



Review

Project-Based Learning as a Potential Decolonised Assessment Method in STEM Higher Education

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Abstract: Decolonising the curriculum (DtC) is an emerging concept that continues to challenge higher education institutions globally, with educators and scholars increasingly recognising how traditional curricular structures, content, and pedagogical practices can reinforce colonial biases and marginalise certain student groups. DtC can be seen as a process rather than a phenomenon, one which is ongoing and multiplexed, consisting of elements that aim to dismantle the hierarchy between staff and students and question the ways in which knowledge is produced, valued, and disseminated. The expected outcome is to provide students with an education which is equitable, inclusive, and relevant to their personal lives and experiences. Efforts in DtC have continued to gain traction, but assessment practices remain overlooked as a crucial component, with most decolonising efforts focussed towards content and pedagogy. As such, this review aims to contribute to the conversation by exploring the roots and impacts of colonisation on higher education, particularly within the context of assessment in STEM subjects. We examine various elements of decolonised assessment methods and ultimately suggest project-based learning (PBL) as a comprehensive approach that brings together the aforementioned decolonial elements, illustrating this concept through the examination of a PBL assessment mode study conducted at the University of Sussex.

Keywords: decolonisation of the curriculum; decolonised assessment mode; project-based learning; transferrable skills; equality; diversity and inclusion; empowerment; hierarchy; STEM



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1. Introduction

The landscape of higher education is undergoing a significant transformation as educators and scholars grapple with the imperative of decolonising the curriculum (DtC). This concept challenges the traditional structures, content, and pedagogical practices that have been rooted in colonial biases, leading to the marginalisation of certain student groups [1]. It is an ongoing process aimed at dismantling hierarchies, questioning knowledge production, and fostering an education that is equitable, inclusive, and resonates with students' personal lives and experiences [2].

Movements like the #FeesMustFall protests in South Africa have propelled decolonising efforts to the forefront, with much attention given to reshaping content and pedagogy [3]. Assessment, however, often remains an overlooked part of this journey, despite its role as a powerful tool that profoundly impacts the learning experience. It is an area ripe for decolonial exploration, especially within science, technology, engineering, and mathematics (STEM) subjects, where the objectivity and neutrality associated with these disciplines can mask underlying colonial influences.

This review aims to contribute to the conversation on decolonising higher education by delving into the roots and impacts of colonisation within the context of assessment in STEM subjects. By examining various elements of decolonised assessment methods, we seek to shed light on project-based learning (PBL) as a comprehensive approach that combines several decolonial elements while transcending the surface-level impacts of other approaches. Through a specific case study of a PBL assessment mode conducted

at the University of Sussex by Pranjol et al. (2022) [4], we illustrate how PBL serves as a promising approach that aligns with the decolonial concepts necessary for a truly inclusive assessment experience.

2. The Colonised Curriculum: Present Day Manifestations within STEM Higher Education

2.1. *Historical Ties of the Colonised Curriculum*

Understanding the DtC movement requires an examination of how the curriculum came to be colonised in the first place. Intuitively, the modern colonised curriculum and its place within higher education can be traced back to historical colonial events.

Mampane et al. (2018) describes colonialism as a “system of domination and subjugation of people from another culture, including all forms of imperial rule and cultural differences that exist between the government and the governed; and the consciousness and rejection of values, norms, customs and world views imposed by the colonialists” [2]. Essentially, colonialism is the control of one group by an alien or “outside” group, resulting in the loss of sovereignty of the subjugated group and often the erasure of their cultural, social, and historical identities [5].

Colonial powers often used their perceived cultural and intellectual superiority as a means to justify their domination over colonised populations [1]. Assimilation, defined as a process in which “groups of differing ethnic heritage are absorbed into the dominant culture of a society” [6], emerged as a pivotal colonial strategy, with subjugated groups expected to “gain civility and enlightenment through social, religious and cultural assimilation” [7]. Education became one way to enforce this, and evidence of this is found in the European empires of the 18th-20th centuries. Pre-colonial education in Africa was distinctly marked by its relevance to the lives of Africans, with strong connections to various aspects of their daily existence in matters such as medicine, leather making, professional trading, and organising religious rituals [8]. Following the presence of the British empire in African regions came a reform to many existing educational programs, one which excluded African interests and instead focused on British empire history, European geography, and English language and numeracy [8]. Through such processes, the culture, values, and systems of the colonisers are imposed onto the colonised group, whilst those of the colonised group are marginalised or even deliberately prohibited, culminating in their erasure. Morreira et al. (2020) describes a further justification of this phenomenon, asserting that “Western conceptions of reason considered only certain people as rational, and thus dehumanised large segments of the population via the exclusion of other groups of people from having the capacity to reason” [1]. A Eurocentric epistemology emerged that was imposed as universal and absolute in its truth and was gradually perceived as such.

Colonialism is widely considered to have ended, at least in its historical form characterised by empires and direct territorial control, but its influences endure and shape various aspects of modern society. Many post-colonial societies inherited the educational and administrative institutions established by colonial powers, those deliberately designed to enforce assimilation and facilitate marginalisation [9]. These structures remain in place even after gaining independence, perpetuating colonial ideologies in a sort of “institutional inertia”. Maldonado-Torres (2007) captures this colonial continuance through the differentiation of colonialism and colonality as distinct concepts; colonality goes beyond colonialism in the form of enduring power dynamics birthed from colonialism, but which persist beyond the formal end of colonial rule [5]. As such, with the persistence of colonality permeating various aspects of society, it is unsurprising that we might find it in our modern academic institutions in the form of a “colonised curriculum”.

2.2. *Colonial Roots of Scientific Knowledge*

STEM subjects are often thought to be immune to this colonial mindset due to their perceived objectivity, neutrality, and association with quantitative information, but colonial-

ity in STEM can be revealed in examining the historical context in which scientific theories arose; asking the questions of how, why, and by whom they were developed.

The origins of science are undoubtedly intertwined with colonial ideologies. Like many other aspects of Eurocentric knowledge and culture, science was seen as a gift bestowed by colonisers to indigenous communities in a “civilising mission”, whereby colonisers had the responsibility to help colonised populations progress in society; this concept is exemplified in Rudyard Kipling’s influential poem “The White Man’s Burden” (1899), where white populations are inspired to fulfil their duty of civilising non-white populations through colonial activities [10]. Many Enlightenment philosophers perceived human history as a series of stages striving towards an ideal society, categorising civilisations into hierarchical frameworks based on their position in these stages; the civilising mission was thus undertaken on the basis of helping civilisations progress through the stages, and this became both a motivating and justifying factor in colonial activities [10]. Notably, while the civilising mission was largely based on religious knowledge in the Spanish and Portuguese empires before the 18th century, this shifted to a scientific basis in the 19th century French empires [10]. In essence, the historical association of science with colonial ideologies has long framed Western scientific knowledge as the superior ideology and central knowledge canon, asserting its dominance since colonial times [8].

The intertwining of coloniality with science is also revealed in historical discoveries and breakthroughs, which were further used to justify colonialism. One example can be found in the views expressed by Sir Ronald Ross, a British medical doctor credited with the discovery of the transmission of malaria, winning him the Nobel Prize in medicine [11]. In a lecture to the Liverpool Chamber of Commerce in 1899, Ross articulated the belief that “in the coming century, the success of imperialism will depend on the success of the microscope” [12]. The advancement of science was essentially seen as a tool in British imperialism; that the discovery of how diseases such as malaria were transmitted could be used to protect British troops and further the agenda of British imperialism, revealing the intertwining of scientific progress with colonial ideologies.

