

BLACK STUDENT EXPERIENCE AND ATTAINMENT ON S112:

improving a level 1 STEM module;

CLOSING THE AWARDING GAP: Listening to our Black Students

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Executive Summary

The awarding gap for Black students vs White students has been widely reported across UK Higher Education. The existence of awarding gaps within the Open University for Black vs White students for pass rate and good module pass rate has implications for OfS funding due to unfulfilled Access and Participation Plan targets. Data examined in 2019 for the interdisciplinary science module S112 Science Concepts and Practice appeared to indicate that pass rates for Black students were much lower in comparison to White students and students of other ethnicities, despite completion rates closer to the rest of the cohort. Awarding gaps were wider than both Faculty and Institutional values.

The project adopted a mixed method approach to investigate Black student experience on S112 via online focus groups and semi structured Black student interviews, together with a concurrent intersectionality study to investigate any possible double disadvantage for S112 Black students.

Thematic analysis identified a lack of representation of Black scientists and University staff together with a lack of sense of belonging amongst the Black student community as being the most impactful barriers to success. Other themes identified such as perceived hidden costs associated with study could be relevant to wider student communities. This was reinforced by a double

disadvantage for Black students residing in an IMD 1 postcode (the 20% most deprived UK postcodes) identified during the intersectionality study. No double disadvantage was identified for gender or being first in family into Higher Education for Black S112 students.

Engagement from Black S112 students with the project was low, with students showing some reluctance and hesitation to participate and share their experiences, despite being approached by a culturally appropriate member of the project team. A key recommendation of this project would be further research to investigate this apparent lack of trust in the University, to open two-way channels of communication with project teams. Other recommendations address the lack of representation of Black scientists and University staff together with the lack of sense of belonging, for example, use of the inclusive curriculum tool by all modules in production and life cycle review, and the inclusion of Global South researchers and examples in teaching materials. Further recommendations address the issues likely to be faced by the wider student community such as minimising additional costs associated with study and ensuring home experiments have readily available cost-free alternatives.

This research has highlighted the importance of listening to our Black students and other marginalised student communities.

Introduction

Project Background

The existence of an awarding gap for Black students compared with White students is well known and awarding gaps for pass rates and good pass rates have been identified and reported for across Universities in the UK (Advance HE, 2020; Woolf et al, 2011) across the last 25 years.

Whilst there has been some success in reducing this awarding gap sector wide across the UK, significant awarding gaps persist for Black students when compared with their White peers, with this issue receiving considerable attention in the literature and media.

Previous research has reported that when factors such as Prior Education Qualifications (PEQ), age, gender, disability, Index of Multiple Deprivation (IMD) and ethnicity are controlled, although the gap can be reduced, being from a minority ethnic community is still statistically significant in predicting final attainment (Broecke et al, 2007). A more recent study suggests that the reasons underlying the awarding gap are complex, with Black students feeling underrepresented and unwelcome at university both in terms of their fellow students but also a lack of representation in the staff body (Greaves et al, 2022).

The existence of awarding gaps within the Open University for Black vs White students for pass rate and good module pass rate has implications for OfS funding due to unfulfilled Access and Participation Plan targets. At the Open

University, data (for 2015-18) produced by the Strategic Analytics Team, Data and Student Analytics, seemed to indicate that pass rates for Black students in the School of Environment, Earth and Ecosystem Sciences (EEES) have previously been low despite completion rates closer to the rest of the cohort (data for other minority ethnic students were not included in the presentation) as illustrated in Figure 1.

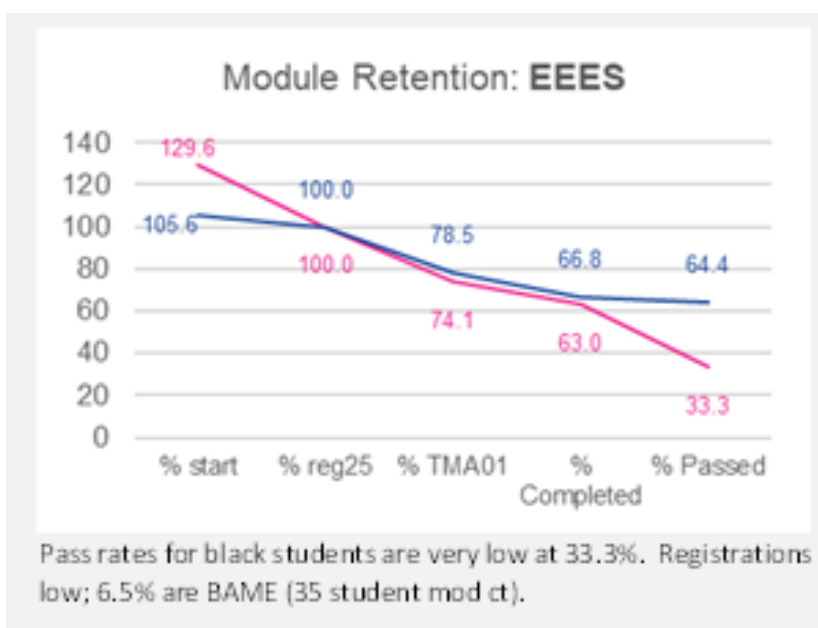


Figure 1 A comparison of completion and pass rates in EEEs for Black students vs White students (2015-2018)

Pass rates for Black students (pink line) were approximately half that of the White students (blue line) during the time period. Data presented in this graph shows values that have been normalized to 25% fee liability point (reg25) – the starting point of 129.6% for Black students further indicates a high number of withdrawals prior to this point. Module availability changed significantly during the timeframe

for the data, including S112 starting in 17J. Registrations for Black students (and all minority ethnic students) in EEES are low and, in 2017/2018 the majority were studying the level one interdisciplinary science module, S112, Science Concepts and Practice (and this continues to be the case).

The module S112, Science Concepts and Practice is a first-year undergraduate, interdisciplinary science module that currently serves 24 qualification pathways with a typical cohort size of approx. 1800 students in a single presentation, of whom approximately 30 students declare their ethnicity as Black. Data examined at the onset of the project in 2019 seemed to indicate that pass rates for Black students were much lower in comparison to White students and students of other ethnicities, despite completion rates closer to the rest of the cohort. Note S112 does not have a good pass rate metric, being a level one module. In this context, completion is defined as having submitted the final assessment for the module (initially a face-to-face exam, now delivered online). This means that a similar proportion of Black students are submitting the final assessment as their White counterparts but are not passing the module (assessment being weighted at 61% exam, 39% continuous assessment). This is consistent with the findings of Cramer (2021) who reported that an analysis of students studying cell biology at University College London revealed that exam performance contributes significantly more to the Black vs White student awarding gap than differences in performance in continuous assessment, and hence institutions themselves could be responsible for the awarding gap between Black and White students.

Figure 2 illustrates the pass rates for S112 in the academic years preceding the onset of this project, which shows, as expected, an awarding gap at module pass

rate for Black vs White students, most notably in the 19J presentation, where the gap was the highest noted to date at 32%.

