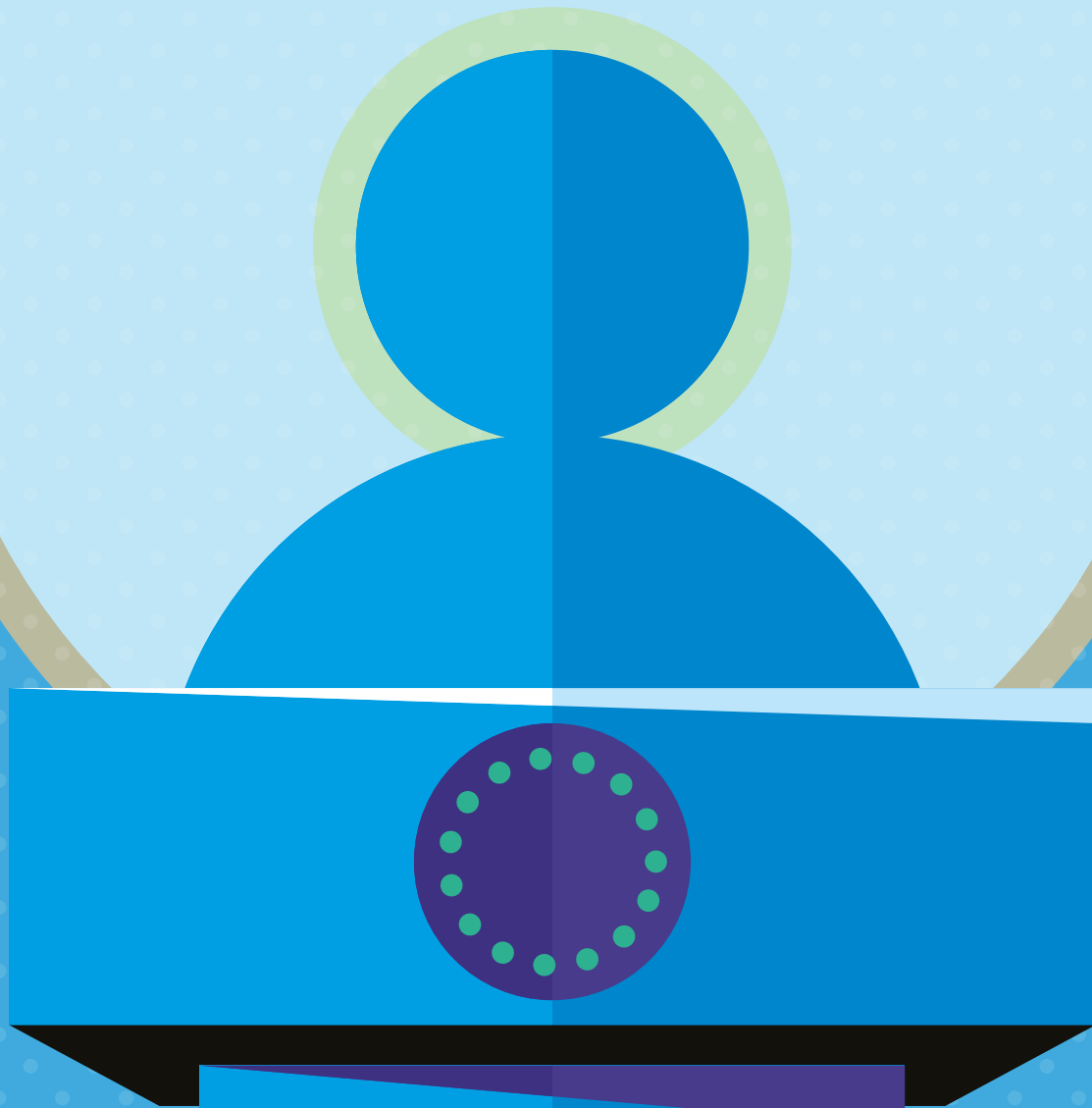


# The Scholar

Issue 18  
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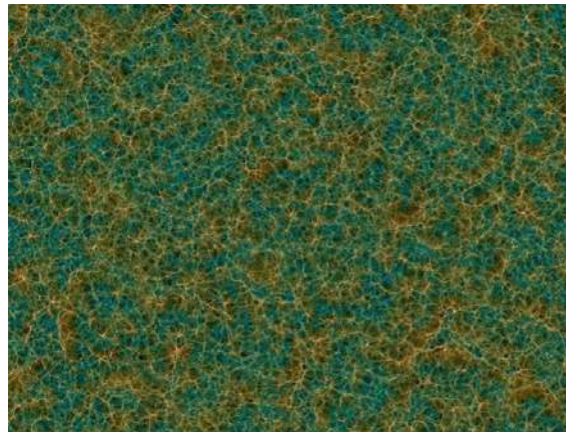


## ***What Makes a Great Prime Minister?***

+

Academic essays on whether  
democracy is a human right and  
how education could be used to  
build an ideal society.

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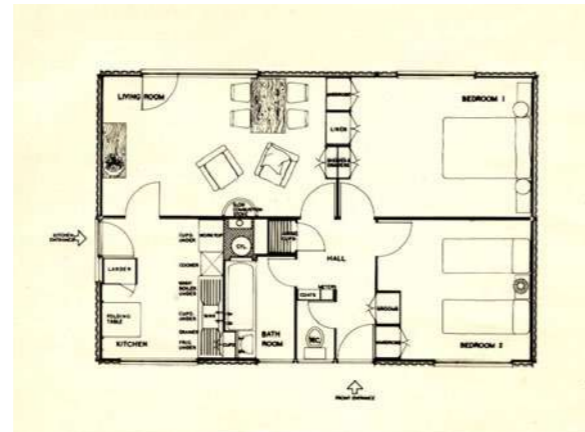
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## Updates

# Introduction from The Brilliant Club

**We are delighted to be celebrating the incredible work of pupils who have taken part in The Scholars Programme from schools across the UK.**

In this edition, you will find 30 impressive assignments with course titles ranging from 'How (and Why) to Make a Brain Cell' to 'What can refugee poetry teach us about the refugee crisis?'. This edition of The Scholar features some of the most outstanding articles ever produced by pupils who have taken part in The Scholars Programme and Uni Pathways.

The university-style learning that pupils are exposed to on our programmes is designed to provide pupils with the freedom to develop their own ideas and approaches. Not only will this help pupils who go on to study at university, but we believe these are crucial skills to develop in the adult world. The development of independent study skills and support with critical thinking provides young people with a platform to share their ideas. We hope it will empower these young people to engage in debates that shape our world, whether they concern democracy or globalisation.

The Brilliant Club is passionate about exposing pupils on our programmes to these important aspects of university. We hope that these projects encourage pupils to dig a little deeper into subjects that matter to them and to seek opportunities to make unique contributions to their fields. In doing so, pupils can change their own lives by enriching them with opportunities for learning and being inspired by the topics they cover. This year, we had a record number of nominations for The Scholar, so we would like to say a huge congratulations to the pupils published in this edition and to the pupils who completed The Scholars Programme or Uni Pathways. All the pupils who graduate from the programmes should be very proud of themselves! On Page 4, we are delighted to have a collaborative guest article for the first time, written by our brilliant Ambassadors Jasneet Singh and Joana Hoxha. Jasneet is currently in his third year studying Civil Engineering at UCL, and Joana studies European, Social and Political Studies at UCL and is currently on her year abroad in Paris. We would like to say a massive thank you to Jasneet and Joana for taking the time to write about their experience at university during the pandemic.

In pursuit of our mission, to support pupils from less advantaged backgrounds to have fair access to university, we run two core programmes: The Scholars Programme and The Brilliant Tutoring Programme. The



The map above shows the locations of all pupils featured.

Scholars Programme allows researchers to share their subject expertise, delivering an academically challenging supra-curricular course; The Brilliant Tutoring Programme allows researchers to use their subject knowledge to support pupils to develop in key curriculum areas.

If you are a teacher who would like to find out how your school can get involved with either one of our programmes, we would love to hear from you! Please get in touch via our website:

<https://thebrilliantclub.org/schools/>

If you have completed one of our programmes, we'd love for you to become a Friend of The Brilliant Club! You can find out more and sign up via our website:

<https://thebrilliantclub.org/friends-of-the-brilliant-club/>

Guest Article

# First Times

**Jasneet Singh & Joana Hoxha**  
Brilliant Club Ambassadors

The COVID Pandemic in 2020 led to many first times. It was the first pandemic that led to international lockdowns, first closing down of schools since the Second World War, first ever cancellation of A Level exams, first year of universities shutting down and the first time the outside world was put on halt in decades. The pandemic led to a lot of firsts that each generation experienced in their own unique way. We are here to share the somewhat universal experience of those whose sixth form/college years were cut short in March 2020. The past two and a half years have been life-altering to say the least; the entire world has undergone a massive change and faced the challenge of a pandemic; something that most people are still recovering from even two and a half years later. It feels as if we have grown and developed into young adults but at the same time, we are stuck in the past, reminiscing about how different our start to university would have been if COVID had never existed. The ramifications of such a global event have left ripples throughout society and the education system. The idea of starting university is troubling for most students on its own, but to do so fully online from the solace of your bedroom was a new challenge entirely. However, technological advances have made it possible to create virtual classrooms and spaces, allowing students to live a life through the lens of their mobile phone or laptop. This meant that educational institutes could somewhat carry on teaching.

Zoom, Microsoft Teams, Blackboard; All platforms that were almost unheard of by a lot of former university students, as well as professionals, have now become second nature to us. Every lecture, seminar, tutorial and group work was completed online. People were reduced to a name on a screen, most hiding behind a camera for a full year of education. It wasn't until mid-2021, when in-person lessons commenced again, that people began to put a face to the name. Attending a university where most of the students are international made integration even more difficult. Students studied from their home countries and some UK students lived at home, one of them being me. Those in student accommodations were restricted from going out. It was extremely difficult to socialize and meet new people. This did not only hinder social life but also academic debates. Zoom classes were silent; people were not accustomed to expressing opinions through cameras and this did not allow for stimulating debates and differing perspectives. This lack of expression prevented us from grasping a more profound understanding of a subject or an issue, which is ultimately the aim of higher education, particularly considering the fact that we have chosen to study these subjects in depth. Whether for good or bad, home learning led to an irreversible change to

the education system, the effects of which still have not been fully realized.

Although in the first two years of university we had somewhat similar experiences, the third year of university is where our experiences slightly diverge. I, Jasneet, can say with some confidence that the world is slowly returning back to normal. Online learning is slowly being phased out in favor of in-person lectures. The idea of meeting your colleagues daily and socializing remains a hard reality to grasp for some 'meeting online' quickly became our new norm. I personally love the idea of traveling to university, getting to meet my friends, going out for a coffee or just sitting in the library and doing my work. Evidently, for some, online learning and teaching was preferred because one could learn from the comfort of their home. It is definitely less tiring as one could wake up and be online in a matter of minutes, reducing tardiness and absenteeism. However, it is a breath of fresh air after the last two years, which were spent behind a screen.

For me, Joana, my third year of university has been my most exciting one yet. Not only have COVID restrictions lifted but I have, for the first time in my life, moved out of my parent's home and I am currently studying in Paris, France. On top of that, all of my classes are in French. Face to face teaching has resumed and it is only now that I am able to reap the benefits of this and understand how valuable it is, particularly at higher education level. Meeting my professors, forming more interpersonal connections with students and being surrounded by differing perspectives and opinions has allowed me to expand my knowledge and understanding of the world. However, it has been an adjustment, especially trying to navigate the social aspect of university life and factoring in time for travel and work, both in the academic sense and extracurricular. Figuring out my work-life balance has certainly been a challenge, especially since being in a new city requires some exploring; facing administration tasks and unexpected situations can also be difficult to deal with. However, in-person contact is invaluable. From the little things such as getting on the metro and talking to friends to the big things such as attending conferences and watching assemblies; all these experiences were overwhelming but in a positive sense. In fact, my first time sitting in a 200 person lecture hall confirmed everything I had seen in movies about university life; it made me feel as if I had just started university. I felt melancholic that this was not possible from the beginning. However, it is wonderful to live in this interconnected world now, whereby we have the chance to do work online as well as attend lectures in person.

What's next? One thing that this pandemic has taught us is that plans for the future are never set in stone. The future is something everyone plans for, but rarely does it happen the way people envision it to. The idea of finishing university and starting a job may seem a simple one, but in reality, it is quite the opposite. It is full of complications and unseen problems, some of which may not be clear at first glance. Thus, it is my advice to you all that you really ponder over where you want to study, but more importantly what you want to study. That will truly decide how your life at university goes. Undeniably, it is important to find something you are passionate about but learning to accept that passions and decisions change over time is a crucial lesson that we have had to learn, unfortunately in a harsher way than envisioned. However, my advice is to work at what you love and if you have not figured that out yet, it is worth branching out and trying new things that you have not considered before. After all, making well-informed decisions requires you to try new things, for the first time.

**Jasneet Singh & Joana Hoxha**  
Brilliant Club Ambassadors



# Arts and Humanities

## What was the impact of prefabricated council-built post-war houses on family life?

Year 10, Key Stage 4

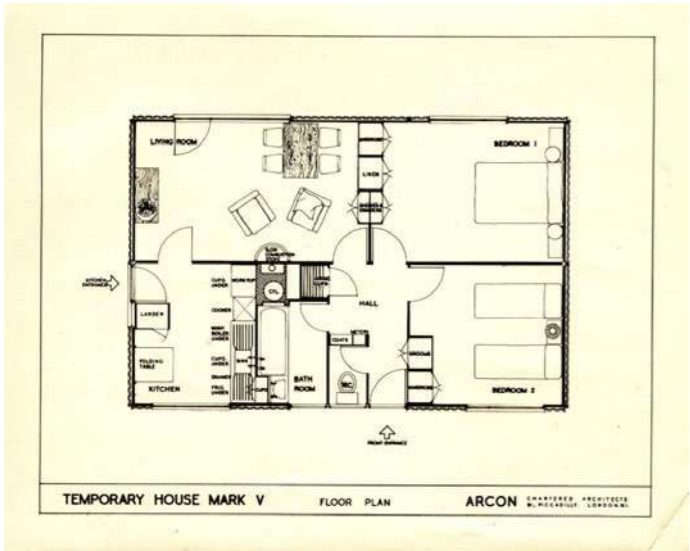
Pupil Name: F.B.  
School Name: The Stanway School  
Supervised by: S. Yanina Gulizzi  
Tutor University: University of Essex  
Course Title: Architecture, Interior and Feminism - Can Feminism Reveal Misogynist Architecture and Interior Design?

Introduction:

The council-built houses of the postwar period had an impact on family life in many ways. These prefabricated houses (sometimes referred to as prefabs) had many effects on post-World War II family life: they encouraged families to have children and made it easier for women to fulfill their “duties” as homemakers. In this essay, I will provide a formal and contextual analysis of images and floor plans of these prefabricated houses. I will also draw on feminist theory to explain how the design and floor plan changed the lives of women (especially mothers) after the second world war.

Image analysis:

Below is a copy of the floor plan I analysed for this essay. These prefabricated houses were equipped with just about everything a family needed at that time.



(prefab museum, Arcon MKV floor plan, Susan wright)

The kitchen was equipped with a folding table, which was easy to clean and gave mothers more freedom of movement when cooking and cleaning. The kitchens also had some work surface, a cooker and about 3 cupboards and a larder for storage. The storage space would have meant that women did not have to go shopping as often, as they could buy things in bulk and store them in their own homes. Larders were often cooled via vents that led outside, so that products such

as meat could be kept for longer.

The kitchen door also opens directly into the living room, where the husbands/fathers probably sat with their children while the mother's prepared dinner in the adjacent kitchen, so that they could easily converse throughout the house.

The living room had a table with 4 seats around it, which probably suggested to the couples that there would be enough room for children to live in the prefabs. After all, if the couple sat at a table with two empty chairs at every meal (compared to the less comfortable alternative of the folding kitchen table), it was more than likely that the thought of children taking the seats crossed their minds at least once or twice.

The entrance hall had entrances to almost every room in the house (with the exception of the kitchen, where the mothers presumably hid to attend to their 'duties'): a bathroom, a toilet, the living room, the airing cupboard and two bedrooms were all accessible through the entrance hall.

The bedroom you pass first when you enter the prefab is furnished with two single beds, a wardrobe and a bedside table with a lamp. This room was obviously set up for two children, which in turn encourages couples living here to have and raise children in these houses.

The other bedroom, just around the corner, was furnished with one double bed, two bedside tables, a wardrobe, a linen cupboard and a few shelves and drawers. This bedroom was where the parents would sleep and store most of their belongings. This bedroom is likely situated so close to the other bedroom so that the mothers could easily get to their children, if necessary, for example if a child were to have a nightmare or could not sleep.

Overall, these houses seemed to convey a purposeful message to the women who lived in them. From the floor plan to the furnishings, the prefabricated houses were built in such a way that women could easily fulfil their role as maternal home makers.

People's lives in prefabs:

From pictures like this one of Rose and Fred Stocking in the garden of their prefab house (59 lower Jackwood close, an Arcon MKV) we can see that the men were often the ones working outside while the women worked inside. In the picture we can see Fred with a gardening tool in his hand and a vest suggesting that he was probably heating up while working in the garden, which his son John says he loved, while his wife Rose is seen to be wearing an apron, which was usually used to keep the women's clothes clean and nice while they cooked or tended the house. The apron was often considered a 'mandatory part of the housewife's uniform'. (1950's apron history: tea apron, half apron, cobbler apron, 2021).

John Stocking also makes a point to mention that his parents moved into the prefab only a short 3 months after his birth (Stocking, 2021), perhaps so that his mother could take better care of him while his father

could go to work ,and spend time in the garden he loves so much.



Many children enjoyed living in their prefabricated houses in those days. So did John Chinery, who moved out of his prefabricated house at the age of 17 because of damp. His mother had unfortunately passed away a few years earlier, which may have led to the neglect of the house and thus the damp. John said 'I loved living in that prefab I did not want to move' and also about his new house said that ' it was brilliant, but not a patch on our lovely prefab' (Chinery, 2016)

Feminism:

The role of women in the post-war period was often equated with cooking, cleaning, consuming various products and media, and caring for children.

Most women, especially married women, stayed at home to do many of these things (cooking, cleaning, etc....). Although women made up a significant part of the labour force in the post-war period, men still considered them inferior and believed that their only duties centred on mothering and household work.

In the 1950s, men were thought of as the head of the household or 'breadwinners' who were expected to work and provide for their families alone, while women were expected to just stay at home, take care of the children and consume media.

This can be illustrated by advertisements such as the one for the "new slim- silhouette hoover" one of the main selling points of the hoover is that it is "slim" and this makes it better. The woman's body shape almost mirrors the shape of the hoover (or a silhouette, as the title suggests). The similarity of the woman's shape to the hoover might suggest that the woman herself is just a cleaning appliance and should not be considered a real human being.

The advertisement also shows a photo of a baby at the bottom left of the image with the words 'a clean "playground" for your child'. This emphasises the idea that women (the main feature on this ad) were only meant to be maternal and look after children, and also helps to show that at this time women were expected

to do everything for their children, while fathers only had to earn money.



In every image featured in the advertisement for the hoover shows a woman using the hoover and cleaning with it. There is not a single man featured in the advert because the advert is aimed at women, which again shows that women were always expected to be housewives and take care of the cleaning, which is sexist because it shows that no one believed that a woman could be anything more than a housewife. It also suggests that women are the primary consumers of labour-saving appliances such as the hoover. This could indicate that women are expected to do all the housework at the same time as being seen as incapable of doing it without help. Similar messages are conveyed in other ads such as 'you'll be happier with a hoover'



Despite the condescending message of these advertisements, the hoovers themselves would have helped the women a lot because they would no longer have had to carry their carpets outside to clean them as they would have before the war. In the past, they would have cleaned their carpets in the garden, by hanging them on something like a washing line and beating the carpet until all the dust and dirt was removed. Now all they would have to do was plug

in the hoover and run it over the carpet a few times, which had just as good an effect, if not better.

In the post-war period, labour-saving devices became increasingly popular, as this advertisement for a Kentwood chef once again shows. This advert depicts a woman in a chef's hat leaning on her husband with the words, "the chef does everything but cook - that's what wives are for!" This suggests that even though women are expected to work in the kitchen at home, they were still unable to take up a relevant profession, resulting in them not being able to provide for their families. It is unfair that women were to work all day in the kitchen preparing three meals a day for their children and husband, while men are paid to do the same thing in a professional setting.

The fact that this is an advertisement for a labour-saving device also suggests that women at this time were unable to perform one of the tasks expected of them as housewives to a sufficient degree without additional help.

Again, the expectation for them to perform certain tasks well, combined with the message that they are not skilled enough to do so professionally or without any assistance, comes across as condescending and demeaning.

Conclusion:

It is clear that during this time period women played a very large and important role in family life, but it is also evident that while their role was important and meant a great deal to the children, who enjoyed having their mothers available to keep them company throughout the day, that many women were often told (either directly or implicitly) that they were worth less than men and that they lacked the skills to pursue a professional career and that their sole purpose was to have children and raise a family.

This is implied by the furnishings and layout of their prefabricated houses and the appliances they were told they should keep in them.

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[1] Abel Meeropol quoted in Edwin Moore, The Guardian, 18 September 2010. Available at: <https://www.theguardian.com/commentisfree/cifamerica/2010/sep/18/strange-fruit-song-today>  
[2] NAACP, 'History of Lynchings' [Accessed 15/1/2020]  
[3] He described incident to music writer Ben Edmonds in the 2001 book, What's Going on: Marvin Gaye and the Last Days of The Motown Sound

Libraries were quintessentially private male places of study. To what extent were private libraries used by the whole family in the 18th century?

Year 9, Key Stage 4

Pupil Name: G.K.  
School Name: The Bolsover School, Derbyshire  
Supervised by: A. Solomons  
Tutor University: University of Liverpool  
Course Title: Voices in the Margins: Private Libraries and their Readers in the Eighteenth Century

The eighteenth century was a patriarchal society, where men were considered to be the stronger, more knowledgeable and most relentless sex. Most receiving no education, women were expected to conform to society's restrictive expectations. As a whole, it is believed women of the eighteenth century experienced great oppression at the hands of the patriarchy.

The private library continued to rise in eminence during the eighteenth century. A private library is private in the sense that it is part of the owner's domestic life and home. A place safeguarded by private ownership, opposed to that of one of a public establishment. The library consisted of an individual's personal collection. This collection was appreciated mainly by the man of the house, his family and a small group of associates. Some of the world's largest private libraries have been sold to institutions such as the Library of Congress- one of the largest libraries in the world, holding more than 29 million books, located in Washington D.C. Other private libraries are inherited by the beneficiary of a will/trust or are bequeathed after death. A local example of this is the private library within Chatsworth House in Derbyshire, which has been a part of the Cavendish family for generations.

During the eighteenth century, the genre of reading material adapted. The private libraries began to contain a vast majority of fictional novels, rather than non-fiction. This was because there was an increase in printing during the reading revolution. The reading revolution was an alteration in reading pattern- from re-reading a small number of texts many times, to people reading a large number of texts only once. This was by virtue of printing developments, including the increased use of the printing press (a machine that allows uniform printed matter- i.e. books and newspapers- to be mass produced.)

While some men did read them, the 'novel's' primary audience were women. By mid-eighteenth century, the percentages of literate men and women were growing. According to a source<sup>1</sup>, around 60% of men and 40% of women were literate in the late eighteenth century, although this did not necessarily mean they could all write.

This point is stressed further in Mark Towsey's Reading History in Britain and America. While women were eventually given the opportunities to read, it was certainly not the same advantages men were given. Towsey quotes: While plenty of boys and girls were therefore introduced to history – either by parental instruction or voluntarily - at what we would now term school age, there is also evidence to suggest that university students – all adolescent men in this period, of course – took seriously the repeated injunction that history would be a profitable accompaniment to their formal course of study.<sup>2</sup>

Towsey's supplementary research showed that 'While some writing continued to stress the conventional view that history was only strictly necessary for those gentlemen 'who may be called to an active and public life in the service of his country',<sup>3</sup> there was increasing recognition that history was fitted to 'persons of almost all ranks and situations' – including women, for whom a 'knowledge of history' was considered 'a necessary accomplishment'.<sup>4</sup> Charles Allen advised his eponymous Polite Lady that "every accomplished woman should have a tolerable knowledge of history in general", adding that 'of all the different kinds of reading, there is none that can afford more profitable instruction, or more delightful entertainment that that of history'.<sup>5</sup> The popular conduct writer and long-serving headmaster of Tonbridge School in Kent Vicesimus Knox recommended history to both sexes as an antidote to less laudable habits. For impressionable young men from 'all classes above extreme poverty', reading history was a more 'satisfactory employment' than 'the bottle and . . . cards'; for young women, history was to be read 'in the place of those novels which often lead them to ruin'.<sup>6</sup> This last comparison was an almost constant refrain, as conduct writers struggled to come to terms with the emergence of the novel. The inimitable Philip Stanhope Dormer, 4th Earl of Chesterfield, Derbyshire, advised his son that novels 'have been the ruin of many a young woman', but that 'there is no impropriety in your reading history' <sup>7</sup> <sup>8</sup>

I believe this source determines why only 40 % of women, even of aristocratic origin, were literate in the eighteenth century.

A myriad of influential British critics, widely denounced 'the novel' as a genre and cautioned the readers of the apparent dangers it possessed. Vicesimus Knox, for instance, declared "If it be true that the present age is more corrupt than the preceding, the great multiplication of the Novels has probably contributed on its degeneracy". Later Knox states, 'The boy who can procure a variety of books like Gil Blas, and the Devil upon Two Sticks, will no longer think his Livy, his Sallust, his Homer, or his Virgil pleasing. He will not study old Lilly, while he can read Pamela and Tom Jones, and a thousand inferior and more dangerous novels. When the judgment is ripened by reflection, and the morals out of danger, every well-written book will claim attention. The man of application may always find agreeable refreshment, after severer study, in the amusing pages of a Fielding; but the fungous productions

of the common Novel-wright will be too insignificant to attract his notice.'<sup>9</sup> In these extracts of Knox's conduit literature, words such as the adjectives 'corrupt' and 'dangerous', in addition to the noun 'degeneracy', are used to deter men from reading novels. Knox only referred to males in the extract, which further promotes the idea that it was women who mainly read novels. However, this could also indicate that Knox deemed it unnecessary to include women in his works, since he possibly thought that even though women could and would read, they mostly read novels due to them being easy to read and did not take a great mind to follow the plot. This perfectly highlight the unjust and preferential gender roles in the eighteenth century.

Samuel Taylor Coleridge also quickly condemned the effects of narrative fiction by stating: Where the reading prevails as a habit, it occasions in the time the entire destruction of the powers of the mind; it is such an utter loss to the reader, that it is not so much to be called pass-time as kill-time. It conveys no trust worthy information as to facts; it produces no improvement of the intellect, but fills the mind with mawkish and morbid sensibility, which is directly hostile to the cultivation, invigoration and enlargement of faculties of understanding.<sup>10</sup> In this extract, Coleridge explicates how reading a novel is incomprehensibly misusing time and is of no practical use to life in general. The words 'morbid' and 'hostile' give intensely negative connotations- highlighting the fact that novels were seen as items of mindlessness and unintelligence. Nevertheless, the novel still thrived.

The private library was a male dominated area. This is illustrated in the Cholmondeley Family Portrait <sup>11</sup>, where there is only a single woman in the room. She sits in an uncomfortably diligent and punctilious manner, staring awkwardly, as if she was in a foreign space. This establishes the impression that she was not accustomed to the private library, possibly because she was not allowed to be there unless authorised. The library being a gentleman's place is further showed with the posture of the obvious man of the house. He is sat comfortably, leaning back into his chair as one would if you owned the place. He also has a book in his grasp, implying that he studies in this room and this was possibly to show his knowledge. He is also the only person in the room dressed in vibrant, Prussian blue, meaning the eye is immediately drawn to him, intensifying our knowledge of his significance within the household. There is an infant (female) that is sat up straight and neatly next to the woman, whereas the two young boys in the image are playing around joyously. This leads to the idea that there was a divide between the sexes from even very young ages. Although this is only a staged painting, it gives us insight into the world of grandeur and opulence during the eighteenth century and provides evidence that the private library was a male led space.

As my research shows, eighteenth century private libraries were predominantly a male place of study: a place a gentleman would retire to, to educate himself or to be alone with his thoughts. Even though most men read in the eighteenth century,

there was a clear class distinction, as it was only the upper-class gentleman that were privileged enough to have a private library in their constitution. The late, great Jane Austen’s *Pride and Prejudice* shows a historical glimpse into the life of an aristocrat. The novel, although fiction, shows relevance and context to match those of the gentlemen in the eighteenth century. Austen’s male lead character, Fitzwilliam Darcy, possessed a library of extensive grandeur, only befitting a man of his status. “What a delightful library you have at Pemberley, Mr. Darcy,” said Miss Bingley. “It ought to be good,” he replied, “it has been the work of many generations.” “And you have added so much to it yourself, you are always buying books.” “I cannot comprehend the neglect of a family library in such days as these.” “Neglect! I am sure you neglect nothing that can add to the beauties of that noble place.”<sup>12</sup> Within this source, Mr. Darcy claims that his library has been bestowed through generations of his family before him. This further substantiates how the collections in private libraries are accumulated over time. Bingley uses the adjectives “beauties” and “noble” to create a semantic field of luxury and opulence. Perhaps Austen wished to establish the archetypal image of a gentleman with a respectable and distinctive status in society.

Furthermore, Austen solidifies this inference with the character, Mr. Bennet of Longbourn Estate. In an extract, after Mrs. Bennet rudely bursts into his private library and states “Oh! Mr. Bennet, you are wanted immediately; we are all in uproar.”<sup>13</sup> Mr Bennet declares: I have two small favours to request. First, that you will allow me the free use of my understanding on the present occasion; and secondly, of my room. I shall be glad to have the library to myself as soon as may be. <sup>14</sup> Throughout the previous source, Mr. Bennet appears to be somewhat frustrated with his wife and is certainly displeased that she had interrupted him from his merriment within his own silence. This, and the possessive pronoun ‘my’, are both used to illustrate that the private library was a gentleman’s place of comfort and tranquillity.

Further indications of Austen’s interpretation of Mr. Bennet (plus the fact that private libraries were quintessentially a private male space) are located in the quote, “in his library he had been always sure of leisure and tranquillity; and though prepared, as he told Elizabeth, to meet with folly and conceit in every other room of the house, he was to be free from them there.”<sup>15</sup> Not only, does this extract develop an understanding - that the private library was a place that offered a sense of relaxation and relief from life in general, for the majority of gentleman in the eighteenth century- but highlights the fact, that it was feasibly offensive for another to enter that gentleman’s library!

To conclude, I believe that eighteenth-century private libraries were quintessentially private male spaces of study. This, I feel, has been demonstrated throughout

all of my research. As history exhibits, novels were the most popular texts during the eighteenth century (and that women were the primary readers of such books), however, I understand that the novel was still deemed foolish and unnecessary by many male British critics. This, I consider to be one of the reasons why women used reading as a form of escapism, whilst men were able to use it to increase their education and social status. It seems even though novels may have been stored within the private library, it was still a gentlemen’s place to go and educate himself- possibly indicating that the women of the house stored their novels in the private library, even though they may have not read them in there. As history promulgates, private libraries in the eighteenth century were not family orientated areas, rather, they were much for the status and serenity of the gentleman.