A further example is found in the beliefs of James Watson, an acclaimed scientist awarded the Nobel prize for the discovery of the molecular structure of DNA. In the documentary “American Masters: Decoding Watson” (2019), the scientist asserts that there is a “difference between blacks and whites in IQ tests. . . I would say that difference is genetic”, reflecting a troubling perpetuation of ideologies that have historically been used to justify colonialism [13]. Watson’s endorsement of eugenic and racist views showcases how harmful ideologies continued to shape the scientific discourse even after the perceived end of colonialism. Praising figures like Watson without addressing their prejudiced beliefs perpetuates a legitimisation of such beliefs and a normalisation of discrimination, misleadingly prioritising their scientific achievements over the harm caused by their views. This not only distorts historical narratives but also undermines the ethical responsibility of institutions to promote inclusivity and diversity.

2.3. Modern Manifestations of Colonised STEM in Higher Education

As such, the Eurocentric lens through which scientific knowledge was initially filtered will have undoubtedly influenced the way scientific knowledge is generated, validated, and disseminated today.

For instance, with the Eurocentric perspective and epistemology imposed as universal and superior since colonial times, it is unsurprising that discoveries and research by white male authors were disproportionately valued within the scientific community. This results in the marginalisation of contributions made by indigenous peoples and scholars from non-European backgrounds, perhaps leading to a general perception today that research produced by white male authors is more trustworthy or reliable. When examining citation patterns, a study by Pan et al. (2012) revealed a notable disparity, with North America and Europe receiving 42% and 35% of global citations, respectively [14]. Furthermore, an analysis of reading lists conducted in life science subjects at the University of Sussex

revealed a significant lack of diversity. The results showed that most authors on the reading list were white (83.4% white vs 7.4% Black, Asian, and minority ethnic (BAME)) and male (75.9% male vs 16.7% female) [15]. This bias was most pronounced in the field of genetics, which is notable given its historical association with eugenics.

A further manifestation of colonisation in present-day STEM higher education is seen in what is often referred to as “linguistic imperialism”, whereby dominant languages, primarily English, are enforced as the primary medium of instruction, communication, and publication [16]. Just as Eurocentric biases have led to the dominance of research by white male authors, this perpetuates the perceived superiority of English academic journals, universities, and institutions over those in other languages. For example, in the Times Higher Education University Rankings, which is the largest and most diverse university ranking, the first 15 institutions in the 2023 rankings are either North American or European [17]. This was also true for the year 2022, while in 2021, this was true up until the 20th ranking; in the last 10 years, every institution in the top ten rankings has been North American or European [17]. This Eurocentric dominance is also reflected in journal rankings—in the SCImago 2022 scientific journal rankings, the first 99 journals are either North American or European; in 2021, the first 215; and in 2020, the first 587 [18]. Clearly, this pattern underscores the entrenched nature of linguistic imperialism and its role in perpetuating the historical power imbalances in higher education. It serves as a reminder of how colonial legacies continue to shape the modern educational landscape, favouring certain languages and regions over others and reinforcing the notion that knowledge produced and disseminated in dominant languages is inherently more valuable.

Colonial persistence is also reflected in the power relations and hierarchies that exist in STEM higher education, with certain voices prioritised while others are excluded. Tate and Bagguley (2016) assert that academia continues to be “predominantly white especially at professor, vice chancellor, and top management levels”, which only serves to further narrow the already Eurocentric view of knowledge that is disseminated to students [19]. This lack of representation is not reflective of the multi-ethnicity and multiculturalism of the current student body; AdvanceHE’s 2022 Equality in Higher Education Statistical Report revealed that proportions of BAME students (26.2% in 2020/2021) remain consistently higher than those of BAME staff (16.3% in 2020/2021) [20]. The result of this is that the lived experiences of BAME professors are excluded, which can impact negatively on student engagement due to a lack of connection or relation. Hierarchy is also seen in teaching methods, as the traditional method follows a top-down, didactic approach, in which students are expected to accept the knowledge given by academics as true [21]. This reinforces power differentials between students and academics, posing a challenge for students in contributing, voicing concerns, or influencing change.

Finally, echoes of assimilation observed during colonial times can continue to resonate in what is referred to as a “deficit discourse”, whereby educators focus on what a student lacks to justify their underperformance [22]. An example of this could be lack of “proper English” skills being perceived as a deficit rather than an advantage of the ability to learn across several languages. The issue with this deficit discourse is the inclination to mould students from diverse backgrounds to conform to a singular standard, one set by the Eurocentric curriculum; assessments and criteria thus frequently demand students to think, speak, and write in alignment with this standard [22].

This ongoing colonality underscores the need to critically examine the historical roots of scientific practices, recognise their potential biases, and strive for a more inclusive and equitable approach to scientific inquiry.

3. The Journey of Decolonising the Curriculum: Shifting the Focus towards Assessment

3.1. The “Decolonising the Curriculum” Movement

Emerging as a response to the clear and deep-rooted colonial influences in education, the DtC movement is an educational initiative that seeks to challenge the traditional content, perspectives, and methods that have been predominantly influenced by historical

biases and Eurocentric viewpoints [1]. The movement recognises that the curriculum itself can perpetuate colonial narratives and power dynamics and thus strives for inclusivity, diversity, and equity within education by critically examining the existing curriculum and making efforts to integrate marginalised voices, diverse cultural perspectives, and non-Eurocentric knowledge systems. DtC ultimately aims to create a learning environment that reflects the complex realities of the world and the diverse experiences of all students.

This leads us to explore the imperative for DtC and its inherent necessity. The persistence of coloniality within the curriculum has adverse impacts on the students it excludes and marginalises. This exclusion of BAME students is reflected in the attainment gap, a disparity in performance between student subgroups (e.g., socioeconomic status, race, gender, disability), of which ethnicity was found to be the most determining factor [23]. AdvanceHE's 2022 Equality in Higher Education Statistical Report cited an attainment gap of 9%, with 85.7% of white first degree undergraduate students receiving first-/2:1-class degrees compared to 76.7% in BAME students [20].

Students from ethnic minority backgrounds are also reported to have less positive experiences in UK higher education than their white counterparts, as well as lower rates of satisfaction [24]. A 2021 study by Arday et al. (2020) explored the "impact of a dominant Eurocentric curriculum within higher education and the influence of this upon navigating factors such as BAME attainment, engagement, and belonging within the Academy", in which 15 BAME students and 3 BAME academics from seven UK-based universities were interviewed to understand their experience of the current colonised curriculum [25]. One male black student said "as a student you are sat there and you are listening to a lecturer talk to you about race. . . who in many respects does not understand what it is like to be a person of colour", whilst a female mixed-heritage student expressed a similar sentiment saying that "as a student of colour when you are sat in that space you feel it, you feel like none of this relates to me" [25]. Their voices emphasise the urgency of creating a more inclusive and representative educational environment that resonates with the diverse perspectives and knowledge systems of all students.

Efforts to decolonise the curriculum have gained significant traction, and the historical and cultural context of DtC is rich with pivotal moments that reflect the shifting tides of student activism, societal frustrations, and a growing awareness of the limitations and biases in higher education. In May 1968, France and the UK experienced significant student protests, marked by sit-ins and calls for changes in teaching methods and curriculum, driven by broader frustrations with capitalist structures and perceived outdated practices in higher education [1]. Another noteworthy example is the "#FeesMustFall" movement in South Africa, primarily focused on stopping student fee increases and demanding "free decolonised education" [26]. These efforts at DtC have primarily centred around content and pedagogy, aiming to diversify what is taught and how it is taught. However, it is essential to recognise that assessment, as a fundamental pillar of higher education, should be a central consideration in these decolonisation efforts.