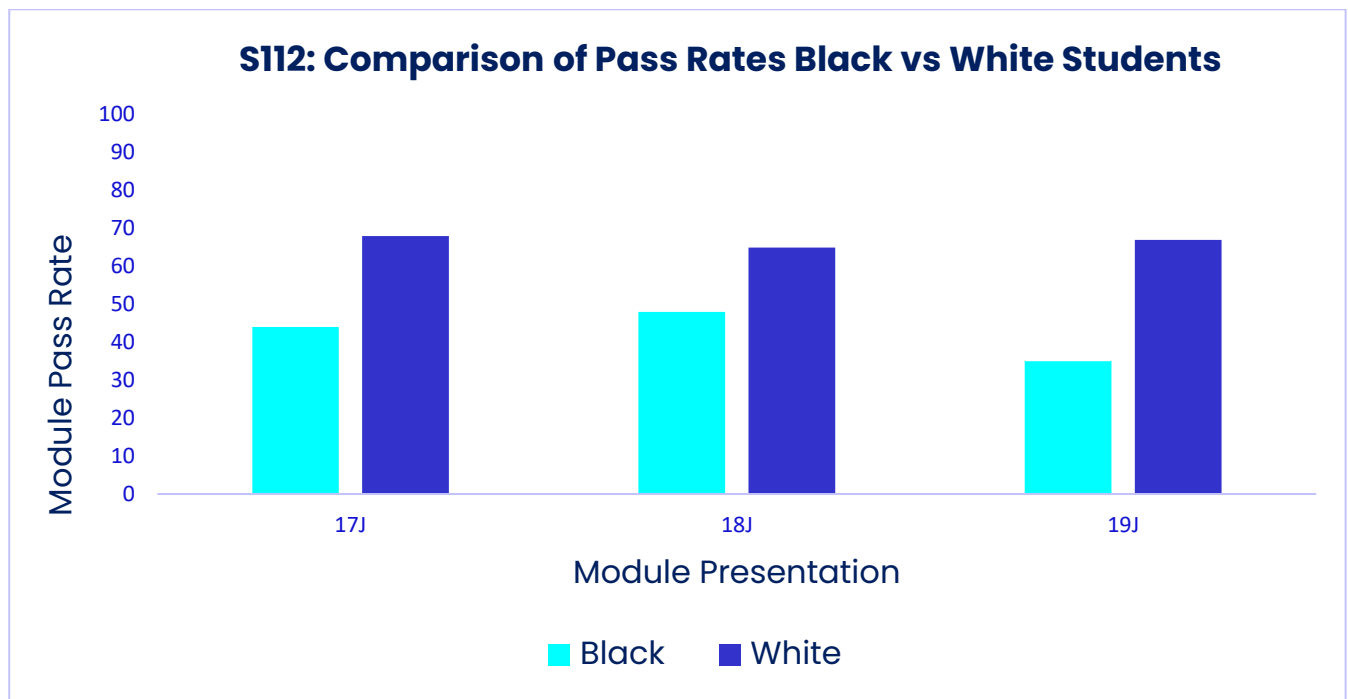


Figure 2 The Awarding Gaps on S112 for Black vs White Students 17J – 19J

Therefore, as a response to the trends identified within S112 regarding Black student completion and pass rates (Figure 1) and the Black vs White student awarding gap evident on S112 in all presentations to date, this project was conceived to have two overarching research questions:

- What are the needs of Black students in S112 and possible barriers to their study?
- What could be influencing the experience and outcomes for Black students in S112?

To address these research questions, the project had 4 aims:

- To develop understanding of issues faced by Black students throughout S112 module presentation, including a focus on the revision period leading up to and including the exam.
- To raise awareness of these issues amongst STEM staff including module tutors, student support staff, and module teams.
- To consider how S112 tutors could adapt their tuition practice to respond to Black students' needs throughout the module presentation as well as to support exam preparation and practice.
- To consider module wide interventions (including module material modification and changes to assessment strategy and tuition) to support and improve Black student experience and success on S112.

It was anticipated that longer-term outcomes would include developed understanding of the needs of Black students amongst tutors and others who support students, increase representation of Black scientists in module content, and more inclusive tuition practice. This should help develop tutors' confidence and ability in supporting this student group which should have a positive impact on students' experiences and performance including fostering a greater sense of belonging for the Black student demographic.

Methodology

Phase 1: Online Focus group

The initial phase of the project involved qualitative data collection, intended to explore Black student experiences on S112 via an online focus group. It was decided to run the focus group online only, to be more inclusive for students who were geographically dispersed, and furthermore, at that time, some Covid-19 protocols and restrictions were still in place.

From the onset, it was decided that the two project leaders, Louise MacBrayne and Jennie Bellamy, would not take an active role in the focus group. The reason for this was two-fold. Firstly, Louise MacBrayne is module team co-chair of S112 and it was felt that some students may be reluctant to share their experiences of the module directly with its chair for fear of possible repercussions in future study.

However, perhaps more importantly, both project leaders are of White ethnicity. Phase 1 of the project was inspired by Heron's "Friendship as a Method" approach (Heron, 2020) which assumes that the project leaders are not present during the data collection. In this study, the focus group facilitator represented a culturally appropriate demographic and was able to guide the focus group discussions in a manner that was sensitive to their lived experiences. Hence having the focus group facilitator of a cultural demographic appropriate to the participants was a key element of the research methodology, helping to foster a level of trust and

rapport with the focus group participants, uncovering insights and experiences that may not have been shared with a White facilitator.

An initial sample of students was requested from SRPP in March 2021. The only criterion for inclusion in this sample was that students should have declared their ethnicity as Black and should have completed a presentation of S112 (17J – 19J). A sample size of 19 students was contacted, initially via a CAMEL email from the project leaders Louise MacBrayne and Jennie Bellamy, inviting students to participate in an online focus group. No responses were received to this e mail.

It was decided that the focus group facilitator, Angela Richards, should attempt to contact the same students via her personal e mail.

Angela is a Black scientist with a background in mental health and neuroscience. Prior to joining the project team, Angela had learnt the craft of facilitating groups when working as an NHS psychologist therapeutic group leader and a genetic counsellor for patients with sickle cell which is an inherited blood disorder typically impacting on people of African and Caribbean descent. (The latter could also have implications for educational attainment due to personal ill-health or dependents with the disorder.) Angela has also given presentations at international conferences on the relevance of their Black identity for individuals' mental health and their commitment to seemingly White-led services and facilities. Angela's STEM teaching experience at the OU and other UK Universities provides an insight into the challenges that Black science students and their perceived barriers to succeeding in these disciplines. Angela expressed an interest in the current project due to the commitment of the project leaders in their quest to try to understand why, in comparison to their White student peers,

more Black students were underperforming at an early stage science module whilst recognising that there are also Black students who do well on the module.

Angela reported that there was initially quite a bit of reluctance from the Black students to participate (as evidenced in theme 5 of the phase 1 focus group findings). Numerous attempts at communication were made by Angela with this first student group to encourage participation and foster trust. Eventually three students agreed to participate, and it was decided to go ahead with the focus group with the three possible participants to avoid any further delays. The whole process from initial student contact until first focus group took eight months.