#### Endnotes

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- 3 Jones, Letters, p.64
- 4 Williams, Letters, p.180; Edgeworth, Practical Education, p.344.
- 5 Allen, Polite Lady, pp.139, 133.
- 6 Vicesimus Knox, Liberal Education, pp. 248-49, 205.
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- 10 Samuel Taylor Coleridge, Seven Lectures on Shakespeare and Milton (London, 1856), p.3.
- 11 The Chalmondley Family Portrait, 1732
- 12 Jane Austen, *Pride and Prejudice*, (London: Thomas Edgerton, 1813), p.42.
- 13 Jane Austen, *Pride and Prejudice* (London: Thomas Edgerton, 1813), Chapter 20, p.79.
- 14 Jane Austen, *Pride and Prejudice*, (London: Thomas Edgerton, 1813), Chapter 20, p.80.
- 15 Jane Austen, *Pride and Prejudice*, (London: Thomas Edgerton, 1813), p.2. of Chapter 15.

#### Tutor comment:

“It was a pleasure to work with G. during my placement at The Bolsover School. They were completely committed to the course and took an active role in class discussions. Their essay included original research and fantastic essay writing skills. The programme was delivered remotely due to the pandemic and students had limited access to resources. This is one of the best student essays I have read and I wish G. every success in the future.”

## In what ways do the works of E. M. Forster navigate issues that are relevant to the modern, twenty-first century reader?

Year 9, Key Stage 4

Pupil Name: T.B.

School Name: King’s College Guildford

Supervised by: J. Attridge

Tutor University: University of Surrey

Course Title: E.M. Forster – Privileged Insider or Sympathetic Outsider?

The subjects of this essay are E.M Forster: son, friend, student, author, traveller, most critically an “outsider” and how he fits (if at all) under the new decolonising curricula. Forster was raised in a female-dominated, upper-middle-class family, attended the University of Cambridge and had a considerable inheritance. These privileged variables

resulted in his later feelings of otherness and liberal guilt. Additionally, the Edwardian period was one of intense transformation in transport, technology and social dynamics; a “decidedly unsettled one” that stipulated enhancement and restlessness within society (Wild and Jonathan, 2017). It heavily impacted the mannerisms of his works; thus, I will analyse said works and their themes to determine their relevance to our modern day. As for the decolonising curricula, what is it exactly? Simply put, it promotes “‘cultural, psychological, and economic freedom’ for Indigenous people with the goal of achieving Indigenous sovereignty — the right...of Indigenous people to practice self-determination over their land, cultures, and political and economic systems” (Belfi and Sandiford, 2021). The novels “A Room with a View”, “Where Angels Fear to Tread”, “A Passage to India”, and “Maurice” - with necessary critical quotes – will be analysed to determine whether he should still be recognized in such curricula. For example, “A Passage to India” connects with Forster’s trepidations on British colonial rule affecting India, which associates to modern campaigns, namely Black Lives Matter. A son, friend, student, author, traveller, outsider, but is he still canonical?

Firstly, the topic of globalisation – having immense dominion in Forster’s novels - will be dissertated, as seen in “A Room with a View”. Notably, E.M Forster was most influenced by his travels throughout Europe and India, intriguing fascination in topics relating to foreign affairs and effectuating the settings of his numerous novels overseas. As a modern society striving to provide equality in many, if not all, aspects of life, it is compulsory for us to unequivocally comprehend how globalisation has enlightened or deformed cultures. As revealed in “A Room with a View”, through the observations and conversation between Lucy and Charlotte, “two rows of English people who were sitting at the table...at the portraits of the Queen and the late Poet Laureate...at the notice of the English church... ‘Charlotte, don’t you feel, too, that we might be in London? I can hardly believe that all kinds of things are just outside’” (Forster: 23). The rhetorical question of “don’t you feel...we might be in London?” is

both astutely directed to Charlotte and the about the impacts of tourism on Italy. The phrase “can hardly believe” indicates disbelief at a country, otherwise teeming with unique splendour and culture, being blatantly British. Throughout the novel, Forster was conveying the unexpected consequences of intercultural contacts through the destruction unconsciously generated by tourists. Equally, our society experiences complications in countries such as Spain and Thailand; having centred on tourism and pleasing outside contenders that they’re now draining themselves of their original identity, both environmentally and culturally. Spain has been detrimentally congested for decades and Thailand, with 40 million tourists received in 2019 (Tourism Statistics Thailand, 2021), has had its ecosystems and air quality devastated. Furthermore, new generations are westernising and the disadvantages are just as abundant as the advantages. For example, traditional clothing is being displaced, languages are forgone, and mannerisms abandoned and adopted. This all leads to globalization being just as contentious a matter as it was in 1924 when Forster had “A Room with a View”

published. Secondly, we must cover the theme of class expectations, and how class still seems to unfairly judge and restrict our day-to-day lives. As exemplified in Forster’s interclass relationship of “Where Angels Fear to Tread”, in which upper class, widow Lilia Herriton elopes with a lower class, Italian Gino. This is evident from the dialogue from Philip to Gino “I have come to prevent you marrying Mrs. Herriton, because I see you will both be unhappy together. She is English, you are Italian; she is accustomed to one thing, you to another. And—pardon me if I say it—she is rich and you are poor” (Forster, 1905). The fact that he focuses on nationality, class, and money while compatibility, characteristics, or even the simple question of their happiness, is grossly, but typically of the time, ignored. Lilia is refused by the entirety of her family to marry Gino, despite her devotion and passion, only because he is lower class and poor. If he had been wealthy, affluent, and higher class, they would have graciously accepted their relationship. The Edwardian society that this was delivered to strongly believed in old money and stubborn maintenance of hierarchy in a time of increasing rank mobility. However much we have evolved since we must not underestimate its relevance. Hierarchy and, the class expectations within it, have been shifting from the beginnings of ancient civilisation; therefore, understanding it is vital in improving our current world. Moreover, the university campaign of CuttheFees has become crucial in encompassing a wider audience of various financial backgrounds, meaning the topic of class expectations, past and present, would be important to students’ feeling embraced.

Thirdly, the malevolent theme of racial prejudice must be introduced - being a close companion to the consequences of globalization. Forster’s novel “A Passage to India” was similarly spawned from his travels to foreign countries; in this case India. In particular, this novel openly highlights the injustices of racism and prejudice, a matter still widely present and contentious today. In summary, it is about: Adela Quested and her soon-to-be mother-in-law travel to “see the real India” where they befriend Dr Aziz who shows them the mysterious Marabar Caves. But after Adela accuses Dr Aziz of assault, tensions between the English and Indians reach a crisis point. Examples of the theme can be seen in, “Aziz was exquisitely dressed, from tie-pin to spats, but he had forgotten his back collar-stud, and there you have the Indian all over: inattention to detail, the fundamental slackness that reveals the race” (Forster: 87) revealing the assumption driven indignancy of prejudice. In this quote, the character of Ronny Heaslop is easily reliant on stereotypes and believes Aziz, an Indian, is lazy and careless simply because he lacked one collar stud – the same stud the audience knows is missing from burrowing it to a friend. The words “exquisite” and “fundamental slackness” create an interesting juxtaposition of complimentary words to racist beliefs, while the word “slackness” itself implies a degraded, negligent personality from Aziz. In reality, his character is compassionate and considerate, but this truth won’t ever be cared for by the discriminatory. There will always be a twist of the details, a misinterpretation propagated as the truth, and Forster acknowledges this. Likewise, the character of the white, racist, elitist Mrs Turton is quoted to have said to Adela - young, British, more open-minded and a main character – that “You’re superior to them, anyway. Don’t forget that. You’re superior to everyone

in India except one or two of the Ranis, and they're on an equality."(Forster: 36) The phrase "Don't forget that" connotes an honest, factual message – one that should not be purely based on imperialistic prejudice. At the time of its writing, India was tense with aspirations for freedom and self-determination, subsequently leading to the Indian Independence Movement. They were plagued with preconceptions, racism, and discrimination on both ends, and from this Foster concocted individuals that showed a range of views that can be equally applied to our modern times. As exemplified by the Black Lives Matter movement, this disease of humanity continually bombards us and is ever-present. We experience injustices at the least, and biased mass misinformation to benefit political, social, and economic means at our worst. Our contemporary curricula would greatly benefit from the attention it draws to not only racial prejudice, but to sexism, imperialism, and the

historical relationship between the colonizer and the colonized. Indeed, it would be representative of students from various backgrounds who could be enriched by establishing an understanding of their past racial obstacles, and aid perception of how our interconnected world functions through diluted relationship dynamics that form our economic and financial standings.

Lastly, the theme of homosexuality (also homophobia, both internal and external) is encased in E.M Forster's final novel "Maurice", posthumously published in 1971. The novel is about Maurice who falls in love with his best friend, Clive. They both attend Cambridge and Clive initially returns these feelings before rebuffing him for the conventional, heterosexual marriage. Maurice intensely struggles with his homosexual tendencies, but soon meets Alec, the gamekeeper on Clive's estate, and they develop a requited love for each other. Interestingly, Forster had also experienced an unrequited love - for Syed Ross Masood in 1906. More exposed and remarkable than ever before, the topic of homosexuality (and the general LGBTQ+ community) is crucial to cover in all curricula - from an inclusivity motive - to represent students who would deeply reciprocate the emotions conveyed by Forster, in one manner or another. However, at the time of its writing, the Obscene Publications Act (1857) restricted the publication and sales of obscene material. As a result, Forster wrote the novel covertly and unpublicised, till after his death, for fear of his work of raw homosexuality falling victim to the legislation. For instance, the quote "Maurice stretched out a hand and...he pulled [Clive's] head against his knee... he had accomplished a new tenderness...he dropped[his arms] on either side of him and sat sighing"(Forster, 1971) would've been perceived as despicable. This is evident from the intimate description of "head against his knee" and the sensual "tenderness" they are sharing – all labelled unacceptable in regards to man to man relations. Furthermore, there is no negative outcome or consequence for their behaviour in the ending, as per usual with homosexual texts of the time that portray gay characters as villainous or having tragically died. This can be seen in the work of Norman Mailer "The Naked and the Dead" where the antagonist is the homosexual General Cummings. Also, explorations of internalized homophobia can be seen in Maurice saying "I swear from the bottom of my heart I want to be healed. I want to be like other

men, not this outcast whom nobody wants"(Forster: 200). At the time he was experiencing deep grievances from the loss of his relationship with Clyde and had started to pursue "medication" for his "condition". The phrase "outcast whom nobody wants" stands out with its connotations of the criminal,

monstrous, and completely alien – blatantly exposing the hatred Maurice has started to brew for himself. Perhaps, it could shed light on how Forster felt when his own sense of "otherness" and suppressed homosexuality domineered over him. To emphasise this, his diary entry from June 1911 reveals his "weariness of the only subject that I both can and may treat – the love of men for women and vice versa" previous to his hiatus in published novels. Sunil (2007) remarks that "during the years 1910 and 1911, Forster's depression and his feeling of isolation worked both negatively and positively" as Forster most likely felt insincere and compressed writing only heterosexual relationships permitted in his Edwardian society. Thus, "Maurice" was a reprieve for him from the usual stereotypes, but would have devastated his career at the time of its writing, 1914. Studying his novel, with its 'happy' ending for its main character despite the period of its writing, would be important in celebrating LGBTQ+ history and material. It makes this piece of work supportively canonical for students who might face equal struggles as Maurice and benefit from its hopeful ending. From its display of healthy homosexual relationships enduring in times of discrimination, to the dark ends of internalized homophobia, this novel is impassioned and of immense social value.

In conclusion, as proven by his recurring themes of class, globalisation, and racial prejudice, E.M Forster is truly an author who deserves – and would provide great service - to remain in our modern, decolonising curricula. The Edwardian society he inhabited was much different from our own, yet his words are still able to be empathised with and applicable. Despite him being male, white, and upper-middle class, he was not held back from perceptive observations of evolving social dynamics, that acknowledged cultural and economic freedom, much beyond the normal of the time. A son, friend, student, author, traveller, outsider, and justifiably should be a part of the modern literary canon.

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### Tutor comment:

"The standards at King's College Guildford were extremely high, but T. demonstrated a flair for writing and an aptitude for critical thinking from the outset of the course. She was extremely engaged with the tutorial content, and was always keen to answer questions on how E. M. Forster might be thought of as a relevant author in twenty-first century contexts. T. final assignment (graded at an excellent 74) reflects her hard work during these sessions - the essays shows off some astute literary analysis and a commitment to independent research that goes well beyond the aims of the course. If T. was interested in pursuing English Literature at a higher level, her contributions would no doubt be invaluable to any college or university discussion."

## 'All Ranks and Degrees now READ' - To what extent do you think this statement was true at the end of the eighteenth century?

Year 9, Key Stage 4

Pupil Name: **B.T.**

School Name: **Raynes Park High School**

Supervised by: **Dr S. Bankes**

Tutor University: **The Open University**

Course Title: **Lesson for the 'Swinish Multitude' - Books and Education in the Eighteenth Century**

This essay will explore whether everyone could really read as stated by James Lackington and will look at the obstacles that may have occurred to prevent them towards the end of the eighteenth century. It will investigate the cost of reading and financial problems that may have challenged some potential readers, such as the cost of materials needed to read and the low wages paid to many in the eighteenth century. It will also examine the different ways that less wealthy people were able to read and the obstacles that could make it challenging to read, for example: space, distractions and limited access to education. Some of these problems still occur today and increase the difficulty to read, and there are still disruptions to education, especially with the pandemic. It will draw upon primary sources such as the writings of James Lackington, Thomas Holcroft and Lady Sarah Pennington and secondary sources from historians such as William St Clair.

When considering whether everyone in Georgian England was able to read, it is useful to think about what reading might cost someone. If I told you that books were only a few pence back in the eighteenth century, you would think that everybody had many books but that is not the case. Books were very expensive and owning them was a luxury. James Lackington's bookselling catalogue for 1792 shows a copy of the popular novel Tom Jones by Henry Fielding cost between 5s and 8s 3d. A useful guide to different trades, Fisher's Young Man's Best Companion, which contains information about measuring and pricing different craft skills cost 1s 7d while a 12-page pamphlet sold by itinerant salesmen, known as 'chapbook', cost 4d. Again, a few shillings do not seem like much and so you may be thinking: How is it a luxury? Well, an agricultural

worker would be paid a shilling a day if they could find work according to the historian William St Clair and so to buy Henry Fielding's, Tom Jones, they would have to work for five long days, without spending a single penny. This would not be easy; they had families that they needed to feed, bills they needed to pay and taxes that were due. With all these expenses, they would simply not have enough to buy the book. For the price of 1.5 shillings a week, they could buy a shared bedroom, a landlady to do all the cooking and the opportunity to sit by the fire. Food would cost 0.25 shillings. This illustrates just how unaffordable most books were at this time.

Suppose our imaginary labourer saved up and was able to finally buy a book. It would be great but what about all the resources needed to read that book? They would need many things including lighting, time, a quiet space, and warmth. But how would they get all these essentials? An immediate problem would be that there would be no time to read. This is evident in James Lackington's memoirs where it states, "I was obliged to attend my work from six in the morning to ten at night." This demonstrates that the whole day was spent working so there would be no times to read apart from late at night, but it was too dark. It was too dark, so how did they find any light? The historian, Simon Eliot explains that wax candles were too expensive for many and were something only the rich could afford so tallow candles were used instead. They were reeds that were lying around covered in mutton fat multiple times to produce a sort of waxy layer. This would be lighted using a flint and would produce a weak light. It would leave a disgusting smell and were dangerous as they had to be held horizontally. The grease would leave marks and damage the surface below. Tallow candles weren't the best but they were the only affordable option. It was either this or light from the moon but that not only provided even little light but would also negatively affect the eyes. Eliot points out one further problem – they were edible so 'when the tallow candle could present the low-income reader with a decision between using the candle as a source of food and using it as a source of light, its use as food usually won'.

After going through the trouble to light a candle, less wealthy readers would then have to find a quiet and warm space that allowed them to concentrate. There were no heaters so they would have to rely on the tallow candle for warmth but finding a quiet space in a big and noisy household was difficult. There weren't many solutions to this apart from reading late at night but that would damage their health and make them tired for work. Maids or servants could sit upstairs away for the noises and cries of children, but it would be very cold there. This is evident through Jane Austen's writing where she writes "By sitting together upstairs, they avoided a great deal of disturbance of the house....They sat without a fire." Overall, it was very hard to get a book as there were many expenditures and salary was low. Even if someone was able to get a book, it would be very hard to find: heat, light, time, and a quiet space..

Assuming that readers could afford to buy a book and prepare a place to study it, it is also important to examine how they might have learnt to read in the days before

the 1870 Education Act brought schooling to every child in the country. Often today in Britain, education is taken for granted. We will usually complain about going to school and waking up early in the morning. In the eighteenth century however, education was something that middle and working-class families saw as a luxury. It was expensive; and there were many things needed to run a school which is why there weren't many available to all children in a particular area. For example, with a population of 8.3 million, only around 500,000 children attended school at the end of the century. There weren't many schools offering affordable education to children from the labouring classes: teachers were hard to find as no one was really educated; resources such as books, pens, and buildings were needed to create schools; and generally, education wasn't seen as important. So, how were children and young people able to read and write?

Many children who did go to school would teach other children; this could be their siblings, friends or anyone they knew. An example of this is in James Lackington's *Memoirs*, where he has written "having three-halfpence per week allowed me by my mother, this money I gave to John (my masters youngest son) and for every three half-pence he taught me to spell one hour." It is an example of the ways that children could be educated. It shows that the young child is so desperate to be able to read and write that he is willing to use all his pocket money for just an hour of tutoring. This was provided only by another child and not a professional teacher. This shows that teachers were hard to find and that most children would rely on other children for guidance and support in their education.

Another example of a child teaching other children to read can be found in one of the first books for children published in England, *The History of Little Goody Two-Shoes* (1765). This shows a young girl using what she knows and materials around her to teach: she 'cut out of several pieces of wood ten sets' of lower-case letters and six of upper-case letters and encouraged her pupils to learn the sound of the letters which would then be put next to each other to form words. This method was used to learn words and sentences. This is like how we learn today but instead of wooden blocks; we use actions and songs to remember certain letters or words. This not only tells us about how some children might have learnt but this book could have been used as a teaching aid. Even with wooden blocks or lessons with other children, there were still a lot of distractions. Children were usually outside, and it was very noisy and uncomfortable. So how were they motivated?

When learning to read and write, children would often start by reading chapters from the Old Testament (the Bible). This was hard to understand as it was written in old, ancient English. If texts were this hard to read, then why were children reading them? What was motivating them? We find a clue in the following: "My progress was so rapid, that it astonished my father. He boasted of me to everybody." This is part of Thomas Holcroft's autobiography. It demonstrates that children can be motivated by support from their parents, and it motivates them as the more they learn, the more they will be talked

about; people will know the child as the educated one as their parent would 'boast' about them even more. This makes the child feel important and confident and the child is motivated to learn even more.

Educated children would want the best from their life. Most jobs available to people from the working classes in the eighteenth century were as farmer workers or servants. Both of these jobs do not require education but just some knowledge on how to grow crops and domestic work. The educated families were the ones that hired these farmers and servants; so, the more educated the child, the more money they could earn. It would be rare to have someone educated working as a servant or farmer, which is why some wealthy and educated people opposed the idea that middle class children should have the right to education. Two of these people include Edmund Burke and Davies Giddy. They thought it would corrupt the system and didn't want to lose their potential servant and farmers because of education. Giddy, a Member of Parliament and a mathematician wrote that 'giving education to the labouring classes or the poor would be prejudicial to their morals and happiness' and would make them 'fractious and refractory' or rebellious. They even called these people 'swine' (pigs) as this statement from Burke shows: 'learning will be cast into the mire and trodden down under the hoofs of a swinish multitude'. This demotivated some people to read and write but for others, it motivated them even more as they wanted to prove these people wrong. It caused them to rebel and made them even more eager to want to learn. Thomas Spence opposed this idea by making a pamphlet which was very affordable (only 1d) called *Pigs' Meat* or, *Lessons for the Swinish Multitude*. This was basically saying that if these people were pigs, then they needed to be fed. He states his intention to 'promote among the Labouring Part of Mankind proper Ideas of their Situation, of their Importance, and of their Rights'. Ironically, Burke's fears about the working classes reading might have led to more people having the opportunity to read about radical ideas at an affordable price.

As the attitudes of people like Burke illustrate, not everyone in eighteenth century England encouraged all members of society to read widely. Have you ever thought about what it would be like to get educated in the eighteenth century and obstacles you would face? We will now consider some of the political challenges that women and less wealthy people had to overcome to get education. How did social attitudes and their consequences shape the way that people learnt to read in the eighteenth century? thinking

Men and woman have always been treated differently in the past; it's the sad truth. In the eighteenth century, they were educated differently. Men were told that they should 'hoard up, while they can get a stock of knowledge' and women were told to 'avoid all books, and all conversations' that might shake their faith and lead them to behave inappropriately. These statements by Lord Chesterfield and John Gregory show that men were supposed to be human robots and were expected to know everything. They needed to be well educated and knowledgeable. Women, however, were told to

be the exact opposite. They were expected to not know anything and to be seen and not heard. It was completely unfair. If a woman was educated or did know something, she was told to hide it and not let anyone know. Gregory advised his daughters that if that had any learning, they should 'keep it a profound secret' especially from men who might feel threatened. Society expected woman to know nothing and if a woman did know something or even had a little bit of education, they were told that there was something wrong with them. This made it hard for them to get an education.

Another obstacle for women was the fear that education could change them and their attitudes towards others. 'It was not long before novels, romances and poets occupied a considerable part of our time, so that I even neglected my shop; for being so much delighted with those fairy regions.' This sentence from *The Confessions* of J. Lackington tells us that people would neglect their jobs just to read. This caused the fear that women would neglect their duties to read which is why the reading of popular novels was often discouraged. There was also the fear that parents couldn't control what their daughters were reading so if they read something violent, it could cause them to become rebellious. This may be another reason why women were not always encouraged to read. Many people also saw nothing good with reading books. Lady Sarah Pennington states that reading novels, a new and popular genre, was 'like searching for a few small diamonds amongst mountains of dirt and trash'. They thought of education for women as 90 % bad and only 10 % beneficial. This was another obstacle for women who wanted an education.

It may seem like everything was amazing for men; they got all the education they needed and could get educated without having any problems. It all seems great; men had all the facilities to succeed in life but was it not too much pressure? If we look at this from another point of view, men had so much pressure and so many responsibilities. They were expected to hoard information and were supposed to be super smart, so they could feel burdened with this responsibility.

Some of these problems still occur today. In some countries, there are equality issues and women are not given the same opportunities as men in education. The Covid pandemic has also disrupted the economy and has caused many people to lose their jobs; meaning they are poorer and may not be able to buy necessities needed to read. This would mean that they are less educated. Michael Savage writing in *The Observer*, states "Engaging in two or three reading activities, on average, increases the pupils' GCSE score by between 7 and 9 points." If people cannot afford to engage in these activities, they will be behind and get lower grades in their GCSEs. Now, it is hard to find jobs if you have lower GCSE scores; so this, in turn, will make it hard for some people to get jobs. Not having enough money to get educated can affect people's lives today as it did in the past.

To summarise, not everyone could read by the end of the eighteenth century: they may have the chance to read but there were certain obstacles that made it

challenging for them. As this essay has shown, books were expensive at this time and wages were low so reading was unaffordable for many people. In addition, there weren't many schools or educated teachers, so children from the labouring classes received no formal education. Sometimes those who could read taught other children and used materials such as wood to make teaching aides to help to recognise words and sentences. This was threatening for some people in authority, and they opposed the idea of working-class families being allowed to have an education. As we have seen, some women were also discouraged from reading widely. Lackington might have liked the idea of everyone being able to read so that they could buy books from him, but, his statement seems over-optimistic.

### Endnotes

- 1 See Lackington's Catalogue for 1792 (London: Lackington, 1792), p. 126.
- 2 William St Clair, *The Reading Nation in the Romantic Period* (Cambridge: CUP, 2007), p. 195.
- 3 James Lackington, *Memoirs of the First Forty-Five Years of the Life of James Lackington* (London: Lackington, 1791), pp. 49-50.
- 4 Simon Eliot, "'Never Mind the Value, What about the Price?', or How Much Did Marmion Cost St John Rivers?", *Nineteenth-Century Literature*, 56 (2001), pp. 160-197 (170).
- 5 Jeremy Gregory & John Stevenson, *The Longman Companion to Britain in the Eighteenth Century 1688-1820* (London and New York: Longman, 2000), pp. 289 and 294.
- 6 *The History of Little Goody Two-Shoes* (London: Carnan & Newberry, 1780), p. 26.
- 7 Thomas Holcroft and William Hazlitt, *Memoirs of the Late Thomas Holcroft Stanhope, Earl of Chesterfield to his Son* (London: 1776), p. 11.
- 8 Cited in Roy Porter, *English Society in the 18th Century* (London: Penguin, 1990), p. 165.
- 9 Edmund Burke, *Reflections on the Revolution in France* (London: 1790) 10
- 11 See Lord Chesterfield, *Letters Written by the Late Honourable Philip Dormer Stanhope, Earl of Chesterfield to his Son* (London: 1776), p. 195 and John Gregory, *A Father's Legacy to his Daughters* (London: 1761), p. 13.
- 12 Lady Sarah Pennington, *An Unfortunate Mother's Advice to her Absent Daughters* (London: 1761), p. 39.

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Tutor comment:

"I am so pleased that B.'s assignment has been selected for publication in The Scholar. As this work shows, she really engaged with the subject and considered the wider implications of reading - or not being able to read - not just on individuals in the eighteenth century but also on people today, taking into account the impact of the pandemic on education. She was part of a wider year group which missed out on an uninterrupted introduction to Secondary School and I don't think this was easy for many young people across the country. B. writes with energy and authority. In order to do this, she worked consistently hard, asked some excellent questions in class, shared some great ideas and thought incisively and creatively. She always submitted thoughtful, careful work in which she took great pride. It was an absolute delight to teach her. I am very grateful to D. Ekpoifiong, the lead teacher, for all his support and to Raynes Park High School for making me so welcome to their community."

How is the theme of loss explored in the poem “Refuge” by JJ Bola?

Year 9, Key Stage 4

Pupil Name: M.L.

School Name: Ringwood School Academy

Supervised by: A. J. Mathers

Tutor University: University of Southampton

Course Title: What can refugee poetry teach us about the refugee crisis?

The word “loss” is a noun and is defined as “the state of no longer having something or as much of something; the death of a person”. This definition can help the reader to understand the meaning of ‘loss’ in the poem “Refuge” by J.J. Bola and the depth that the poet explores the theme of loss. Bola illustrates ‘loss’ in this poem through the use of his own personal experiences with imagery and this will be discussed.

One of the reasons Bola wrote this poem (Appendix 1) was to “raise awareness of the refugee crisis and perception” and used his creativity to focus his experiences. One argument to consider is how can a refugee form their identity when they have been displaced and their home taken away. Loss of identity is illustrated in the quote “changed the way we dressed to look just like them”. This in itself is a huge form of personal ‘loss’, where refugees not only had to dress like others to fit in but lost familiar surroundings, language and families. When Bola writes: “monsters that tore families apart” and “monsters that would chase families away forcing them to leave everything behind” illustrates the harsh physical and emotional grief that refugees face, losing family and forced to flee their homes. This can be compared to the metaphor quote from Bola: “As a refugee there is only ever half of you in one place; because you have left half of you where you have come from, and half of you is rejected where you arrive” <https://www.theguardian.com/books/2015/sep/16/poets-speak-out-for-refugees-and-illustrates-his-own-personal-experiences-to-write-the-poem-feeling-he-has-lost-half-of-himself-in-one-country-and-the-other-half-of-him-in-another>.

The use of the metaphor “imagine how it feels to be chased out of home” has connotations of someone literally being chased out their home by a “monster” (the

monster being the police or the people taking refugees away). One reason Bola may use this is to show the reader how a refugee might feel when fleeing their secure home in a crisis which is beyond their control, leading to “loss” of their home. The use of the verb ‘imagine’ is used to encourage the reader to use ‘imagery’ and help the reader form a mental image of something and ‘bring it to life’. Bola starts the poem this way, to get the readers imagination started, as many readers may not have experienced what it is like to be a refugee. The use of the metaphor ‘monsters’ is used to encourage the reader to imagine how scared the refugees are of the police and those who come to take them away, demonstrating how quickly everything changes for a refugee, living in a constant state of crisis and forebodings of loss, feeling insecure and no safe or secure place to belong to.

Imagery is used by Bola to get the reader to feel empathy for the refugees for their loss. However, this is often challenged by the media where representations of refugees portray unsympathetic headlines. For example, the headline: “illegals have landed” may portray a negative image to the reader that refugees are a nuisance and cause trouble. Imagery and photography are used in the media to help communicate messages to readers about the loss that refugees face. The quote: “Visual representations of refugees play a crucial role in shaping our imaginations, and therefore underlying patterns are important for understanding the politics of asylum” can be compared to the imagery that Bola uses in the poem. The quote “each memory buried” is an example of personification and compares the memory to something ‘buried’ or ‘lost’ which may not ever be found. Many refugees give up their life and friends, which can be compared to ‘buried memories’.

The use of the phrase “like a lovers hand that slips when pulled away” has connotations of loss, as this conveys the idea that every time a refugee ‘grips onto something’, they lose it. This may help the reader to relate to ‘loss’ as a more accurate feeling. Many readers have experienced ‘loss’ of a loved one, pet or even loss of a friendship but may not have experienced the type of loss experienced by refugees. By making this comparison, Bola is anticipating that the reader will understand the depth of this ‘loss’ and how a refugee feels when they lose everything. The quote “When we let people die rather than provide safety, we face not a refugee crisis but a crisis of values” seems to imply that refugees are not cared for and loss doesn’t seem to matter, whether it is loss of home or even loss of life, which is what Bola wants to strongly portray in his writing.

The type of punctuation used in the poem, for example enjambment, is used to help ‘speed up’ the pace, creating a sense of urgency and tension. This might be used by Bola to illustrate how a refugee’s life is constant tension and emotion with an emphasis on the loss of structure and normality in their life. The use of lower case letters could be being used to show the reader how small and insignificant Bola feels. The use of the three adjectives together, in the quote “foreign, unfamiliar, uninviting” could be used to make the reader stop and think about this dreadful situation. Bola may have used this language to emphasise the point and get the reader to understand

how a refugee can feel uninvited, when entering a strange and unfamiliar country.

From this analysis, it can be concluded that Bola explores the theme of loss by using his own experiences of being a refugee and the loss of his identity. The use of imagery in the poem helps the reader to grasp the enormity of the feeling of loss from a refugee. The use of language and poetic conventions illustrate the theme of loss. The quote “The interventions of artists, writers and activists also expose what is not visible to the eye of mainstream media or what is deliberately kept invisible” seems to fully support Bola in his writing to raise awareness of the refugee crisis in “always reaching for a place to call home”. If writers continue in this way, we may find that the refugee crisis is understood far more by people who do not understand how much physical and emotional loss that refugees have to experience.