3.2. *Shifting the Focus towards Decolonising Assessment*

Decolonising assessment and feedback methods in higher education involves critically examining the assumptions, values, and knowledge systems that underpin current methods and considering alternative approaches that are more inclusive and representative. The question arises, why decolonise assessment?

Assessment is a crucial and unavoidable part of higher education, serving as a barometer of student achievement that primarily determines whether a student has met certain required learning outcomes [27]. The result of this has the power to affect the student's future and career; assessment could thus be considered the area of higher education in which power relations are most exercised. Heron asserts that assessment is the "most political of all educational processes; it is where issues of power are most at stake" [28]. The gravity of assessment means it is also a primary source of student engagement and motivation.

As many educational practices are inherited from colonial systems, it is natural that assessment practices are also affected by colonial ideologies. Current assessment methods, especially in biological and other natural sciences, can be said to have a “positivist” view, such that knowledge is only recognised when it can be logically or mathematically proven or scientifically verified [29]. These assessments were not designed with inclusivity and diversity in mind, resulting in students being treated as a single body with no consideration of personal attributes, histories, or capabilities. This is often justified by the perception that the reliability and fairness central to assessment are achieved by treating students uniformly, the result of which is an exclusion and discrimination of certain student groups. For instance, assessments measure if a student has met the required learning outcomes within a course; however, not all students may meet these requirements in the same way [27]. Assessment methods can thus inaccurately evaluate and exclude students who are in fact able to meet the required learning outcomes, but perhaps not through the specific pathways or approaches traditionally favoured. For example, most exams are historically closed-book and time-limited, which “advantages those who can recall information quickly under pressure” and those who can “concentrate immediately, maintain focus for the duration of assessment, perform the task quickly, and/or perform well under stress” [27]. This does not fairly evaluate whether a student can or cannot meet the required learning outcomes; certain students may be able to do so given more time and access to resources (which would also more accurately reflect real-world conditions). Aside from the immediate adverse impacts of this exclusion (attainment gaps, low engagement and motivation), a further question arises: are assessments fulfilling their purpose of correctly determining who has and who has not met the required outcomes?

Efforts to decolonise assessment must take care that the assumptions, values, and knowledge systems that underpin current methods are truly examined. Many methods focus on surface-level modifications that thus only have superficial implications and fail to address deeper structural and epistemological issues rooted in colonial legacies. As an example, there have been several efforts to diversify reading lists which are largely dominated by white, male, Eurocentric authors [30]. Although a step in the right direction, this method could raise concerns of tokenism, a gesture of symbolic inclusion lacking substantive impact or intent; decolonisation must transcend tokenistic gestures to truly confront underlying power imbalances and systemic biases [31]. The mere addition of non-Western texts, without genuine engagement or partnerships with diverse knowledge systems, may fall short of challenging the pervasive Eurocentric perspectives that have historically dominated academic discourse.

In the effort to decolonise assessment, it thus becomes imperative to understand what decolonised assessment truly entails. A decolonised assessment method must depart from the traditional structures and assumptions that have built today’s assessments and instead align with current educational needs, containing decolonial elements that undo colonial practices and influences [1]. These elements ultimately promote an inclusive learning environment with a contextual awareness of our increasingly connected world, thereby transforming assessments from rigid constructs into adaptable instruments that are relevant and sensitive to individual students’ backgrounds and lives [32]. The decolonised assessment represents a departure from colonial practices that have historically prioritised a dominant Eurocentric perspective and instead embraces the value in a multiplicity of viewpoints and cultures [33]. For instance, one decolonial element of a decolonised assessment is to foster the development of transferable skills that are useful to students’ personal and professional lives; in doing so, creating world-class students who are prepared to engage with a global community across various contexts. Another decolonial element is co-creation and collaboration, which serve to promote student empowerment and agency to shift the hierarchy towards students having a stronger voice in their learning experience. These examples show how decolonial elements within assessment methods can foster a more inclusive and culturally sensitive learning experience, essentially serving to undo the colonial practices that have been intertwined with traditional assessment methods.

There thus remains a clear call for reform in how decolonised assessment methods are designed and disseminated, one which seeks to transcend surface-level adjustments and engage deeply with the decolonisation of education, addressing systemic biases and fostering authentic representation.

4. Project-Based Learning: A Comprehensive Approach to Decolonising Assessment

4.1. Introduction to Project-Based Learning

PBL emerges as a promising and comprehensive approach that integrates and addresses the shortcomings of prior decolonisation efforts within higher education assessment, demonstrating the ability to incorporate several decolonial elements alongside academic benefits to student learning and understanding.

PBL is a student-centred, inquiry-based instructional approach, in which learning is achieved through hands-on activities centred around questions, challenges, or real-world problems [34]. The approach is based on constructivism theory, which proposes that “what the individual learns and understands is constructed by the individual”, and that this construction occurs through social interactions (making collaboration an important part of PBL) and the integration of new knowledge with prior knowledge and experiences [35]. As such, instead of being passive recipients of information, students build their own meaningful and relevant understanding of the subject matter. PBL has demonstrated notable efficacy as a learning method and has been widely implemented in numerous educational institutions, as evidenced in studies by Gavin (2011) [36], Xu & Liu (2010) [37], and Kokotsaki et al. (2016) [34].

Beyond its pedagogical benefits, PBL presents a unique opportunity to incorporate and address decolonial elements within the context of higher education assessment. Among these elements are engagement with community knowledge, development of transferable skills, cultivation of collaboration and cohort identity, and promotion of student agency and ownership. In both direct and indirect ways, PBL is also able to challenge power relations and hierarchies, an objective central to the DtC movement but often difficult to address. In the following analysis, we delve into each of these elements to explore how they are integrated within PBL and evaluate its potential as a decolonised method of assessment.

4.2. University of Sussex Case Study

To explore the application of PBL as a decolonised assessment method, we investigate a study conducted at the University of Sussex that implemented a PBL assessment mode in a foundation, first, and second year BSc Biomedical Sciences course [4]. This serves as a case study to exemplify how PBL can effectively incorporate the aforementioned decolonial elements to challenge traditional assessment practices. The detailed method, findings, and analysis of the study can be accessed at Pranjol et al. (2022) [4].

The aim of the study was to evaluate the effectiveness of PBL in achieving the following outcomes:

- “Consolidating and integrating knowledge, from other modules, into a disease setting”;
- “Encouraging students to collaborate, and to build a sense of community in the cohort”;
- “Develop transferable skills, such as effective communication, problem-solving, time management, and team building”.

Students were randomly divided into groups of 3–4 and introduced to a formative PBL exercise, tasked with creating a digital revision resource for a certain disease condition over a period of 3 weeks. The product would be shared with the entire cohort to be used for exam revision. For example, the task given to year 1 students was to:

“produce a revision guide that describes what happens when *Staphylococcus aureus* bacterial antigen in staph infection is detected by our innate immune system. The guide should include the following details: bacterial cell structure, bacterial metabolism, assessment of the presence of bacteria in patients’ samples, the immune system, available antibiotics.”

Students were free to choose their resource format; some example formats included a PowerPoint presentation or video.

The final product was assessed formatively by two staff members and was marked based on the following criteria:

- “The clarity of presentation—information presented clearly with relevant figures and diagrams, labels and figure legends”;
- “The detail and quality of content that sufficiently covers the key learning outcomes”;
- “The creativity of the revision material, e.g., interactivity”.

Feedback was then given via the “sandwich method”, in which improvement areas were suggested in between positive feedback.