The initial focus group, arranged for November 2021 suffered from technical difficulties in the online setting (Adobe Connect), hence after nearly an hour of trying to resolve this issue, it was decided with the group that the meeting could go ahead at another time. The main reason was connection issues for participants, so it was only after a very long time that all participants were securely in the group.

The rescheduled focus group was held online in Adobe Connect on 2nd December 2021, with 2 two students attending. The focus group was facilitated by Angela, recorded, and the recordings transcribed, ensuring participant anonymity to the other project leaders. The third student did not attend this second focus group due to time differences as this former student had now returned to the Caribbean. Additionally, it appeared that the former student's current work context made it almost impossible to participate in the focus group. The structure of the focus group is included in Appendix A.

Phase 2: Semi Structured Interviews

Following completion of the first online focus group in December 2021, it was decided, in spring 2022, to draw a new sample of students to be contacted via SRPP. As per the first student sample, the only criterion for inclusion in this sample was that students should have declared their ethnicity as Black and should have completed a prior presentation of S112 (17J – 20J). For this second sample of students, more students were available from SRPP to contact (as a further presentation could now be included), and 36 students were made available to the project team to contact (with no overlaps from the first list).

Given our experiences of contacting students in phase 1, it was decided from the onset that for this second student sample, the project leaders would not have any contact with these students, and that all contact would be made through Angela as the focus group facilitator.

As per phase 1, several attempts were made by Angela to contact these students, however, as experienced previously, the students were very reluctant to participate and were wary about committing to a focus group date. There were also logistical difficulties with two of the interested students living within a different time zone.

After several months of limited progress, with Angela unable to confirm a date for an online focus group with the few willing students, it was decided to offer the same group of students a 1:1 interview with Angela instead, with the same intended content as the focus group, as it was felt that this may be easier to manage logistically and may encourage the reluctant students to come forward.

Eventually two students were persuaded by Angela to be interviewed (with a third student withdrawing later), and interviews took place in January 2023, in an online Adobe Connect meeting room. The recordings from these interviews were anonymised and transcribed as per the focus group and then made available to the other project leaders.

Phase 3: Intersectionality Study

Open University-wide data is already available that indicates that Black students are less likely to complete, pass and achieve a good pass on their modules (OU Access and Participation plan 20/21-24/25), but this study aimed to extend this by looking at other demographic factors in combination with student ethnicity. An intersectional study to investigate whether S112 Black students face a double disadvantage was undertaken. The double disadvantage hypothesis states that individuals with more than one disadvantaged status experience poorer outcomes than their singly disadvantaged or privileged peers (e.g. De Jong and Madamba, 2002). This study uses scores from students' S112 assessment, and factors like where they live and whether they are the first in their family to go to university. Five years of data were analysed (17J-21J). The main intersections investigated were:

- Ethnicity and Index of Multiple Deprivation (IMD) where IMD1 is the most deprived 20% of UK postcodes and IMD5 is the least deprived 20% of UK postcodes
- Ethnicity and gender
- Ethnicity and parents in Higher Education ('first in family')

Pass rates for students according to their ethnicity were analysed against pass rates for the other factors (listed above) and if the rate for students at the intersection was below the rate for both the factors alone there was considered to be a 'double disadvantage'. Five years' data was analysed for each intersection, with each IMD category plotted individually where data allowed and

with IMD categories 1&2 combined to increase the number of students in each category. That is, 20 sets of outputs/plots were generated (see Findings). The Office for National Statistics website was used to benchmark data and population distribution (ONS, 2023).

As a result of early findings from the December 2021 Focus Group, TMA scores for questions linked to practical activities were also scrutinised according to student ethnicity to look for differences in scores and rates of submission at the question level.

A statistical significance test (Mann Whitney U) was undertaken to determine whether there was a statistically significant difference between

- 17J-21J Black students' and White students' average module scores
- 17J-21J Black students' and White students' first-time pass rates
- 17J-21J Black students' and White students' completion rates.

Findings

Phase 1: Online Focus Group

Five themes were identified from thematic analysis of transcripts from the focus group held on 2nd December 2021.

The two strongest themes identified were (1) lack of representation of Black scientists in the curriculum, alongside (2) a lack of sense of community and belonging for Black OU students, which together led to students questioning their choice of study, feeling that there was no visible pathway to success (academic or professional) for “someone like me”.

Theme 1: Representation in curriculum

A dominant theme evident throughout the focus group was the under representation of scientists from the Black and other minority ethnic communities in the S112 module content and also within their qualifications in general:

- “I’m in my last year of environmental science and not one of the modules has taught me about a black environmental scientist”.
- “If I’m trying to look for – if I see I’m not represented in environmental science, in terms of the professional aspect, you know, my community – because I’m Caribbean – why would I want to continue into that field, its clearly not a place for Black people”.

- “We clearly do not feel represented in any of the curriculum, and that’s including in S112”.
- “I’ve just learned about White scientists, which is good but it’s not equal”.
- “If there are no Black people in the curriculum where else am I going to look?”
- “I think in general they just need to add Black people, Black scientists as well, you know, and encourage, on the advert and on the syllabus, they need to....show different courses....and show Black people...they are part of history as well”
- “Considering Stuart Hall was a tutor at the Open University you would have thought that the curriculum would be more inclusive”.

Underrepresentation of Black scientists was identified both within the S112 module content itself but also in the Open University staff demographic:

- “Why would I, as a young Black woman, want to approach these two older White men” [set in the context of meeting OU staff at an in-person geology event at the British Geological Survey]

This is consistent with the findings of Krause, who has previously suggested that engagement by marginalised students in their studies is not just limited to the academic content of the module itself, and that learning takes places in a variety of settings both within and outside of the formal curriculum (Krause 2011). Hence,

marginalised students may have difficulties forming communities outside of their own demographic , which in turn may have direct impact on their learning.

Theme 2: Sense of Belonging

The second most dominant theme from the focus group discussions was the feeling of disengagement from the wider student community, for example, feeling as if they were the “only Black student”:

- “To have a [Black] partner to study with, that would be nice”.
- “Every exam that I attended I was the only Black person there”.
- “Yes, the Black person is here and she is going to sit down right here and do the exam just like you are going to be doing the exam” [said in the context of being the only Black person in the exam room]
- “I have had to attend a practical project lesson where we all went to the Open University, and I was the only Black person”.

At the time of writing, for the 2021/2022 academic year, the number of Black students registered for study in UK Higher Education was 7.86% of the total student cohort (an increase from 6.06% in 2020/2021) compared with White students representing 71.62% of the total student population in 2021/2022 and 56.49% in 2020/2021 (HESA, 2022).

In contrast, only 3.3% of the total number of registered students at the Open University in the 2021/2022 academic year declared their ethnicity as Black (in

comparison to 86.7% of White students). On S112, this is even lower with Black students representing 1.38% of the students registered on S112 2021 J.

