
Social Justice and Decolonising the Curriculum in Computing

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It has been said that Computing is a 'neutral' subject, untainted by prejudice or bias. This cannot be further from the truth. From IBM's role in providing rudimentary database technology (Black, 2001) to enable the categorising of certain groups of people during WWII, to the more recent identity profiling which forced Microsoft to abandon its Artificial Intelligence (AI) development of the Twitter bot Tay in 2016, the historical arc of digital capability documents cases of technology being misused, and failing to protect targeted individuals from hate. (Alleyne, 2021)

In his review of Charlton McIlwain's *Black Software: The Internet & Racial Justice*, Alleyne records that:

Digital tech has a problem with 'race'. Facial recognition software is least accurate when presented with facial images of dark-skinned Black people. Microsoft ended development of its AI driven Twitter bot Tay in 2016 when the bot began to spew sexist and antisemitic tweets.

The development and application of AI relies on gathering large data sets, which include the personal information of diverse groups of people. However, systems and AI do not have a hard-coded moral compass, nor the algorithmic capabilities, to recognise certain comments to be discriminatory or damaging. Since the AI processes are still in their infancy, data found on social media platforms can be rife with bigoted and hateful comments. So far, only people can recognise content that is hurtful and pejorative and therefore system designers still have much yet to learn. In his *Reith Lectures* (2021) Prof. Stuart Russell posited that we could be on the cusp of the next technological revolution and could, for the first time in history, literally design our future. However, that future depends on being able to answer two questions: Firstly, can we articulate the criteria necessary to create just and equitable systems for everyone? Secondly, and more importantly, can those in a position to take the decisions, and make those changes, be impartial and nuanced enough to enable the design and building of technical systems to reflect our larger social and moral values?

As a new Secondary PGCE Computing lecturer who is dedicated to building and developing a challenging curriculum for trainee teachers, I think it is crucial that students understand wider ethical issues of new technology. Our courses at BGU must contain subject content and reading lists that are as equitable, diverse, and inclusive as possible. By doing so, our modules would support the Secondary PGCE ADEPT ethos (2021) of being Ambitious, Diverse, Engaging and Professionally Transformative.

What did I do?

Getting students to see that Computing is not a 'neutral' subject has been extensively discussed in my sessions this year. A breakdown of discussion points and how these key issues affect an understanding of computing as a subject follow:

Ethnicity and language dominance

In an overview of programming languages, there is a bias favouring English. Another key issue particularly in programming, is the lack of historical recognition for Black and Asian Ethnic Minorities (BAEM) inventors and contributors to developments in computing.

This limits the contribution of people from diverse cultures and limit our global progress in problem solving. Of the =>8,500 global computing languages, well over a third are English or use English as part of the process. In their paper, Guo (2018) suggests that

By empowering more future creators from diverse backgrounds, the artifacts that end up being created will hopefully in turn become more representative of the needs of the world.

We've all heard of Steve Jobs, but fewer of us might have heard of Gerald (Jerry) Lawson who worked alongside them in the Homebrew Computer Club and helped invent the Fairchild Channel F games console, or of Mark Dean, who helped design the IBM personal computer and the technology that allows us to connect to peripherals (e.g., monitors, printers etc) (Adams, 2012).

Gender

There are currently a lower number of girls than boys accessing STEM subjects, and fewer women in senior positions at tech companies. The low visibility of females in the industry generally, and in online cultural and commercial spaces has led to virtual environments which are designated 'men only' and hostile to women in general. Certain areas of the gaming world are rife with blatant misogyny.

The online meetings and teaching revolution, precipitated by the Pandemic, would not have been possible without the work of Dr Marian Croak, whose work on Voice Over Internet Protocols (VOIP) was revolutionary. She is a mentor for women and sits on the board for the Holocaust, Genocide and Human Rights Education Centre. Lisa Gelobter was central to the development and introduction of online video and of Shockwave, that has given us web animation. She also served in the White House (2017) as the Chief Digital Service Officer with the US Department of Education.

Ruhi Lee (2020) wrote that according to the *Digital Australia* report of 2018, 46% of all gamers in Australia were female, and yet the rampant sexism and hate made it feel as if this was not the case. Anecdotally, a young female friend of mine is a gamer and never reveals her gender in online games because of the hostility and discrimination she has experienced. She is on her way to becoming a computer scientist and it would be a tragic loss if women like her were discouraged from a digital career because of this.

Dr Peter Kemp (2021) wrote about the changing landscape of computing teaching in the UK, before the pandemic, highlighting the intersectionality discussed earlier, finding that fewer students who are black, female and from poorer backgrounds are taking, or being offered, digital qualifications.