The study results were measured both quantitatively and qualitatively. Student performance was compared in two assessed modules before and after the introduction of the PBL task. Data from the academic years 2018/19 (pre-task introduction) and 2020/21 and 2021/22 (during task implementation) were collected from the school database and anonymised. The analysis aimed to determine whether the students achieved higher module grades following the task’s introduction, presented as mean values with standard deviations.

The study also utilised a questionnaire to assess the student experience with the PBL task. The questionnaire included both quantitative and qualitative aspects, consisting of close-ended questions with nominal scale and Likert-rating scale for quantitative analysis and open-ended questions with free-text boxes for qualitative analysis.

The study report then discusses the findings and implications of the PBL approach, exploring its effectiveness in achieving the study aims and improving the student learning experience, albeit without an explicit focus on decolonising assessment. In the following sections, this report thus examines the decolonial elements embedded in the study’s PBL implementation, connecting it to the broader context of decolonising assessment in the higher education biological sciences.

4.3. Integration and Consolidation of Knowledge

The PBL task required the students to respond to a big-picture, real-world question, compelling them to draw from various areas of their learning and synthesise disparate elements into a coherent context. This facilitates cumulative learning, promoting a deeper and more holistic understanding of the subject matter [4]. The study results indicated success in achieving the consolidation and integration of knowledge. A total of 74% of the surveyed students explicitly indicated that their participation was helpful in facilitating the integration of knowledge from previous modules and experiences. When the students were asked in the questionnaire to evaluate the effectiveness of the activity, as measured by “Q16—One aim for this activity was for you to consolidate and integrate your knowledge. How useful was this activity in consolidating your knowledge (0 being not useful and 5 being very useful)?”, the mean result was 4.1 ± 0.8 .

The integration and consolidation of knowledge in this manner also yields decolonial benefits alongside academic ones. Students draw not only from prior academic knowledge but may also draw from their personal experiences and backgrounds to contextualise the scenario posed by the PBL task. The study describes a “semantic wave” pattern of learning to illustrate how this consolidation and integration of knowledge occurs, starting with an “abstract concept or questioning followed by a descending wave of unpacking knowledge and information” [38]. In this descending wave, students make sense of this abstract concept, assigning their own meaning and understanding to the subject matter; this can occur through application of prior knowledge and prior experiences from the context of their own lives and histories. Students then undergo an ascending wave, in which they “repack knowledge and link back to the abstract concept”, thereby constructing a deeper and more meaningful understanding that resonates with their unique perspectives [38]. This promotes the empowerment and validation of students, acknowledging that their voices and experiences are important to their educational process and allowing them to

see how their learning can have relevance to their own lives. The curriculum also becomes more enriched with a multitude of perspectives, ultimately fostering a more inclusive, diverse, and decolonised academic environment.

4.4. Collaboration and Cohort Identity

The case study also demonstrates how collaboration and cohort identity are fostered through PBL, in alignment with the study's objectives. The study design divided the students into groups, providing a shared task and purpose and thus encouraging the students to work together towards a collective goal. This process of co-creating knowledge, especially in the form of a revision resource that benefits the entire cohort, helps to build cohort identity, nurturing a sense of belonging and community for the students and fostering a more inclusive learning environment. The task appeared successful in achieving collaboration and cohort identity, with 66% of the students agreeing that "the PBL tasks enabled them to build cohort identity".

The benefits of collaboration in deepening learning and understanding are numerous. Group work almost inevitably involves disagreements or differences of opinion, necessitating discussion at different stages of the knowledge-production process that results in a more "in-depth social knowledge construction" through a sort of "testing and verifying" process that strengthens understanding [39].

The discussions and negotiations that occur in group work are also able to achieve decolonial effects. Through collaboration, students can share their experiences with each other, promoting a more inclusive learning environment in which diverse viewpoints, values, and knowledge systems are recognised and acknowledged. Adam (2020) describes this decolonial approach to education as "situating one's culture at the centre of one's learning while still drawing on other cultures", thereby valuing the exchange of perspectives for academic benefit [40]. This can be seen as a form of engagement with community knowledge, as students are exposed to new and perhaps previously overlooked perspectives.

Collaboration and cohort identity are also able to address power relations and hierarchies in assessment, as the group work that occurs in the study offers a more horizontal approach, in which knowledge is co-created. Cain and Cocco (2013) describe this as a flat leadership model, in which "leaders are situational and collaboration is dynamic and non-coercive" [41]. This differs from the traditional top-down method, in which knowledge is transmitted by the educator; in this case, the educator is no longer the sole authority on knowledge and the power dynamic is shifted such that students have a voice on what is relevant and meaningful.

4.5. Transferable Skills

Another aim of the study was to develop transferable skills. These can be defined as "a set of achievements, understandings, and personal attributes that make individuals more likely to gain employment and be successful in their occupations"; the development of such skills also has benefits in students' personal lives [42]. The PBL exercise fostered this, as the students needed to channel teamwork skills, organisation, time management, leadership, communication, problem-solving, and other skills in order to successfully collaborate and respond to the question framed. From a decolonial perspective, transferable skills can be inserted and assessed in the curriculum to challenge the Eurocentric perspective that learning and knowledge is solely about content and information, thereby highlighting the importance of diverse forms of knowledge and expression [32]. In this case study, transferable skills were not objectively assessed but self-reported by students in the survey; this nonetheless opens the door to expanding assessment criteria and achieving a more comprehensive and holistic evaluation of a student. Again, this would challenge the Eurocentric-rooted norms of assessment, providing a more inclusive approach that values diverse competencies beyond traditional content-focused metrics.

Decolonisation through transferrable skills is also achieved through engagement with personal and community knowledge, allowing for an assessment method that meets local

needs and acknowledges diverse perspectives [32]. In developing transferable skills, students are prompted to apply them to real-world scenarios and projects, which naturally leads to students drawing from their lived experiences and cultural backgrounds to help contextualise the skills they are learning. These skills can also become relevant and applicable to individual students' lives, mirroring the traditional model of pre-colonial education in Africa, which was characterised by its relevance to local life and strong connection to daily activities [8]. As such, teaching transferable skills breaks away from the colonial paradigm in which cultural contexts and traditional practices are ignored and instead attempts to build on the strengths, capabilities, and needs of individual students and local communities. This is well exemplified in New Zealand's policy on Māori education, which "states that schools, while meeting academic achievement targets, must also have the goal of Māori succeeding as Māori" [43]. A more inclusive and culturally responsive assessment process is fostered, one in which students are empowered through the acknowledgement of their identities and experiences. Power dynamics are also shifted as students shape their own educational experience based on their lived realities.

Hierarchies and power dynamics can be further disrupted through transferable skills development in the context of "colonial dependencies"; this occurs where previously colonised countries are perceived as dependent on the knowledge and technology of colonisers, resulting in a perception that the former are merely users of knowledge rather than creators of it [44]. PBL disrupts this power dynamic by providing students with tools and techniques that enable them to engage with knowledge, adapt it to their contexts, and create new knowledge in future contexts, thereby increasing student empowerment and agency. This encourages students to be innovators and creators rather than just passive recipients of knowledge and information, helping to stop the perpetuation of colonial dependency dynamics.

Finally, this method helps shape world-class students with "globally transferrable skills" that can be applied across several contexts. As our world becomes increasingly connected, students are required to engage in a global community; assessments should prepare students for this reality, empowering them as global citizens that can navigate diverse cultural, social, and economic landscapes [45]. Winberg and Winberg (2017) assert that students can "interactively learn how to use and adapt tools, determining effective approaches to use the tools and apply the theories in order to develop solutions to realistic problems" [44]. Equipping students with globally transferrable skills achieves decolonial influence in breaking away from traditional assessment methods designed to evaluate knowledge within specific cultural and historical contexts; adapting these methods to meet the needs of the 21st century and acknowledging the diversity of global experiences represents a departure from colonial-era practices that prioritised one dominant perspective and instead embraces the multiplicity of viewpoints.