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Endnotes

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APPENDICES:

APPENDIX ONE:

Refuge poem by JJ Bola:

REFUGE by JJ BOLA:  
imagine how it feels to be chased out of home.  
to have your grip ripped, loosened from your  
fingertips something you so dearly held on to.  
like a lovers hand that slips when pulled away  
you are always reaching.

my father would speak of home, reaching.  
speaking of familiar faces, girl next door

who would eventually grow up to be my mother.  
the fruit seller at the market. the lonely man  
at the top of the road who nobody spoke to.  
and our house at the bottom of the street  
lit up by a single flickering lamp  
where beyond was only darkness. there  
they would sit and tell stories  
of monsters that lurked and came only at night  
to catch the children who sat and listened to  
stories of monsters that lurked.  
this is how they lived, each memory buried.  
an artefact left to be discovered by archaeologists.  
the last words on a dying  
family member's lips. this  
was sacred, not even monsters could taint it.  
but there were monsters that came during the day.  
monsters that tore families apart  
with their giant hands.  
and fingers that slept on triggers. the sound of gunshots  
ripping through the sky became familiar like the tapping  
of rain fall on a window sill. monster that would kill  
and hide behind speeches, suits and ties. monsters  
that would chase families away forcing them to leave  
everything behind. i remember  
when we first stepped off the plane.  
everything was foreign, unfamiliar, uninviting.  
even the air in my lungs left me short of breath.  
we came here to find refuge, they called us refugees  
so we hid ourselves in their language until we sounded just like them.  
changed the way we dressed to look just like them.  
made this our home until we lived just like them  
and began to speak of familiar faces, girl next door  
who would grow up to be a mother, the fruit seller  
at the market. the lonely man at the top of the road  
who nobody spoke to. and our house  
at the bottom of the street lit up by a single flickering lamp  
to keep away the darkness, there  
we would sit and watch police that lurked  
and came only at night to arrest the youths who sat  
and watched police that lurked and came only at night.  
this is how we lived.

i remember one day i heard them say to me  
"they come here to take our jobs  
they need to go back to where they came from"  
not knowing that i was one of the ones who came.  
i told them that a refugee is simply  
someone who is trying to make a home.  
so next time when you go home,  
tuck your children in and kiss your families  
goodnight be glad that the monsters  
never came for you.  
in their suits and ties.  
never came for you.  
in the newspapers with the media lies.  
never came for you.  
that you are not despised.

and know that deep inside  
the hearts of each and every one of us  
we are all always reaching for a place that we can call home.

Tutor comment:

"M's participation in class was excellent and she was always ready to discuss the poems in great depth. M's examination of JJ Bola's poem "Refuge" demonstrates how poetry can help us to understand the plights of refugees more generally but also tackles the question by emphasising the different kinds of loss experienced by refugees. M's engagement with a wide range of resources is impressive; showing her ability to research subjects independently and critically engage with resources to enhance an argument. Due to M's sophisticated approach to the question and critical analysis of the poem, the essay received a first-class mark.""

# How democratic is the United Kingdom? Is there anything we should do to make it more democratic?

Year 6, Key Stage 2

**Pupil Name:** K.S.  
**School Name:** Crab Lane Primary School  
**Supervised by:** R. Wang  
**Tutor University:** University of Manchester  
**Course Title:** Power to the People

Originally the United Kingdom was based monarch system in a single king of England with other ruling lords beneath them. The first of these kings was named Athelstan of house Wessex in 895AD to 939AD. During his reign, he defeated the last of the Viking invaders and consolidated Britain. The common concept of parliament was created on June 15th 1215 and this has remained to this day. Morden parliament consists of two houses, the House of Commons and House of Lords with a monarch figure head. I do not believe this to be democratic and this essay will explore why.

I believe, there are numerous reasons why the United Kingdom isn't democratic. First, that certain station with in the parliamentary system are not voted for and rather given. For example all seats, in the House of Lords are inherited rather than elected. This ignores the basic principles of democracy by not having elected members represent the public. This also promotes exclusion of the general public especially those of "lower class" as only lords who are already wealthy or powerful are permitted seats. Rather than being inherited or given to those of wealthy backgrounds, seats in the House of Lords should elected and treated as seat for senior member of parliament or should be absorbed by the House of Commons altogether. These changes would promote equality and give public vote's full say in parliamentary membership therefore conforming to the idea of democracy more accurately.

Second, another significant reason is not all those seeking a career in politics will be given equal opportunity to gain votes from the public. For example, not everyone is registered as a candidate even if they are running for a seat in the House of Commons with an official campaign. Obviously, this is not democratic or equal, as everyone participating in the United Kingdom elections. These inequalities once again go against the basic principles of democracy as it assures stagnation and repetition of voting options. A remedy for this would be the inclusion of fully open list of all potential MPs that all of the public can accesses at any time. This list should not be influenced by candidates with more money or experience and should merely exist to allow all candidates to have equal opportunities for notice by the public excluding any campaigning done independently. The reason as to why this would be effective is it creates an initial starting point for all candidates to enter the election with personal campaigning still holding weight while being equal from the start.

Furthermore, not all voices and opinions are heard or listened within the parliamentary system. For example most recently with covid-19 we are not hearing anyone else's opinion or voice besides that of the prime minister and the conservative party. This would infer that the general public isn't being represented properly. This isn't democratic as this resembles a meritocracy as it will promote a ruling of an influential group that happens to have the slight majority. If opinions of non-majority parties are allowed to be heard by the public then the majority will hold less power as their opinion or voice won't be the only one presented to the public allowing them to have a greater understanding of processes and view within the house.

However, the United Kingdom could be considered democratic. One reason is that three fourths of Britain think the United Kingdom is democratic (youngov.com December 4th) Which would likely infer that we are exposed to a modern and democratic society/parliament this would mean that from the view of the public the governing body does keep within the constraints of a democratic society.

Another reason why the United Kingdom is democratic is because the House of Commons is elected fairly (studyrocket.co.uk 2019) there elected by the first-past-the-post system this consists with more than 650 House of Commons seats to be elected for democratically. For example, our formal election every 5 years which is a vote for a new roster of selected MPs with a democratic vote as everyone over 18 whether your foreign, female, lgbtq+ etc are able to vote(commonslabry.parliament 2020.) . This again would demonstrate that there is a fair and ever changing presence within the House of Commons and by extension with in the laws passed by parliament. This changing and evolving electoral process in theory would keep public opinion and interest effectively represented with in the government.

Furthermore, all these requirements of eligibility to vote are still inclusive of all areas of the UK and all those that live there are given equal opportunity and say in theory under this system.

Also, the United Kingdom is quite democratic in the fact that no political party has absolute power (outside of emergencies) or propaganda they force all members in the party to spread. In fact many party members refuse to spread any openly damaging policies or propaganda/fake news such as misleading or false information in any form. Also, regarding the prime minister who is currently Boris Johnson doesn't have a dictatorship because he is obligated to listening to the general public and must take their opinions in mind during processing of new proposed acts or reforms within parliament. The prime minister must not only propose new laws to members of their own party, but also others in the house needing a majority to pass any acts or reforms. This illustrates the sharing of power throughout society with selected member representing the public which they elect in which would fall in line with in a democratic system.

To conclude, despite the fact that the United Kingdom has aspects of a democratic society such as elections

allowing the public to select and change with in parliament to better reflect overall societal views. However, the undemocratic tradition and systems such as inherited positions in the House of Lords as well as inopportunity for those seeking participation in parliament whom do not have wealth or pre-established connections combine to overshadow the democratic aspects of the UK making it undemocratic. To illustrate this the monarchy has survived to this day with the queen's signature still being needed to officially pass an act or reform as well as holding the power to make other crucial decisions with no official restrictions. Any society that includes this system can't truly claim to be democratic meaning the UK isn't democratic.

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### Tutor comment:

"Working with K. during the Power to the People tutorials was an incredible pleasure. His essay showed exceptional levels of critical thinking and writing. I was most impressed by the way he expressed his opinions and the depth of thought he displayed. He is without a doubt a gifted student and will continue to perform well in his future studies."

# What does the history of the Windrush generation tell us about different understandings and experiences of 'belonging' in Britain in the period after they arrived and at the time of the Windrush scandal?

Year 8, Key Stage 3

**Pupil Name:** A.K.  
**School Name:** Tanbridge House School  
**Supervised by:** Dr K. George  
**Tutor University:** University of Brighton  
**Course Title:** "Back to My Own Country": Windrush, Migration and Belonging in Modern Britain

After World War Two Britain needed extra support for rebuilding and filling shortages in services like the NHS and public transport. Many people from different Commonwealth countries moved to Britain at this time, including thousands from the Caribbean. In 1948, the SS Empire Windrush arrived at Tilbury Docks in Essex having made the 8000 mile journey from Jamaica. It was the first of many ships carrying people from the Caribbean to their new homes in Britain. By 1961 it is estimated that 172000 people born in the Caribbean were living in Britain and they became known as the Windrush generation [1]. People left their homes searching for a better life and the promise of jobs. They were often professionals or skilled labourers who had been told their skills could help with the countries rebuilding. Many people moved their whole families with them, while some left their families behind, wanting to settle and establish themselves before bringing them over.

The arrival of so many people from different countries raised important questions about the idea of belonging, for the people who were new to Britain and also for the British citizens. According to the Cambridge Dictionary belonging is "a feeling of being happy or comfortable as part of a particular group and having a good relationship with the other members of the group because they welcome and accept you." The immigrants from the Caribbean looked different to most people from Britain, they brought a different culture, different food, music, fashion and style which people in Britain were not used to. Often people don't trust things that are different, which creates tension and this was regularly experienced by people from the Windrush generation. This made it difficult for them to feel like they belonged in their new country as they weren't welcomed or accepted.

When the Windrush generation arrived in Britain they received very different treatment from British people compared to how they had been treated in the Caribbean. They had come to Britain to find jobs and a better life but often weren't able to get the jobs that they were qualified for. For example, in an interview with the BBC, Clinton Edwards describes returning to Britain after being here with the RAF during the war. The first job he was able to get was as a welder but he wasn't actually allowed to do any welding, he was given a wheelbarrow and a

shovel and had to clear up after other people [2]. This was unfortunately a common experience for many people at that time and lead to Clinton Edwards re-enlisting in the RAF as he disliked not being able to use the skills that he had learnt.[3]

In an extract from 'Floella Benjamin on Coming to England' she talks about coming over from the Caribbean to be reunited with her parents who had come to Britain in the years before [4]. She experienced a big cultural difference, racist comments at school and bullying and humiliation on the streets. To add insult to injury she and the other 7 people in her family, had to share one room in the building she first lived in. There were other people in the building in the same situation and they all had to use a communal outdoor toilet. Sometime later, Floella and her parents were viewing a house and the neighbours called 999 saying that black people were there to steal the possessions. The policeman who attended was married to a black woman and said that this kind of thing happened all the time just because of the colour of their skin.

By 2012 many of the Windrush generation were in their 60s and 70s, however they lacked official documents to prove that they had the right to 'legally' remain in the UK after the government had destroyed passenger records from the Windrush in 2009, including landing cards and other documents. This became more of a problem after the Government made changes to immigration policies to create what was known as the 'Hostile Environment.' policy. [5]. This was designed to make life difficult for illegal immigrants by restricting access to services like the NHS, police and to homes and employment unless people could provide evidence of their right to live and work in Britain. An interview with Judy Griffith gives the example of how her passport, which contained her original visa stamp, had been lost in the post [6]. At that time she had recently been made redundant and found it difficult to find a new job due to the new policies about proving her right to work. The Home Office said that people from the Windrush generation had to provide at least one official document from every year they had lived in Britain which was extremely difficult for most people. Luckily Judy had kept a large amount of her old documents but many were not as fortunate.

The MP for Tottenham, David Lammy, is a very well known campaigner for the rights of the Windrush generation. His parents had arrived here from Guyana and it was a very personal issue for him. In 2018 he presented a letter to Theresa May which had been signed by 140 MPs and called for urgent action from the Prime Minister to correct the wrongs which had been done to his parents and others of their generation. This was followed by an Urgent Question being asked in the House of Commons for the Home Secretary to confirm the status of the Windrush generation as British citizens. Further letters followed to the Prime Minister as more and more MPs gave their support [7].

The history of the Windrush generation tells us a lot about different understandings of belonging and how people were affected by this. Belonging can be a temporary feeling because you can feel like you belong in one place but may not feel the same if you move somewhere else.

In the example of the Windrush generation, they left their homes where they felt like they belonged and travelled to a new country which was so different that it was hard to feel the same. The experiences of Clinton Edwards and Floella Benjamin show how attitudes towards them could be hostile and they were often discriminated against because of the colour of their skin and where they had come from. Over many years the Windrush generation built lives in Britain, they raised families, they worked, paid taxes, were part of local communities and became an important part of British culture. After all this time they felt like they had mostly been accepted and felt like they belonged but all of this changed with the Windrush scandal and the Government's changes to immigration policy which created the 'Hostile Environment'. I believe it is disappointing that they were treated this way after living in this country for so long and for contributing so much to society. There have been so many developments in technology over the last 50 years but it seems that, for some people, prejudice and discrimination have not developed in the same way.

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Tutor note:

"A. is a high achiever and excellent all rounder. He did one of the key things that earned his success – he listened. This led to him being able to prepare a balanced essay with a good introduction, middle and end. He quoted, referenced and analysed the material well so that his conclusion was considered and well thought out."

Is it possible for a portrait to show a real personality?

Year 8, Key Stage 3

Pupil Name: S.A.

School Name: Knights Templar School

Supervised by: T. Lee-Wolfe

Tutor University: University of Nottingham

Course Title: Power, Personality and Portraiture

A portrait can be considered a window to the soul, a true representation of the subject, a method of personality genuinely displayed by the artist to the viewer. However, to fully comprehend a portrait and the complex human personality behind the canvas would require consideration of the motives of the artist in looking for and portraying the soul in the first place. What incentives could be influencing their choice of characteristics shown?

Money, romance, propaganda and status could all impact the artist's final portrayal of the subject. Through the analysis of three portraits, three relationships between artist and sitter, three differing levels of intimacy and control, all set within different socio-economic backgrounds, I will discuss whether it is possible for an artist to truly represent and share a person's personality without influence or agenda. One portrait is by a husband of a much-loved wife, one a royal commission of a queen and the last, a

self-portrait of a man troubled by his mental health. The artist's perceptions, misconceptions and preferences regarding that particular person are the essence of the portrait but the artist's relationship with the audience or purchaser of the portrait also needs to be considered. A clear concept of the relationship between all these parties is critical to reaching a decisive conclusion to the original question.

The first portrait to be considered is Portrait of Mrs Gainsborough, a painting by Thomas Gainsborough. It was created as a gift for his wife's fiftieth birthday, a present to display his emotions of gratitude and affection. The portrait is a depiction of her and only her in front of a plain, unlit background. As a result of the background being a very dark shade, the emphasis of the painting is on the light skin tones of her face and hands.

This contrast could signify that Thomas Gainsborough thinks that she is the focal point and any background frippery would be irrelevant. Likewise, the costume of Mrs Gainsborough, despite being fashionable at the time, does not include any blatant extravagance that could convey grandeur. Thomas Gainsborough had "came to be known as the expensive painter of expensive people in expensive dress"1 and this contrast makes a less frivolous and opulent example of his work stand out as rather unique. The painting is

1 Home is where the art is: Margaret Drabble on Gainsborough's family

about his wife not the clothes or jewellery but her and what makes her so special to him. Mrs Gainsborough's very direct gaze at the viewer could be interpreted as her staring into the eyes of her much-loved husband

highlighting the intimacy between them. This painting was created for Margaret Gainsborough's fiftieth birthday. It does not make her look old or dishevelled or malicious because it is a gift, a gift that allows Thomas Gainsborough to acknowledge what his wife has done for him. In his early days as an artist, Margaret Gainsborough was a huge support for him; supplying him with the money he required. The "annuity paid to her enabled her husband to embark on his career as an artist"2. Without the help from his loving wife, Thomas Gainsborough likely would have had a very different life to the one we know now. Even though this is a very close relationship and Thomas Gainsborough probably knows her personality quite well, is the entirety of her personality expressed through his representation? As this is supposed to be a way for him to demonstrate his gratitude to his loyal wife, parts of Mrs Gainsborough's personality that he assumed would not be pleasant enough to include could have been left out. This would mean that if such things did occur, the certain traits incorporated could be and likely were true yet the personality would be incomplete. Humans are imperfect beings and that was not shown. This is a work of art that fulfilled its purpose to simply say thank you.

The second portrait to be considered is a royal commission of Queen Charlotte by William Beechy. It depicts the queen walking with her dogs on the grounds outside her Windsor residence. The dogs in the picture are all pristine and near Queen Charlotte. One of the dogs is nestled in her hands whilst the other dogs are looking at her intently. This connection with the dogs presents us with an image of a gentle caring personality even though she is a regal queen. Her costume is presented simply with only a plain white dress, black veil and subtle jewellery. What is so intriguing about this painting is the absence of significant royal symbols. With no clues or crown, Charlotte could be indistinguishable from any noblewoman. This could have been done to attempt to show her as more relatable to the general public not just a queen in a crown. This was especially pertinent at the time as her husband, George the Third, was suffering from a disease called porphyria that led him to madness and had retired from royal duties two years

2 Home is where the art is: Margaret Drabble on Gainsborough's family

previously. Queen Charlotte is alone in this image and has no noticeable signs of royalty that would relate her to the mad king. A portrait of this sort could have been utilised as a method to distance the public's perception of the royal family from George the Third's ailment and onto the accessibility of his wife. However, imagine if the artist depicted Queen Charlotte in a way that did not suit her, a way that was perhaps less flattering. It would be very possible that there would either be a restriction put on the painting or the artist would face punishment. With this in mind, would the whole personality be portrayed or a fragmented version that corresponds with the royals' standards? Does this mean that the representation of royals or noblemen is propaganda? These portraits are meant to make you think that these leaders are doing a good job, are nice people and have hobbies and interests just like you or me.

The third and final portrait to be considered is Self Portrait with Bandaged Ear by Vincent van Gogh. The painting shows him alone in his house, recently back from the hospital. Van Gogh is wearing a thick green coat and blue hat but most intriguingly is the bandage on his ear. It was a deliberate choice of van Gogh to honestly depict himself with this self-inflicted injury. Also, the solemn and melancholy stare at the viewers could suggest that he is aware of what has happened and wants to address it in this painting, to acknowledge his faults. In the background, there is an easel with a blank canvas on it and a painting hung on the wall. Van Gogh purposefully might have included these to tell the viewers that he was still an artist, still producing art even after everything he had done and his time spent in an asylum. Although he recognises in this portrait that he has had consequences from his mental illness, is he portraying this as a defining facet of his character and personality? His first thought, his priority when returning to his home was to paint and share this part of his life with the viewers. The lack of yellow (considered the colour of madness by Vincent van Gogh) in the image is rather surprising as it could mean that he did not think of himself as still struggling with mental instability rather he wished to portray himself as in recovery or recovered from the malady; “he accepted his illness and wished to recover, though was perhaps unaware of the full extent of his mental condition”<sup>3</sup>. So, is the personality depicted in this portrait his true personality or is it an image of himself that he wishes to share? In this altered mental state and still suffering from this terrible

<sup>3</sup> <https://www.vincentvangogh.org/self-portrait-with-bandaged-ear.jsp>

ailment is he able to express himself without being massively influenced by the illness. Vincent van Gogh is still Vincent van Gogh, yet the disease may have remodelled or perhaps amplified certain traits of his. On the other hand, for van Gogh, his art could be one of a few things that give him a sense of normality, an escape from the current world. It is that as a result of all the madness he has been experiencing that means everything is disconcerting and bleak except for him and his art.

In conclusion, were the artists ever intending or able to show that person's real or complete personality? In a portrait, the viewer is seeing the subject through the eyes of the artist. The motives of the artist to show the subject in a favourable light may be unknown by the viewer. The motivation of money, gratitude or the threat of displeasing a royal court would certainly influence the personality displayed. A self-portrait would be thought as the most honest and clear version of a personality but if that judgement was skewed by mental instability or the public perception of insanity then can that be a true and complete reflection either? From the artists' perspective, maybe the portrait is readable and concise. However, in that scenario would the artist have any pre-existing information regarding the subject? The fact is personality is “a characteristic way of thinking, feeling, and behaving”<sup>4</sup>, it “embraces moods, attitudes, and opinions and is most clearly expressed in interactions with other people.”<sup>5</sup> In honest portraits, snapshots of the emotions, traits and experiences are presented. For a portrait to show a real and complete personality, it would

need to be constantly changing to reflect all the different elements of a person's character and the subject's evolving social situation. The relationship between the subject and the artist would also need to be known by the viewer in order to add background understanding of the situation. Without background understanding and knowledge can we ever know the whole personality even through social interactions let alone through paint and canvas? People always keep parts of themselves inside and no single snapshot or painting can reflect the entirety of a human being.

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**Tutor comment:**

“I really enjoyed my time teaching at Knights Templar School. S was a very engaged student throughout the programme and I was thoroughly enjoyed his input in class. I was particularly impressed by his ability to engage with the theory, his sophisticated writings skills and creative thinking in answering the essay question. He received 72 out of a 100 (a 1st), which shows he would perform highly in an undergraduate programme. Congratulations S, you should be very proud of yourself!

## What social, cultural and biopolitical factors influence contemporary digital ‘self-tracking’ health behaviours using wearable biometric fitness devices?”

**Year 12, Key Stage 5**

**Pupil Name:** I.P.

**School Name:** St David's Catholic Sixth Form College

**Supervised by:** K. Lawson Hughes

**Tutor University:** University of Wales Trinity Saint Davids

**Course Title:** Self-Surveillance in the Digital Age: is digital self-tracking good for our health?

There are several stances one can take on the question as to whether digital self-tracking is good for our health. To truly answer this question, we must first understand the different components that make up this topic, such as 'self-tracking', 'self-surveillance', 'biopower', and 'autoethnography'. This essay will lay out, define, and dissect terms such as these to ensure the question is answered to its fullest extent. There are also many definitions about what people believe constitutes the word 'health'. According to the WHO, health is 'a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity' [1]. I believe that self-tracking can improve a person's well-being in many cases, yet there are times when it could have a detrimental effect.

Self-tracking is defined as the practice of systematically recording data information about one's health, diet, or physical activities to discover behavioural patterns which could improve overall health and wellbeing [2, p. 8]. It is the recording of data from the activities one completes, often assisted by digital wearable technology and applications such as Strava and Zwift. People can therefore set personal goals with ease and can see their progress journey. Self-tracking is not a new human behavioural phenomenon, and at a basic level does not need to use technology at all, and can even be as simple as writing down one's calorie intake in a logbook, or the distance of their runs. Technology has increased what one can track and has made the process more accessible to the average person. Digital wearable fitness devices are devices such as smartwatches that are used to keep a record of activity and progress over time, often with the use of applications. Some can also measure physical activity by tracking heart rate, calories burnt, step-count, and a whole range of other activities or processes.

Tracking oneself with a digital wearable fitness device may have a big positive impact on a person's health and well-being since it allows them to establish goals and measure their progress and activities easily. Having easy access to this and seeing the results could provide a lot of motivation to many individuals and help them along their fitness path. Setting objectives is an excellent strategy to boost motivation and focus on achieving a specific goal in one's health and fitness journey. Achieving a goal may boost one's mental health and provide extra drive to keep

going. People can also use wearable devices to check their overall health, such as blood sugar level monitors, which could be lifesaving. In addition to this, self-tracking has become a massively social activity, with an estimated 110 million wearable sensors having been shipped by the end of 2016. In the five following years, this number has likely grown exponentially. Athletes now race each other virtually, on apps such as the aforementioned Strava, while being situated in opposite corners of the globe [3]. It allows athletes to partake in competitive activities without exposing them to possible dangers, such as infection during the current COVID-19 pandemic [4]. Note: This study only looked at the aerodynamics of the droplets spread and not the virology, thereby calling into question if runners staying 1.5m apart from each other are in any greater danger than the average person. Nevertheless, there is still an increased risk by being in a large gathering of people [5].

There are of course possible negatives to one's health and wellbeing by self-tracking using a digital wearable fitness device. One is that people can easily become obsessed and take self-tracking to extremes. This can have the extremely dangerous effect of causing eating disorders, and mental illness such as depression and anxiety if one does not meet their goals or 'targets' [6]. People may become disheartened if they compare themselves to others and realise they are performing at a much lower level. The data one views may not tell the whole picture about one's health and therefore could lead to issues as people may focus too much on the things that they can quantify.

There is a global community of individuals who share their tracking practises with others, both online and in real-world environments, and a cultural phenomenon of self-tracking using digital wearable technologies called 'The Quantified Self' [2, p.13]. These spaces have become powerful motivators for many people who enjoy being a part of a global community of like-minded people. It encourages people to compare, which could have drawbacks, but it also encourages people to discuss and share ideas about things they are all passionate about in a welcoming and safe environment.

Digital wearable fitness devices are devices such as smartwatches that are used to keep a record of activity and progress over time, often with the use of applications. Some can also measure physical activity by tracking heart rate, calories burnt, step-count, and a whole range of other activities or processes. This data can be collected and used for a variety of factors, from leisure to monitoring health, and research.

Self-surveillance is the internal attention we pay to observing our behaviors and actions, in relation to how we will be perceived by others in the external world. Self-tracking is a form of self-surveillance because it is a way of observing our behaviours, actions, and activities, often with a deeper level of scrutiny. The concept of 'Technologies of the Self' was developed by French philosopher Michel Foucault to define the different techniques individuals use to adopt or transform themselves, to attain better states of happiness, health, or quality of life. Foucault introduced his concept in a seminar he delivered in 1982.

From an extract of his seminar [7], Foucault refers to four major types of technologies, with technology 3 seeming to relate the most to the concept of digital self-tracking behaviours.

Foucault states technologies of power 'determine the conduct of individuals and submit them to certain ends or domination'. The pressures to conform to an ideal, often shown through advertisements, connects the technologies of the self that we use to adapt and understand ourselves in contemporary culture to bigger social, political, cultural, or scientific ideas, such as the societal pressure to reduce one's weight or health messages delivered by people in positions of political power. This can be viewed negatively, especially in societies where individuality is celebrated, as people may not feel they have a choice but to conform. In contemporary culture and society, we have internalised ideas about appropriate health behaviours and conduct, such as walking 10,000 steps per day. Few people know where this figure comes from yet most people recognise this as the 'correct' figure we should aim to complete every day without giving it a second thought. Self-tracking also encourages us to pursue specific ideals, in relationship to our subjectivity and identity such as the idea of the good citizen. Behaving in a certain way, while managing it through self-tracking, to achieve a goal of being healthy; the byproduct of that being alleviating pressure on the NHS.

While using popular self-tracking apps such as Strava may seem very appealing, users must note that the companies gather large amounts of data on users. Many people are unaware that this even happens, and this can cause big security concerns. This has happened in the past such as when US military bases were exposed in countries such as Syria and Afghanistan when Strava released a heat map showing where their users were active [8]. This put many lives in danger only because Strava had not carefully considered the effects of releasing their highly sensitive personal data. Data collected on individuals can be highly beneficial to the health of its users in certain cases. By monitoring patterns and behaviours of its users the companies can tweak and improve the apps so that the user has a better experience, in turn increasing retention rates and ensuring that more people are encouraged to complete their fitness journey.

Autoethnography can be used as an alternative method and self-reflective approach to digital self-tracking, bridging the gap between journal and academic papers. Using a qualitative method allows one to gather information on things that numbers alone would not be able to capture, or at least not easily, such as emotion. I have used an alternative method of self-tracking to document my experience undertaking a certain physical activity. I recorded myself doing block starts for sprints by using a video camera. I was able to see my body shape in a way a digital wearable fitness device would not have been able to capture. This allowed me to adjust my body accordingly and create a more effective start. It also allowed me to hear my foot contact, which gave me a good idea of how much force I was putting into the ground. Autoethnography seems to be very beneficial to one's health because it allows people to make improvements based on experiences that would not be

able to be shown through pure quantitative data alone.

Overall, digital self-tracking can be extremely beneficial to people's health and wellbeing when applied correctly, with the correct restraints. People must realise their digital self isn't everything and their health is made up of many more aspects. People mustn't allow themselves to become obsessed as this leads to health problems in itself. Moderation is key and realising that these products, such as apps, aren't magic, and they require as much effort placed into them for the reward to be returned.

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**Tutor comment:**

"I really enjoyed my time teaching at St David's where the staff and pupils were welcoming and incredibly enthusiastic about the programme. I's essay showed a level of sophisticated thinking and an in-depth understanding of the complexity of the issues we studied. He considered alternative points of view thoughtfully, while using good source to substantiate his argument. "

# Social Sciences

## What environmental factors influence our eating behaviour, and why? Can we use the effects of these environmental factors in interventions that encourage healthy eating?

Year 9, Key Stage 4

**Pupil:** N.G.

**School:** Cardinal Newman RC School

**Supervised by:** R. Embling

**Tutor University:** Swansea University

**Course Title:** Food for thought: How does the environment influence what we eat?

There are many environmental factors that contribute to changes in our food intake. These include eating with others and dishware size. It is important to study environmental factors when considering food intake because these factors can be influenced to encourage healthy eating. Doing research into these factors means that individuals can have a better idea about the individual factors in their eating environment that influence them to eat more or less.

The first factor that can influence personal food intake is eating with others. A collection of three theories known as 'The Social Facilitation of Eating' explain the reasons that lead to why this effect occurs. The three theories are the time extension theory; the modelling theory; and the distraction theory. (Herman, 2017).

The time extension theory suggests that meals take longer to eat when with a group. This means that individuals are exposed to the food for longer periods of time further tempting them to eat more. However, this theory can be challenged because if people are eating in groups together they may spend time talking to each other and not just eating. A group (Pilner et al. (2006)) did a study, taking 70 male participants and 62 female participants to eat lunch. The participants were given either 12 or 36 minutes to eat their lunch. Results showed that participants given 36 minutes to eat their lunch ate more. The researchers, however, did not consider liking for the foods given or how hungry participants were previous to the experiment. These factors may have influenced results, but they did conclude with the same results as many other studies.

The second theory, modelling, suggests that we eat more with others because of the effect of social norms. This means that we try to match our habits to those around us. For example if one individual were to eat more, then another may too as they want to appear similar. Individuals may also want to maximise their food intake during a meal, so if they were to see another eating more during a meal, they may think it necessary to ensure that

they are getting their fair share of the meal. It also makes individuals feel more secure when others match their food intake to theirs.

The third theory, distraction, suggests that we eat more with others because another person being there is a distraction from the meal. This results in one not monitoring their food intake as frequently as they maybe would when eating alone, often resulting in an increase of food intake. A study done by Hetherington et al. (2006) found that participants were likely to eat around 18% more food when eating with friends and 14% more whilst watching TV. For this study 37 participants were invited to eat a buffet lunch and they either ate alone, alone watching TV, with same sex strangers or same sex friends. The results were compared with those of eating alone.

However, there are several factors that rival these theories. For example, when eating with strangers, people tend to monitor their food intake more rather than when with friends. Ruddock et al. (2019) did a comparison of 42 studies. They compared their results with those found when participants ate alone. It was found that participants ate up to 48% more when eating with others but were more likely to eat less when with strangers. It was also found that some participants monitored their food intake more when with certain groups of people; for example overweight people were prone to eating less when with others, and females ate less when with male friends or strangers. Eating with others may shorten the length of the meal due to the potential awkwardness and lack of conversation when eating with a stranger, particularly if an individual suffered from anxiety or suffered from an eating disorder, this being due to feeling insecure or uncomfortable.

Dishware size can also affect food intake. This is explained by two theories: capacity and perception. The theory of capacity suggests that because smaller dishes can hold less food, a smaller portion will be consumed. The theory of perception proposes that when choosing a dish, a smaller dish may be chosen rather than a larger dish because it appears to be holding more, when in reality the portion sizes are the same. This is called the delboeuf illusion.