Table 1 illustrates similar trends across previous academic years, highlighting the under representation of Black students at institutional, faculty and modular levels.

Academic Year	Open University	STEM Faculty	S112
19-20	5956 (3.5%)	1723 (2.9%)	34 (2.0%)
20-21	6735 (3.3%)	1988 (2.9%)	29 (1.5%)
21-22	6790 (3.3%)	2013 (3.0%)	30 (1.4%)

Table 1 A comparison of Black student numbers across the University, the STEM Faculty and registered on S112 in 3 previous academic years

It is not, therefore, surprising that the focus group participants identified a lack of sense of belonging and community for the Black students in S112, given that the students were distributed geographically across the UK and internationally, representing such a small proportion of the total student cohort.

Marginalised students may not only perceive a lack of representation on their course materials, but also face difficulties when building relationships with their student peers and staff members if not from an equivalent demographic. This is consistent with our findings, with the two predominant focus group themes identified relating to both representation and a sense of belonging.

Theme 3: Student costs

A less common, but still important, theme that arose from this focus group centred around costs that were associated with the use of home experiments within the module. S112 has a strong emphasis on practical work, being a level one science module, with several learning outcomes associated with the development of practical work-related skills. To meet these learning outcomes, students are required to set up experiments in their home, using a variety of household equipment (such as a fridge, freezer, measuring scales) and a variety of substances, some of which would need to be purchased if not already in the house. An early comment made by a student in the focus group highlighted the assumption made by the S112 module team that all students had easy access to such equipment. The resulting discussion also revealed issues surrounding financial hardship and the requirement to have to ask for permission to use resources supplied by the module team (provided data) as an alternative to setting up the experiment themselves when they did not have suitable equipment.

- “The experiment it assumed that you had certain things in your house, it assumed that you had a freezer and a fridge, it assumed that, you know, you had everything in your house and they don’t support you”
- “Times are hard, and you are trying to salvage whatever”
- “Having to give an alternative option for the experiment was like us asking for too much”.

- “so when you’ve got to go out and get this [equipment] and that its annoying but you want to pass it so you end up sacrificing”

At the time of the focus group, there were limited OU research and scholarship projects that focused on the attainment of learning outcomes for students on a low income. However, Butcher (2022) has since reported results of a project designed to investigate whether digital poverty can act as a barrier to the Access module Y032. The project concluded that challenges in relation to disposable income intersect with other aspects of disadvantage, with the recommendations arising for the project aimed at promoting inclusion amongst students from poor socio-economic backgrounds for entry-level learning.

Theme 4: Motivations for study

The exact motivations for studying S112 were less obvious from this focus group, although were elucidated further in phase 2 of the project. However, one student commented:

“Knowing that you have somebody similar to you doing the same thing, it is a big motivation”.

It is unclear from the transcript whether by saying “somebody similar to you”, the participant was specifically referring to their own ethnicity but is a reasonable interpretation.

Theme 5: The Importance of the Focus Group Facilitator

The decision to have a focus group facilitator whose ethnicity reflected that of the participants was proven to have been worthwhile when, towards the end of the focus group, this question was asked:

“If you had received this invitation from a white lecturer, do you think you would have still engaged in this process? ”

Student responses:

- “I would have engaged but I would have been a bit sceptical or suspicious, ... because I think we see it very often ... that you have the white person leading the equality, you know, ethnic minority or whatever, part of the organisation and you – how can you – ... decide what changes to make for us when you haven’t experienced the same thing ...?”
- “[I was] Curious as to why there were no Black teachers in the organisation that would be able to facilitate this meeting – you know, when we come together in this group – you know, when Black people do come together we look to someone who has had the same experience as them or might have had the same experience as them and can relate on a similar level!”

This may explain why no responses were received to the initial e mail invitation sent out by the two White project leaders and reinforces the advantage of the researcher sharing the same ethnic background and perceived lived experiences as the participants, when more challenging and negative University experiences are being discussed. The creation of a safe space in which all users are of

comparable ethnicity, meant that it is likely that participants were more open to sharing their experiences without fear of misjudgement, meaning participants could speak freely and in their own dialect (slang) thereby ensuring that experiences were shared as openly and as freely as was possible. A sense of safety for Black students is thought to be uncommon at schools, universities and in the workplace (Greaves et al, 2022).

Phase 2: Semi Structured Interviews

Two students were interviewed by Angela Richards, one of whom was in a Secure Environment during the time of their S112 study. This information was not made available to the project leaders, or to Angela prior to the interview.

Thematic analysis of the interview transcripts revealed themes that mirrored those coming out of the focus groups (see below), although additional comments about students being time poor were noted that did not previously come out of the focus groups, and the costs associated with studying S112 were not mentioned by either student.

Theme 1: Representation in curriculum

Although the theme of lack of representation of Black scientists in the S112 teaching materials was not as clearly apparent as in the focus group, this was mentioned by both students in their interviews:

- “as a BME person you want to be inspired by your own”
- “there are not many Black scientists who are highlighted for their achievements!”

Theme 2: Sense of Belonging

The lack of sense of belonging or feeling of a collegiate community of Black students was very clearly expressed from thematic analysis of both interview transcripts. It was apparent that for these two students, the lack of a sense of community and belonging for Black students played a significant role in their study, not just of S112 but beyond.

- “I feel like I was alone, I don’t think there was a Black student there!”
- “if there was a way for support groups for BME students within the Open University..... there is nothing like that, so it’s just, you feel like you are on your own”
- “with science is the impression that it’s difficult it’s only – it’s not for Black people it’s for white”
- “Having a Black person to support me it can make me open up more, more confident to open up to feel that, ok it’s a safer place to say what I really want to say.....and to know that somebody that looks like you have done it before, that motivates you to say yes, you know you can do it too”
- “it’s that connection to allow you to be open and just be yourself and it’s that, yeah, that person they understand exactly what I’m thinking... you know..”
- “it would be nice to have a forum, not just for S112 but overall in all the curriculums to use – it would be nice to know that, you know we are there and we might need a bit more encouraging just to step out because – I think we feel shadowed, so it’s encouragement – I mean, look at me, it’s

taken me so long to get here bit finally we are here and able to do this interview! “

- “...might have helped me a bit more to feel like I’ve got some support around me, that I’ve got other people with similar circumstances, to know that other people were struggling, other Black students”

Both students expressed a clear preference for a Black student community to be facilitated, not just within the confines of one module, but University wide. For example, via an online forum community where Black students could engage with other Black students studying with the Open University at the same time. Although there is an BAME student group facilitated by the Open University Students Association, neither student mentioned this, which suggests that they were either unaware of its existence, or they may have preferred a support group targeted at Black students only.

Theme 3: Student Costs

This theme, previously identified in the focus groups was not strongly expressed in either student interview, and costs associated with their study (in particular with regards to the home experiments) were not highlighted as an issue. However, it should be noted that one of the interviewees was in a Secure Environment during their study of the module, meaning that the opportunity to participate in home experiments was not available to them.