As such, the opportunity to develop transferable skills through PBL demonstrates its ability to disrupt several colonial practices as a decolonised method of assessment.

4.6. Multiple Modes of Expression

The PBL task also offered students the freedom to select their preferred format for their revision resource, allowing for a more inclusive and decolonised approach to assessment.

Traditional assessment methods in STEM higher education often involve a written output and are limited to certain formats such as lab reports, essays, or multiple-choice question (MCQ) exams [46]. These formats are designed based on tradition rather than recent evidence, perpetuating a monocultural perspective on knowledge that disregards the varied ways in which different cultures and individuals comprehend, internalise, and convey information [27]. For instance, in a biology course, a standard MCQ may assess a student's ability to recall information on a subject but might fail to capture their ability to apply the knowledge in a real-world scenario; this can be disadvantageous for students who excel in practical application or creative problem-solving but are hindered by the constraints of MCQs [27]. Furthermore, traditional assessments can perpetuate a narrow

view of knowledge representation that privileges Western norms and cognitive styles [27]. Physical lab reports, for instance, may align with Western academic writing conventions, which would not adequately accommodate the strengths of a student from a non-Western background who might excel in visual representation or storytelling [27]. As such, these formats cannot capture the true nature of student learning and understanding, leading to the exclusion of students who may have successfully achieved the learning outcomes albeit through alternative ways of knowing and expressing knowledge [33].

Assessment must instead recognise that students have unique learning styles, strengths, and interests that are informed by their individual histories and should value the full range of characteristics of students [33]. As such, PBL offers the opportunity to embrace diverse modes of expression in a decolonial approach to assessment. In the PBL case study, the students were required to collectively and collaboratively decide on a mode of expression based on each group member's individual strengths, acknowledging that students possess varied skills and ways in which they contribute to their learning community and thereby challenging the inherently colonial tendency towards uniformity in assessment methods [27]. The collaboration required in deciding the assessment mode also helps students develop valuable transferable skills such as communication, teamwork, decision-making, and problem-solving, further shaping adaptable students prepared for global citizenship and helping achieve the decolonial impacts discussed in the previous section.

Supporting multiple modes of expression also allows for a shift in hierarchy, whereby students have a stronger voice in their educational experience; by placing the authority to choose assessment formats in the hands of students, educators signal a departure from teacher-centric models of education and embrace a collaborative approach that promotes the empowerment, ownership, and accountability of learners [1]. This increase in ownership is also essential in fostering intrinsic motivation and engagement. When students have the agency to select their assessment modes, they are required to critically evaluate their strengths and learning styles: this self-reflection fosters a deeper level of engagement with the subject matter, as students are not just passive recipients of information but active participants in shaping their learning experience [45].

Perhaps most importantly, supporting multiple modes of expression provides students with the power to showcase their creativity and adjust according to their strengths and differences to meet the learning outcomes. Ajajawi and colleagues (2022) assert that "assessment should not disadvantage students because of characteristics or abilities extraneous to the outcomes being judged"; essentially, a fairer and more accurate evaluation of whether a student meets the required learning outcomes can be achieved if their strengths and characteristics are considered in the assessment process [47]. The freedom to choose from a range of formats shows value for the diversity of learning styles within the student body and contributes to a decolonised learning environment where students can excel in their own unique ways.

It is important to note that students may become anxious or overwhelmed when given the opportunity to choose their own assessment formats as they try to make sense of what is expected of them with various formats [48]. This freedom can also be challenging for educators in managing and evaluating a wide variety of formats. In this case, it may be more effective to provide a choice of certain assessment formats to choose from, providing a variety of formats that meet student needs and that educators are comfortable with managing. Co-creation should be considered, and student voices should be involved in choosing the options of formats, helping to challenge the hierarchy associated with assessment processes in higher education.

The aforementioned elements thus illustrate how incorporating freedom with multiple modes of expression in PBL is a decolonial assessment method; it sends a clear message that knowledge is multifaceted, and its representation should reflect the richness of human culture and experiences. By diversifying assessment methods, educators acknowledge that learning can take shape through various pathways, respecting the value of non-Western

epistemologies and alternative modes of understanding that may have previously been marginalised or excluded.

4.7. Culturally Sensitive Feedback

Traditional feedback methods can lack cultural sensitivity and fail to recognise the diverse backgrounds and perspectives of students, leading to a one-size-fits-all approach that may overlook individual needs and hinder a truly inclusive learning environment. The ability to provide culturally sensitive feedback is thus a key decolonial element, one that can be harnessed with the PBL approach.

Culturally sensitive feedback requires a respect for diverse perspectives; feedback needs to recognise and acknowledge that different cultures will have different communication styles. Understanding and appreciating this diversity is essential, as the way feedback is provided significantly influences how it is perceived and acted upon. For example, certain cultures respond best to direct and specific feedback, while other cultures may respond better to indirect and gentler feedback [49]. In this specific case study, the revision resource produced for the PBL task was assessed formatively and feedback was given in a “sandwich method”, in which improvement areas are sandwiched between positive feedback. This method emphasises respectful yet constructive feedback; by encouraging open communication that recognises students’ strengths, the sandwich method can contribute to a more balanced and equitable exchange of ideas, challenging traditional feedback practices that may reinforce power imbalances. Educators practicing culturally sensitive feedback thus demonstrate their commitment to meeting students where they are, helping to contribute to the broader decolonial goal of dismantling homogenising practices and ensuring that education serves the needs and aspirations of all students with respect for their cultural backgrounds.

Respect for diverse perspectives in culturally sensitive feedback also necessitates the careful selection of feedback delivery and format; PBL offers a valuable platform to put this into practice given its inherent flexibility in accommodating various feedback formats. Similarly to providing alternative assessment formats, providing diverse feedback formats is an important decolonial element, as it aligns with the broader aim of dismantling a “one-size-fits-all” approach and recognising the diversity of learning preferences and communication styles among students. For example, while traditional formats might adhere to written outputs that follow a standardised template, educators can opt for video feedback, audio recordings, or interactive discussions in an attempt to dismantle the Eurocentric biases that might underlie rigid feedback structures [50]. This approach also empowers students with a more active role in their learning journey; students can voice their opinion on the feedback format that best resonates with them, and decolonial influence is achieved as student identities become acknowledged and valued. Another important decolonial element of delivering culturally sensitive feedback is using inclusive language. Language is not universal, and students will interpret it differently based on their backgrounds and personal histories; it is thus essential to consider this diversity when choosing words for feedback to ensure that the language used respects the unique perspectives of each student [51]. Educators should conscientiously select words and expressions that promote a sense of belonging for students, demonstrating an attunement of the impact of language on students’ sense of identity, self-worth, and engagement with the subject matter [52]. This is particularly relevant in contexts where traditional education systems may have historically marginalised certain groups or reinforced colonial hierarchies. Through use of inclusive language, educators can help deconstruct these historical power imbalances and create a more positive and equitable learning space. Using inclusive language can be easily applied in a PBL scenario with the help of teacher training and awareness.

A further way to exercise culturally sensitive feedback within PBL is to encourage a reflective and dialogical approach; this is inherently decolonial, as it disrupts the hierarchy between teacher and student and improves student empowerment and agency [21]. PBL

feedback can be constructed as a conversation between teacher and student, one in which the student is able to voice their opinions and responses to their feedback, allowing for a deconstruction of the hierarchy in which the teacher normally exercises an absolute judgement over the student's work. It empowers students to take ownership of their learning and provides opportunities for both students and educators to learn from each other, particularly as educators shape how they provide future feedback.