The theory of capacity shows that when using smaller dishes portion sizes, in turn, will be smaller due to the dish only being able to hold so much. Similarly, larger dishes will increase the portion size because of the capacity of the dish. However, this does not mean that food intake will stay relative to portion size. Using smaller dishes may encourage individuals to serve themselves further helpings, as one serving may not be satisfying due to its smaller size. This leads to an increased food intake over time. Robinson, 2015 did a study on the theory. He, along with several others, invited participants to watch a comedy programme and participants were given either a 450ml or 800ml bowl at random to serve themselves popcorn in. Food intake was measured and it was found that participants ate more popcorn when given the smaller dish. Robinson later wrote an article (2017) on the subject, using further research to show that using smaller dishes did not decrease food intake.

The theory of perception suggests that when choosing a dish, even though the portion sizes may be the same, the

portion looks larger when put on a smaller dish because it takes up more space on the dish. This is explained using the delboeuf illusion. This comes to a similar conclusion to the capacity theory. Due to individuals choosing the smaller portion they may not feel satisfied with what they have eaten or not feel full and serve themselves further helpings, resulting in an increased food intake over a longer period of time. A group conducted a study which concluded that the delboeuf illusion does apply to the food on a plate (McClain et al. (2013)).

Considering the effect that eating with others has on food intake, it is possible to use the modelling theory to encourage healthy eating. This can be implemented into everyday lifestyles by influencing the 'social norm'. An individual can use this theory to encourage others to eat healthily. A study conducted by Thomas et al. (2017), in which posters were displayed in three workplace restaurants. These posters contained the message 'Most people here choose to eat vegetables with their lunch'. Of the 3179 meals that were purchased in the time following, 64% included vegetables, compared to the 60% before the posters were put up. The study concluded that influencing social norms to encourage intake of vegetables does work. This can however be countered due to the fact that some people that bought meals may not have liked vegetables, or not have wanted them at that particular time.

The time extension theory can also be used to encourage healthy eating. This can be influenced due to the fact that an individual has a tendency to eat more when exposed to food for longer periods of time, whether it is because of socialising or simply being around other people. Healthy eating can be influenced by exposing healthier foods for the period of time that an individual is at the table or place of eating. Linking this in with the distraction theory, if a person is distracted whilst talking with other people they are therefore exposed to food for longer periods of time. Due to the distraction theory the person is less likely to monitor their food intake, and because of the time extension theory they are exposed to the food longer. If the food that said person is exposed to is healthy, then there is less of a need to monitor food intake. Moreover, linking this with the modelling theory, if one person at a meal chooses to eat healthier foods, the others there are more likely to as well; thus, resulting in all at the meal eating healthier options.

However, this can be argued against due to the fact that healthier foods are less likely to be first choice at meals, and most individuals are more likely to take advantage of the chance to choose the options that they want, and not necessarily what is healthier or better for them. Fruits and vegetables are, also, less likely to satisfy a person's hunger, possibly resulting in a further increased food intake. It is also known that individuals prefer to maximise food intake when eating with others, further increasing food intake.

Furthermore, using eating with others to influence healthy eating could be used within the home at family meals. The modelling theory can be used to encourage household members to choose healthier options and this may be easier than when eating in a restaurant with friends because the choice of meal is more likely to be a

joint decision, rather than individual. Moreover, it may be easier to convince household members to eat healthily due to closeness of individuals in the home, and the sharing of food in general. It is easier to influence healthy eating when one person is responsible for providing all of the food eaten.

Additionally, the effect that dishware size has on food intake can also be applied to everyday life to encourage healthy eating. Due to the capacity theory, a person is likely to eat less when serving themselves with a smaller dish. This coincides with the perception theory, and people are more likely to serve themselves from a smaller dish if the serving looks like it fills the dish more. Using these theories, it can be recommended that individuals use smaller dishes when eating unhealthier foods and larger dishes for healthier food options. Furthermore, it could be implemented so that an individual finds a portion size or dish that personally satisfies their hunger, as this differentiates per person.

Against this, when an individual eats from a smaller dish, it is less likely to satisfy hunger, resulting in that person helping themselves to further helpings; this can lead to an increased food intake. A study done by Robinson et al. (2015) showed that food intake was increased when using a smaller dish but not by a significant amount, thus showing an inconsistency in the theory. Moreover, this strategy is difficult to implement into an everyday lifestyle. Due to these facts, it may be sensible for an individual to only implement this theory to healthier food options, in order to avoid over-compensating on unhealthy foods.

In conclusion, the effects of eating with others and dishware size and food intake have been thoroughly discussed by researchers. Eating with others influences food intake due to three theories: time extension, modelling and distraction; these are known as the social facilitation of eating. These theories can be used to influence healthy eating: the modelling theory can be used to encourage others to eat healthily by using the influence of one individual or several. The distraction and time extension theories can be used together; if a person is distracted during a meal it becomes longer, resulting in the person being exposed to food for longer periods of time and not measuring food intake, and if this food is healthier then they are less likely to consume too much unhealthy food. It is likely that this effect can be used more effectively when concerning family or household meals.

The effect that dishware size has on food intake can influence healthy eating because of the capacity and deception theories, both of which state that using a smaller dish decreases food intake due to the dish itself being smaller and the portion looking larger. However, neither theory discusses the fact that a person may take further helpings due to not feeling satisfied or not feeling full. Considering all of this, it is best to only apply the use of this theory to healthier options to avoid over - eating unhealthier options.

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**Tutor comment:**

"It was an absolute pleasure to work with N. at Cardinal Newman. Their approach to the topic was well developed and thoughtful, producing a very high standard of work that would not be out of place at KS5. Da iawn!"

# Drawing on one behaviour change theory, discuss how wearable technology could be used to improve physical activity, and how this would be tested.

**Year 9, Key Stage 4**

**Pupil:** E.H.  
**School:** Oldfield School  
**Supervised by:** G. Wort  
**Tutor University:** University of Bath  
**Course Title:** Fitbits and Apps: Can wearable technologies get us moving?

Physical benefits of exercise

Physical activity is essential to our health. It reduces the risk of coronary heart disease, stroke, breast and bowel cancer, and type 2 diabetes (NHS, 2022). Furthermore, it lowers blood pressure, helps strengthen muscles, and is key to weight control (Johns

Hopkins Medicine, n.d.). Approximately 63% of adults in the UK are overweight (Formulate Health, n.d.). By increasing physical activity, this figure would decrease because exercise burns calories and fat, resulting in weight loss. In England 2020, the NHS spent £8,167,383 on a drug called Orlistat to treat obesity (Formulate Health, n.d.). Therefore, physical activity would reduce the financial burden on the NHS, consequently having more funds for potentially life-saving research.

Importance of research focus

The WHO recommends that children and adolescents aged 5-17 do at least 60 mins of moderate-to-vigorous physical activity per day (WHO, 2020). Despite this, 80% of children aged 11-17 aren't active enough (The Lancet, 2019). Prioritising children for research focus has a significant advantage. By helping children get into healthy routines such as regular exercise, it will cause a future knock-on-effect into adolescence and adulthood. As the children grow up with healthy routines, the need for interventions and research focus is reduced. Furthermore,

the WHO states: "Young people aged 10-19 years have experienced the least improvement in the health status of any age group in the British population over the last 50 years." (WHO, 2016). As children and adolescents have experienced the least improvement, it's time to make some changes. Researching solutions would improve their health status.

On the other hand, figures from the WHO show that deaths of over-60s caused by non-communicable diseases (NCDs) are over twice the number of those below 60.

NCDs are diseases such as cancer that aren't contagious and therefore can't be transmitted. Targeting lifestyle risk factors including physical inactivity could prevent a predicted 80% of major NCDs (WHO, 2016). Therefore, research focus is valuable to older adults because they have the most deaths from NCDs and physical activity significantly reduces the risk of getting an NCD.

In conclusion, I think it's most important to focus on improving physical activity in children. Although the older adult age range presents a strong argument, I believe the advantage of habits continuing through life (starting in childhood) is too beneficial to pass up on.

Mental benefits of exercise

As well as physical benefits from regular exercise, there are mental benefits. When exercising, your body releases endorphins (Bruce, 2008). These are hormones that reduce pain and increase positivity. I think feeling positive encourages people to make better choices. Research shows that emotions experienced in one situation can carry over to the next - this is called "carryover of incidental emotion" (Jin, 2019). Therefore, the more exercise you do, the more positive you are. Studies show there is a relationship between positivity and cognitive function (Isen, 1984). Further evidence suggests a connection between cognitive function and decision-making performance (Jin, 2019). Hence, the correlation between physical activity and decision-making is substantial and impacts the people and environment around you.

Another benefit especially relevant to children is cognitive development, which is the growth of mental capabilities that defines how a child understands the world. Young people need to develop cognitive functions such as learning, thinking, reasoning, remembering, and decision-making. Research suggests the first eight years of life are the foundation for future success (Robinson, 2017) . Therefore, the impact of physical activity on a child's future is remarkable.

In 1999, Henriette van Pragg experimented on mice to see whether aerobic exercise would affect the brain. Pragg subjected mice to different living conditions; some had a wheel, others didn't. The mice using the wheel experienced increased size of the hippocampus. This part of the brain is associated with learning, memory, motivation, and emotion. Linking this discovery to children, the more physically fit a child is, the bigger their hippocampus (Dewar, 2021). Therefore, children who exercise have more

potential to increase their academic qualities than children

who don't. A downside of this is that experimenting on mice is controversial for animal cruelty reasons. It's also unreliable to know if the results of an experiment on mice would be relevant to humans.

#### Wearable Technology

In 1961 and 1965, Claude Shannon (wearable computer) and Dr. Yoshiro Hatano (Fitbit) created the first wearable technologies. Following this burst of opportunity, giant tech companies such as Google and Samsung joined in with the production and development of this new idea. An immediate drawback of these devices is that they have had limited research time due to their modernity, meaning technical difficulties are common. Furthermore, high expenses will isolate poor people from the movement. If we rely on tech too much, inequality could increase.

Popular wearable fitness devices include smartwatches, Fitbits, and health-trackers.

Many models measure heart rate, breathing, calories burnt, and physical activity intensity. It's part of what attracts people to buy smart devices; they want their stats to compare to others. Social aspects of wearable tech have benefits and drawbacks.

Competitions against friends or seeing how many calories you can burn in one day may inspire you to get more active, as the concept of winning appeals to many. That's due to the release of dopamine after a win (pleasure hormone) (WebMD, 2020). With social aspects, fitness may increase. However, screentime often leads to a sedentary lifestyle, which makes me skeptical about whether it would have a positive or negative net outcome. In addition, fitness devices have become desirable objects. New designs involve more social features like messaging and games, suggesting a change in focus from the intended issue to current trends.

There is also a lack of knowledge behind why people buy wearable tech. It's easy to believe that a simple pedometer is used solely for fitness purposes, whereas someone buying an apple watch could have different reasons. However, there is evidence to suggest the opposite. Wristly conducted a poll of more than two thousand Apple Watch owners. They found the most frequent activity was checking activity rings. On an Apple Watch, an activity ring is a graphic showing statistics such as moving, exercising, and calories burnt. 70% of people questioned by Wristly said they check their activity rings more than expected, and 59% said they used the watch for personal messaging less than expected (Whitney, 2015).

#### Behaviour Theories

We can link physical activity to wearable technology by using behaviour theories. An example of a behaviour theory is "Social Norms Theory" (Michie et al., 2021). Norms are behaviours that are considered acceptable in a group or society. It bases behaviour change on how you perceive others in a social group. For example, if your friends go to sports clubs, that may influence you to go to sports clubs or vice versa. Therefore, being in a social group where the norm is to exercise will encourage you to

engage in physical activity.

An issue with "Social Norms Behaviour Theory" is that your perception of others may not be as you believe, meaning false behaviours could influence you. Although some of these behaviours aren't negative (such as saying you exercise when you don't, as it still has the same effect on your peers), some could cause issues within the group or in your future. Moreover, feeling pressured to follow norms within a social group can lead to insecurities and lack of confidence that negatively impact mental health.

Practically, this theory is lacking because it doesn't consider the opportunity. Even if you wanted to follow the social norm of your group, unless you have the necessary equipment, it's unrealistic. For example, it's the social norm to go to after-school sports clubs, but you can't go because you have to take the bus straight after school. Another example is: the area is unsafe, after school clubs end when it's dark and your parents can't pick you up, so you don't want to be around alone. Here, motivation or anything related to psychological boundaries isn't relevant. I believe this is the most substantial limitation of social norms, as the theory can't apply to real-life without considering the environment.

#### Intervention

An intervention is taking measures to try and change something. An example of an intervention is The Daily Mile (founded by Elaine Wyllie). The aim is to get primary school children regularly moving a mile every day. I would say this intervention was successful because from experience, many schools partook in it. It shows that interventions work if the concept is popular. Using behaviour theories and wearable tech, I will describe an intervention that will support physical activity in children. Then I will discuss the methods of data collection I would use to see if it was successful.

I've decided to use one hundred primary school children over six weeks. I think it's more beneficial to learn a skill as a child; after all, you have your whole life to apply and master it. I've not set the exact age of participants so I can collect data from various ages (5-11).

#### Week One

To begin, each student will receive a health tracker to use at school daily for a week (intervention not started). I'll collect this data for comparative before and after results. A drawback is the potential technical difficulties and expense of the health trackers. There is very little I could do about this because the intervention relies on the trackers to provide data at the end. Furthermore, it's useful for students to set themselves goals.

For example, they might aim to walk two-thousand steps a day. If they complete this, teachers will encourage them to select higher goals, such as four thousand steps a day. The theory is called Goal Setting Behaviour Theory. It functions by creating a self-set target. By learning how to self-motivate at a young age, the students will use these skills all through their life. Similar to the Social Norms Behaviour Theory, a limitation is a lack of consideration for the opportunity. I would regard equipment and

environment when selecting a school. So, although this argument won't apply to my intervention, it's still important to consider. It's interesting how wearable technology can tie in here, as it contradicts the goal-setting theory. If the next generation of children can motivate themselves using goals, the attraction to motivational tech would decrease.

#### Week Two

Beginning week two, students will attend at least two after-school sports clubs. Their health trackers will measure their heart rate, steps, and physical activity intensity throughout the day and during the club. To prevent health trackers from being lost or damaged, the children will collect them at the beginning of the day and hand them in at the end of the day. After-school clubs would include team sports such as netball and football and individual sports like athletics and tennis. Unfortunately, some schools lack the necessary equipment to provide clubs such as these. However, with new funds from charities and governments to improve sports facilities, this may not be an issue in the future.

#### Weeks Three, Four, Five and Six

Over the following four weeks, coaches will gradually increase exercise intensity. For example, if the students started by running 20m sprints in athletics, by six weeks, it could be increased to 60m. Or in netball, if the students started by playing two vs two games, it could progress until five vs five.

To encourage students to be more active during the day, schools could link the number of steps to a reward system, such as house points or vouchers. If this was unavailable, they could receive a certificate every time they completed their goal for a week. It's challenging because they have to sustain and increase the difficulty throughout the week. Receiving a reward will motivate them to keep working hard.

Inputting fun games and team-building exercises will ensure the students engage in the activity, build confidence and develop a love for the sport. Saying this, not all children will find enjoyment in similar activities. I hope to eradicate this issue for the future by using surveys at the end of the intervention to obtain helpful criticism. I would use the survey information to improve the model before repeating it.

#### Data collection

There are two main approaches to collecting data: Quantitative (objective) and qualitative (subjective). Numbers and statistics relate to quantitative, and surveys, questionnaires, and observations link to qualitative. In this intervention, I am using both statistics and surveys to broaden the information I receive at the end. Although I see positives and negatives in both, I believe qualitative is more useful when looking to improve as it offers personal feedback, unlike numbers. As aforementioned, I am using quantitative data to compare statistics from before and after the six-week intervention. Solid mathematical evidence will prove that the intervention was or wasn't successful.

#### Conclusion

In conclusion, my intervention links Goal setting theory and wearable tech to support physical activity in primary schools. Considering both the benefits and limitations, I think wearable technology has exciting potential to increase physical activity in many age ranges. However, current designs are straying from the original idea, meaning fitness isn't the only reason to purchase. That's why I prefer using interventions and behaviour theories to find the solution. It means we rely more on humans than tech to improve physical activity.

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#### Tutor comment:

"E. engaged excellently with the course, asking lots of questions and showing a desire to learn. Her essay is well structured, presenting a convincing argument for the importance of physical activity, as well as explaining the theory well. She demonstrates critical thinking throughout and summaries the key points well: she is working at an excellent GCSE standard and should be proud of this work."

**‘Developing countries are developing countries because they remain underfunded, corrupt and mismanaged?’ Discuss the reasons for and against this statement and the extent to which this is true or false. Finally, consider the argument in an international context, drawing on historical lessons learnt.**

**Year 12, Key Stage 5**

**Pupil:** W.B.  
**School:** George Spencer Academy  
**Supervised by:** I. Zahair  
**Tutor University:** University of Liverpool  
**Course Title:** The Challenges and Consequences of Brain Drain

In this essay, I will discuss brain drain in Ghana in relation to globalisation and health inequalities. Brain drain is when highly skilled individuals migrate out of a country to continue their career elsewhere. It has both a negative and positive impacts on developing countries such as Ghana. This article (\*R1) gives an example of brain drain as it talks about how “48.9% of the participants had emigration intentions”, this means that the nurses would have most likely migrated at the earliest opportunity given to them. Brain drain impacts several things in Ghana, bringing about things like health inequalities.

The reason why there are health inequalities is due to the fact that not everyone has access to an ideal environment and upbringing. The Dahlgren and Whitehead rainbow model is used to show how different factors such as: individual lifestyle factors, social factors, socioeconomic, cultural and environmental factors can affect an individual's health. The model suggests that at times someone can be in complete control of their health due to their lifestyle but similarly things such as socio-economic and environmental conditions may cause the individual to have no control over their health. For example if a person grows up with a good education, they are more likely to have a better health situation than someone who didn't. This is because the person with good education has a better chance to gain a good job which would then take care of any health costs leading to a better health status. In a country like Ghana where you are required to pay for health care treatments, things such as your social and economic status are crucial. Likewise if you have no employment and or grew up in poor housing, this can cause health problems and place you at a disadvantage when it comes to health care. The following article (\*R2) discusses the fact that “72% of deliveries take place at a health facility in Ghana” and it was suggested that “place of residence, financial status, education, religion, parity and perceived need were significantly associated

with health facility delivery”. This means that just over ¼ of the population did not deliver their babies in a healthcare facility due to various reasons and some of them being: financial status, their place of residence and education. This all links back to the Rainbow Model, because “rich women were 95% times respectively more likely to deliver at a health facility compared to the poor”, they are able to do that because of their financial status. Furthermore “women with either at least secondary education (AOR = 2.04; 95%CI = 1.57-2.64) or primary education (AOR = 1.39, 95%CI = 1.02-1.92) were more likely to deliver at a health facility than women with no education”, this was due to the level of education that they had gained, linking back to the rainbow model.

In relation to COVID-19, if individuals don't have the necessary knowledge and education on the virus, it can cause further health inequalities because there are people who are educated on it and therefore will proceed to act accordingly to reduce the infection rate. Not only would a lack of education on COVID-19 cause health inequalities, but it would also create higher infection rates and consequently create more health issues for the public. Health Inequalities can also be reinforced due to corruption. This article (\*R3) mentions how “political corruption negatively affects job creation, investment potentials, infrastructural development and generally the standard of living of the people”. This means that corrupt individuals who may have a higher socio-economic status (blue section in the rainbow model), would be able to gain healthcare services a lot easier and a lot quicker than normal citizens due to their status. This is very unjust as it creates further health inequalities in the developing country.

Brain drain contributes to the negative impact on health inequalities in Ghana. A disadvantage of brain drain is that as the highly skilled individuals migrate from their lower income developing country to higher income countries and therefore the health care system is left struggling to develop. Consequently there will be a higher demand for the highly skilled individuals left over in the country and people who will most likely be able to receive their services are the more wealthy individuals, causing further health inequalities in the country. Brain Drain is not always a bad thing. A lot of the highly skilled individuals that migrate out of the country, decide to send remittances in the form of money back to their families at home. Therefore, the individuals that migrated are helping the economy of the country they left, which is an advantage. Even Though remittances are mostly a good thing, there is a downside to it. The remittance can create an economic dependency which may discourage individuals to start their own business or find a better job in order to enhance their living standards. Another advantage of brain drain is that at times, the highly skilled individuals that migrate out of the country in pursuit of a better career, decide to return back to their original country after they have had some training and experience and improved their skills abroad. This means that the developing country gains more skilled individuals who can help the economy of the country to develop.

Another thing that brain drain impacts is globalisation. Globalisation is the growth of interdependence of

the world's population, economies and cultures, this is done through the trade of goods, services, technology, investment, information and people. Arjun Appadurai categorised globalisation into 5 scapes: technoscapes, financescapes, ethnoscapes, ideoscapes and mediascapes. An ethnoscape is “the landscape of persons who constitute the shifting world in which we live: tourists, immigrants, refugees, exiles, guest workers and other moving groups and individuals” (Chun, 2016). Basically this refers to the people who move around in the world and to the ideas that move with them and the impacts that this has. On the other hand, ideoscapes refers to the flow of ideas and they can be portrayed in however big or small scales such as on a social media post or in a systematic way. Financescape is the global flow of money, it refers to things such as bitcoin and other ways of acquiring finance, such as: loans, investments and currencies. Technoscapes are the flow of technologies across the world, such as phones, TVs, planes, cars etc.. Lastly, mediascapes refer to the images that are based on reality and the distribution of electronic technologies. Appadurai also talked about the possible effect of homogenization of culture, this where more dominant countries like the United States spread their cultures through television and films. This may lead to the loss of indigenous cultures. This whole process can be called cultural globalisation. McDonalds is an example of cultural globalisation. This is because McDonalds originated in the western culture of the United States but today it is globally known and you would probably be able to find one just about everywhere.

Brain drain can severely impact technological globalisation. The highly skilled workers are the first people to develop or use the new technologies. Therefore they are crucial when it comes to the country wanting to upgrade to higher technology. This is due to technology being a very important factor that determines what types of foreign investments a developing country attracts. Therefore, brain drain can have a massive impact on the development of a country because if there are little to no highly skilled individuals, foreign investors will most likely only be interested in cheap workers or natural resources and not the local talents. A lot of foreign investments don't help with the development of a country as they are not willing to train the remaining skilled workers because there aren't enough to train.

Health care globalisation has positively impacted Ghana, this (\*R4) article quotes that “a transition in the culture of abortion care and service provision in Ghana”. This means that the due to the health care globalisation, abortion care and services are improving in Ghana. This type of improvement would only boost the country's economy as there would be less people in need of further health care treatment due to an abortion complication. “In Ghana unsafe abortion contributes to the high maternal mortality rate of between 310 and 402 deaths per 100,000 live births”, so by improving the health care through globalisation, less people would suffer from a poor health care system.

Furthermore, brain drain can also be affected by technological and scientific globalisation. This is because the technology does not reach the countries

equally, especially the developing countries. These technologies indirectly favour the more skilled people within a developing country. Therefore they would use the technologies to find better work conditions and eventually migrate out of the developing country. Globalisation shows people what various places in the world have to offer and because of this people would move to places they think would benefit them and where they would fit in due to not having the suitable facilities in their developing country. A lot of individuals that migrate out of a country to go to another country, due to this they proceed to build a new life there and a family in that country. After forming a family in a more developed higher income country, any children that they may have, would then have a higher chance of getting a good education, further developing their skills, which would then lead them to obtaining good jobs. This new generation may also decide to go to their parents' original country and then find jobs there and consequently help the economy of the developing country. If the new generation decides to move to the developing country with their set of skills, it would be very easy for them to find a really well paid job due to their skills, meaning that they would be more than financially stable. This would lead to the developing country gaining more skilled individuals, further developing the country. In this case, brain drain would be an advantage for developing countries.

In conclusion, the brain can have negative impacts on things such as health inequalities, as the highly skilled individuals migrate, it leaves the developing country with less skilled workers to help the public. Despite this, the individuals may decide to come back, helping the developing country to develop even more. On the other hand, brain drain mostly has a positive effect on globalisation, as more countries benefit from it overall. This would lead to the development of the underdeveloped countries. In my opinion, brain drain has had a general positive impact on developing countries such as Ghana and it will continue to benefit from it.

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**Tutor comment:**

“W. is a very impressive student who showed a level of sophisticated thinking and in-depth understanding in her final assignment. It was a joy to work with W. and the rest of class at George Spencer academy. No doubt W. would be an invaluable presence to any undergraduate programme.”

# Imagine you had the power to redesign the world! Imagine you could use your knowledge from the present, the past and this course to build a better society. In doing this, discuss how education could be used to build an ideal society

Year 12, Key Stage 5

**Pupil:** C.W.  
**School:** St Wilfrid's RC College  
**Supervised by:** M. Malibha-Pinchbeck  
**Tutor University:** The Open University  
**Course Title:** How to Build an Ideal Society Through Education

Whether it's capitalism, communism or Gandhian philosophy, ideology clearly shapes education and what is taught through it to the population, with all three ideologies promising the goal of an ideal society for all. With an ideology's control over capital (what molds our individual position in society and the workplaces we may attend/wish to attend) it can teach its way of learning to create a "better future" for education's stakeholders. Stakeholders are those who invest into schools either money, time, or both, and can range from governors to parents with the common desire for compensation from the school itself, with certain ideologies benefitting specific stakeholders over others. The three ideologies covered do have both positives and negatives to their hold on education and, speaking from a more capitalist perspective myself, I believe that capitalism in education is the ideal way to building a perfect society.

Under the control of capitalism, education's goal is to prepare students for their unique but beneficial role in society via the influence of their capital and the subsequent choices that they make from this increased capital, which is referred to as social solidarity by consensus theorist Durkheim. Capitalism itself is founded on the core principles such as competition (the maximization of social welfare of both the consumer and producer by allowing producers to enter and exit markets freely), self interest (allowing people to pursue their own desires without external pressure, however they still end up benefiting society overall) and the freedom to choose (the ability to choose a different product if dissatisfied). These pillars of the ideology help morph education by allowing parents to choose which school/form of education is satisfactory for their child, boosting their economic, cultural and social capital in the process by helping them achieve the skills they need for specific or higher paying jobs, allowing them to gain access to the likes of food and WiFi, as well as helping those in education find people who can help them with jobs/work experience. This all culminates in a fair society in which stakeholders such as governors and private businesses can invest in education and other stakeholders such as students and supply teachers can gain the experience needed to reach their desired goal,

regardless of background, which functionalist Talcott Parsons refers to as a meritocratic society.

However, there are drawbacks and criticisms to this way of thinking, such as the "myth of meritocracy" as coined by Marxist theorists Bowles and Gintis and the overall contrasting belief that not all stakeholders properly benefit from this structure of capitalism. Due to the fact that not every child's individual background/social class is the same because of material and cultural deprivation (a lack of resources or knowledge needed for a successful outcome in school), meritocracy's idea that everyone has an equal opportunity to reach the job they desire is widely viewed as false when put into practice. There's also the idea that not all stakeholders are able to gain the same benefits from education, as students may not be able to gain the skills necessary for the job they want or the cultural/ symbolic capital for specific jobs needing specific credibility. Private businesses may also see that a school isn't producing the desired grades wanted to bring in new students and reduce funding, meaning the cycle will perpetuate as parents (predominantly middle class families) won't take their children to that school. On top of this, middle class families also have a high amount of economic capital in the form of extracurricular activities and the funds to take their children to other areas of learning outside of school which

helps expand their skills for work, whereas in the lower classes this capital is sparse and so many students of working class families will go to underfunded schools and leave with a lack of symbolic, cultural and economic capital which reduces their plausible opportunities for unique jobs with specific skills. Therefore, this means that although capitalism in education is the most ideal way to create a perfect society for most, it does come at the expense of the working class stakeholders as the ideology itself isn't beneficial to the lower classes who lack the economic, cultural and occasionally even symbolic capital necessary to progress beyond education.

When looking at a left wing alternative to this imbalance, communism in education is the ideal counter-ideology to capitalism's neglect and unequal treatment of certain stakeholders to education. Firstly, the idea of participatory budgeting in education is that all stakeholders in education, whether teachers or students or private businesses, get to vote on how a schools budget should be spent and in which sectors. Participatory budgeting considers the wants and needs of all stakeholders equally so to directly involve these stakeholders in participating in budgeting decisions that will have a direct impact on improving their lives (PEF 2020), whether this be through gaining cultural capital (knowledge) of budgetary activities and the simulated feel that participatory budgeting is akin to democracy or simply the symbolic capital of independently voting but improving the school with said vote. Plus, economic capital is gained via the opportunities and resources gained through participatory budgeting which allows for students and staff of all social backgrounds/classes to have an equal opportunity within education in the form of books, teaching equipment, food etc. Similarly, communism grants equal opportunity to the stakeholders who likely receive less than others as a result of capitalism's control over education, teaching

those who are illiterate how to read and write, boosting their cultural and economic capital regardless of social class or background by providing them with the skills required for basic jobs in society. This is beneficial overall as it allows the lower classes to have equal chances in society with middle class individuals, regardless of their cultural capital, as all of them are taught the same skills by education that help the political organisation in control of education. Also, the removal of private control over education means that businesses cannot defund certain schools based on results or performance, with the organisation funding all schools that it controls equally so certain individuals (commonly upper/middle class) don't have the headstart in education over others and meaning that cultural and economic capital is distributed equally.

Yet, communism's control over education comes with its drawbacks similar to capitalism, mainly in regards to symbolic capital and the core principles of communism's ideology influencing education. Symbolic capital under communism is heavily reduced because the sense of individuality is lost when all skills taught are identical for the same roles in society. This also technically is a reduction of cultural capital due to only certain skills being taught under communism with the closure/large reduction of private business meaning specific intellectual skills aren't needed. Plus, at the core of the ideology it's belief is "remodling the behaviour, emotions, attitudes and outlook of the people" which results in a more skilled and loyal workforce for the communist regime but at the expense of a complete loss of individuality amongst those taught by education. An example of this remolding of attitudes/opinions is apparent in the introduction of "Xi Jinping thought" into Chinese curriculum in 2020, which is a way to "help teenagers establish Marxist beliefs" and "the latest effort by Mr Xi to consolidate the ruling Chinese Communist Party's role in different areas of society." This altering of student attitudes does benefit the political organisation by establishing a loyal population to their belief/ideology, however strips them of all of their individuality and, as a result, their symbolic capital which helps them define themselves as individuals. Also, control over education exclusive to the state is a disadvantage as it eliminates other options to education for stakeholders as official methods of informal/non-formal education aren't often permitted by the communist state and only exist through family teaching life skills to their children. Therefore, although communism can help provide equal educational opportunities for stakeholders such as teachers and students, it's lack of individuality/unique skills to provide plus its changing of attitudes creates a population who lack the skills needed for specific, intellectual jobs.

Yet, there's a third viable option for the control of education: Gandhian philosophy and its core beliefs surrounding education. First of all, one of his immediate aims for education was that he believed in the idea of character building: which was that "character is the foundation of any education" and therefore one of educations' end goals under the philosophy is for all knowledge to build up and culminate in a student's character, as "weak moral and ethical people will not be able to take the world to new heights". This therefore results

in an increase of a students symbolic capital due to their character/individuality being focused on and developed through education (also known as secondary socialisation according to Durkheim), as well as an increase in cultural capital via the teaching of unique skills to students that fits their character whilst creating able workers for society both morally and ethically, on top of preparing them intellectually. Secondly, Gandhi believed in training for leadership which was the belief that "education should imbibe good leadership qualities to the children" and in turn create a successful democracy/society for people to flourish. This immediate aim of education leads to the increase of a student's social, economic and cultural capital: as they will learn the correct knowledge and attributes of a leader which can help certain students achieve certain jobs required in a perfect society (cultural), earn the skills needed to allow for better conditions and so to avoid material/cultural deprivation when in full time occupation (economic), and make connections with others in specific fields either within education or outside which allow a better understanding of the role you play in society (social). Thirdly, there's the existence and belief of pragmatism in education which is the idea that education should be about life and growth and that all children must 'earn' whilst learning. This entails that students earn something aside from knowledge throughout education to encourage/prepare them for wider society, such as material possessions (e.g. money) which in turn increases their economic capital by granting them the money for better goods/basic necessities like water, food etc and thus being prepared for society without material deprivation.