Theme 4: Motivations for study

The motivations surrounding the study of S112 was clearly expressed by both interviewees, in particular, the Student in a Secure Environment was keen to study the module in preparation for their release:

- “Because I was in there for 5 years – do I spend my 5 years sitting there feeling sorry for myself or do I study – so then I felt that S112 was more fair, like something I can give pride to – so when I wake up in the morning I’ve got something that I can study”
- “I just wanted to better myself and come out and be able to obtain a career in the Sciences”.

The second student was motivated strongly by a desire to illustrate to their children what a Black person can achieve:

- “I need to do what’s best for my children, and show them that they can achieve – no matter who they are or – we are Black, yes, and there are things that seem to be directed at us so we have to kick through to make sure we get what we want done, and we have to, you know, go to extreme levels”

Theme 5: Importance of the Interviewer

One student, who had previously agreed to be interviewed, e-mailed Angela to pull out of the interview, after finding out that Angela was not the project leader, fearing that their contribution would not lead to change or be listened to by the project leaders themselves.

This could be seen to reinforce the 5th theme identified from the online focus group in which students expressed a clear reluctance to communicate with anyone from the University who was not of comparable ethnicity to their own, although note that this was only implied and not explicitly stated by the student.

Theme 6: Being time poor

A further theme that arose from these interviews, that did not previously arise in the focus group, centred around being time poor with students commenting on the lack of available time they had for study due to family, work and other commitments. One particular quote of note was from a student whose only study time was when their young children were in bed:

- “Wake up at midnight and study for 3 hours!”

It was apparent that this student was studying during the early hours of the morning as this was the only time available to them to study, when their young family was asleep.

Grandner et al (2016) have reported that ethnic minorities are often more likely to experience less/worse sleep with self-identified race/ethnicity and socioeconomic factors being associated with differing sleep patterns, which could explain why this student was only able to study at unusual times.

Other quotes of interest relating to a lack of time to study could link to poor Black student performance and progression on S112:

- “When you don’t have time to really study as much as you would like to, you are basically whizzing through everything”.

- “I had to work evening shifts and that really tires you out and especially when you have assignments”.

We have no firm evidence for why students in both phase 1 and phase 2 were so reluctant to participate in this research, but possible reasons are that many students tend to be time poor (due to work/family commitments) and were perhaps reluctant to commit time to improve a module that they had completed. Furthermore, Black students may be reluctant to trust in a study that includes White project leads and/or to trust that it would indeed improve outcomes for future Black students. There was also a hesitation from some students about contributing for fear of impacting their exam results (despite assurances to the contrary).

Angela herself has proposed more in-depth thoughts on this: “It could be that the first generic recruitment drive could have influenced how students perceived researchers' investment in the project and therefore the implicit importance that had been attached to the project. Students may have seen the initial generic e-mail as not specifically relevant to them as individuals, but as a group, so did not feel personally considered, compelled to find out more or even read the message which was sent in the standard format of other OU general circulations. Therefore, second and third personalised invitations came on the wave of a previously general invitation. With so much email traffic, and busy lives, individuals have to quickly discriminate what is specifically relevant to them and then whether it is of benefit to them. Black science students are no different in this aspect. There could also have been the feeling that this was a tick box exercise for the Open University and students were suspicious that White OU researchers were exploiting Black

students as a stepping stone to advance their career. Both aspects (the circulation of the initial seemingly non-personal recruitment material which resulted in students' perception that the project leaders had not invested that much into the project and students' uncertainty of the project leaders' genuine motives) were among the reasons that students gave for not participating."

This may be consistent with the findings of Bashir (2023), who also reports how the perceived power of researchers influences the engagement of minority ethnic participants.

Phase 3 Intersectional Study

The study identified that Black students living in IMD1, the poorest postcodes, were most likely to experience a double disadvantage.

For example, Figure 3 shows only 16.7% of the Black students in IMD1 passed the module in 19J compared to 60% of White students in IMD1, and over 70% of White students in IMD5.

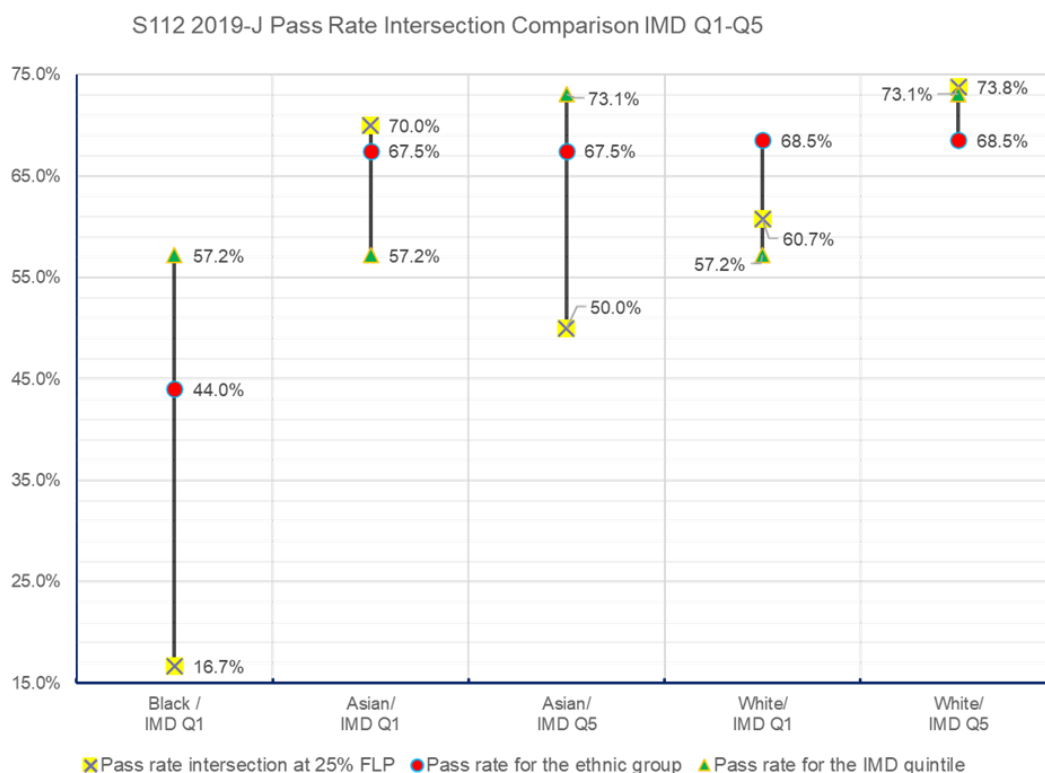


Figure 3 Pass rate comparison for students of different ethnicities and their IMD status for the 19J presentation of S112

The intersectional charts in this section all plot:

- average pass rates for ethnic groups as red circles
- average pass rates for IMD quintiles (location) as green triangles
- pass rate for the students at the intersection of those groups as the yellow cross.

The average score for all Black students that year was 44%. So, an already large difference between rates for Black students and White students was considerably larger for Black students living in the most deprived UK areas, experiencing a double disadvantage. Even though numbers of students in the intersectional groups are often small, the ones with the large double disadvantage are often Black.