A final way in which PBL achieves decolonial influence through culturally sensitive feedback is through peer-to-peer feedback, with the collaborative nature of PBL granting students the opportunity to assess both their own work and that of their peers. As the product of the PBL task is a revision resource that benefits the entire cohort, this should ideally foster a culture of constructive critique moving beyond simple fault-finding [4]. This peer-to-peer feedback within PBL aligns with decolonial principles primarily by disrupting the power dynamic that exists when a dominant figure holds absolute authority over what is considered correct or incorrect; it once again acknowledges the value of diverse viewpoints and contributions, helping to create an inclusive environment where knowledge can be co-created, shared, and critiqued collectively [32].

Culturally sensitive feedback thus has several clear decolonial elements, and its ease of integration within PBL exercises further positions PBL as a valuable decolonised assessment method.

5. Advantages and Limitations of Project-Based Learning

In general, the PBL task can be seen as a success, with the authors of the paper stating they were “pleasantly surprised at the amount of positive feedback the task received from students” and concluding that “the task did everything it set out to do in terms of contributing the students’ learning: it helped students consolidate their knowledge from previous learning, build a sense of community and develop transferable skills” [4]. PBL thus appears to represent a strong approach as a decolonised method of assessment, one with clear links to decolonial elements as discussed in the previous section but one that is also successful in deepening student learning and understanding.

PBL also offers a practical advantage due to its relative ease of implementation, as highlighted by a quasi-experimental study conducted in Oman involving grade 11 female students [53]. This study explored environmental science projects and their impact on students’ environmental knowledge and attitudes, ultimately concluding that PBL does not demand more time or resources than traditional instructional methods. Furthermore, PBL demonstrates the ability to be replicable and adaptable across various subjects. The fundamental principles of PBL, fostering problem-solving, critical thinking, collaboration, and real-world application, as well as the decolonial elements it has been linked with, prove valuable and applicable irrespective of the subject matter.

Both the study and PBL as an approach are not without limitations. It is important to note that the study did not specifically focus on PBL in the context of decolonisation and did not measure its efficacy; the links made in this paper between the PBL task and decolonial elements are theoretical and not directly evaluated. A further study would be valuable in empirically assessing these connections; however, challenges exist in determining methods to assess or quantify the efficacy of PBL in decolonising assessment. Furthermore, it is important to note that the decolonial and pedagogical benefits evaluated in this paper are not unique to PBL—a comparative analysis with other assessment methods could be an interesting future exploration to gain insights into the broader landscape of inclusive and culturally responsive education practices.

A potential issue with PBL’s implementation is addressing heterogeneity within student groups. It is possible that power dynamics could emerge within these groups, not just between students and staff, but for instance through “social class differences, gender and attainment hierarchies” [54]. This can impact the distribution of agency within the group, manifesting as varying levels of participation, decision-making power, and engagement; some students may dominate discussions while others may feel marginalised or find it

challenging to voice their ideas and opinions. Although students who did not prefer groupwork had an option to work individually, some of these students may have not had the same learning opportunities or benefits from the group work experience, potentially hindering the overall effectiveness of the PBL task. One potential way to mitigate this is in providing clear guidelines and expectations for the group work that emphasises respectful communication, active listening, and equal participation. Crossouard (2012) also suggests an increased focus on teacher training [54]; Kokotsaki et al. (2016) supports this in the assertion that “teachers need to be better supported, both within initial teacher education and continuing professional development, to develop more sensitivity towards the social and gendered hierarchies that can often be implicit in pupils’ discourse, particularly in relation to peer assessment interactions” [34]. Teachers should be provided with an opportunity to learn about and address power dynamics and social inequalities in the classroom and become equipped with effective facilitation and conflict resolution skills.

A further limitation of PBL is the issue of engagement, as there is no guarantee that every student in every group is interested or willing to participate. For instance, one student in the study stated that “We actually don’t contact as the way I expected. I always messaged and they usually just didn’t reply” [4]. A potential solution could be introducing peer-to-peer marking to encourage involvement and foster shared accountability within the group. Furthermore, repeating the PBL exercise has shown promise in enhancing engagement, as was observed among students who participated in the task multiple times. These students appeared to have a better understanding of its educational value, with one student stating that “Having completed this task before the previous year, I understood what was expected of these resources e.g., getting in all the key points. Also, I managed to tailor it more so to my revision by including additional concepts from other parts of the module” [4].

A final limitation of PBL is the potential appropriation of community knowledge, which relates to the ethical challenges and potential pitfalls that can arise when academics engage with indigenous knowledge in the context of co-creating knowledge such as through research collaborations or PBL. The challenge becomes more significant when there are unequal power relations between academics and the knowledge practitioners from local communities. Morreira et al. (2020) describes this as a form of “epistemic injustice by academics who exploit the currency of indigenous knowledge to further their own careers by appropriating and repackaging indigenous local knowledges” [1]. While the direct appropriation of indigenous knowledge may not be a primary concern in a typical STEM classroom using PBL, it remains crucial to be aware of and uphold cultural sensitivity, respect diversity, and prioritise ethical practices.

6. The Future of Project-Based Learning

The potential of technology in enhancing the learning experience should be explored and promoted to students; integrating technology into PBL could provide tools for collaboration and research that further promote the decolonisation of assessment. Authors assert that “effective use of technology as an integrated part of the pedagogical processes has been found to help both weakly and strongly performing students construct knowledge in the PBL environment” [34,55]. Digital platforms and communication tools, for instance, can facilitate remote teamwork, enabling students to work together on projects regardless of location [4]. Online resources offer a wealth of information for research, enabling students to explore diverse perspectives. Technology also allows for innovative project formats, making the learning process more engaging and dynamic [34]. Careful consideration is needed to ensure that technology does not overshadow the primary objectives of PBL and that all students have access to the necessary digital resources.

A further enhancement of the PBL experience is the co-creation of PBL tasks, in which students and staff form a partnership to collaboratively design or develop certain aspects of an assessment method. Several benefits emerge with co-creation in PBL, the first of which is an increased assessment literacy, in which students form a deeper understanding of the

assessment and the criteria used to evaluate their work [56]. This heightened assessment literacy often leads to improved academic performance and a more comprehensive grasp of course expectations. Co-creation also offers an opportunity to transform assessments into tools for learning, rather than just a means of assessing learning; through active participation in task development, students shape their learning according to their personal strengths and identities, becoming more empowered in the process [56]. Co-creation also allows students to develop transferable skills, a phenomenon which was previously discussed to have inherently decolonial impacts. These include communication, teamwork, negotiation, and critical-thinking skills; Boud & Falchikov also assert that “partnership in assessment can effectively equip [students] for a lifetime of assessing their own learning” [57]. Perhaps most importantly, co-creation directly challenges the hierarchy, breaking down the rigid distinction between educators as knowledge providers and students as passive recipients. This shift promotes a more egalitarian learning environment, where knowledge can be constructed collaboratively.

Additionally, exploring ways to support teachers is crucial in maximising the effectiveness of PBL. Brown and Crippen (2016) assert that even “highly effective science teachers require additional professional development experiences to successfully meet the needs of culturally diverse learners, as they must address the constraints inherent in responsive teaching in restrictive environments” [58]. Support for teachers could include guidance on designing effective tasks, managing group dynamics, facilitating meaningful discussions, and assessing student outcomes while being cognisant of decolonial principles [58]. Mentoring and peer collaboration can help teachers refine their PBL skills and share best practices, all while considering the broader context of decolonisation. By ensuring teachers have the necessary support, including decolonial awareness, PBL can be implemented more smoothly and effectively, leading to improved student outcomes.