Yet, even with Gandhism's control over education there are flaws that have their influence over specific stakeholders, predominantly students, which can have a ripple effect upon society as a whole under this control of education. Firstly, one of Gandhi's immediate aims for education was the cultural aim; in which the cultural aspect of a student's character takes priority over the academic aspect within education as Gandhi said "I attach more importance to the cultural factor of education than its literary factor". Despite the increase in symbolic capital per student as their personal culture is developed, this factor of Gandhian philosophy within education (when put into practice) results in a decrease of students' cultural capital due to their knowledge on unique skills for specific occupations being secondary to building their cultural character.

Secondly, another immediate aim of education under Gandhian philosophy is the dignity of labour where children must 'earn' after 7 years of education (7-14), which involves their transition into the workplace despite their young age. Although it increases a students' social capital by allowing them to gain references and relations with their employers from an early age, it still decreases their cultural capital as they aren't given enough time in education to develop specific skills for certain, more intellectual jobs and as a result decreasing the number of intellectuals within the perfect society envisioned. Thirdly comes the ultimate aim of education in the eyes of the Gandhian philosophy: "to realise god or self-realisation". This can greatly benefit students' symbolic capital as

focus on themselves can greatly increase their sense of self/uniqueness in comparison to their peers throughout education. However, due to Gandhian education taking a more spiritual standpoint over the aspect of literacy/skills, it can be a detriment to students' capital, more specifically their economic capital. This is because the focus on god and religion/culture neglects physical literacy based skills, creating an imbalance between the lower classes of this society as middle and upper class families will possess the extracurricular activities which can expand their child's skills for work, yet working class families lack these added resources needed. Overall, Gandian philosophy's hold over education in theory could bring prosperity through its development of one's character and increase of both symbolic and economic capital, in practice it comes at the cost of students' cultural capital and its focus not being centred around literacy is a significant factor in this.

As a whole, this all shows that each of these three ideologies have their upsides and downsides when in control over education, with their core principles/beliefs/aims making it impossible for each of them to form a perfect society. Capitalism allows for individual exploration of sectors, opportunities and skills, however it treats its stakeholders of education unequally so certain people benefit where others lack the skills to do the same. Communism in theory treats all stakeholders equally and allows for resources to be distributed among everybody regardless of class, however its goal to create an obedient workforce/society that's loyal to its political and ideological regime ends up removing all sense of individuality and reduces the number of intellectuals within that society's borders. Gandhian philosophy is key at creating an increased culture and builds the character of individual stakeholders (especially students) yet this comes at the cost of literacy rates and a lack of focus on the physical over the spiritual.

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Create case studies on two countries and give two recommendations for how to improve life expectancy in one of these countries

Year 8, Key Stage 3

Pupil: M.M.  
School: Christ's Church of England Comprehensive Secondary School  
Supervised by: L. Geurts  
Tutor University: Kingston University  
Course Title: Social Science: The Secret to Living a Long and Happy Life

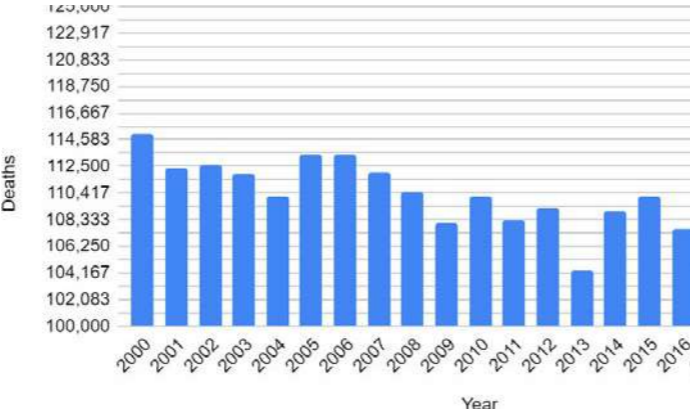
This question has puzzled philosophers for many centuries,  
Part 1- Bulgaria

This bar graph shows the number of deaths in Bulgaria, per year, from 2000-2020. The data this chart is based on comes from;

'Demographics Of Bulgaria', https://en.wikipedia.org/wiki/Demographics\_of\_Bulgaria [6 December 2021]

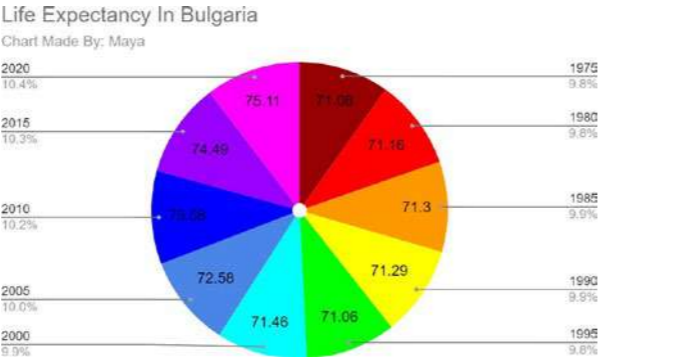
The source used by Wikipedia is as follows;

'Our World in Data', https://ourworldindata.org/ [1 January 2022]



This pie chart shows the life expectancy in Bulgaria from 1975 to 2020, going up in 5 year gaps. The data from this chart comes from;

'Bulgaria Life Expectancy 1950-2020', https://www.macrotrands.net/countries/BGR/bulgaria/life-expectancy [6 December 2021]

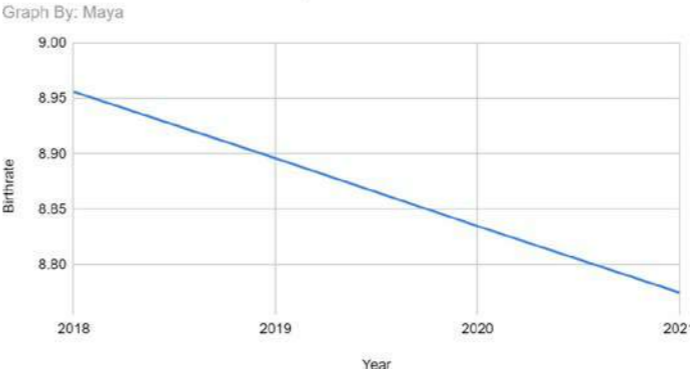


This line chart shows how many babies are born per year, per 1000 people in Bulgaria, 2018-2021. The data that this chart shows comes from;

'Bulgaria Birth Rate 1950-2021', https://www.macrotrands.net/countries/BGR/bulgaria/birth-rate [11 December 2021]

December 2021]

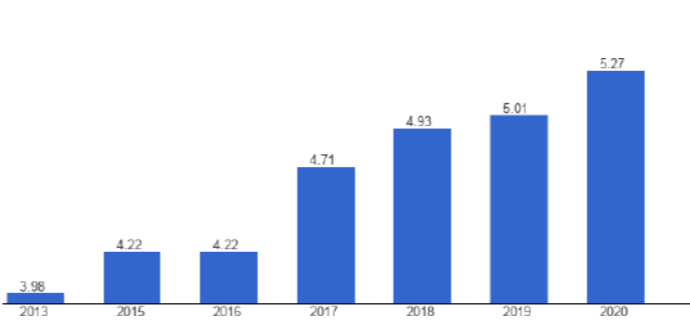
Birthrate Vs Year / 1000 People



This chart shows the happiness levels in Bulgaria over the years according to the Global Happiness Index, where 0 is very unhappy and 10 very happy. This chart comes from;

'Bulgaria Happiness Index - Data, Chart - The Global Economy',

https://www.theglobaleconomy.com/Bulgaria/happiness/ [11 December 2021]

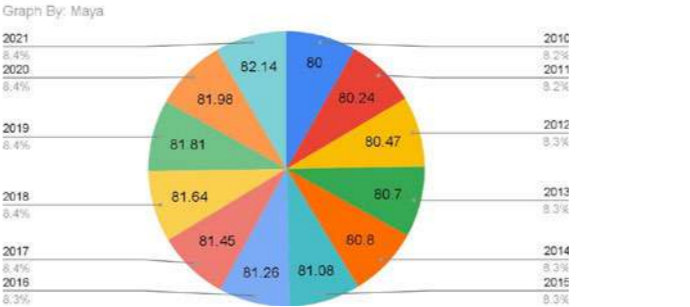


Part 1 - Finland

This pie chart represents the life expectancy in Finland over the past 11 years; from 2010-2021. The data this chart is based of comes from;

'Finland Life Expectancy 1950-2021', https://www.macrotrands.net/countries/FIN/finland/life-expectancy [11 December 2021]

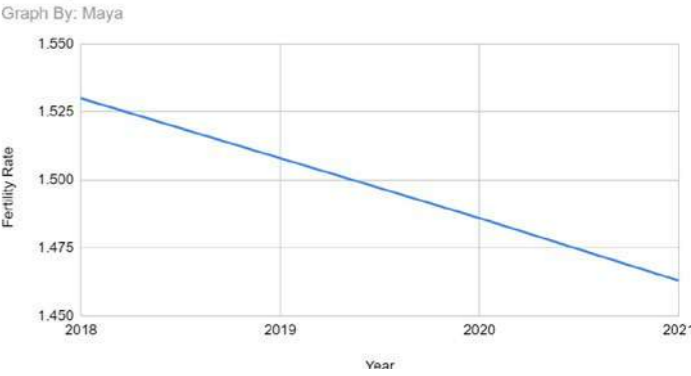
Life Expectancy Vs Year



This line graph shows the fertility rate in Finland, per woman, per year. The data this chart used comes from;

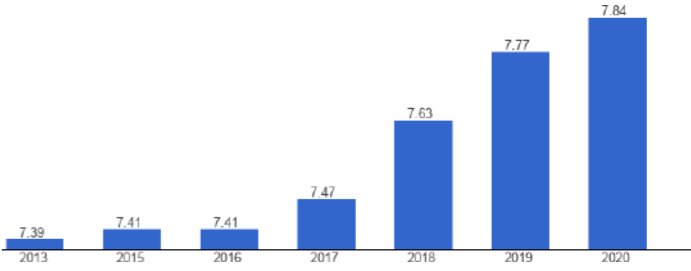
'Finland Fertility Rate 1950-2020', https://www.macrotrands.net/countries/FIN/finland/fertility-rate [11 December 2021]

Fertility Rate Vs Year / 1 Woman



This bar chart shows the happiness level in Finland, using the World Happiness Index with 0 being most unhappy and 10 happiest. This chart comes from;

- 'Finland Happiness Index - The Global Economy', https://www.theglobaleconomy.com/Finland/happiness/ [11 December 2021]

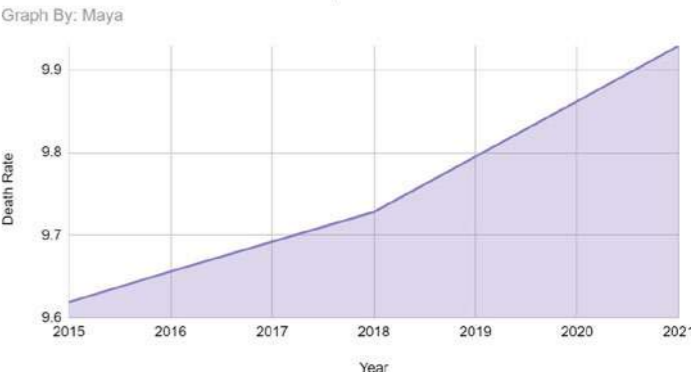


This area graph shows the death rate per 1000 people per year in Finland. The information this chart is based of comes from;

Finland Death Rate 1950-2021', https://www.macrotrands.net/countries/FIN/finland/death-rate [11 December 2021]

December 2021]

Death Rate Vs Year / 1000 People



Part 2:

Interpretation & Evaluation - Bulgaria

According to the UN's first World Happiness Report[1], Bulgaria is one of the 10 unhappiest countries in the world. Its average life expectancy is lower than the EU average: in 2019, the average was 81.3[2] years whilst Bulgaria's was 74.91[3]. So, why the difference? Studies have identified that Bulgaria's low wages towards the working class, and lack of quality education[4] are high risk factors. As of March 2021, 5.71% of the able population were unemployed[5], and those who were only got paid 18.4% more than what they would receive on welfare benefits[4]. These problems contribute to poor mental health - secondary impacts of which are; economic loss, lower life expectancies, and higher mortality rates. To change these numbers - for the better - I would recommend higher investment into education, healthcare, and women's rights.

Firstly, access to quality education is an essential human right. Learning creates strong, smart, opinionated individuals that can positively contribute to local communities by working hard, being innovative, and making good decisions. Furthermore, investing in today's education system is making sure that future generations have improved access to greater job opportunities, ensuring their ability to provide for themselves and their families, strengthening the economy along the way. By investing in Bulgaria's education, people can become more aware of the world around them, allowing young people to address global issues and look at problems from a new perspective. Children would become more responsible as they learn right from wrong, and by investing in quality education, the citizens of Bulgaria can share knowledge and experiences that will help improve Bulgaria's life expectancy and happiness levels, whilst stimulating growth in the economy.

Secondly, it is well evidenced that over 60% of mortality in Bulgaria is a result of Cardiovascular Diseases[6]. Some factors, such as smoking, lack of exercise, unhealthy diets and alcohol abuse are caused due to poor decisions made largely by youth in Bulgaria. Studies show that 15 year old boys have the second-highest smoking prevalence in the EU, while 30% of 15 year old girls - the highest level in the EU - are regular smokers[7]. It is against this context that we can see how important education is; young people must be taught about healthy lifestyle choices to prevent statistics like these. This being said, healthcare is also very important to deal with these issues. However, healthcare isn't accessible to everyone. In Bulgaria, there are 2 types of insurance, Compulsory Insurance, or Complementary Insurance. Although Compulsory Insurance is aimed to be accessible to all, it requires 8% of a citizen's monthly income[7]. As said previously, the unemployment rate is 5.7%, meaning that this bar is out of reach to those without [well-paid] jobs. Healthcare is important to strengthen the economy in Bulgaria; since 1990, the country has lost of its population due to illnesses. Additionally, Bulgaria has the highest stillbirth rate in Europe; 5.9 deaths per 1000 births[8]. As the population shrinks, so does the number of people contributing to the economy.

Investing in modern healthcare facilities alongside higher wages for medics is important to improve life in Bulgaria for all. A highly developed healthcare infrastructure and evolving resources can improve the economy as well as life expectancy, and mental wellbeing.

Lastly, investing in women's rights and safety would be hugely beneficial to Bulgaria. In 2018, 5.9% of women between 15-49 years reported that they had been subject to physical and/or sexual violence by a current or former intimate partner in the past year. Also, women and girls aged 20+ spend 18.5% of their time on unpaid care and domestic work, compared to 9.2% spent by men[7]. This is almost double the amount. Furthermore, gender inequality in the economy is also huge. In Bulgaria, 100% of males above the statutory pension age receive a pension, whereas only 82.5% of women above the age receive pensions. In Bulgaria, maternal health isn't a priority either; 10 of every 100,000 mothers die whilst giving birth, due to inadequate healthcare. Finally, women are much more likely to be subject to sexual harassment than men in Bulgaria; the adolescent birth rate due to rape is 38.9 / 1000 women, showing that women's safety isn't prioritised[9]. Although some may argue that this issue isn't important, investing in this problem - by employing more women and equalising wages regardless of gender - would greatly improve mental health, happiness, and safety in Bulgaria. Furthermore, women can play a huge role in solving Bulgaria's declining population, so it's important that they feel safe and happy.

To conclude, I believe that making education accessible, providing quality healthcare, and ensuring women's rights and safety will make Bulgaria a happier, healthier, more welcoming country. All these recommendations can lead to a stronger economy and better quality of life for everyone.

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[3] 'Bulgaria Life Expectancy 1950-2021', <https://www.macrotrends.net/countries/BGR/bulgaria/life-expectancy> [1 January 2021]  
[4] 'Bulgaria: Studies highlight rising poverty in households', <https://www.eurofound.europa.eu/publications/article/2015/bulgaria-studies-highlight-rising-poverty-in-households> [12 December 2021]  
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[6] 'Over 60% Mortality In Bulgaria Due To Cardiovascular Diseases', <https://bnr.bg/en/post/100218911/over-60-of-mortality-in-bulgaria-due-to-cardiovascular-diseases> [12 December 2021]  
[7] 'Bulgaria - European Commission', [https://ec.europa.eu/health/sites/default/files/state/docs/chp\\_bulgaria\\_english.pdf](https://ec.europa.eu/health/sites/default/files/state/docs/chp_bulgaria_english.pdf) [12 December 2021]  
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[9] [UN Women Data Hub], 'Bulgaria, Country Fact Sheet', <https://data.unwomen.org/country/bulgaria> [12 December 2021]

### Tutor comment:

"It was wonderful to work with M. During The Brilliant Club tutorials. She was incredibly keen to learn, really smart and on top of things, and to top it all off, she wrote brilliant stuff in her final essay as well as her homework. I imagine M. Will achieve great things in her bright academic future and can do anything she sets her mind to."

# What makes a Great Prime Minister?

Year 7, Key Stage 3

**Pupil:** E.L.  
**School:** Lynn Grove Academy, Gorleston  
**Supervised by:** T. Davey  
**Tutor University:** University of East Anglia  
**Course Title:** What makes a great Prime Minister?

This question can be answered in many ways, depending on the person's political views. Clement Attlee was a socialist, while Margaret Thatcher was a capitalist, so someone with capitalist views who agreed with what she did throughout her premiership may perceive her as the better Prime Minister (PM) of the two. After evaluating both Thatcher's and Attlee's time in power, the essay shows that individual acts, laws and policies that were made cannot determine an overall opinion on the greatness of a PM without relying on personal bias. Firstly, this essay will discuss whether the ability to perform the PM's basic roles and responsibilities can be used to assess the greatness of a PM. It will demonstrate that both PMs in question were prepared to take on the responsibilities they needed to, and did so well, so a conclusion cannot be made about which one was greater without taking their political ideas into account. Secondly, this essay will explore the ways that both PMs managed the economy. The things they both did to achieve this were large ideological projects that were initially thought to be working well, but seemed to lead to a damaged economy. We can draw from this that neither of the Prime Ministers left the country in a good economical state, and so it would be difficult to call either of them truly 'great' in this part of their premiership. Finally, the essay will talk about the significance of a controlled and positive relationship with the public and media. Thatcher and Attlee had differentiating personalities, and as a result of this they had contrasting ideas on what a good relationship with the people was. Both of the strategies they used to make themselves popular and trusted were successful in their own ways, and it again depends on an individual's political thoughts which one they deem 'greater' at doing this.

A crucial factor in the success of a Prime Minister is how they handle the roles and responsibilities they must take on, from the very beginning of their premiership. (Haddon, 2019) and Attlee and Thatcher both did this effectively. The Prime Minister can appoint ministers: these are MPs who, as well as representing their constituencies, are bestowed with extra responsibilities such as Health, Environment and Defence (BBC, 2019; Lord, 2021). The PM is able to make decisions that could significantly affect the political future, so they should consider their choices logically and not act on impulse (Haddon, 2019). For example, Clement Attlee's judgement in choosing his Cabinet allowed him to act on his fast-paced nature and bring swift change to the country with the help of the Cabinet members he picked so wisely (Addison, 2005). Furthermore, basic tasks set for a PM to follow do not lose any importance throughout the person's premiership. These include the creation of laws: if the Houses of Parliament and the Prime Minister are in mutual agreement on a possible law, it can be created (BBC, 2019; Lord, 2021). The PM is also responsible for the nation's defence policies, which aim to preserve the safety of the citizens of the UK, stop major

conflicts and attack our adversaries when needed (Ministry of Defence, 2020). It could be argued that Attlee was better at fulfilling the responsibility of creating law. He implemented eight "major" acts within the first years of coming into power, although Thatcher did this only once over a span of 11 years. (Gov.uk) Defence was more of a strength for Thatcher as she built many useful relationships with other international leaders (The Scholars Programme 2020).

A sensible Prime Minister will tackle all of their responsibilities, and management of the economy is one of the most important responsibilities they will have, because it can easily change people's day-to-day lives. (Mackenzie, 2020). It is clear that both Clement Attlee's and Margaret Thatcher's economic policies did this, although their vastly different approaches led to vastly different effects on the public's lives. And while both had a grand vision for the economy, the reality was that Attlee's reforms eventually stopped the economy from growing (The Scholars Programme, 2021) while Thatcher's premiership was followed by a recession two years later (Pettinger, 2018). Attlee was elected and appointed soon after WW2, when the state of the economy was in a bad condition (The Scholars Programme, 2021). His socialist approach was to improve people's lives through the economy: he was focused on ensuring that every person had a job and he did this by nationalising industries, including the Bank of England, inland transport and many others (The Scholars Programme, 2021). However, this policy was not entirely successful: at first the public loved the idea of more jobs, but soon after this British Railways became greatly disliked, and over time, Clement Attlee's vision of secure and well-paying jobs for the UK could not happen (The Scholars Programme, 2021). However, other aspects of his nationalisation programme – e.g. the NHS, welfare benefits for all who needed them – did become reality and are still an important part of society today.

Margaret Thatcher's approach to dealing with the economy was different to Attlee's. She was a capitalist who privatised many industries in an attempt to benefit the economy at the same time as helping the public become independent and need fewer things from the Government (The Scholars Programme, 2021). This plan benefitted the state of the economy, although many people were still unemployed (The Scholars Programme, 2021). Thatcher introduced supply-side policies to increase the wealth of the country, and these included privatising essential services like electricity, water and gas (Pettinger, 2018). Some may have considered her a good PM due to this, as it provided a stable financial source for the economy. In the process of privatising an industry, the Government sells it to a business, resulting in a huge profit: after this the owner, instead of the Government, will pay the workers and the industry will run like a business. (Sasse and Davies, 2020). Margaret Thatcher also recognised that trade unions were a threat to the economy and she made many attempts to decrease their power and influence (Pettinger, 2018). She was able to prevent many trade union strikes (Pettinger, 2018) and use some of her policies to reduce their control (Wilenius, 2004). However, while this helped the economy grow, it left millions unemployed (Wilenius, 2004) and Thatcher's policies eventually led to a recession (Pettinger, 2018). In summary, Margaret Thatcher's policies had a similar effect on the economy to Clement Attlee's - they both left power when

money was relatively low - but the situations that led up to those similar events were different. The economy suffered when Attlee was PM because he focused on the security and wealth of the people rather than the state of the economy, and Thatcher did the opposite by taking away employment from many.

A great Prime Minister will be able to retain a likeable public image. This is beneficial as it may gain them public support. While both Attlee and Thatcher largely succeeded in doing this, they approached it in very different ways, and this reflected their personalities and political views. Having and keeping a good relationship with the people a PM has power over will greatly decide how many differences they can make during their premiership (Rosenthal, 2020). The media plays a large part in how the public perceives politicians: it can easily cause a massive gain or massive loss in their popularity (Study Rocket, 2021). The media has changed radically since the times of Attlee and Thatcher, when the dominant way of spreading news was through newspapers, something which did not change as non-interactive technology developed, but has been massively changed by the internet (Spanier, 2018). Clement Attlee was known to sit in the passenger seat of his family car while his wife drove him to public events (Beckett, F., 2020) and this perhaps shows that he wanted to be seen as one of "the people". He handled negative opinions about him in newspapers in a calm way through his speeches, and did not say anything that could start a conflict of any kind (Beckett, 2020). On the other hand, Thatcher was one of the first to realise that she needed to advertise herself in order to gain the media's attention. She did this by ordering poster campaigns, doing PR stunts and delivering catchphrases to make herself known and manipulate how she was seen (Beckett, C., 2013). Fast-forwarding to this day and age, politicians need to directly use social media as a tool, because the directness of social media has meant it has overtaken newspapers, which are not as accessible or interactive (Smee, 2019). If either of the PMs in question were alive and in power today, Thatcher would have been better at tweeting, because of her ability to create advertisements, 'sell herself' and her fiery nature.

To conclude, this essay worked through many points that I believed could determine a PM's greatness, however, after assessing the three categories I researched, I can conclude that the only way to answer this question is to rely on opinions rather than facts. One person may think that something a PM did was great because it benefitted them, but others may think that that same thing was bad because it affected them in a negative way. A fact provides no conclusion on whether a PM is great. A fact gives out the impacts and statistics related to something, which could be used to form an opinion. In my opinion, a great Prime Minister needs to focus on the country rather than themselves, and I believe this because the needs of one person (the PM) are less relevant than the needs of a whole country. However, I am judging objective points through my own subjective view.

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**Tutor comment:**

"E. has demonstrated excellent skill in academic writing already at KS3, considering alternate points of view before arriving at a robust conclusion of her own. In this essay, E. has shown deep knowledge of important events in contemporary British political history and how these may shape a Great Prime Minister. Teaching E. and the rest of the pupils at Lynn Grove Academy has been an absolute joy, and I know they will all go on to do great things!"

## Is There An External World?

Year 8, Key Stage 3

**Pupil:** Y.H.  
**School:** The Bridge Academy  
**Supervised by:** Mr J. Onelum  
**Tutor University:** University of Birmingham  
**Course Title:** Is There An External World?

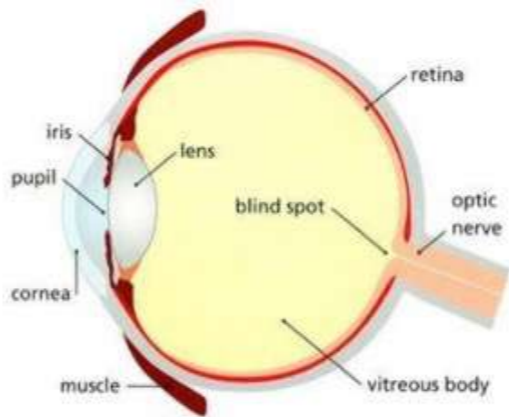
### Introduction

This is a question that has been debated for many centuries, both in philosophical and scientific terms, as well as being a common theme portrayed in fiction. There are also various different depictions and ideas of what an external world is. Many arguments are held for and against this idea, and in this essay I will be arguing that yes, there very well could be an external world.

Initially, what kind of external world are we talking about?

Some people may view another world as an afterlife; heaven or hell, while others may think of it as another universe, a parallel dimension, or even somebody else's mentality. I will be using 'external world' as an umbrella term for any world or field of understanding outside of our own perceptions, and debate these different ideas.

Our brains are extremely intuitive organs, which thrive on using our former knowledge and experiences when utilising our senses. As Susana Martinez-Conde[1], a neuroscientist, says, "Our brain is constantly filling in the blanks, seeking structure and order even in the cases where it doesn't exist.". Here is an anatomic diagram of the eye:



Where the retina meets the optic nerve, light-sensitive cells are not present, and this is called the blind spot, and generally our brains will send neurons to try and fill in what we cannot see.

This is an example of how the brain works. If it does not know or feel something, it will fill in the blanks with information that isn't necessarily correct. A large percentage of what we think and feel has actually been made up by us. As the philosopher George Berkeley[2]

(1685-1753) believed, when we try to think of external objects, all we're really doing is recalling perceptions.

In addition, because humans have a strong need for all five senses, the quality of each individual sense will be sacrificed. For example, certain animals such as specific species of mole, are blind, but have an acute sense of hearing, because their brains have less to focus on.

Therefore the status of each of our senses is forfeited so that they can all have reasonable quality.

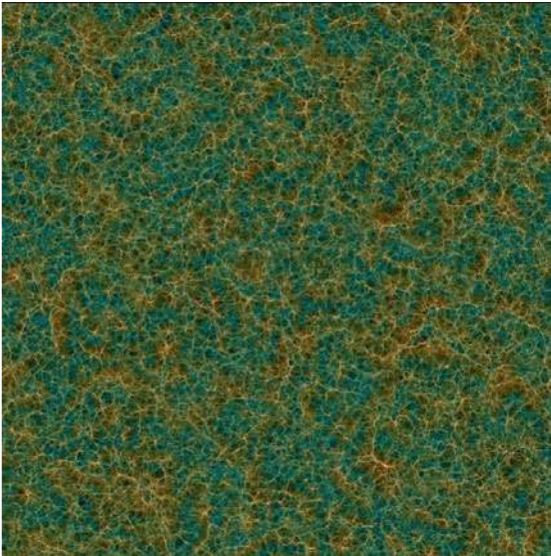
How can we entirely trust our senses if they are mostly used intuitively and with forfeited quality?

And what can this tell us about how much we really know about external dimensions?

Furthermore, when thinking about our cosmic address, we truly are a minuscule morsel in the entirety of the universe. Earth orbits the Sun, one of approximately 200 billion stars in the Milky Way galaxy, which is one of around 50 others in our local group, which forms a tiny portion of the Virgo

Supercluster, which is only a diminutive speck in the Laniakea, which is a vast region of space but only about an inch of cement if the universe was a building. The entirety of the universe contains about 10 trillion galaxies in total, spanning 93 trillion

light-years and is constantly expanding.



Here is an image of what the universe looks like: [Fig2]

As incredible and perfect-seeming we are compared to other planets, how can we possibly be as intelligent as we think we are? And we do not know enough about the impenetrable enigma of the universe to know that there isn't an external world. The majority of what we think we know about the universe is scientific guesswork and estimates.

For example, black holes remain one of the most mysterious things in the universe. We simply do not know enough about them to even make a proper judgement about what they really are, and how do we know that things even more

Due to the sheer scale of our universe there are far too many incredibly mysterious things beyond the scope of our understanding for us to determine that there is not an external world out there.

The philosopher Rupert Read[3] was presented with the question of us ever being able to experience or interact with the world, except via perception. Read took an unorthodox turn on it. He claimed that it was nonsense, and we cannot ever know the answer. How can we possibly judge whether our perceptions of reality are true or false, if we can't escape our skins in order to see what we're missing, or assert that we are missing anything? Some would argue that this is why there cannot be an external world.

However, I see this as precisely the point.

If we cannot step outside of our perception of reality, how do we know that there is not an external world? If we really know as little as we do, who are we to assert that there cannot be an external world?

On the other hand, it could be said that an external world is simply someone else's perceptions. A person's personality, decisions and the way they see things wholly depends

on their former experiences throughout their lives. As well as brain development, the reason why we hardly know anything when we are born is that we haven't experienced or learnt anything in the real world to make judgements.

I am autistic, and it could be said that being neurodivergent is like being in another dimension. For example, I am hypersensitive, which means that my senses are more extreme than other people's. For instance, I have less of a filter on sounds, and I often become fixated on specific subjects and find eye contact and social interaction difficult. This is all because my brain processes and receives information differently from the neurotypical brain. It can often feel as if I am experiencing a different type of world. In addition, autism is a spectrum, so each and every person will have very different experiences within it, for example, one person may have lower sensory needs but be non-verbal, and vice versa.

Neurodivergence is a very good example of how a different way of thinking and processing information could be seen as an external world. Even all neurotypical people will have a unique outlook on life, even subtly, because of different personalities, which are formed of experience. Although we as humans do have many collective experiences and views, these are generally very basic and can be related to how we survive and have evolved in this world (eg. a fire brings warmth). However, different species have found incredibly diverse ways to survive and have evolved accordingly. Birds, for instance, can sense the earth's magnetic field when migrating to different environments in order to find comfort in different climates all year round. Sharks can detect blood from a quarter of a mile away, as one of the ways they use to detect prey.