Importantly, about 38% of the OU's Black students live in IMD1 postcodes, compared to about 17% of our White students meaning the Black students are already more likely to be facing financial difficulties. This observation is also made by Byrne et al (2020). Nevertheless Britton, Dearden and Waltmann (2021) report the significant returns for graduates of all ethnicities from the poorest neighbourhoods forming a strong motivation for success at university, although returns for Black men are lower than for many intersectional groups.

Data for most (IMDQ1 &2) and least (IMDQ3&4&5) deprived areas were also considered as combined cohorts to increase significance of findings due to the small numbers of Black students studying S112. For example, Figure 4, below for 21J, shows only 43.8% of the Black students in IMD1&2, the poorest 40% of areas, passed the module in 21J compared to 55.6% of Black students in other areas

(IMD3&4&5) and 65.9% of White students in IMD1&2, and over 70% of White students in IMD3&4&5.

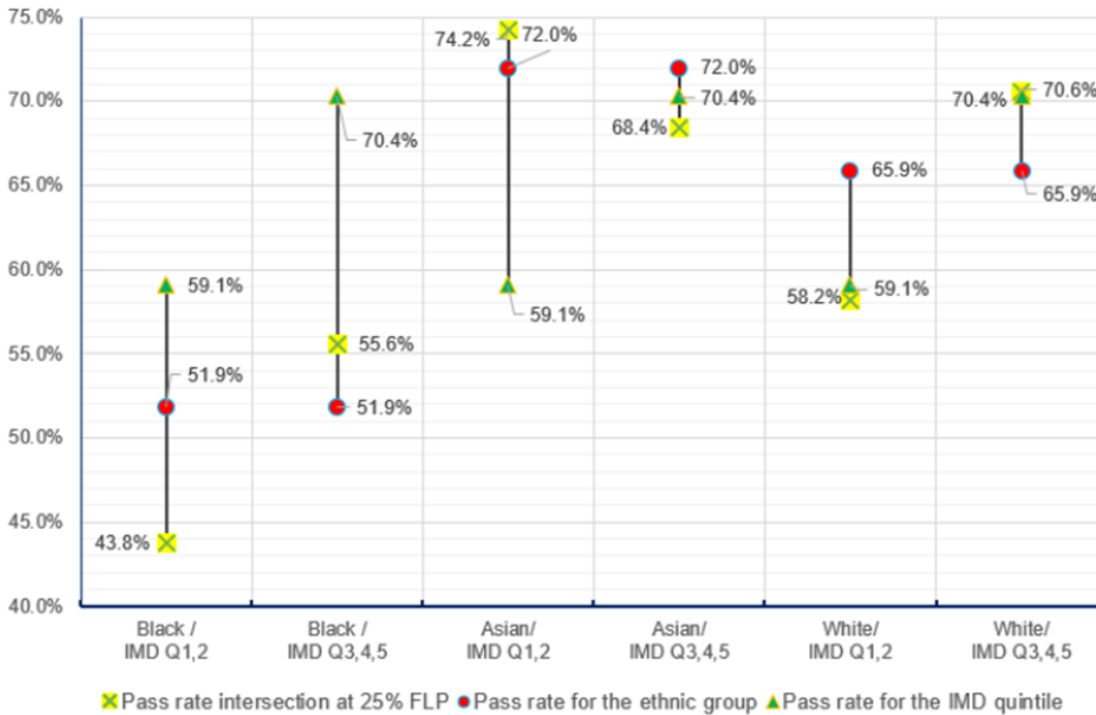


Figure 4 Pass rate comparison for students of different ethnicities and their IMD status for the 21J presentation of S112

The fact that it is the Black students in IMD1(&2) with the intersectional double disadvantage links to the focus group quote about assumptions about owning, or having the money to buy, items for kitchen experiments. Khan (2020) discusses how Black people in Britain face economic inequality and quotes research stating pay gaps of nearly 25% for Black men, but, interestingly in the context of this present study, concludes that whether they live in poor or affluent areas Black people experience inequalities in employment.

No consistent pattern was found for Black students who are first in their family to go to university being doubly disadvantaged (e.g. Figure 5), nor a consistent double disadvantage for students of a particular gender (Figure 6). The lack of double disadvantage for First in family students might indicate that S112 makes fewer assumptions about prior understanding and experiences (the so-called hidden curriculum) than some HE offerings. Adamecz-Völgyi, Henderson and Shure (2022) also report that being ‘first in family’ into HE has less impact than expected, although they focus on the labour market post-graduation.



Figure 5 Pass rate comparison for students of different ethnicities and their ‘first in family’ status for the 21J presentation of S112 (groups omitted where sample size zero or one)

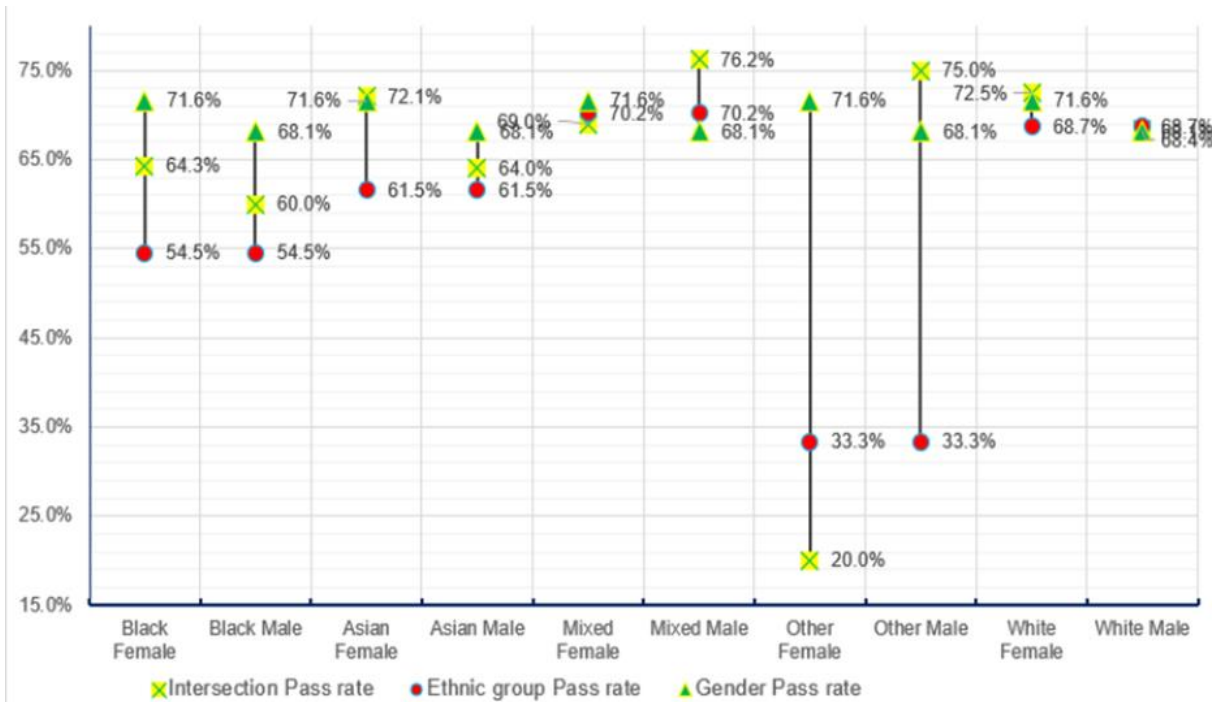


Figure 6 Pass rate comparison for students of different ethnicities and gender for the 20J presentation of S112 (groups omitted where sample size zero or one)