The digital divide

Barriers to entry and ownership, often referred to as 'the digital divide', can be caused by low household incomes, geographical location and age. These were thrown into the sharpest focus during the worst of the Pandemic when some children were only able to 'listen in' to lessons on their mobile phones. Here in the UK, there is a postcode lottery where upload and download speeds can vary enormously due to infrastructure disparity. This impacts individuals and businesses alike, and this inequality has led to various governments trying to address it. Current global economic impacts on household incomes will only serve to increase the divide and closing the gap will become more difficult.

The issues above show there is a great deal of intersectionality when considering decolonisation and social justice in computing. I felt that the way forward for me was to apply a more granular categorisation in order to add greater breadth and depth of course material readings. My first instinct was to seek help and collaborative support, so I discussed my desire to expand my curriculum reading

list material with Teaching Resources Librarian, Dr Rose Roberto, who directed me to ‘Decolonisation Toolkits’ produced by other universities, and one <https://libguides.bishopg.ac.uk/SJD>. The toolkit prompts gave me ideas for how to search, sort and select material relevant to my subject.

Structuring resources

The Computing reading list was originally conceived to simply identify the lecture session topic, the date it was to be delivered, and topical recommendations. Please see Figure. 1.

Figure 1.

Date	Teaching session	Reading recommendation

I felt that this table needed to be expanded to support the nuances of specific computer science topics and a greater cultural context for technology. I also wanted to develop a clearer structure allowing me to identify where in the existing curriculum I could integrate social justice and decolonising topics. Therefore, I adjusted the reading list table accordingly. From this exercise, ‘The Digital Divide’, ‘Ethnicity’ and ‘Gender’ became the three main column headings. (Please see Figure 2.)

Figure 2.

Date	Session	Recommendation	Accessibility / Ethics		
			Ethnicity	Gender	The Digital Divide
			<ul style="list-style-type: none"> Language – the number of English coding languages – language dominance Heritage 	<ul style="list-style-type: none"> STEM & Barriers to entry Hostility in gaming Progress within the industry 	<ul style="list-style-type: none"> Cost – digital poverty Location - infrastructure Environmental impacts Free software movement

Next, as I worked through the existing reading recommendations, I identified those that belonged in each new category. Similar to coding exercises, or discourse analysis, this process allowed me to place topics into a useful column. Further sub-sets emerged from this activity, and I added these as bullet points below the main headings e.g., ‘Hostility in gaming’ is one element of the ‘Gender’ issues we currently experience. All of these main categories and sub-sets were, in my view, moral and ethical issues that impacted someone’s access to digital technologies, so I added ‘Accessibility and Ethics’ as umbrella terms.

What am I doing next?

Happy with my initial developments of the reading list, I am now:

- Systematically visiting websites of governing and professional bodies for Computing, and Computing education (e.g. National Centre for Computing Education, Computing at Schools and British Computer Society) using their menus and ‘search’ functions to find what they are doing about decolonising and social justice and adding these to reading lists.
- Listening to eight RaspberryPi social justice and decolonisation themed seminars.
- Searching other universities’ reading lists to see what I may be missing, and what others have chosen to include.
- Scrutinising the PGCE Secondary collective session reading lists and removing any that I may have replicated, thus making the Computing list wholly subject specific.

Difficulties and challenges

One of the difficulties of using the 'search' function on websites is that I may not be using the correct search terms and I am sometimes finding no search results. Therefore, I will be revisiting this task and trying other key words and terms.

Upon reflection, one issue gives me a little trepidation—placing myself in a position of 'choosing' what research to include and what to leave out. Making decisions such as these requires me to examine my own biases and I might find that I am not as equitable as I think (and hope) I am. This is an uncomfortable prospect, but I must proceed with a genuine and honest hope of making reading lists better and not be stifled by fear of making mistakes. To mitigate this, I will seek peer guidance and support in evaluating progress.

Horizon scoping is continuous; it would be folly to think that this process of developing and updating my reading list for PGCE Secondary Computing trainees is one that has a definite end. It will, and should be, a work in progress, and will entail effective quality checking and contribute to my own professional development.

Conclusion

'Every Child Matters' was introduced by the Government in 2003 and, despite it not being used as frequently in our contemporary lexicon, it should ultimately form the cornerstone of our vocational aims. To develop this by further identifying the hopes and needs of all our students, and endeavouring to meet those needs, is a privilege and a necessity. Recognising the past mistakes and triumphs in our subject area and looking to make a positive contribution and impact on a fairer future is, in my view, what must underpin all our discussions with our trainees.

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