice in STEM higher education settings, this paper explores the potential utility of adapting and implementing a science capital teaching approach (Godec et al., 2017) to best support these ‘elite’ educators – particularly by encouraging reflection and increasing awareness of their own entrenched views and providing embedded support to guide them towards more equitable teaching practices and interactions with students.

Full paper

There is sustained focus within the literature on widening participation in higher education globally. In the UK, there is growing policy effort devoted to increasing and diversifying engagement in STEM. This relates to all levels of education and also extends to the STEM workforce (Archer et al., 2023; Smith & White, 2024). However, research exploring student and staff experiences of ‘equity’ - particularly in the elite STEM higher education context - is sparse.

STEM subject enrolment within the UK often comes with higher status, even within a school learning context, depending on the science options ‘chosen’ (Archer et al., 2016; Moote et al., 2020), with certain routes, disciplines, and professions being viewed as for the ‘elite few’. Hughes (2015, p. 7) has argued that “*as soon as one starts to describe groups as “elite”,*

one is in an elitist mode of thinking". However, the perception that STEM is 'elite' is prevalent - including among students and higher education teaching staff themselves, and warrants cautious exploration.

Within the context of educational development at Imperial College London explored in this paper, staff are supported towards a more student-centred approach, seeing the teacher, less as an 'expert' deliverer of knowledge, and more as a facilitator of knowledge construction. While some staff value this, preliminary observations show that others are resistant. Resistance often seems to come from a feeling that this approach challenges their status as professors (or similar) generally, but specifically as professors within STEM fields – manifesting an elitist approach. For these individuals, the idea of not being seen in the eyes of their students as *the* expert, with extensive knowledge to deliver, and instead valuing what students can bring to the classroom settings, can be a real challenge.

Institutional assumptions, structural barriers, and teaching practices have an impact on students' sense of belonging, which has been shown to be connected to students' future trajectories and decision-making processes around pursuing STEM (Marey et al, 2021). Previous work (e.g. Archer et al., 2017) advocated for a change in the culture of STEM, particularly physics and engineering, so that STEM can become a tool for social justice instead of a proponent of inequity. Therefore, this paper takes the position that it is important to address directly such 'elitist' attitudes to be able to change them. This approach is key to engaging with relevant higher education practitioners and helping to dismantle current elitist structures that exist in STEM higher education. It also allows for the exploration of how these views are shaped by various stakeholders involved (e.g. the students themselves, STEM leadership and industry partners).

The ASPIRES studies (with survey data from over 47,000 young people and over 800 interviews from a longitudinal cohort of 50 between the ages of 10 and 22) found that while many young people enjoy learning STEM subjects in and out of school contexts, few aspire to work in STEM careers and industries. One of the key outcomes of the ASPIRES research was the development of the concept of science capital and a series of related teaching resources (Godec et al., 2017; Nag Chowdhuri et al., 2021). A growing body of research is showing that the likelihood of a young person aspiring to a career in science is strongly related to how much *science capital* they have (Archer et al., 2015; Dewitt et al., 2016; Moote et al., 2020, 2021). The results of a systematic review found that these studies mainly focused on secondary school education and formal contexts and highlighted that more work is needed in other educational settings (Kontkanen et al., 2024), including higher education, but specifically teacher education within higher education institutions.

Drawing primarily on the findings of the ASPIRES mixed-methods studies conducted over the last decade, as well as recent practical observations within a STEM educational development context at Imperial College London, this paper focuses on the need to support practitioners in higher education to dispel feelings of 'elitism' around STEM, which can put students off pursuing the field. Specifically, this paper explores how a science

capital approach to teaching could be extended, adapted and embedded within current educational development provision, to help break down perceptions of elitism in STEM higher education. Through offering these methods and ideas, the paper provides a chance for deeper reflection on what practical support is needed and explores the value of extending the significant body of research in this field into a higher education STEM and educational development context.