Scrutiny of 21J TMA scores by student ethnicity revealed that for TMA01 Question 2 (based on a collaboration with other students following an Earth science ‘kitchen’ experiment in topic 2 of S112) no Black students scored full marks compared to 17% of White students whereas 19% of Black students scored 7 marks or fewer out of 32, compared to 6% of White students. That is, White students tended to score well on this question, Black students didn’t. As above, Butcher (2022) supports this view (see Theme three – student costs).

The outputs from the three significance tests comparing rates for Black students vs rates for White students were as follows:

Average module scores	Statistically significant difference
First-time pass rate	Statistically significant difference
Completion rate	No statistically significant difference

Table 2 Outputs from Statistical Significance Tests

This result confirmed an initial perception that Black students were completing S112 at a similar rate to White students but were less likely to be awarded a pass and a good grade.

Impact and Recommendations

Impact on Teaching and Learning

Dissemination of the findings from the online focus group led to S112 being included in a pilot run of the Inclusive Curriculum Tool in August 2022. The Inclusive Curriculum Tool was based on 3 questions:

- 1) Is the material accessible to diverse groups of students (not just in terms of accessibility for disabled students; in terms of the language and images used)?
- 2) Will diverse groups of students see themselves reflected in the material?
- 3) Does the material equip students to participate in a global and diverse world?

Findings from the Inclusive Curriculum Tool were in good agreement with the findings of this project, with the auditors identifying that Black (and other diverse) groups of students may not be able to see themselves reflected in the module materials, and that many images and language used throughout S112 may not be inclusive or easily accessible for our Black students. This, in combination with the findings of our own project, led to the following changes being made to S112:

Theme 1: Representation in Curriculum

Where possible in S112 23J, module content was updated to replace images of White scientists with scientists representing a more diverse ethnicity (and

gender), together with a greater emphasis on global representation (as the majority of the images used in S112 were of White scientists within a Westernised setting). An image that was identified as being potentially racist was replaced immediately.

Furthermore (and related to Theme 3), a new video was produced for S112 23J to be made available to students in week 2 of the module. This new video shows the set up and results from the topic 2 kitchen experiment, assessed in TMA01, for which many Black students had previously shown a low question score. One of the presenters of this video is a Black Earth Scientist and a new member of the S112 module team. It was hoped that seeing a Black scientist from the OU performing practical work early within their module would help S112 Black students see themselves mirrored in the teaching materials, fostering the realisation that Science is indeed “for someone like me”, and that having this early realisation could help promote motivation and engagement for their onward study.

Theme 2: Sense of Belonging

At this early stage, the project has had no immediate impact for this theme directly. However, recommendations arising from this project largely relate to the fostering of a safe community in which Black students feel a sense of belonging (See Recommendations).

Theme 3: Student Costs

In 21J, it was decided to allow all students direct access to the online alternative resources for any home experiment, thereby removing the requirement for students to have to request permission to use alternative resources and the possible stigma/embarrassment associated with this, especially close to module start. Links to alternative resources, together with encouragement to use them if required, were made available for all S112 home experiments from the 21J presentation onwards. Any student who is unable to perform the home experiments within the module for whatever reason (including cost or availability of materials and equipment) can now go ahead and use alternative resources without having to admit this to their tutor.

The new video produced for the topic 2 home experiment (see Theme 1) also had the added advantage of providing students with a means of taking observations themselves from the video (rather than simply being provided with a set of experimental data as the alternative resources). This provided a better way for students, who are not able to perform the home experiments, to be able to achieve the practical based-learning outcomes.

The theme of student financial deprivation identified in our focus group has resulted in the setting up of a further eSTEEeM project to explore the impact of the

cost of home experiments on student learning in both S111 and S112 (as S111 has more home experiments embedded within its core content than S112).

Language of Assessment

Although not identified as a direct theme from the focus group or interviews, the project leaders were concerned about some of the language used in assessment in early presentations of S112 (where the awarding gaps were highest). Of particular concern was the fact that the language of the exam questions did not mirror that of the TMAs, where students were faced with new process words for the first time in the exam. This may have been worsened by the in-person nature of the exam, where students were not able to research the meaning of any process words unfamiliar to them.

For 20J (the first year the S112 exam was written for the online setting from the onset), questions adopted a different pedagogical approach requiring application of knowledge and understanding to an activity, more closely resembling the TMA assessment language, and a similar approach has been adopted in S112 exam questions in subsequent presentations.

Impact on awarding gaps

At this stage, project recommendations are still being disseminated, and it will be some time before any impact of some of these recommendations is evident within an awarding gap.

Certainly, the largest reduction in awarding gap has been noted between the 19J and 20J presentation, and whilst the awarding gap does appear to have reduced on S112 overall (Table 3), the confounding effect of the pandemic makes causality difficult to attribute.

Academic Year	Institution	STEM	S112
19-20	10%	13.4%	24.5%
20-21	11.4%	17.4%	14.2%
21-22	11.9%	18.5%	14.1%

Table 3 Comparison of awarding gaps for Black vs White Students

Despite causality being difficult to attribute, the awarding gap for S112 for Black vs White students has remained at a consistent level since 20J. Faculty level awarding gaps for Black vs White students have increased since 19J, however the awarding gap on S112 has decreased and is now below that of the Faculty, although remains higher than the Institutional level.

It is hoped that longer term recommendations from this project will continue to improve Black student success on S112 and beyond.

Recommendations

Build a sense of Belonging:

Building a sense of belonging through informal student networks and spaces to enable Black students to find each other. Networks should be student-moderated and feel somewhat separate to university online spaces. On large population modules (e.g. at Stage 1) these spaces could be per module to encourage study support, or could be across groups of modules or qualifications to enable connections to continue throughout study journeys.

However, some spaces should be free of links and associations to a module, Faculty or subject/discipline to remove any formality associated with standard module forums used to support study. The existence of the current OUSA BAME student forum could be highlighted on module websites and introductory tutorials.

Any spaces and networks should have a high profile in university communications and its online infrastructure to raise awareness among students of their existence.

Consideration should be given to whether Black students could be grouped together when allocated to tutors (Findings, Theme 2):

- “To have a [Black] partner to study with, that would be nice”.

Reverse a lack of representation:

The university should commit to **all** modules using the Inclusive Curriculum Tool to identify modules that lack representation of diverse people, places and literature. Global South researchers and their work should be included in every module. Module teams that are not ethnically diverse should organise Guest Lectures by diverse colleagues from other universities/industry.