Finally, one of the most valuable features of PBL is its flexibility in allowing both students and educators to shape assessments that align with and are relevant to their intended purpose. This flexibility can be found in the ability to incorporate diverse assessment formats, feedback formats, and central questions or situations for students to respond to. There thus exists a rich landscape for further exploration and research into maximising the utility of PBL’s flexibility for decolonial influence, requiring an investigation into how each aspect of PBL’s adaptability can be harnessed to challenge traditional norms, foster inclusivity, and promote a consciousness of decolonised assessment among students. As an example, open debates could be integrated to allow for higher-level, more practical learning within the context of global citizenship and social justice. Students engage in PBL experiences with an understanding of the contextual significance of decolonised assessment and its pivotal role in education, thereby creating “links between theory and practice preparing students for the workplace” [45]. Both students and teachers become active participants in shaping the educational landscape and in shaping themselves as global citizens.

7. Conclusions

The pursuit of decolonising higher education is of paramount significance. In this endeavour, the focus must extend to assessment, an aspect often overshadowed by content and pedagogical changes, particularly in the domain of STEM. This review addresses this challenge by offering PBL as a promising avenue for comprehensive decolonial progress, demonstrating how PBL embraces several decolonial principles and transcends the surface-level adjustments made by other approaches. In the investigated case study conducted at the University of Sussex, the success of PBL in deepening student learning, understanding, and experience becomes clear, and the investigation into several aspects of PBL shows how links can be made to decolonial elements that promote an inclusive assessment experience.

PBL is just one potential approach to decolonising assessment in STEM higher education; although it appears comprehensive in nature and its academic strengths and decolonial capabilities are clear, its implementation is not an all-encompassing solution for decolonising assessment. This can be seen as a positive—the lack of a single solution

for decolonising assessment opens the door for pedagogy to be even more diverse and contextually relevant. It is important to note that while the focus on decolonising assessment is necessary, its achievement is not possible without the decolonisation of content and pedagogy, and thus it still requires us to challenge the entire educational framework.

Decolonising assessment necessitates a continual examination of the assumptions and values that underpin current methods as well as the incorporation of more inclusive and representative approaches such as PBL. This ongoing process holds the promise of transforming our educational landscape into one that is truly inclusive, equitable, and open to diverse knowledge systems, ensuring a richer learning experience for all.

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References

1. Morreira, S.; Luckett, K.; Kumalo, S.H.; Ramgotra, M. Confronting the complexities of decolonising curricula and pedagogy in higher education. *Third World Themat. A TWQ J.* **2020**, *5*, 1–18. [CrossRef]
2. Mampane, R.M.; Omidire, M.F.; Aluko, F.R. Decolonising higher education in Africa: Arriving at a glocal solution. *S. Afr. J. Educ.* **2018**, *38*, 1–9. [CrossRef]
3. Le Grange, L. Decolonising the university curriculum. *S. Afr. J. High. Educ.* **2016**, *30*, 1–12. [CrossRef]
4. Pranjol, M.Z.I.; Oprandi, P.; Watson, S. Project-based learning in biomedical sciences: Using the collaborative creation of revision resources to consolidate knowledge, promote cohort identity and develop transferable skills. *J. Biol. Educ.* **2022**, 1–17. [CrossRef]
5. Maldonado-Torres, N. On the Coloniality of Being. *Cult. Stud.* **2007**, *21*, 240–270. [CrossRef]
6. Pauls, E.P. *Assimilation*; Encyclopedia Britannica: Chicago, IL, USA, 2022.
7. Shizha, E.; Kariwo, M.T. Impact of Colonialism on Education. In *Education and Development in Zimbabwe*; SensePublisher: Rotterdam, The Netherlands, 2011; pp. 13–26.
8. Nwanosike, O.F.; Onyije, L.E. Colonialism and Education. *Mediterr. J. Social. Sci.* **2011**, *2*, 41–47.
9. Musitha, M.E.; Mafukata, M.A. Crisis of decolonising education: Curriculum implementation in Limpopo Province of South Africa. *Afr. Public. Serv. Deliv. Perform. Rev.* **2018**, *6*, 1–8. [CrossRef]
10. Stuchtey, B.; Petitjean, P. Science and the “Civilizing Mission”: France and the Colonial Enterprise. In *Science across the European Empires 1800–1950*; Oxford University Press: Oxford, UK, 2005; pp. 107–128.
11. Cox, F.E.G. History of the discovery of the malaria parasites and their vectors. *Parasites Vectors* **2010**, *3*, 5. [CrossRef]
12. The Malaria Expedition to West Africa. *Science* **1900**, *11*, 36–37. [CrossRef]
13. Harmon, A. James Watson Had a Chance to Salvage His Reputation on Race. He Made Things Worse. In *The New York Times*; The New York Times: New York, NY, USA, 2019.
14. Pan, R.K.; Kaski, K.; Fortunato, S. World citation and collaboration networks: Uncovering the role of geography in science. *Sci. Rep.* **2012**, *2*, 902. [CrossRef]
15. Taylor, M.; Hung, J.; Che, T.E.; Akinbosede, D.; Petherick, K.J.; Pranjol, M.Z.I. Laying the Groundwork to Investigate Diversity of Life Sciences Reading Lists in Higher Education and Its Link to Awarding Gaps. *Educ. Sci.* **2021**, *11*, 359. [CrossRef]
16. Isik, A. Linguistic Imperialism and Foreign Language Teaching. *J. Asia TEFL* **2008**, *5*, 123–144.
17. THE. World University Rankings, Times Higher Education 2023. Available online: <https://www.timeshighereducation.com/world-university-rankings/2023/world-rankin> (accessed on 22 August 2023).
18. SJR. SCImago Journal & Country Rank. 2022. Available online: <https://www.scimagojr.com/journalrank.php> (accessed on 22 August 2023).
19. Tate, S.A.; Bagguley, P. Building the anti-racist university: Next steps. *Race Ethn. Educ.* **2016**, *20*, 289–299. [CrossRef]
20. AdvanceHE. Equality in Higher Education: Statistical Reports. 2022. Available online: <https://www.advance-he.ac.uk/knowledge-hub/equality-higher-education-statistical-reports-2022> (accessed on 2 July 2023).
21. Hlatshwayo, M.N.; Shawa, L.B.; Nxumalo, S.A. Ubuntucurrerein the academy: A case study from the South African experience. *Third World Themat. A TWQ J.* **2020**, *5*, 120–136. [CrossRef]