If every single being (human or other) has diverse perceptions, however extreme, isn't this a variation of external worlds?



René Descartes [5] (1596-1650) was a famous philosopher, whose argument on our perceptions of reality simply stated, 'I think therefore I am.'. This meant that although he could not be certain whether what he was perceiving was real, he was able to think this, and

therefore, he knew that there must be at least an element of truth embedded in our lives.

If we are truly able to think, why do we know so little?

If we know so little, why do we subconsciously see ourselves as so clever? We can label ourselves as amazing beings, who have lived for billions of years and created a society; but what do we actually know? There is no proof that what

we see, hear, touch, smell and taste is real. The only thing we do know is that we can think, and therefore, we are.

We are able to experience emotions, so there must be an element of truth in what we experience, but sometimes our emotions aren't actually genuine. We can experience emotions even if what they are connected to isn't real. For example, you might feel sad at the pure thought of something, when it hasn't actually happened and may never happen. So why do we experience them?

We experience emotions because of our experience and what we know about specific circumstances from our memory, connected with what we felt then. Some people will have different emotions connected to the same thing, and this continues to develop the fact that people's outlooks and perspectives are all unique. Because others can never fully know our motivations and perceptions, how can we not each have our own field of understanding, creating our individual external dimensions?

### Conclusion

In conclusion, I believe that yes, there must be an external world. For that matter, there are certainly external worlds.

This could be in terms of 'alien' worlds. If our planet of seeming geographical perfection hosts such a vast array of life, created by pure coincidence of creation, how incredibly small and unimportant we are compared to the universe we reside in, how could other coincidences not have happened anywhere else? The probability is too great.

Is the external world a parallel existence outside of our knowledge?

Or is it simply anybody else's field of understanding? Every single being experiences a different life with completely different perceptions. Isn't simply this what an external world is, no matter where it is? Aren't you in an external world? A parallel dimension to me? Every single being is theoretically living an alternate dimension, however extreme in difference they each are.

So my final determination is yes, there must be external worlds: both literally and conceptually. I am convinced of both the high probability of there being a physical external world, and within the perceptions of every other being in this world.

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### Tutor comment:

"Teaching Y. during The Brilliant Club tutorials has been an absolute delight. She expressed a keen interest in the topic, apparent in her typically thought-provoking questions and contributions during group activities. In addition, Y worked very hard on her final assignment and provided a comprehensive reflection on the topic. Her essay included diagrams and a personal testimony that made for an engaging and compelling piece deserving of the high mark she received."

## In your own words, what is peace?

### Year 8, Key Stage 3

**Pupil:** S.D.

**School:** Forest Gate Community School

**Supervised by:** Dr M. Meneses

**Tutor University:** Goldsmiths, University of London

**Course Title:** Peace and Gender

According to Google's online Oxford Languages definition, peace is defined as: 'freedom from disturbance; tranquility' or 'a state or period in which there is no war or a war has ended' [1]. Similarly, but perhaps not as concise, my own definition argues that peace is the harmony and contentment between and within communities and where there is a sense of respect and tolerance for one another, even when disagreeing with another's opinion. My understanding of peace aligns with that of the International Congress of Women's definition explained as being 'promoted by the equality of the sexes, economic equality and the universal enjoyment of basic human rights and fundamental freedoms' [2]. I would add that underpinning this, there would have to be a collective will for peace to exist. This essay aims to further explore my own understanding of peace, the role of the United Nations Organisation in international peace keeping and the feminist approach to peace.

The United Nations Organisation was borne out of the 'commitment to maintaining international peace and security, developing friendly relations among nations and promoting social progress, better living standards and human rights' [3]. In 1945, following WW2, the establishment of the UN meant that the 51 member states had a vested interest in harmonising the world on many issues so as never to allow future wars. Almost 77 years later, now with 171 member states, the UN has unfortunately failed in living up to its commitments. This is evident in the Korean War (early 1950s), the Vietnam War (around 1970), the Iran-Iraq and Afghanistan wars (1980s) and further conflicts in the Middle East, most recently in Syria [4].

It is a basic failure of the UN that the world and its communities have not enjoyed 'international peace and security'. For example, the Iraq War of 2003 happened because the then Iraqi president, Saddam Hussein, was regarded as a threat and was believed to have military weapons that would cause mass destruction [5]. The US responded to this threat by militarily invading Iraq so as to remove this threat. Ironically, such military intervention served to cause and encourage more conflict and also to politically destabilise the Middle East [6] - a clear failure of the UN's commitment to 'maintaining peace and security'.

Furthermore, research into the post 9/11 wars of Afghanistan and Iraq show not just the political, but also the human, social and economic costs of war. Such findings include close to a million deaths due to direct violence, and millions more due to ripple effects like malnutrition and damaged infrastructure. Additionally, a staggering 38 million have also been displaced [7]. The UN's commitment to 'promote social progress, better living standards and human rights' has failed too. And still, in spite of the devastating loss of life, livelihoods and complete destruction caused by the militarism approach to war, it continues to be the defining way to achieve international security

The UN claims to make a positive difference in the world and lists its successes in '70 ways the UN makes a difference' [8]. But to date these successes do not go far enough in achieving their 1945 commitments. Perhaps the failures of the UN are a consequence that stems from its very beginnings. Although the UN did not officially come into existence until 1945, in 1942, representatives of 26 of the WW2 allied nations came together to support the Declaration of the United Nations. A photo from this historic event [9] shows the all-white and all male representatives bordered by the flags of their countries. The United Nations Charter outlined that the purpose of the organisation was to strive for and maintain international security and peace [10]. Only through unity and working together could this be possible. However, the image taken at the signing of Declaration of the UN shows something different: each leader is flanked with his country's flag which immediately demonstrates how each country is representing themselves as individual nations rather than as a collaborative collective. Also, the representation of the member states is not diverse or inclusive and shows off an all-white and male only cast which suggests patriarchal leadership.

In 1915, following on from the Suffragette movement, the International Congress of Women was formed and this later led to the establishment of The Women's International League for Peace and Freedom (WILPF). As a feminist and pacifist organisation, it pushed for international disputes to be handled by peaceful means and for women to have the right to be able to have their own vote in government [11]. Fundamental to the movement was the women's role in the promotion of peace. Today, WILPF continues with this work to promote feminist peace through promoting equality of the sexes, economic equality and the universal enjoyment of basic human rights and fundamental freedoms [12].

My understanding of peace and how it can be maintained aligns with the aims of WILPF. Historically, leadership and decisions have been made mainly by men without the input of women and I could argue that our post-WW2 world has failed to be a conflict free and peaceful one because of this. Only if women are equally included in the processes of discussions and leadership, would peace ideals have a chance of being successful. Women make up the majority of the world's population, yet they are not represented in this way to take part in conversations, planning and decisions that affects them.

WILPF aims to bring women from across the world together and to enhance the feminist perspective on peace. It also has a pacifist approach to security and is opposed to militarism - a belief that it is necessary to have strong armed

forces and that this should be used in order to win political or economic advantages [13]. Militarism fuels conflict and similarly the military activities that come with it negatively impact the environment. This leads to devastation, pollution and destruction of ecosystems. Additionally, by promoting socio-economic justice, it again aligns with my definition of peace: a harmony and contentment between and within communities and where the ideal of peace benefits everyone.

In my understanding, conflict is not just about wars fought for political reasons. I believe conflict arises and can affect all aspects of our lives because it is a response to very unfair and unequal systems. Lasting peace requires fairer economic systems and protection of people and the planet [14]. The capitalist economic system that functions out of greed, money and power has a devastating effect on our planet. Natural resources are being depleted and nature and the environment is being destroyed for economic gain. Indigenous people who live in and care for nature are being forced out of their environments [15], while climate refugees are being displaced from their land. Global problems like these, which affect everyone, must take all voices into account. Through people activism, movements can come together to challenge governments to do more to make the world a better place.

Such was the thinking behind WILPF's establishment. A photo from its first congress [16] shows 13 founding mothers, seated against a background of foliage. An all women organisation se out the message of female empowerment and that women too had a role and voice in peaceful governance. The seated women contrast with standing men of the photo taken at the Declaration of the United Nations. In these seated positions, they are showing that each is equal to the person next to them and in having a background of natural foliage, they do not identify with any particular country but rather with all of the world and its natural environment. This is difference to that of the UN's where the background creates an impression of sovereignty and the nationalism of the country they represent. In the absence of flags there is a message of equality, inclusivity and belongingness in an equal world.

The right to peaceful protest is enshrined in law and is important because it is a way for ordinary people to be heard. Peace activism like that of the Suffragette movement, the Black Lives Matter movement and more recently Extinction Rebellion bring about change that improves the lives of ordinary people [17]. It works because it brings people together and gives hope for change. Also, through peace education people gain knowledge, skills and attitudes that create societies that can be tolerant and understanding. In this way conflict can be prevented, it can be resolved peacefully and social conditions that are conducive to peace are created [18]. So peaceful activism promotes access to education, it works against discrimination and encourages gender equality. Furthermore, through activism, issues that affect ordinary people are highlighted and pressure is put on corporations and governments to make change happen.

Activism does not affect immediate change but it makes a difference over time thus creating a fairer, harmonious and therefore more peaceful world.

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**Tutor comment:**  
"Working with the pupils attending Forest Gate was great. I met so many brilliant minds with exciting comments and world views. The pupils were challenging social structures and proved to have a unique understanding of peace, gender and politics in general. Out of many great pupils, S. was one that worked really hard for his mark evidenced by his well-developed argument and historical context. I am sure that a great future awaits for S, and the rest of the Forest Gate community. Congratulations on this publication, S. I am very proud of you. Awesome job!"

STEM

How circular economy principles could work on our environment?

Year 9, Key Stage 4

Pupil: L.A.  
School: Denton Community College  
Supervised by: J. Li  
Tutor University: The University of Manchester  
Course Title: Can Circular Economy Really Benefit the Environment?

Does circular economy and its principles reduce waste in the textile and clothing industry?

Over the years, the textile and clothing industry has grown more demanding due to a rising increase in fast fashion, competition with other companies and the constant need for new clothing items or products. In Europe, the UK buys the most clothes per person and the fashion industry's worth continues to rise [1]. Now, a great deal of waste is produced each year from the industry (350,000 tonnes a year in landfill [2]) and clothes are being used and wasted even quicker. In 'Circular economy and sustainability of the clothing and textile industry' [3], it is said that the clothing consumption is now 400% more globally than it was two decades earlier. With this much waste, it is more important than ever that the industry switches to more efficient and sustainable ways of creating products. With circular economy, the principles can reduce waste and create alternative ways of removing unused products. When the clothing waste is put into landfills or burnt, it releases methane, a greenhouse gas, and negatively effects the air, biodiversity and nearby habitats [4]. Furthermore, the continues production uses up raw materials, such as cotton or polyester (made of petroleum).

In this essay, methodology will cover literature and the problems caused by waste, results will cover the measurements and statistics of country's waste and the discussion will debate whether circular economy benefits the industry.

Methodology

The table below shows the results of searching and how I received the literature provided in this essay, using google scholar as my search engine.

Topic	Searching Strings	Searched results
Circular Economy in the Textile and Clothing industry	R strategies in the clothes industry  Sustainability in the Textile industry  Recycling  Sustainable supply chain	8
Waste produced in the clothing industry	Waste management in the clothing industry  Efficiency in clothing processes  How much waste is produced in the textile industry?  Does circular economy reduce waste?	7
R strategies in textile	Reducing waste in clothing  Alternative materials in textiles and clothing  Is recycling efficient in textiles?  Can people repurpose their clothing?	10

Instead of using waste treatment that mainly includes less eco-friendly materials, it is better to focus on reusing and recycling more products with higher quality and improve second-use materials [5]. This means that to reduce the waste produced by the clothing industry, it is better to first focus on the already existing materials and make them reusable. However, this may be difficult to achieve, as some materials currently used are difficult to recycle (such as polyester).

Another way in which circular economy has been applied is by mixing different materials, like polyester and cotton [6]. Doing this increases the life span of some products, as well as making them easier to recycle.

Although recycling is a common solution to waste problems, only 20% of waste is globally collected to recycle and the

rest (80%) either goes to landfill or gets incinerated, both of which lose energy and materials. [6] This shows that not all circular economy principles are useful to clothing and not all are used fully.

In a product’s lifetime, different stages produce different impacts and issues that affect the environment- meaning that multiple circular economy principles could be applied in different parts.

The table below was made based off a table found in [6]. It shows the environmental impacts of different stages in a clothing product’s lifetime and suggestions on how to solve them.

Environmental Problems	The stages that cause the problem	Why?	Solution
Energy Consumption	Fibre production Yarn Manufacturing Washing and drying	Production and manufacturing often use the most energy, due to the creation of new materials instead of reusing raw materials.	By reducing new raw materials with recycling old ones, energy consumption may go down. However, it may increase energy use, depending on how it is recycled.
Water and chemical consumption	Fibre Growth Dyeing	With dyeing and growing of any material, water and chemicals are used to help increase the quality.	By cutting down on chemicals and excessive water use, waste would be reduced, as well as protecting the environment from chemical leaks.
Solid Waste	Disposal of Products	With current disposal methods, most waste is sent to landfill or burnt. Neither of which help the environment.	Reusing or repurposing clothing products are the most mainstream solutions but there may be others in development.
Carbon Emissions	Transportation of Products	When factories are a long distance away from	To lower carbon emissions, buying locally
		shops, the transportation emits carbon dioxide from the vehicle. The further away the shop, the more carbon emissions.	prevents long-distance transport and mass production of specific items.

Most environmental impacts are measured through physical amounts of waste (tonnes) or footprints (carbon, environmental).

Results

In clothes, over 68% of the fibres used are extracted from non-renewable sources, like fossil fuels [3]. This measures the impact on air pollution (carbon dioxide emitted from burning) and on local environments (the initial extraction of the fossil fuels). Most synthetic fibres are produced this way, like acrylic or polyester. However, natural fibres, such as cotton and linen, are more eco-friendly, although, they take up a lot of space. [7]

Almost 98% of finished clothing is made up of fibres but only 12% of it is recycled while the other 73% is sent to land fill or incinerated [8]. This is most likely due to the difficulty of recycling certain synthetic fibres and the fact that most do not degrade easily [7]. For example, polyester is made of petroleum, and therefore is not biodegradable.

Below is a tabled created, based off information found in [6].

Textile waste: All NACE activities and household	2004 waste amount [Tonnes]	2014 waste amount [Tonnes]	Change in waste [Tonnes]	Change in waste [%]
Poland	79,402	261,135	181,733	229%
Belgium	106,766	181,266	74,500	70%
Germany	222,336	343,757	121,421	55%
Turkey	260,549	214,324	-46,225	-18%
United Kingdom	378,233	281,235	-96,998	-26%
Portugal	963,633	75,493	-888,140	-92%

As seen in the table, some countries, such as Portugal and Turkey, have decreased their waste production, whereas others, such as Poland and Germany, have increased over a 10-year gap.

The source is reliable; however, certain factors must be taken into consideration for the results. For example, the country's wealth, population, and size. Furthermore, some of the data may be outdated or have changed since publication.

For Poland, between 2004 and 2014, the waste produced has gone up drastically. Approximately, Poland recycles 11.1% of its textile waste, and there is a constant demand for clothing, as they export to multiple countries [9]. More recently, the polish government has made changes to their waste management systems [10]. However, this is for overall management and not specifically textiles or clothing.

Belgium has also had a significant increase in waste over the 10 years. Belgium does not have an entire waste management plan, but instead has three divided between different areas of the country. The Brussels plan was started in 2018 and ends in 2023. It aims to reduce the use of raw materials and try to become more circular. The Flanders plan was started in 2016 and ends in 2022. It focuses more on waste prevention and recycling/reusing- the main objective is to reduce waste going to landfill or being incinerated. The Wallonia plan was started in 2018 and does not have a finishing date. It aims to promote reusing products and optimising the use of raw materials [11]. However, like Poland, none of these plans focus specifically on textile waste, and the Belgium government do not have any specific plans to handle textile waste.

In Germany, the increase was over half between 2004 and 2014. In the world, Germany's waste recovery rates are one of the highest. It's sustainable and helps to save raw materials and energy [12]. However, this does not specifically benefit the textile industry and there is little the German government has said about clothing waste.

Over the 10 years, Turkey has decreased their waste by a small amount. Although there is nothing specific from the government, many Turkish companies have begun to reduce their waste production in different ways. Unfortunately, it is difficult to find specific information on what Turkey or Turkish companies are doing to prevent waste.

In the United Kingdom, textile waste has been reduced by 26%. Although the UK still produce a large amount of waste, the reduction is mostly due to clothing companies becoming more eco-friendly. Recently, many British brands have put out statements that promise to reduce waste or already have, like New Look [13] and Next [14].

Despite having the largest decrease in waste, there is little information about what Portugal has done. Much like the other countries listed, the Portuguese government have an overall waste management plan, but nothing specific. However, Portugal does promote recycling and other circular economy principles.

Most governments in these countries have not spoken specifically about clothing waste. This may be because it is believed to be more of the companies' responsibility to reduce waste.

Discussions

So far, different methods that include circular economy principles have been discussed. Some R strategies work better than others and some are more suited to a linear economy (the opposite of circular economy- making a product and then it goes straight to waste), such as recovering energy during incineration.

Trying to recycle certain clothing products/brands doesn't always work effectively. This is because some fibres (especially synthetic ones) are hard to recycle. Repurposing items may work if the item can easily be changed into something else. For example, a shirt into a pillow. However, this may be difficult if there is nothing to change the item into, or it takes a lot of time. Repurposing is more effective if it works in smaller scales.

Reusing items is one of the more popular, and easiest, ways of implementing circular economy into textiles and clothing. Just by wearing cold clothes instead of throwing them out, people are reusing items. Although it isn't all people, some choose to only where a piece of clothing once before discarding it.

Recovering energy is also a widely used R strategy, as large companies use it when burning waste. An example of this is Nike, who aim to have energy recovered on all its waste sent to landfill or incinerated [15]

However, certain principles on circular economy can be expensive to use or begin. For some companies, it may be easier to remain using a linear economy than paying more.

It has also become clear that it isn't only a company's responsibility to have a circular economy, but also the consumer's. Consumers can help by doing several things with the unwanted products that they buy. For example, repurposing clothing that they no longer use or giving it to someone else. They can also repair clothes that may have ripped or have holes in them or alternatively, not buying clothes they might only where once (refuse).

Below is a table based on one found in [6]. It shows different how people/groups contribute or affect circular economy.

Consumers	Disposal and collection	Recycling technologies
-Less demand for recycled products -Recycled textiles are viewed as lower quality -A lack of education on which materials can be recycled -A lack of information about how to recycle different materials	- A focus on re-wearable clothing instead of already existing waste which may cost more. -Little information given on how disposal works -Harder to accesses on smaller levels, such as local.	- A lack of recycling for certain textiles -Recovery can be expensive -Low availability of recycling plants on smaller levels, such as local. -Recycling more common with lower quality material

Problems and concerns

However, there are also some concerns, besides the cost, with circular economy.

First, will a circular economy be able to keep up with the high demand of new clothing? Fast fashion companies are less likely to have circular economy principles, but they also get new clothing items produced quicker. Even though reusing materials is better than harvesting new ones, the process might take longer. The only way to combat this problem is to either attempt to decrease the demand or develop a quicker way of reusing materials.

Another issue are companies. Although consumers can help, the main goal of circular economy relies mostly on companies [16]. It is only companies that can choose how they dispose their waste and which materials they use. If the clothing companies choose not to implement a circular economy, there is not much customers can do. Governments could potentially create a law, however, that is on a large scale.

People's jobs may also be affected. Some research shows that with a circular economy, more jobs will be created and some already have [17]. However, one of circular economy's main principles is reducing the number of raw materials used and extracted. By doing this, people who work in coal mining, or oil plants will begin to lose their jobs. People who work with landfills and incinerating waste may also lose their jobs [18].

Finally, hard to recycle materials aren't benefited from a circular economy. Once these materials are thrown away, and can no longer be reused or repurposed, they go directly to landfill. As of now, there is little companies and people can do about this.

Suggestions

One suggestion would be to promote reusing clothes and give out more information on how to do this. As of now, it is hard to access useful information, especially for all ages. If governments and companies give information out to the public/their customers, it would prevent more clothing from being thrown away needlessly.

Another suggestion is recovering energy. Although it is not the most environmentally friendly option, it is popular, and it helps reduce the cost of more energy.

Also, refusing to use certain materials that are difficult to recycle will avoid multiple problems, such as high cost and adding to landfill. However, this may be difficult to achieve straight away. Instead, cutting back on using these materials slowly will help reach the goal of not using those materials.

Teaching more people to repair their clothes and encouraging them to do so would extend the lifetime of clothes that otherwise would have been wasted. It reduces household waste while teaching people a new skill.

Finally, governments and companies should first focus on waste that already exists, as it is already impacting people. If they prioritise future waste, the existing waste will keep growing and have a bigger impact.

Conclusion

In conclusion, circular economy and its principles, from what has been shown in this essay, does help reduce waste in the clothing and textile industry. The majority of the R strategies, such as recovering energy and refusing certain materials, have been implemented successfully into different businesses and companies. Some, specifically repurposing and repairing, are easier to practise on a smaller level. Others, like recycling, have been shown to be popular methods, but hard to implement everywhere. Overall, it has been made clear through different statistics and results, that waste has been reduced using a circular economy.

In the future, it would be useful for scientists to develop new, more sufficient ways of recycling. This is especially important for hard to recycle materials. Alternatively, a newer way of disposing of these materials, without destroying habitats, would help reduce waste. Another future focus should be on discovering alternative materials, either man-made or natural, that can replace current ones which are difficult to degrade. Furthermore, governments should release plans for specific types

of waste, as municipal waste isn't specific enough. This is because it does not cover different types of waste, like textile waste and food waste. Finally, a way to make recycling and other R strategies more accessible to everyone.

To summarise, multiple textile and clothing companies have promised to begin using a circular economy structure to reduce the waste they produce each year. Countries as a whole may also begin to improve textile waste, but the main focus is on companies. Even though there have been proven setbacks to this structure, hopefully in the future, new technology might help solve these issues. With time, a circular economy could be used throughout the textile and clothing industry.

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**Tutor comment:**

"It was a great joy to work with L. in The Scholars Programme. I was very impressed by her outstanding level of engagement with the research process. Not only her final assignment showed an advanced level of research skills, I immensely enjoyed every piece of homework she submitted. L. has shown her talents in creative thinking, critical analysis, and the rigorous attitude in academic research. It was my pleasure to have the participation from her in my tutorials, and I was always amazed by her contributions. I would sincerely congratulate her on this publication and best wishes for her future studies. I am seeing a new star rising."

**You have just been appointed as the head of the World Health Organisation's new Disease Detective Division. Congratulations! Unfortunately, on your first day, you receive an alert of a new malaria outbreak. This malaria outbreak is spreading through a rural village in Mali, situated in West Africa. Your role is to write a report designing a strategy to help prevent the outbreak spreading further.**

Year 7, Key Stage 3

**Pupil:** Z.H.  
**School:** Hessle High School  
**Supervised by:** F. Chong  
**Tutor University:** University of Hull  
**Course Title:** Disease Detectives

Malaria Outbreak

The disease detectives task force appointed by the World Health organisation (WHO) aim to advise the people of Mali to take vigilant action in regards to the emerging Malaria outbreak. It is recommended that the government of Mali follow and adhere to the following cautions and strategies set out by WHO to ensure the safety of Malian citizens and prevent further spreading Additional information surrounding the outbreak describes the origin and development of the disease, as well as the extent to which it is harmful.

Malaria is a life-threatening disease which is caused by parasites of the Plasmodium genus [1], that are transferred to humans through the bite of a contaminated female Anopheles mosquito, acting as a vector [4]. Malaria is a treatable and curable disease. Plasmodium vivax (P. vivax) is the name and type of Malaria people are suffering from in Mali. [2] With a population of approximately 11 million people, Mali has over 800,000 reported cases of malaria annually [2], according to the WHO. Malaria accounts for 13% of deaths in Mali for children the age of 5 and under [2]. According to the latest WHO data published from 2018, malaria deaths in Mali had reached 21,115 also known as 12.87% of total deaths [2]. Considering the fact that Malaria is a very serious and deadly disease, preventing further spread of Malaria to the remaining parts of West Africa, will decrease the transmission rate and protect the people of Mali.

Pregnant women in particular, are vulnerable and at great risk of contracting malaria, as well as other illnesses and maternal anaemia, due to reduced immunity [5]. In relation to this, a study conducted by Andemel and others in 2020, investigated adverse pregnancy outcomes in 1814 women who had contracted Malaria, in which

163 of the pregnancies resulted in complications [6]. This indicates that the unborn baby is also put at risk, as exposure to Malaria may result in premature delivery, low birth weight, or even miscarriage [5].

If an individual contracts Malaria, they may experience the following symptoms in the first 7 - 18 days of being bitten by an infected mosquito [7]: fever, headaches, shaking chills, high temperature, sore throat, tiredness, muscle aches, pains, flu-like illness, loss of appetite, coughing and difficulty breathing [2]. If left untreated, it could result in the following: kidney failure, coma, seizures, anaemia, mental confusion and even death. Therefore, those infected must seek urgent medical help.

It comes to our attention that throughout the rainy season, Mali usually faces problems with bad flooding and river overflows. When combined with other environmental difficulties of deforestation, desertification and soil erosion, ideal conditions for the transmission of malaria are created [9]. Therefore individuals located in wet areas are more susceptible to Malaria, than those in the dry areas. It is advised that people follow the guidance provided to ensure safety.

In terms of prevention, some measures are essential as it reduces the prevalence of Malaria; including: spraying insect repellent to exposed skin avoiding the eyes, nose, and mouth areas, as well as application on all clothing. In addition to this, targeting or killing mosquitos, burning mosquito coils, using heated insecticide mats in sleeping and living areas at night, as well as draping mosquito netting over bed(s) and putting screens on all windows and doors can help. The efforts Mali have been making to gain control of malaria and prevent it, including using indoor mosquitos spray, insecticide-treated nets, and for pregnant women only, is Intermittent treatment [2].

Malaria is a treatable and curable disease. Both early diagnosis and treatment of malaria decreases the chances of contracting the disease, it prevents death, and also contributes to reducing the spread of it. The best available treatment possible, specially for P.vivax Malaria, is artemisinin-based combination therapy, also known as ACT [1]. ACT is a combination of drugs that work against the parasite [1] and has proven to be more effective than the commonly used drug, chloroquine [10]. This is supported by figure 1, which illustrates P. vivax resistance to chloroquine where individuals relapsed two weeks after starting treatment [10]. The use of antimalarial drugs targets the Plasmodium parasites in the bloodstream and aims to eradicate them completely [2].

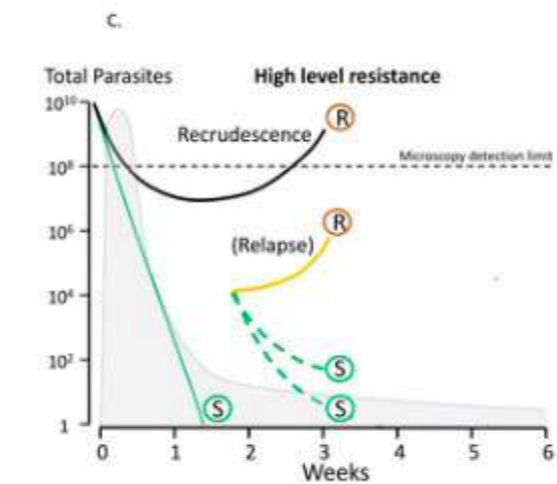


Figure 1. Illustration of P. vivax response to chloroquine, showing high levels of resistance [10].

Taken from Plos Medicine, 2021.

Vaccinations will reduce Malaria incidence and pose a valuable strategy in preventing outbreak [11]. In 2006, a vaccination study took place in Mali in which the drug AMA1-C1 aimed to reduce the parasites in the blood of Malian children, however no results were published. This puts the citizens of Mali at a disadvantage, and vaccinations must be investigated in the near future to help prevent the spread of Malaria.

To conclude, malaria is a very serious disease and if caught, individuals must be examined and treated as soon as possible, in which ACT is the most effective option. Pregnant women and children are at high risk and must take caution. Adherence to preventive measures will reduce the transmission of Malaria. It is essential that citizens have access to insecticide and mosquito nets and remain covered at all times when travelling around. Once individuals exhibit symptoms, they must seek medical help. Although vaccines would prove a great preventative measure of Malaria, it has yet to be developed and approved for use by Malians. Therefore citizens must adopt the measures stated above in order to reduce the risk of contracting malaria as well as transmission.

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Tutor comment:

"Z is a diligent and insightful student, and her positive attitude made her a delight to work with on the Disease Detectives programme. In this final assignment, she delivered her arguments logically, demonstrated impressive independent research skills, and her ability to write succinctly joined it all together effortlessly. Z would do brilliantly in any undergraduate programme of her choosing."

# “Social actors are key to successful online lessons”. To what extent do you agree with this statement?

Year 9, Key Stage 4

**Pupil:** J.W.  
**School:** The Becket School  
**Supervised by:** C. Poussa  
**Tutor University:** University of Nottingham  
**Course Title:** Trust me! I'm a Social Agent!: When Machines Act Human

## Introduction

This essay focuses on the use of social actors in the modern world and zooms in on them in a digital environment.

Social actors (aka social agents) are any web-based media that we see on the screen such as images, emojis and avatars. There are 2 categories: high and low fidelity (Lievens & Patterson, 2011) which I shall address in a later topic. These work to elicit different emotions in human beings. Computers As Social Actors (CASA) is the theory (Reeves and Nass, 1996) that humans unconsciously respond to and interact with computers the way they would other human beings, knowing that they are only machines with no feelings or thoughts. Some are programmed to boost our self-efficacy, which is the belief in oneself to achieve and produce a good performance (Bandura, 1977, 1986, 1997). These types of social actors create relationships with their user and within this relationship, become persuasive enough to induce a bigger reaction. Social actors can be persuasive by:

- Rewarding with positive feedback
- Providing social support
- Modelling a target behaviour or attitude

## Computer persuasion

‘A medium which provides people with intimate or immediate responses may evoke social emotional reactions.’ ‘Such experiences could allow an individual to perceive that another social being exists and is interacting with them.’ (Poussa, 2017) (Tung and Deng, 2007). This insinuates that computers are one of the best tools for mimicking human behaviour, leading to responses from people. Computers that convey different personalities invoke different responses from people. For example, a computer that keeps on crashing displays a personality of being ‘uncooperative or vengeful’ (Fogg, 2003) or a computer that continues to run smoothly displays a personality of being helpful and obliging. The personalities displayed by each of these examples would produce either positive or negative feelings towards computers in general.

## Social actors in the field of learning and education

Social actors can be applied in many different areas apart from invoking human emotion, for example, with

students and specifically, online learning. As the student and teacher are not together in the same place, social actors such as emojis and emoticons must be relied on to deliver the intended emotion through non-verbal communication. In a normal learning environment, both the teacher and the student rely on verbal and non-verbal communication to express thoughts and feelings. However, in an online lesson, social actors are used instead. Where students already use emojis in text communication informally with their peers, teachers can utilize emojis to make teaching more visual, accessible, and interactive (Al-Zou'bi and Shamma, 2021). During the COVID-19 pandemic, social actors were used more than ever, while in distance education and everywhere was on lockdown. In my own experience, I found that the use of emojis, more specifically emojis, somewhat encouraged me to work. Just a simple thing like a smiley face at the end of a piece of feedback genuinely made my day as it motivated me to realise that I was doing well in my work.