No additional costs of Study:

Societal inequalities mean more Black students live in deprived areas, work longer hours with less control over the hours they work and have lower incomes. Additional costs to enable students to undertake all module activities should be kept to a minimum, the university should investigate providing equipment to students in IMD1 postcodes and any alternative online study materials E.g. videos of experiments, should be made available to **all** students not just those who request them or qualify, e.g. due to a declared disability.

Listen to students:

Create opportunities for Black students to share their study experiences in a variety of ways including the chance to contribute anonymously, including student moderated spaces (akin to social media) or a feedback tool similar to 'Report and Support'.

Increased awareness of students residing in IMD1 postcodes:

Consider use of a flag (similar to the "carer" flag) whereby students residing in an IMD1 postcode area are highlighted to both Student Support and AL staff (among

others). This could increase awareness of the issues that could be faced by students residing in an IMD1 postcode (e.g. additional proactive support or flexibility with TMA extensions) and could be taken into consideration if discretionary postponement is requested.

Conclusions

This project has several findings, which could be relevant beyond STEM as identified themes were not science specific.

One over-riding finding of the project was the continued reluctance of our Black students to talk to the project team to share their lived study experiences. Even a culturally appropriate researcher was unable to recruit a high number of participants for this study. Reasons for this require further investigation.

Themes identified from the online focus group and Black student interviews largely focused on a lack of representation of Black scientists and staff, together with the absence of a sense of belonging within the Black student community. The project team has made recommendations for how to address this and would encourage all new modules in production or in a life cycle review to consider how to increase diversity within their teaching and building a visible Black student community on a module, qualification, or wider basis.

Other themes may be relevant to all students, including costs associated with study and being time poor. The recommendations made by the project team could benefit all students on a module with respect to this.

The intersectional study identified a double disadvantage for Black students in IMD 1 postcodes but no double disadvantage for gender or being first in family into Higher Education. This reinforces our recommendations regarding the need to minimise additional hidden costs associated with study.

Future research could consider other potential intersectional double disadvantages such as PEQ, employment status, caring responsibilities or other HESA identified characteristics, with ethnicity.

Further exploration of the reasons underlying the reluctance and hesitation of Black students to participate in scholarship research, together with their lack of trust (including in organisational EDIA) would be beneficial. If Black students feel more confident about sharing their experiences, this gives the University wider opportunities to respond and adapt to their needs. This project has demonstrated how difficult it is to gain knowledge about Black student experiences on our modules, and such knowledge is essential to close the awarding gap further for our Black students.

As Angela herself said at the onset of the project: “The voice of African-Caribbean students who have an interest in science can somehow get lost if it is not encouraged.”

Acknowledgements

The project team would like to thank Jonathan Evans, eSTEEem Project Officer for his invaluable assistance with data acquisition, Paul Piwek our project mentor for his advice and guidance at project start, and to the eSTEEem team for their continued advice and assistance with the focus group and interview logistics.

The project team is also grateful to the Black students who did participate and share their lived study experiences with such honesty, without whom the project would not have progressed.

Dissemination

- [Interactive poster](#) at eSTEEem (2021) conference
- [Interactive poster](#) at STEM Teaching (2022) conference.
- [Project video](#) made for Black History Month, October 2021.
- Inclusion in EDI session at AL staff development day March 2022.
- [Short talk](#) at eSTEEem conference May 2022
- Presentation at LHCS Teaching and Learning update day April 2022
- Presentation at LHCS BoS May 2022
- [Presentation](#) at EEES Research Day May 2022
- Presentations at EEEs school meeting October 2022 and [March 2023](#)
- [Interactive poster](#) at eSTEEem conference May 2023 (Winner of best poster)
- [Interactive poster](#) and discussion session at APS conference April 2023

Figures and Tables

- Figure 1** A comparison of completion and pass rates in EEs for Black student vs White students
- Figure 2** The Awarding Gaps on S112 for Black vs White Students 17J – 19J
- Figure 3** Pass rate comparison for students of different ethnicities and their IMD status for the 19J presentation of S112
- Figure 4** Pass rate comparison for students of different ethnicities and their IMD status for the 21J presentation of S112
- Figure 5** Pass rate comparison for students of different ethnicities and their ‘first in family’ status for the 21J presentation of S112 (groups omitted where sample size zero or one)
- Figure 6** Pass rate comparison for students of different ethnicities and gender for the 20J presentation of S112 (groups omitted where sample size zero or one)
- Table 1** A comparison of Black student numbers across the University, the STEM Faculty and registered on S112 in 3 previous academic years
- Table 2** Outputs from Statistical Significance Tests
- Table 3** Comparison of awarding gaps for Black vs White Students

University Approval Processes

- SRPP – Approval from the Student Research Project Panel was obtained according to the Open University’s code of practice and procedures before embarking on this project. Application number 2021/1774.
- Ethical review – An ethical review was obtained according to the Open University’s code of practice and procedures before embarking on this project. Reference number HREC/3877/MacBrayne.
- Data Protection Impact Assessment – A Data Protection Impact Assessment was obtained according to the Open University’s code of practice and procedures before embarking on this project. Data Protection registration number 28-04-099.

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Appendix A

Focus Group Structure

Leaders to welcome participants and thank them for giving up your time.

The leaders reiterate that the conversation will be about the module S112 and your experiences leading up to and during the module. The aim is to help the OU to improve study experiences for Black students studying S112.

- Can you tell us briefly about what led up to you deciding to study with the OU at this time?

(prompts around career stage, employment, caring)

- Can you remember your initial impressions of S112 when you started the module?

(prompt - how did your impressions of S112 compare with previous study? Anything you liked? Anything off-putting? Was it what you expected?)

- Can you tell us about any challenges you faced during your study of S112?

(prompts around outside life challenges, e.g. changes to work/caring;

prompts around challenges in the module itself)

Some, or all, of the following questions may be covered by focus group members answers to the preceding question and so may not be needed.

- What do you think about the online module materials?

- Is there anything about the module materials that you would advise the module team to change to improve the module for future Black students on S112?
- How did you find the TMAs and the exam on S112?

(prompts around whether student felt module material prepared them well for TMAs, whether TMAs were good preparation for the exam, how did you find the wording of the assessment)

- How did you approach exam preparation?

(prompts – did you attend tutorials, tutor group discussions, watch recordings?)

- Is there anything you would advise the module team to change about the assessment to help future Black students on S112?
- Is there anything you found particularly helpful during your study of S112?
- Did you feel that you feel part of an OU community while you were studying S112?

(prompts -module, tutor group, wider student groups in the OU?)

And our final question...

- Is there anything else that hasn't been mentioned that you think the OU could do to help future Black students studying at Level 1 in Science and Environment?
- Or anything else you would like to share about your experience of studying S112 that has not already been covered?

Leaders to thank students again for their time and being willing to share their thoughts with us. Encouragement to contact facilitators/project team with anything else that they think of after the session that they would like to add.