22. Lambert, S.; Funk, J.; Adam, T. What Can Decolonisation of Curriculum Tell Us about Inclusive Assessment? In *Assessment for Inclusion in Higher Education*; Routledge: London, UK, 2022; pp. 52–62.
23. UUK. Black, Asian and Minority Ethnic Student Attainment at UK Universities: #Closingthegap. 2019. Available online: <https://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2019/bame-student-attainment-uk-universities-closing-the-gap.pdf> (accessed on 2 July 2023).
24. Mahmud, A.; Gagnon, J. Racial disparities in student outcomes in British higher education: Examining Mindsets and bias. *Teach. High. Educ.* **2020**, *28*, 254–269. [CrossRef]
25. Arday, J.; Zoe Belluigi, D.; Thomas, D. Attempting to break the chain: Reimagining inclusive pedagogy and decolonising the curriculum within the academy. *Educ. Philos. Theory* **2020**, *53*, 298–313. [CrossRef]
26. Griffiths, D. #FeesMustFall and the decolonised university in South Africa: Tensions and opportunities in a globalising world. *Int. J. Educ. Res.* **2019**, *94*, 143–149. [CrossRef]
27. Tai, J.; Ajjawi, R.; Boud, D.; de St Jorre, T.J. Promoting Equity and Social Justice through Assessment for Inclusion. In *Assessment for Inclusion in Higher Education*; Routledge: London, UK, 2022; pp. 9–18.
28. Heron, J. Assessment Revisited. In *Developing Student Autonomy in Learning*, 1st ed.; Boud, D., Ed.; Routledge: London, UK, 1987.
29. Crossouard, B.; Oprandi, P. Decolonising Formative Assessment. In *Theory and Method in Higher Education Research*; Emerald Publishing Limited: Leeds, UK, 2022; pp. 181–196.
30. Schucan Bird, K.; Pitman, L. How diverse is your reading list? Exploring issues of representation and decolonisation in the UK. *High. Educ.* **2019**, *79*, 903–920. [CrossRef]
31. Andrews, K. Blackness, Empire and migration: How Black Studies transforms the curriculum. *Area* **2019**, *52*, 701–707. [CrossRef]
32. Shahjahan, R.A.; Estera, A.L.; Surla, K.L.; Edwards, K.T. “Decolonizing” Curriculum and Pedagogy: A Comparative Review Across Disciplines and Global Higher Education Contexts. *Rev. Educ. Res.* **2021**, *92*, 73–113. [CrossRef]
33. Tai, J.; Ajjawi, R.; Bearman, M.; Boud, D.; Dawson, P.; Jorre de St Jorre, T. Assessment for inclusion: Rethinking contemporary strategies in assessment design. *High. Educ. Res. Dev.* **2022**, *42*, 483–497. [CrossRef]
34. Kokotsaki, D.; Menzies, V.; Wiggins, A. Project-based learning: A review of the literature. *Improv. Sch.* **2016**, *19*, 267–277. [CrossRef]
35. Tennyson, R.D.; Volk, A. Learning Theories and Educational Paradigms. In *International Encyclopedia of the Social & Behavioral Sciences*; Elsevier: Amsterdam, The Netherlands, 2015; pp. 699–711.
36. Gavin, K. Case study of a project-based learning course in civil engineering design. *Eur. J. Eng. Educ.* **2011**, *36*, 547–558. [CrossRef]
37. Xu, Y.; Liu, W. A project-based learning approach: A case study in China. *Asia Pac. Educ. Rev.* **2010**, *11*, 363–370. [CrossRef]
38. Mouton, M. A case for project based learning to enact semantic waves: Towards cumulative knowledge building. *J. Biol. Educ.* **2019**, *54*, 363–380. [CrossRef]
39. Wu, S.-Y.; Hou, H.-T.; Hwang, W.-Y.; Liu, E.Z.-F. Analysis of Learning Behavior in Problem-Solving-Based and Project-Based Discussion Activities within the Seamless Online Learning Integrated Discussion (SOLID) System. *J. Educ. Comput. Res.* **2013**, *49*, 61–82. [CrossRef]
40. Adam, T. Addressing Injustices through MOOCs: A Study among Peri-Urban, Marginalised, South African Youth. Ph.D. Thesis, University of Cambridge, Cambridge, UK, 2020.
41. Cain, K.; Cocco, S. Leadership Development through Project Based Learning. In Proceedings of the Canadian Engineering Education Association (CEEAA), Montreal, QC, Canada, 17–20 June 2013. [CrossRef]
42. Knight, P.; Yorke, M. *Learning, Curriculum and Employability in Higher Education*, 1st ed.; Routledge: London, UK, 2004.
43. McKinley, E.; Gan, M.J.S. Culturally Responsive Science Education for Indigenous and Ethnic Minority Students. In *Handbook of Research on Science Education*, 1st ed.; Lederman, N.G., Abell, S.K., Eds.; Routledge: London, UK, 2014; Volume II, pp. 284–300.
44. Winberg, S.; Winberg, C. Using a social justice approach to decolonize an engineering curriculum. In Proceedings of the 2017 IEEE Global Engineering Education Conference (EDUCON), Athens, Greece, 25–28 April 2017; pp. 248–254.
45. Mello, L.V.; Wattret, G. Developing transferable skills through embedding reflection in the science curriculum. *Biophys. Rev.* **2021**, *13*, 897–903. [CrossRef]
46. Turner, R. *7 Steps to: Decolonising Assessment*, University of Plymouth; University of Plymouth: Plymouth, UK, 2022.
47. Ajjawi, R.; Tai, J.; Boud, D.; Jorre de St Jorre, T. *Assessment for Inclusion in Higher Education*; Routledge: London, UK, 2022.
48. ICL. Making Assessment and Feedback Inclusive; Imperial College London. Available online: <https://www.imperial.ac.uk/staff/educational-development/teaching-toolkit/inclusive-learning-and-teaching/making-assessment-and-feedback-inclusive/> (accessed on 1 September 2023).
49. Chydenius, T.; Gaisch, M. The Impact of Cross-Cultural Differences in Feedback Behaviour: A Comparative Study in a Technological Setting. In Proceedings of the Cross-Cultural Business Conference 2014, Steyr, Austria, 14 May 2014; Überwimmer, M., Wiesinger, S., Gaisch, M., Sumesberger, T., Füreder, R., Eds.; University of Applied Sciences Upper Austria: Steyr, Austria, 2014.
50. Johnstone, C.; Ketterlin Geller, L.R.; Thurlow, M. Opportunities and Limitations of Accommodations and Accessibility in Higher Education Assessment. In *Assessment for Inclusion in Higher Education*; Routledge: London, UK, 2022; pp. 131–141.
51. Oxford, U.O. *Making Feedback Inclusive*; University of Oxford: Oxford, UK, 2023. Available online: <https://www.ctl.ox.ac.uk/inclusive-feedback> (accessed on 1 September 2023).
52. University of Leeds. Inclusive Language Guidance. *Inclusive Language Guidance*; University of Leeds: Leeds, UK, (n.d.). Available online: <https://equality.leeds.ac.uk/support-and-resources/inclusive-language-guidance/> (accessed on 2 July 2023).

53. Al-Balushi, S.M.; Al-Aamri, S.S. The effect of environmental science projects on students' environmental knowledge and science attitudes. *Int. Res. Geogr. Environ. Educ.* **2014**, *23*, 213–227. [[CrossRef](#)]
54. Crossouard, B. Absent presences: The recognition of social class and gender dimensions within peer assessment interactions. *Br. Educ. Res. J.* **2012**, *38*, 731–748. [[CrossRef](#)]
55. Erstad, O. Norwegian students using digital artifacts in project-based learning. *J. Comput. Assist. Learn.* **2002**, *18*, 427–437. [[CrossRef](#)]
56. Deeley, S.J.; Bovill, C. Staff student partnership in assessment: Enhancing assessment literacy through democratic practices. *Assess. Eval. High. Educ.* **2015**, *42*, 463–477. [[CrossRef](#)]
57. Boud, D.; Falchikov, N. Aligning assessment with long-term learning. *Assess. Eval. High. Educ.* **2007**, *31*, 399–413. [[CrossRef](#)]
58. Brown, J.C.; Crippen, K.J. The Growing Awareness Inventory: Building Capacity for Culturally Responsive Science and Mathematics with a Structured Observation Protocol. *Sch. Sci. Math.* **2016**, *116*, 127–138. [[CrossRef](#)]

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