Fogg's (2003) experiment with positive, negative, and neutral feedback from a computer showed that the more praise received, the better the participants did. Students with experience with computers were chosen to play a game of '20 questions', and after each answer was given, the computer would display some sort of feedback in the form of a dialogue box for only some participants. Most messages were pure praise, however two were not as positive. After finishing the game, participants filled in a questionnaire about their experience. The results concluded that those who received computer praise responded much better. It was shown that they felt better about themselves, were in a better mood and overall, had a positive reaction than those who received 'no evaluation'.

In relation to online lessons, you could argue from this that low fidelity social actors would be extremely useful as part of an online lesson because as illustrated in the reference above, offered computer praise boosted morale and made them feel that they had performed well. If this was applied to an e-learning platform, learners would be motivated to do well in their work and in turn, genuinely do better in assignments. They would be willing to interact with the computer again, leading to more productive and engaged lessons.

## High and low fidelity actors

As mentioned in the introduction, I shall expand on high and low fidelity social actors.

A high-fidelity social actor is any web-based media that are highly functional and interactive, such as a conversational agent or a chatbot. Examples of high-fidelity social actors include;

- Avatars
- Conversational artificial intelligent (AI) actor
- Chatbots

An avatar is graphical representation of a person's character or person. It could be in a 2D form as an icon

on internet forums and other online communities or a 3D form, as in games or virtual worlds. They are used widely on social media platforms, such as Snapchat and Facebook. Using this on an e-learning platform, students would be able to create their own avatar to look however they want to access the website. Avatars are a fun way of getting students to learn as they are a way of motivating them to come back to the website not only for the avatars, but to learn as well. If used properly, they could make learning much less of a tedious task. In a series of studies, Bailenson and colleagues (Fox and Bailenson, 2009) have found that the way people represent themselves in a virtual environment can change their behaviours in all sorts of manner (Baylor, 2011). For example, if learners watch an avatar that looks like themselves exercising and becoming healthier in a virtual environment, they also exercise more and strive to become healthier (Fox and Bailenson, 2009). This study shows that participants that have avatars that mimic their looks can have profound effects on their behaviour in the real world. If this was applied to online learning, students would be prompted to do better in their work, as they see their avatar encouraging them to do so. The change in their virtual self can lead to changes in one's physical self (Baylor, 2011).

A low fidelity social actor is any web-based media which are simple and low-tech concepts, such as static images and even motivational text. As mentioned in Fogg's experiment, low fidelity social actors like the motivational text that each participant received showed particularly more positivity than those who received more praise. They do not require as much sophistication to make and could be as simple as copying and pasting an image with encouraging text around it onto the learning platform. Studies have proven that smaller gestures are highly appreciated amongst big gestures (Baeker et al., 1995). An emoji is a graphic symbol, ideogram that represents not only facial expressions, but also concepts and ideas (Kralj Novak et al., 2015). They are used widely in text communication and on social media, adding a tone of informality and 'improves the understanding of the message' (Kralj Novak et al., 2015). So, something small as the emoji as a smiley emoji with the phrase 'good work!' written underneath it or a textbox telling you how great you have done in an assignment can be extremely motivating to continue learning. Another type of low fidelity social actors are emoticons, a distant relative of emojis. These are a lot more simplistic as they only include a small number of characters.

However, if I was designing an online lesson, I would use a mixture of both high and low fidelity social agents, specifically avatars and motivational text. I would not use conversational artificial intelligence as it is not really needed for an online lesson. I think that they would be the most useful when used on a shopping website and you are struggling to find an item, so it would be irrelevant to put in an online lesson. Chatbots also would also be better suited for an online shopping environment, so I would not put any in either. The avatars would add a side of enjoyment into the work and the motivational text would be a form of encouragement. The combination of these 2 social actors could be the key to successful online learning.

## The downsides to social actors

Even with their many upsides, there are also some reasons as to why they should not be used as part of a successful online lesson. For example, behind the sophistication of an avatar would be down to a lot of programming. If this was to suddenly hitch and bring down the whole website, disruption to learning within lessons would be immense, which would most likely take some while to repair. Aside from the above-mentioned points, artificial intelligence would also be a bad idea in an online lesson because studies have shown that over the past century, efforts to model human language use by computers has not been widely successful (Hill et al., 2015).

From this, I can tell that AI would not be a suitable candidate for an online lesson as it still has the obstacle of properly understanding language. This study also analysed the difference between human-human interaction and human-chatbot interaction. It was concluded that there are 'notable differences in the quality and content of these conversations,' 'even though human language skills transfer easily to human-chatbot communication' (Hill et al., 2015).

There is also the issue of social actors being interpreted the wrong way. For instance, emojis have the quality of being ambiguous, even though they may seem that they are intended for only one purpose. Milner et al. (2016) performed an evaluation of asking human annotators the meaning of emojis and the sentiment they evoke. People do not always have the same understanding of emojis as there seems to exist multiple interpretation of their meaning beyond their designer's intent or the physical objects they evoke (Barbieri et al., 2017), nonetheless they have the ability to recognise when emojis are being used in a different manner. Although, the remaining problem would be how the computer would be able to decipher these hidden intentions as well as a human would be able to.

Would I trust these social actors? Not necessarily, even though they are as useful as stated in the paragraphs above. This is since they are so widely used in all sorts of contexts, it can be hard to pin down just 1 specific meaning, signifying that it may be a better idea for social actors not to be used in an online lesson, which could lead to mixed messages about important things like assignments.

## Conclusion

To conclude this assignment, I shall summarise everything that has been mentioned so far and their impact in successful online lessons to support learners studying online.

CASA is the theory that humans subconsciously react to a computer interaction in the same way they would do with other human beings (Reeves and Nass, 1996), even with the knowledge that computers are robots with no feelings. This mostly refers to the concept of social actors, both high and low fidelity. Computers have been evaluated to be the best solution for invoking responses in people, by

displaying different personalities.

A high-fidelity social actor is any piece of interactive media, e.g., a chatbot or an avatar. These are much higher tech and are now starting to become more popular throughout the globe. It has been proven that people that see themselves in a virtual world are more encouraged to adapt their behaviours to fit into those of the character online (Baylor, 2011). A low fidelity social actor is a more simplistic piece of media, e.g., an emoji. These are lower tech than high fidelity agents and do not require as much crafting to master. To create a successful online lesson, I concluded that I would include both types of social actors to boost efficiency.

Nevertheless, there are some downfalls to having the social actors. From being misinterpreted and give out the wrong message (Milner et al. (2016)) or even taking out a whole website in a few steps... The progress of computers with modelling language has also not been as triumphant as thought (Hill et al., 2015), adding to the list of downsides to the agents.

Overall, using social actors to support learners studying has both its positive and negative sides. But I think that with the right technology, the use of social actors will continue to increase and develop websites. It is impossible to tell what the future of education holds, although I can assume that it will certainly include more social actors, as we see them grow and develop.

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How can biomaterials be designed as nerve guidance channels to promote peripheral nerve repair after nerve injury?

Year 9, Key Stage 4

Pupil: S.C.

School: The Compton School

Supervised by: Dr. C. Simitzi

Tutor University: University of Crete / UCL

Course Title: Repairing peripheral nerves: Is there an alternative solution?

Introduction

Peripheral nerves are paramount, crucial for experiencing both conscious and involuntary occurrences, yet they are extremely vulnerable to injury, and when subjected to this, devastating effects can emerge. It is of the utmost urgency that they are appropriately treated, utilising both modern technology (including light, fluorescence, and electron microscopes) and biomaterials to obtain the desired convalescence, and overcome the obstacle of peripheral nerve damage.

Peripheral nerve cells: function and structure

Peripheral nerves are of critical importance in every person's life, but what precisely is a peripheral nerve, what is their structure and function, and what are the predominant types of cells that configure a peripheral nerve? A sensitive organism possesses two areas of the Nervous System: the Central Nervous System, occasionally referred to as the CNS (consisting of the brain and spinal cord), and the Peripheral Nervous System, or PNS (involving the nerves branching out from the CNS, reaching around the body). Within the PNS, there are 2 divisions - the Somatic and Autonomic Nervous Systems - which control the voluntary and unconscious actions respectively. Specifically, the Autonomic Nervous System is responsible for ventilation, the churning of the stomach, and respiration, while the Somatic Nervous System determines movement of muscles. The Peripheral Nervous System uses sensory - afferent - and motor - efferent - neurones to aid communication between the CNS and the rest of the body so it can react with surroundings. Receptors, typically sense organs, such as skin, ears, and eyes, respond to their environment, and this information is transmitted through sensory nerve cells to the Central Nervous System. Then, motor neurones send these impulses to effectors - for example muscles or glands, causing a reaction, like travelling away from a boiling hot object which could lead to detriment (Fig. 1).

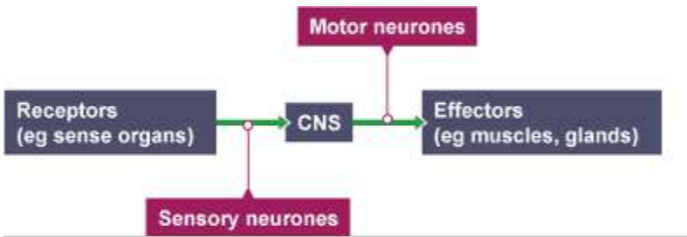


FIGURE 1: Diagram showing the sequence of signal transmission throughout the Nervous System. [1].

A peripheral nerve contains a bundle of nerve filaments (Fig. 2) that are each composed of 2 main types of cells: neurones and neuroglial cells. Each neurone features an axon of great length which can reach around the body, with the longest nerve, the Sciatic Nerve [3] extending from the hip joint to the foot. The large span of the axon is due to the necessity of arrival at every part of the body, and of being able to connect them with the Central Nervous System to relay sensory input. Also, neurones possess many dendrons, which are extensions of the neurone that further separate into dendrites (Fig. 3). Instead of touching, the dendrites of 2 neurones adopt a miniscule space between them: a synapse. The signals are transported through the dendrites to other neurones, until they reach the Central Nervous System, enabling effective transmission of impulses around the entire body.

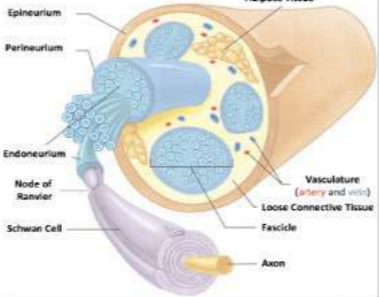


FIGURE 2: Diagram showing the cross section of a nerve, focusing on one neurone. [2].

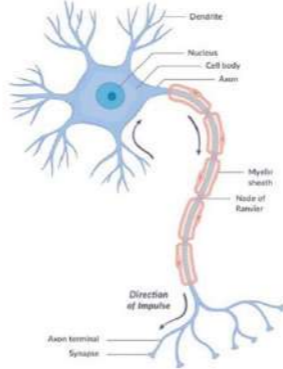


FIGURE 3: Diagram illustrating the structure of a peripheral nerve. [4].

Although the neurone is solely responsible for transmitting signals to and from the CNS, the neuroglia are of vital significance in addition to this. These myelinating Schwann cells insulate the axon of the nerve, by surrounding it and forming the myelin sheath (Fig. 3), with the function of allowing efficient communication of signals around the body.

Peripheral Nerve Injury and Treatment

Whilst peripheral nerves are indispensable for coordinating actions, reacting to changes in environments, and regulating involuntary occurrences, they are not immune to damage, and when peripheral nerve injuries arise, a multitude of symptoms can develop, depending on the severity of the harm, and on which type of neurone was damaged. Peripheral neuropathy is caused by a variety of situations, for instance, during an accident or partaking in sport, since these activities can cut, crush, or stretch nerves [5]. Alternative reasons for peripheral nerve injury are medical problems, like diabetes, autoimmune

diseases such as lupus, hormonal imbalances, or tumours [5]. Common side effects are reliant on whether motor or sensory neurones were harmed; if motor neurones are damaged, twitching and muscle cramps are typical, as well as difficulty elevating specific areas of the body, frequently the feet [6]. This is because motor neurones conduct signals to effectors, instructing them on actions to take, and if these nerve cells are not working to their full potential, then muscles and glands cannot be controlled effectively. Contrastingly, symptoms of sensory neuropathy are numbness, reduced pain and temperature sensitivity, and loss of balance [6] since sensory neurones utilise receptors to respond to changes in environment and transmit these impulses to the Central Nervous System accordingly. If there is any harm to the sensory nerve cells, the signals are not successfully sent to the CNS, resulting in inability to completely detect alterations in the conditions of surroundings. Furthermore, 9 of 10 patients with diabetic neuropathy were observed to have poor control over balance in comparison to those with uninjured neurones [7], because there is a lower potential to determine where distinct body parts are (namely feet and hands) [6].

The type of peripheral neuropathy treatment received is influenced by the intensity of the damage to the neurones, of which there are many grades (Fig. 4). Injuries where the nerve has been hurt, however not entirely disconnected are likely to heal without the use of surgical repair. For more serious nerve injury, where it is wholly cut through, but the deficit under 5mm in length, micro sutures are used [9] to stitch the two sides of the peripheral nerve together. Damage with an increased severity could be treated through nerve repair: when the surgeon extracts the harmed area of the nerve and reattaches the two healthy sides of the peripheral nerve. Moreover, peripheral neuropathy that causes a deficit of over 3cm is regularly remedied by nerve grafting, during which injured nerve tissue is removed, and replaced with that of either a donor, or an unrelated, less required, part of the patient's body. In spite of the seeming convenience of nerve grafting, it has several limitations: the unavoidable circumstance of a second surgery, different sizes of nerve tissue, and the low availability of donors, specifically.

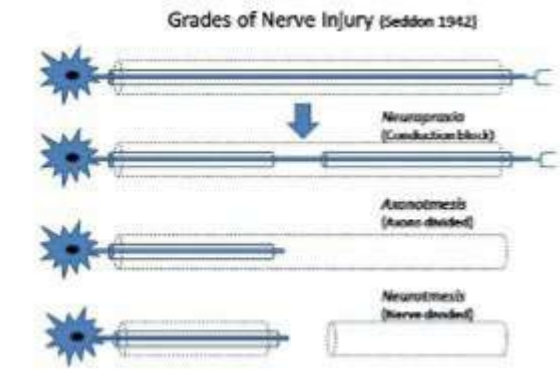


FIGURE 4: Diagram demonstrating the various grades of nerve injury – their severity. [8].

Nerve Guidance Channels: design and function

A nerve guidance channel (NGC) is a tube intended to aid peripheral nerve repair by bridging the gap between

two ends of an injured peripheral nerve, and is applied if the nerve cannot be sutured without tension, generally when the distance between the two stumps is substantial. The axons of the Peripheral Nervous System are capable of regenerating [10], unlike those of the Central Nervous System (when in their natural environment), and this is an incredible advantage in the field of nerve repair. Since peripheral nerve cells can grow back after suffering damage, a nerve guidance channel is used to steer axons towards their target, and prevent them from regenerating randomly to the degree that they become unable to reach the other end of the nerve and never regain function, while also protecting the new axons from forces produced by neighbouring body parts' movement.

Additionally, the design of an NGC can be improved in multiple ways to further promote the guidance and direction of axonal growth (Fig. 5), and this occurs due to physical, chemical, and biological signals. Nerve guidance channels can be built to imitate the healthy tissue, and by achieving this, they can communicate standard signals to the adjacent cells, and activate usual cell responses. This results in proliferation, or differentiation, of the cells. One method of designing NGCs using signals is through the process of including grooves to the inside surface of the channel – an example of physical signals (more particularly, topographical signals) impacting the efficiency of the nerve guidance channel. For instance, PC12 cells have a keen tendency to regenerate along the direction of ridges [12], which is greatly beneficial, as it decreases the length of time necessary for the axons to reattach to their target and will ensure that they do so. Electrospun fibres and multichannel NGCs possess sufficient control over the direction of axonal growth, however, they contain relatively sizeable tunnels to reduce growth resistance, whilst the small voids between fibres of electrospun nerve guidance channels prevent most other cells from migrating into the NGC [13]. Besides this, alternative topographical signals can be used to increase the rate of peripheral nerve regeneration; porous, or semipermeable substrates result in more normal structural characteristics in nerves than those grown in impermeable biomaterials like polyethylene [14]. This is because waste, and nutrients essential for nerve regeneration, can be diffused with more ease when the pore size is larger [15]. Also, chemical, and biological signals are immensely important in the design of nerve guidance channels and employ various chemical compounds and proteins respectively. These substances regulate, and affect, cell behaviour, as encountered in an experiment of testing the difference in peripheral nerve regeneration in an NGC filled with merely collagen, and one containing both collagen and a compound chemically similar to that of a neurite-promoting cell (m-HNK) [15]. The nerve guidance channel enriched with the compound alike m-HNK cells, caused better peripheral nerve recovery (the post-injury nerve functioned to a more productive standard) [15].

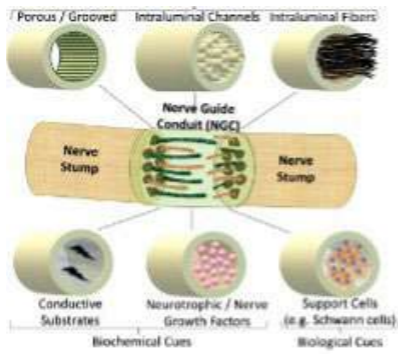


FIGURE 5: Diagram illustrating different designs of NGCs, and the signals they utilise to assist peripheral nerve regeneration. [11].

#### Biomaterials: Properties and Uses

Every nerve guidance channel should be made of a biomaterial - a material aiming to be in close contact with a system of the body, with the purpose of replacing, augmenting, or treating the area with which it interacts – commonly involving tissues or organs. Properties of all biomaterials are a high biocompatibility (being able to exist without issues among living cells), and not producing blood clots or infection [16], leading to unproblematic recuperation. Nevertheless, each biomaterial has a wide range of juxtaposing properties from the rest that make it suitable for its function. Durability, strength, not being biodegradable, and holding a lower density than other metals, causes titanium to be one of the most appropriate candidates for hip replacement implants, whilst elasticity, flexibility, and biodegrading over time are assets of surgical sutures that make them apt for bonding body tissues after wounds open or surgery is performed. Many nerve guidance channels consist of biodegradable biomaterials, which diminish the necessity of a second surgery for removal, an example being polyurethane, yet in spite of that, a vast quantity of NGCs are also produced from non-degradable, synthetic materials - conventionally silicone [17].

#### Light, Fluorescence, and Electron Microscopy

Nerve guidance conduits, and the damage that is treated by them, can be minute, thus, when they are designed, it is key that NGCs are the precise, correct size. To fulfil this demand, microscopes - of which there are three main types: electron, fluorescence, or light microscopy - are routinely called upon. Electron microscopy is utilised to a great extent for several reasons, like its resolution (0.25nm, compared to the 250nm of fluorescence and light microscopes) and magnification of X500,000. However, electron microscopes are expensive and exclusively dead samples can be imaged through one, dissimilar to other forms of microscopy. Fluorescence microscopes (Fig. 6) use fluorescent stains (if one colour of light is shone through, a different colour is shown when it comes back out), enabling distinction of each area of the specimen, a significant advantage, although preparation is expansive. Light microscopy is the least costly of the options and has the same resolution and magnification as that of those concerned with fluorescence but cannot distinguish the parts of the sample from one another.

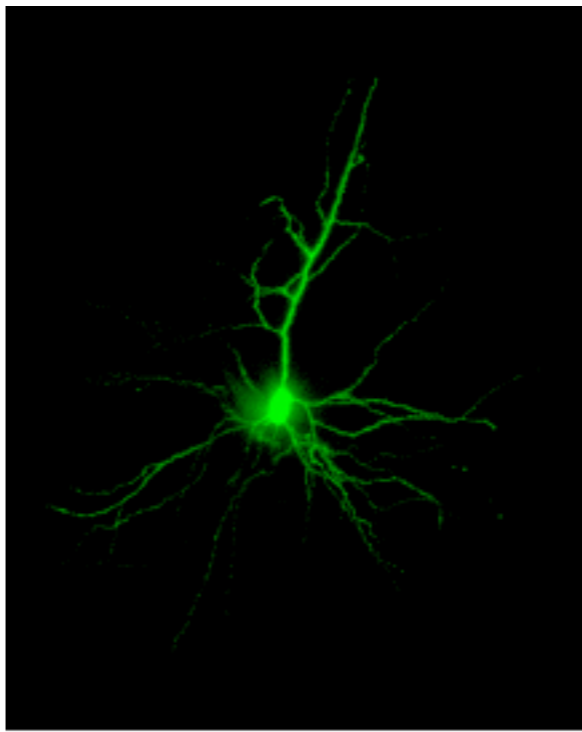


FIGURE 6: Fluorescence Microscope image of mirror neurone, present in the Central Nervous System. [18].

#### Conclusion

Ultimately, biomaterials, namely silicone or polyurethane, are hugely beneficial in aiding peripheral nerve damage, by creating nerve guidance channels, that can be filled with multichannels, electrospun fibres, or otherwise. Through physical, chemical, and biological signals, they mimic the healthy tissue surrounding them but are immune from the typical issues of nerve grafting and repair. Therefore, nerve guidance channels are the future of treatment for peripheral nerve injury.

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#### Tutor comment:

"In her essay S. has demonstrated a level of sophisticated thinking and in-depth understanding of the topic, especially for a student in Year 9. It was a pleasure to teach S. and the rest of the pupils at The Compton School, and I wish the best for all of them in the future."

## Evaluation of One Health

### Year 12, Key Stage 5

**Pupil: S.M.**

**School: St David's Catholic College**

**Supervised by: S. Morgan**

**Tutor University: Cardiff University**

**Course Title: Parasites, Pathogens and Puffins – Oh My!**

An Evaluation of One Health as a Global Health Approach to Zoonotic Disease Control:

In the following essay, I will be discussing to what extent One Health is effective as a global health approach in controlling the spread and containment of zoonotic diseases. According to the American Centre for Disease Control, One Health is defined as being "an approach that recognizes that the health of people is closely connected to the health of animals and our shared environment" . I will explore both the ramifications and advantages of a One Health approach from the perspective of zoonotic disease.

One Health is a truly global health approach with established research centres and programs run in every inhabited continent. Testament to its acceptance in Africa is the fact that its main office is housed within the Head Quarters of the ILRI - International Livestock Research Institute in Kenya .

One Health has proved to be an effective driver of creating more interdisciplinary discussion between, not just health professionals, but animal and environmental agencies too. This approach has been more effective than health campaigns focused solely on human health, as up to 75% of diseases in humans originate from wild animal vectors according to the University of Hohenheim, Germany .

The policy promoted by One Health of preemptive action

to protect the environment and treatment of animals is a much more efficient way of stemming outbreaks of zoonotic diseases than waiting for it to 'spillover' into the human population before taking action. After all, prevention is almost always more efficient than treatment.

An example of this in the context of One Health is the recommendation to minimize and reduce human encroachment into wild habitats. This will not only protect the environment and endangered species but also protect human health by preventing new transmission events for zoonotic diseases to infect humans. In this scenario, a One Health approach might be creating new national parks (or stronger measures to protect existing ones) such as in the Amazon Rainforest where the WWF reports a new species is discovered every 3 days or on average 111 per year . With these new species emerging every year, the opportunity for new zoonotic diseases to emerge increases too, therefore protecting them would benefit both humans and the fragile ecosystems. This is because the multitude of plants and animals being discovered, although fascinating, present the opportunity for more diseases to emerge that we have no treatment for.

Some may argue that One Health does not offer a prescriptive framework of how to implement its advice. Opposedly, I would argue that it is precisely this lack of clarity that has made One Health into the success it is today by encouraging cooperation between the 3 sectors of humans, animals and the environment without the need for strict laws and regulations that may otherwise have deterred countries and governments from adopting the approach.

Another example of a more open approach proving more effective than a structured framework is the UN's Sustainable Development Goals which, because they are not legally binding, leave countries to decide how best to reach the goals independently. This has resulted in the mass participation from all 193 countries in the UN in order to solve some of humanities greatest inequalities such as the goal of "ending poverty for all". It has also proved very effective with extreme poverty rates falling by more than half since 1990 according to the UN. In some respects, The Sustainable Development Goals also align rather closely in value to those of One Health, such as the goals of 'Protecting life on land' and 'Good Health and Wellbeing for all' . This proves that, if taking an open-ended approach can work effectively for the Sustainable Development Goals, it can be effective for One Health too.

After further research, I discovered the One Health approach is also not entirely without guidance as the Centre for Disease Control has set out 7 key activities (rather than a strict framework) that were deemed as fundamental to implementing a One Health agenda. These activities include training and educating target audiences such as politicians and students on how best to implement a One Health approach, creating a One Health Global Network (OHGN) in order to garner international support for One Health programs and projects, plus setting up a Needs Assessment to identify programmatic areas that could benefit from a One

Health approach, especially in developing countries. Creating a common ideology without strict confinements allows for countries to adopt the strategy they see fit to deal with zoonotic disease outbreaks. Being able to tailor a response to suit the situation can be more effective than a general 'one size fits all approach' – after all, every outbreak is unique and has its own challenges.

Another common criticism of One Health is that there is an apparent priority on the health of humans when moral dilemmas arise. For example, during the start of the Covid-19 pandemic, according to National Geographic, the Netherlands killed roughly 500,000 Mink to stop the spread of coronavirus to humans after they became a vector for the virus . However, the minks are likely to have initially caught the virus from farmworkers, therefore the question is raised whether, in this case, human health was valued more than animal health, rather than treated equally, as recommended by One Health. However, I would argue, that in this case, One Health has been used effectively to prevent the spread of zoonotic disease throughout the ecosystem, by not only protecting the health of humans, but also the health of other animals who are vulnerable to the disease. In fact, the culling might have been treating all humans, ecosystems and animals equally as, according to PBA in America, minks themselves are vulnerable to Covid-19 and would have likely died from the virus regardless of the cull.

In other circumstances, prioritizing the health of humans through culls of animals may not be treating all three parts of the One Health approach equally (with the health priority usually placed on humans) but it is effective in stopping the spread of zoonotic disease from making the jump to humans. The reality is that the 3 parts cannot always be treated equally if we want to be effective in preventing outbreaks – it simply is not feasible in all scenarios. For example, in the case of Covid-19, bats are a reservoir of many common coronaviruses but are completely unaffected by their presence making it unfair (in respect to both animals and the ecosystem) to cull them because humans cannot fight coronaviruses as well as they can.

One Health also recognises the role that humans themselves have in preventing the spread of zoonotic diseases since we are increasingly placing pressure on the natural environment due to our species' never-ending need for further resources, land and wealth due to overpopulation, climate change and also greed. It recognises that humans are having an impact on animals and that is human's interaction with animals that it is to blame for zoonotic disease outbreaks. This is especially true when humans are pushing the wild environment into smaller and smaller pockets of land until it becomes inevitable that the animals spillover into 'our' habitats of cities and suburbs making the chance for zoonotic diseases to emerge even greater as the supposed boundary between humans and the natural environment and animals is further eroded or destroyed entirely. For example, an analysis published in the Landscape Ecology reveals how the loss of tropical forests in Uganda puts people at greater risk of physical interactions with wild primates and the viruses they carry. It states that "In Uganda, decades of migration and the creation of

farmlands outside Kibale National Park have led to a high density of people trying to support their families at the edge of forested habitats. Ordinarily, people avoid wild primates because they are well-known carriers of disease, and many are protected by Uganda's Wildlife Authority. However, continued loss of forested habitat means wild primates and humans are increasingly sharing the same spaces and vying for the same food" .

It also acknowledges that humans are directly impacting the environment. One example of this is climate change which is due to human's increasing carbon consumption since the industrial revolution. As well as damaging the environment through melting ice caps and deforestation, it also creates more indirect consequences. For example, the warming climate poses challenges for zoonotic disease control since animals, such as mosquitos, are able to survive in regions further and further from the equator as the Earth warms, leaving countries such as the UK, at greater risk of vector-borne diseases such as the Zika Virus and Malaria. According to the World Health Organization, in 2018 alone, there were 228 million cases of Malaria, and 405,000 deaths . Since these figures will only increase with a warming climate, it demonstrates the idea that according to One Health, we need to take more responsibility for our natural environment and prevent rapid climate change in order to prevent further outbreaks.

Another argument in favour of One Health, is the fact that zoonotic disease in humans is usually just the tip of the iceberg. Often, when a zoonotic disease has made the jump over to humans, it is an indicator of the wider health of both the ecosystem and the animals within it. This is because humans, animals and ecosystems are so interdependent and interconnected (especially in developing countries) that when one part of the system is disturbed it has a knock-on impact on the others. For example, in Uganda, Rhodesiense is a zoonotic bovine disease for cattle that carry the Trypanosome Infection, which can then be transmitted to people . It is not easy to diagnose early and is difficult to treat in late stages in humans but is a wider sign of the poor health of cattle in the area. Therefore, in this case early animal intervention not only allows the disease to be controlled in humans, but also improves the health of cattle. This is beneficial to the local people, in terms of increased productivity of healthier cattle in an area that largely depends on livestock. This intervention is achieved by treating the cattle with trypanocidal drugs which is effective at reducing the disease to undetectable levels and prevents the spread to humans , thereby demonstrating the effectiveness of a One Health approach.

One Health is also effective, as increasing collaboration between agencies allows the sharing of important data quicker and more effectively. This increased collaboration, and therefore speed of data sharing, is a major factor in One Health's success, since the quicker a zoonotic disease is detected, the quicker it can be prevented from spreading to humans. An example of the importance of a quick response time is shown by the extraordinary speed at which SARS spread, as described in the National Centre for Biotechnology Information: "On 21 February 2003, a physician from Guangdong spent a single day in a Hong Kong hotel, during which time he transmitted an infection

to 16 other guests. These guests seeded outbreaks in Hong Kong, Toronto, Singapore and Vietnam, and within weeks SARS infected over 8000 people in 26 countries across 5 continents" .

An example, in this context, of how One Health may be used, is that veterinary professionals may detect a new zoonotic disease which, as directed by One Health, should then be reported on a zoonotic disease detection register so that other sectors are aware of the new development and can begin risk assessment and containment plans to prevent further spread throughout animals and humans. Speed is one of the most important factors when dealing with zoonotic disease, so this increased collaboration is a key way that One Health is effective in controlling the spread of zoonotic diseases.

Furthermore, this increased surveillance has resulted in precursors being identified prior to the emergence of new zoonotic diseases. Similarly, to how the sea level massively decreases and leaves beaches bare before a tsunami, these sometimes subtle ecological signs can give a crucial early warning to the emergence of new diseases. For example, before an outbreak in Ebola in humans, it has been observed that Great Apes in surrounding forests die off in considerable numbers due to being infected with Ebola. This then results in the local authorities issuing a warning to hunters to avoid dead ape carcasses which dramatically reduces the chance of an Ebola outbreak occurring in humans . These early warning signs can provide crucial time for authorities to formulate a response to stop the outbreak at the source and prevent the disease's spread to humans proving how effective taking a holistic One Health approach can be.

According to the World Bank, One Health's proactive approach is incredibly cost effective in comparison to a more 'business as usual' approach. Prompt mitigation of zoonotic diseases that have the potential to turn into pandemics are much more effective economically than adapting to the threat once it has already emerged. This is shown in an estimate from The Proceedings of the National Academy of Sciences of the United States of America (PNAS) which predicted that if adaptations to prevent zoonotic disease outbreaks were implemented in 2014 when the paper was published, the saving could be "between \$344.0.7 billion and \$360.3 billion over the next 100 years if implemented" . This is opposed to their estimate that if nothing was done to prevent a typical zoonotic disease outbreak it could cost billions of dollars. For example, using WHO data the PNAS estimate that the cost for even a mild influenza pandemic "is about \$374 billion (in 2014 US\$)" .

As evident from the unprecedented level of economic damage caused by Covid-19, the public and government are more aware than ever about the significant risk zoonotic diseases pose to the world and economy. It is clear that if One Health measures were implemented at the suggested source of the current pandemic, i.e., Chinese wet markets, such as improving conditions for the animals sold there and reducing their contact with humans, great economic damage could have been prevented. This demonstrates the scope and scale of the problems that One Health is attempting to mitigate or

prevent.

Furthermore, due to Covid-19 we are also more aware of the threat to human health caused by zoonotic diseases and, at the time of writing, December 2021, global deaths from SARS-CoV-2 stand at a catastrophic 5 million deaths according to the WHO . The interdependence of humans on animals and the environment means that zoonotic diseases on this scale are set to increase in the coming decades and One Health is a key way in which we can prevent the spread of these outbreaks before they take hold in humans.

In today's world when diseases can travel as fast as jets fly and the world becomes increasingly more interdependent through globalization, then the opportunity for transmission events will surely only increase. Given the transboundary nature of pathogens, surely a transboundary approach is the only way to tackle zoonotic diseases before they become uncontainable?

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A machine to measure muscle oxygen levels for athletes

Year 8, Key Stage 3

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Supervised by: **W. Bowling**  
Tutor University: **University of Nottingham**  
Course Title: **illuminating the body**

Blood oxygen is an important metric used by athletes. By gaining sufficient information from collected data, athletes can continue to improve techniques and structure their performances. For my essay, I have decided to focus and adapt my research and findings for a long-distance runner.

Haile Gerbrselassie is a well-known athlete who has competed in long-distance races all around the globe, breaking record after record.[1] Although it may seem like a natural ability, Gerbrselassie and other long-distance runners have all undergone thorough tests, examinations and taxing, extensive workouts all to try and fathom the workings of their body and to what extent they can push it to achieve unimaginable accomplishments. Blood oxygen monitoring is a much less stressful method which can also still produce useful results.

A long-distance runner has to consciously focus their attention on the physical activity occurring during a race to beat the other contestants. However, the body does miraculous things subconsciously which, when examined in more detail, can be the differentiator that helps an athlete win: like controlled breathing.

There are two types of respiration – aerobic (which needs oxygen) and anaerobic (which doesn't need oxygen).[2] Aerobic respiration occurs routinely and when the lungs are not under strain or pressure unlike in situations when intense physical exertion is occurring or when there is lack of oxygen in order to maintain this process. Taking in all the previously mentioned scientific evidence, we can tell that aerobic respiration would be slightly more unattainable for a long-distance runner who has to endure physical activity for long periods of time. Therefore, the body switches to anaerobic respiration which converts energy from our glucose store instead. However, a chemical called lactic acid is formed as a by-product which can buildup in muscles causing intense muscle fatigue, cramps and serious injury. Unable to measure their blood-oxygen, the athlete may struggle with pains early on in the race - causing them to fall behind.

Long-distance runners need equipment capable of monitoring their blood oxygen, the speed of the flow and how it changes when encountering different climates, temperatures and environments.

The engineering design process is important as it helps engineers plan their design avoiding any potential financial losses. Previously, I identified the problem for long-distance runners and will now collect ideas. One possible idea to help bring forth a solution, is to create a fitbit-like, compact device that could easily be connected to the wrist. However, this doesn't highlight the specific muscle that is taking the impact of the activity causing the data

collected to be non-specific. Also, optical fibres used may become a trip hazard.

Another functional idea involves strapping a light to the required muscle and transferring the information to a (NIRS) machine located nearby. Though this may be useful for the training process (eg a treadmill), it would not be workable during a race as the equipment is bulky and not portable.

The final idea involves a sticky patch with a small light. Nonetheless it would be inconvenient when it comes to adding the other necessary components.

Upon choosing the fitbit suggestion, we could enhance this idea and use different techniques; pumping light in from the underside of the device onto the skin and therefore use the correct materials to record the data. This could be wireless which could also save money - adding economic benefits. In addition, a method could be used where tape is attached to the head / vital muscle to add specificity. In detail, any of these devices and methods could be used as part of one big procedure where the athlete is put in a contained environment for training like an isolated gym with only instructors. Moreover, the speed of the treadmill may be altered to replicate the environment the athlete may be put in that could cause an impact on their performance (for example, a steep incline), the temperature of the room to copy the necessary climate of the competition or even restricting the levels of oxygen intake allowed with a mask. This could be extremely helpful when it comes to determining how the blood-oxygen levels change and the speed anaerobic respiration is implemented. Many engineers would be needed for this and I will provide further detail on this later on.

I am certain that the most important attribute to the engineering design process is the

planning.[3] My proposed design is called RunNIRS. This product aims to capture all the desired information that I stated above and will be made up of six main components: the strap, white light, power source, spectrometer, CCD camera and a laptop.

My first design feature: the strap configuration. After much research, I have concluded that polyester is the most suitable fabric option. Polyester is extremely breathable which is important as many athletes can crash under the heat pressure. Another key positive of polyester is that it is moisture-wicking; this will protect the experiment from going awry by preventing sweat and any other substance from tampering with the dispersing of the light source. This is also flexible which is crucial to help guide the muscle movement of the athlete.[4] Overall, the strap formation is similar to that of a blood-pressure monitor and involves velcro to ensure the application of the strap.

My light source resolution is the next design feature: a miniscule, LED, recessed white light. I am confident in my choice here as white light contains many colour rays to help collect sufficient data simultaneously - this is critical to the analysis. It also reduces health risks as the light is dispersed within the strap rather than pinpointed to a specific place on the skin.

Equally important is the third and fourth design features: the power source and spectrometer involved. I decided on small round batteries. These batteries have a life in excess of the race and the athlete can confidently replace the batteries when necessary. I have decided that these batteries should be rechargeable as the mass use of these may have a negative environmental impact and rechargeable batteries have the added advantage of cutting costs. If the bulb ever breaks, the light source should be easily accessible to the user. In regards to the spectrometer, I have concluded that it should be placed in a lightweight 'pack' attached to the strap as it is quite bulky and so deflects any unwanted light.

Another design feature is the CCD camera which was my choice of camera as I believe the good quality counteracts the high pricing. Notably, the money saved on the cheaper light source and optical fibres (the device will be wireless), should cover the cost of this more expensive device component. This would also be situated inside the pack with the spectrometer as the camera itself is extremely small.

Finally, the sixth design feature relates to data. Due to it being wireless, all the required data will be transferred to the coach's laptop and crunched into digestible documents or graphs.

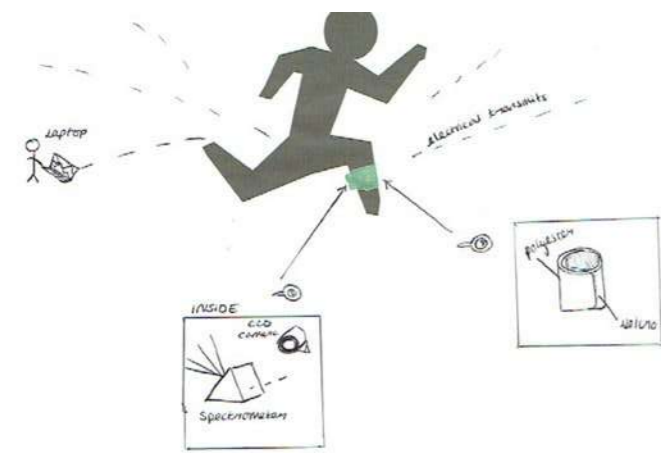
When it comes to thinking about who will help do the creation of the prototypes and final product, I would enlist a wide variety of engineers from different and unique disciplines to assist with this study. These include individuals such as Electrical engineers - designs equipment, Computer engineers - programs the crunching of data, Aerobics / sports engineers - tests the effect of the study and how it helps improve the performance of the runners and Biomedical engineers - assists with the measuring of the blood-oxygen levels.

There are endless ways I could improve this design and the way it works on different athletes. To begin with, the muscles of each individual can range significantly depending on body type or gender and this could affect the comfort of the strap and pack. This design could be adapted to fit different sports and types of strenuous activity that different athletes endure - eg swimmers. Designing this for swimmers could be difficult as the simultaneous movement of arms and legs may cause friction problems and, of course, water can definitely be a major issue. As the movement of the muscle conveys, the strap may shift, allowing water to enter and therefore interfering with the assembling of statistics. This could be ameliorated by adapting the strap to stick to the skin's surface.

In conclusion, there are difficulties to this that engineers all around the world are proficient enough to solve and help athletes perform to the best of their abilities. Competition gets substantially more onerous causing more athletes, scientists, doctors and engineers to rethink the way competitors can surpass previous performances and achieve new records. This can be accomplished by helping the body sustain aerobic respiration for the optimal time to result in the reduction of lactic acid. As many of these long-distance runners train constantly,

**Tutor comment:**  
"St David's College was my first experience teaching at KS5 level and all of the students surpassed my expectations. S.'s keen interest in the subject and her ability to utilise feedback to produce an outstanding piece of work are what made her essay really stand out. S.'s enthusiasm and growth mindset will be an asset to her in whatever she chooses to do next on her academic journey. I wish her all the best for the future."

there are fine margins when it comes to winning or losing. Using the data discovered from new IT, the athletes can pace themselves and earn themselves first place in their next competition.[5]



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### Tutor comment:

"M. is a very enthusiastic student and I thoroughly enjoyed reading her essay, in which she presents a well-researched and robust piece of work including a drawn diagram! No doubt that M. would be an invaluable presence to any undergraduate programme."

## What is the best treatment for anxiety disorders in children and why?

Year 10, Key Stage 4

Pupil: A.C.

School: Wollaston School

Supervised by: A. Trumm

Tutor University: University of Brighton

Course Title: How We Treat Anxiety: The Science

Anxiety is an abstract concept as it can only be defined by someone's personal experience, which can differ greatly due to external factors such as a person's upbringing or the area that they live in. This means that anxiety can be defined as "a feeling of apprehension or dread in situations where there is no actual real threat and is disproportionate to the situation faced." (Anxiety UK, 2022). Whilst this provides a more relatable definition, emotions are subjective. A child may find it easier to understand a description of a feeling rather than the medical perspective, but they may not feel the same way. Their anxiety could be in the form of their hands shaking or

an inability to breathe evenly. It is a possibility that a child might not be able to comprehend these feelings but only know that something is wrong.

This raises the question of who is defining anxiety? We don't know if the author has experienced an anxiety disorder. Can a medical professional really define a mental health issue accurately from their objective perspective? This definition is also phrased in a demeaning way. To someone who has a social anxiety disorder a crowded room may be a "real threat" (Anxiety UK, 2022) and to say otherwise is dismissive of their feelings and worries. This is of a greater importance when a child is involved. Even talking about their anxiety is putting them in a vulnerable situation and implying that feeling this way is an overreaction is belittling. For someone living with this type of disorder their reaction is appropriate to the "threat" (Anxiety UK, 2022) they are facing.

Most treatments require young people to interact with trained professionals. This means that they need to be provided with a certain level of respect as they need to articulate what they are experiencing well. A critical definition such as this could harm their image of themselves, something that has already been affected by social media and the expectation of perfectionism by the school system. This will further discourage them from opening up and making the most of the help that they have been given.

A more clinical approach to defining an anxiety disorder would be "a long-term condition that causes you to feel anxious about a wide range of situations and issues, rather than one specific event." (NHS inform, 2021). This highlights how the condition monopolises a person's life and how a disorder is different to simply feeling anxious in the moment. This website also mentioned that it may be caused by an "imbalance of the brain chemicals serotonin and noradrenaline" (NHS inform, 2021) whilst this makes it much easier to diagnose, it would be confusing to young children. This reinforces that there is something wrong with their brain, and by extension themselves, further perpetuating the stereotype that this is something to be ashamed of. This website only suggests two treatments, "psychological therapy" (NHS inform, 2021) or "medication" (NHS inform, 2021) both of which I deem unsuitable for children in most scenarios.

Anxiety disorders are difficult to diagnose as they present different symptoms in different people, this also means that they are difficult to treat. How could there be one treatment for everything? If one person cut their hand and another had broken their finger you couldn't give them the same treatment even though they both have hand injuries, so why are healthcare providers offering only a few treatments to care for a broad variety of symptoms?

Another issue when it comes to treating anxiety is that many people expect their anxiety to be cured, whereas for most people this is not the case: their disorder may never fully be cured with treatments only lessening the symptoms. Different environments may cause someone's anxiety to flare up, this is very important to consider in children as the school system creates pressure to succeed. Constant exams and categorising create an environment where

children are taught to believe that their intelligence is determined by being able to perform well under scrutiny. This is notoriously difficult with people with other mental health issues such as ADHD which affects focus making it harder to achieve in exams, having been made to concentrate for long periods of time.

Anxiety can also be influenced by other people, for example during the pandemic where many parents were struggling financially due to either not being able to work from home or having been furloughed. This has resulted in "One in six children aged five to 16 were identified as having a probable mental health problem in July 2021" (Young Minds UK, 2022).

A popular treatment endorsed by the NHS is cognitive behavioural therapy (CBT); the NHS define it as "a talking therapy that can help you manage your problems by changing the way you think and behave" (NHS, 2019). This shows us that to be able to utilise this resource requires a basic understanding of repercussions and that how we behave can have long term consequences rather than a short term, superficial punishment like a "time out". Young children's knowledge of behaviour and consequences is limited to concept of being "naughty" and having an authority figure correct this. So, the idea of correcting themselves is not uncommon, however the context in which they are applying this knowledge is something they will not have experienced yet.

Can we expect children to understand the bigger picture? Whilst this may not be the same for other ages, Piaget believes that between the ages of 2 and 7 a child is egocentric (Piaget, 1936). Evaluating their own actions in certain situations is a key aspect of therapy and understanding other perspectives would be crucial to criticising their behaviour, which therefore limits the benefits of talking therapy for this age group. A study shows that "Full guided parent-delivered CBT is an effective and inexpensive first-line treatment for child anxiety." (Thirlwall et al, 2018) however this doesn't consider that a parent may be a source of anxiety for the child, they also have a bias so might not take certain issues as seriously as they should.

For some children having a parent being involved in this experience may help, providing more support as a nurturing presence when in a new environment but others may be accustomed to a more authoritarian parenting style and having them present may encourage defensive behaviour meaning that the therapist may struggle to find the vulnerability that they need access to for improvement. Structured therapy sessions would make a therapist seem like an authority figure and they are also a stranger, whilst an objective view on the situation is useful it also encourages social norms that would make answering personal questions uncomfortable such as direct eye contact. Until the child and therapist have built a relationship of mutual trust and respect, they cannot proceed, however as previously mentioned, including a parent could block this relationship from forming.

They also have a small age range of only "7-12 years" (Thirlwall et al, 2018). It is important to consider the stage of development as this could change how they react towards

this style of treatment and external factors such as GCSE exams could create more pressure and anxiety therefore impacting the results. They also only use neurotypical children, in their criteria they state, "child does not have a significant physical or intellectual impairment (including autism spectrum disorders)" (Thirlwall et al 2018), this means that the results cannot be generalised. This study has only considered a small number of variables limiting the usefulness of the data. They can to the conclusion that parent-guided CBT is an effective treatment for anxiety in children as "(76%) who had received full guided CBT and 27 participants (71%) who had received the brief guided CBT no longer met diagnostic criteria for their primary anxiety disorder" (Thirlwall et al 2018) though I wonder if this is really a success. If we already know that anxiety is difficult to diagnose, does not fitting the criteria really count as being cured?

Another treatment that the NHS gravitates towards is medication such as SSRIs. These are antidepressants but they are also used to treat some types of anxiety such as generalised anxiety disorder or GAD. SSRI stands for selective serotonin reuptake inhibitors; they work by stopping the serotonin from being reabsorbed which allows it to travel to other nerve cells. This serotonin will lessen symptoms and may increase the chance of success when paired with other treatments such as CBT.

Though this would be useful for children who don't respond well to CBT is it ethical to medicate a child's brain which will not have fully developed yet? Not only could SSRI's cause long lasting damage to the brain but if a child couldn't communicate their emotions effectively can they educate themselves on the risks of changing their brain chemistry and fully consent for this treatment? It would be unethical to medicate anyone without their consent especially when they do not understand what is really happening to them. The question would then fall to the child's parents, but if therapy sessions with a professional have failed, could a parent or guardian (who may even influence the child's disorder) be able to decide if the medication would have any benefit? Anxiety can have different symptoms and unless you have experienced these, which the parent or guardian may not have, it would be difficult to empathise with them. Due to the complexity of anxiety and the symptoms it produces, no one but the person experiencing these can fully understand what would help. If the child cannot comprehend their own feelings, it would be impossible to expect them to come to a well-informed conclusion about their own brain.

SSRIs are not encouraged for treatment of anxiety as there are many side effects, the NHS has stated on their website that SSRIs are "not usually recommended if you're ...under 18, because there's an increased risk of serious side effects." (NHS, 2021). The National Institute for Health and Care Excellence (NICE) guidelines for the treatment of anxiety in young people clearly states, "You should not usually be offered ...medication" (NICE, 2013) and yet medication is still being prescribed. In fact, the "Prescribing of antidepressants in children aged 5-12 years has increased by more than 40% between 2015 and 2021" (Royal Pharmaceutical Society, 2022). If they know that this medication can have serious side effects

why are they still giving these to children? I believe that this increase is due to the NHS struggling to provide the therapy that these children need, and prescribing this medication is seen as a substitute or placeholder.

The wait time for CAMHS appointments is unacceptable with the average being "nine weeks for a first appointment and a total of 13 weeks to start treatment" (Centre for Mental Health, 2022). This would undoubtedly cause worry as mental health issues are seen in many cultures as something to be ashamed of it may have taken a while for parents or guardians to even consider asking for medical help. The theory of the NHS being overwhelmed is strengthened by the increase of prescriptions for SSRIs for women under 18 during the COVID-19 pandemic with "further peaks of 17,311 and 17,088 antidepressant prescriptions for female patients aged 0–17 years were seen around the time of the second and third lockdowns, in December 2020 and January 2021, respectively." (Royal Pharmaceutical Society, 2022).

Though I believe it to be unethical for children to be medicated with this amount of side effects when there are other alternatives quality of life must be taken into consideration. Anxiety can change the way a young person goes about their everyday life; severe cases of anxiety disorders can prevent a child from living a relatively normal life. In a post on Young Minds UK Emily writes that she was "on constant high alert" and that it affected her school life as she "spent a lot of time away from sixth form and running out of class because I was absolutely petrified" (Young Minds,2022). This emphasises how an anxiety disorder can affect a young person's life and education.

Due to the many side effects of these medications and the unpredictable nature of mental health, one young person's body may react differently to a medication than another. This means that they may have to try multiple medications before finding the right one, this could be detrimental depending on the stage of development that they are in as many side effects that are insignificant in adults or teenagers may make a huge difference in a young child. A build up of small side effects can snowball into a larger problem causing lifelong health issues.

Children may not understand simply talking to a therapist, and medicating them is extremely unethical, so what is the solution? I believe a better treatment for anxiety would be a different form of psychotherapy. This may include some aspects from CBT, as the only way to understand the issue is through communication but using other tasks such as art may be a useful medium to explain emotions where language fails. It is also more likely that children could understand this as arts and crafts have been used to teach younger children with PVA glue and glitter being a staple in most primary school classrooms. A familiar task like this may be source of comfort for them in an unfamiliar environment. Keeping themselves busy could be a distraction from the vulnerability that they must show in front of a stranger, a shield against social pressures like eye contact which may add to the discomfort of the situation. Continued used of the teacher/student dynamic is something that they will be accustomed to, this will create a sense of routine therefore eliminating another unfamiliar

aspect of therapy. A more comforting environment could increase the likelihood that a child would open up and increase the chances of the treatment working.

A recent study showed that incorporating art therapy into their life for up to a year meant that they experienced "improved mood, confidence, communication and understanding. Of the 14 children interviewed, 8 reported change, corroborated by both a parent and teacher in 5 cases, and the rest by one secondary informant"" (Deboys, Holttum, Wright, 2016). This proves that art therapy is effective, providing important life skills that will help them cope independently if their anxiety flares up again. This method might not be for everyone but art therapy is versatile with the ability to change the medium to be more mature like a colouring book or something more fun like macaroni art.

The lack of research into unconventional treatments for anxiety disorders, discounting the preconceived image of traditional therapy, emphasises the need for it. These stereotypes limit the variety of treatments that psychologists are willing to research, potentially leaving successful alternatives undiscovered. I believe that art therapy is a step in the right direction to a new way of thinking. A more casual environment and flexible approach to treating a health issue moves away from the medical ideology of pharmaceuticals and promotes finding a solution independently. I feel that viewing treatment from this perspective would help patients find the root of the problem, without the perceived interrogation of traditional therapy, and create a long-term solution.

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**Tutor comment:**  
 "In her essay, A. has shown a robust knowledge of anxiety disorders and has demonstrated impressive consideration of the issues around treating such disorders in children. Her work is beautifully written and showcases A.'s potential to excel in academic writing. I really enjoyed my time teaching at Wollaston, and I'm certain the pupils will go on to do great things in the future!"

Look at the decision that was reached by the school committee. Discuss what information you would like to see before you were willing to believe that the correct decision has been made

Year 6, Key Stage 2

Pupil: S.L.  
School: Meadgate Primary School  
Supervised by: B. Halliday  
Tutor University: University of Plymouth  
Course Title: Lying with Statistics Versus Capturing The Truth

Final Assignment

1) Questions one, three and five are the most useful. This is because without question one the entire survey would be useless as there is no point in doing the survey if you do not know what class the child is in. Also, question three is useful since, if you answer question three you answer question two. Same with questions four and five. However, the only drawback is that questions 3 and 5 can be misinterpreted as school activities that are already a club or school activities that the parent want but are not an after school activity.

2) The best aspects of the survey are that five hundred people responded out of a population 1200. Also, a mix of open ended and closed ended questions were used. However, the worst aspects are that different numbers of people from each class gave their opinions to the survey. This affects the result as it varies them drastically. For example, P7 may vote for an activity but P1 one might not agree. P7 has more responses so even though P1 does not agree to it, it will become an activity only because of the extra people in P7. Instead, use a sample of the population from each class. Furthermore, some questions are vague such as question three. This is because it does not specify if the activities are activities that are in school or outside school. Moreover, some important information is missing like gender.

3) Question 5 can cause a misunderstanding as it is not clear. It can be interpreted as either school activities that are not an after-school activity, but you would like it to be one or the activities that are currently ongoing and if your child would like to join them. The question would be 'What activities (that your child would like to take part in) could we run as a new after school club?'

4) Yes. This is because for example, if in P2 the majority of responses replied as they do not want tennis but in P5 the majority wants tennis, even though P2 does not like tennis, it will unfairly become an activity. The reason for this is that P2 has less opinions than P5.

5) Some statistics in the survey are missing, like the gender of the child, so my question would be 'What gender is your child? (Select one)'

-boy

-girl'

Another piece of information that is necessary is the day that the parents want the after school activity to be, meaning that the question would be, 'What day would you like the after school club to be on? (Select one)'

-Monday

-Tuesday

-Wednesday

-Thursday

-Friday'

Part Two

Q: Do you think the school made the correct decision? Why or Why not? In your answer you should also discuss what other information you would like to see before you were willing to believe that a correct decision had been made

The school has done a reasonable job in selecting what the after-school clubs will be, however there are still some faults. In addition, I believe that the school has not made the correct decision so I shall provide my reasons for this statement in the following paragraphs.

Pros

One thing that the School Committee did well is that they selected the top four choices. Also, they gave the percentage of each activity, showing the popularity of people that voted for a certain activity. In addition to this, the reason and benefit was also given to show why parents selected an activity. Moreover, the activities were listed in order to the least popular to the most popular from the top four. Finally, the entire school, from across all classes, were included in the survey (likewise this point can surprisingly be considered as a fault).

Cons

On the other hand, there are also many aspects that are biased or misleading, like the whole school was included (which I already mentioned that it is also an advantage as well). The problem with this is that a year 6 student may not prefer to watch the same content as a year one student. To improve this mistake, you would separate each year's results in the survey. Another mistake is that the School Committee should focus on is including everyone, ensuring that every child has at least one activity that they prefer. For example, if most students want either cricket or tennis but few children want football, the after-school clubs would be cricket and football because everyone gets one preferred option even though cricket and tennis are the most popular activities preferred by the children and adults. Furthermore, the school committee did not provide necessary information like what days each activity will be on or the start and end time in the letter.

Statistics

Furthermore, there is some information and statistics that are missing before believing this survey and conforming that it is not bias in any sort of way. One necessary statistic is the number of responses compared to the number of children in the school as if there were less responses, than the survey would not be fair as only a few people voted for their opinions. Also, the number of children that have not got at least one option that they selected in the survey, to the population of children that are satisfied would be quite important as well. Moreover, the number of children who responded to the survey in each class is needed as there could a large difference in population causing the results to be unfair. If this is the case, then taking a random fair sample from each class would resolve this issue.

Conclusion

Overall, the School Committee did a great job in making this big decision however it can still be improved on. In my opinion, I do not think that it is the best decision and is slightly unfair considering the facts I have listed above, but it is a good start.

Tutor comment:

"S. was a very keen student throughout the course, being able to apply their learning into a fantastic final assignment scoring a 1st. They were able to demonstrate skills beyond their current level, being critical of how information is presented and analysed. A massive well done."

Designing a machine to measure muscle oxygen levels for athletes

Year 8, Key Stage 3

Pupil: C.N.  
School: Hall Cross Academy  
Supervised by: O. Shobayo  
Tutor University: Sheffield Hallam University  
Course Title: Illuminating the body

Iceoxy in muscle measurer

Introduction:

The product I have designed is to measure oxygen in the muscles, specifically for a figure skater, which incorporates the usage of near-infrared spectroscopy. My design inspiration is based on the infamous Yuzuru Hanyu, a Japanese prodigy and gold medalist.

Problem:

Name: Yuzuru Hanyu

Profession: Figure Skater



12. The Image above: (Stockam2022)

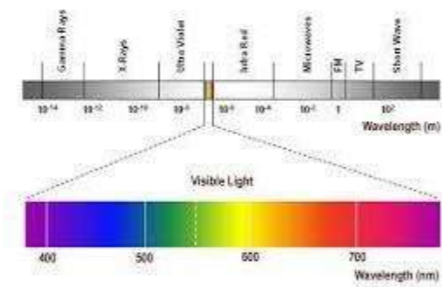
Who is he: Born on the 7th of December 1994, Yuzuru Hanyu is a talented two-time Olympic figure skater winner from Japan. He is pronounced to be one of the most influential male figure skater of all time with his multitude of awards and accomplishments: he was granted the Super Slam; broke two world records and was announced World Champion two times in 2014 and 2017. (Wikipedia 2/6/2022)

It is vital to understand the usage of oxygen in muscles to get a perception of how well specific muscles function. Allowing us to analyse these muscles would result in a more profound analogy , and help ensure that working muscles have sufficient oxygen for sustained, strong performance and endurance. A figure skater's routine includes a multitude of arduous jumps; powerful rotations and rapid speed. They must have stability, balance and control and must be able to generate maximum power and navigate tight turns. Additionally, a skater needs to strengthen all their lower body muscles in order to support the multi-joint movements of the knee, ankle and hips in skating, meaning that figure skaters need to have a strengthened lower body.(PoweringAthletes2021). Using the NIRS system would be able to analyse these muscles in great depth to provide feedback for higher performance. Overall, all these factors conclude that the product should be attached to the legs- calf/thigh.

While using this product, figure skaters will be able to analyse how oxygen levels in their muscles correspond to their performance levels. Various studies show that the amount of oxygen in muscles correlates to their overall athletic achievement. The higher amount of oxygen translates into greater energy production and therefore in an enhanced performance. (Anderson2022). When the figure skater is able to analyse this, they are able to improve efficiency and reduce injury.

Ideas:

To make this creation possible, its components must incorporate an adjustability feature -a waterproof velcro strap- to make it easy and possible to use it for different muscle sizes on the athlete's leg; it must have a strong Bluetooth wireless connection, so the data can be easily analysed on a computer; it must be wearable, lightweight and portable - by using a sturdy plastic case-, allowing easy access to the device yet not limiting the athlete's abilities as well as be waterproof and hydrophobic, as a figure skaters' working environment consists of ice and water molecules, therefore all of its technology -within the sturdy plastic case-will be contained in a clear waterproof pouch.

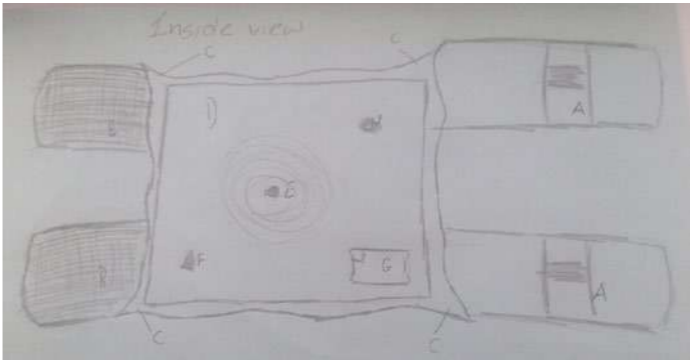


13. Image above: (Aquanswers 2022)

Focusing into the specific product, the way it analyses the oxygen within the muscles is by using near-infrared spectroscopy. This is a spectroscopic method that uses a scale from 10-6m and 10-4m wavelengths or 780 nanometers to 2500 nanometers on the electromagnetic spectrum. (Wikipedia 4/6/2022). Zooming into the specific components of the near-infrared spectroscopy device, the most suitable option would be to include: a concentrated laser light source -there is minimal light dispersal; a spectrometer to measure the wavelength of light; a high-quality CCD camera- it can detect a wide range of light wavelengths; a light detector to translate information to a human-readable form and a wireless Bluetooth connection to make it accessible on a computer.

Plan.

Further constructing my NIRS product, it will be named "iceoxy in muscle measurer"- ice represents the ice feature within figure skating; oxy is short for oxygen, and therefore the name represents the measuring of oxygen in figure skater's muscles.



(Diagram of the inside view of "iceoxy in muscle measurer")

The diagram above illustrates what the NIRS device looks like. On points A, it identifies that my device will include an adjustable waterproof velcro strap, making it accessible for all body types, and for a variety of leg muscles. The straps will be able to go around the preferred muscle and fastened to the velcro material (points B). Since figure skaters work in a humid, water environment, the device must be

waterproof and hydrophobic. Therefore "iceoxy in muscle measurer" will be contained in a waterproof pouch. This means that it will be protected in a waterproof polyurethane coating, making any sources of water (ice) inaccessible within the main NIRS variables within the device. Ensuring this level of protection will also secure the person from having any technological outbursts. Within the waterproof pouch, my NIRS device is stored in a plastic case (point D). On point E of my diagram, you will be able to find the light source. I have incorporated a strong, concentrated laser light that will shine onto the skin. The reasoning behind this is that it will be able to travel for long distances with minimal scattering, making it the perfect candidate for an intense analysis of the oxidation in muscles. On point F, there is a spectrometer, which can measure the amount of wavelength of light, and on point G, there is a CCD camera that can detect a wide range of light wavelengths and produce a

high-quality image. On point H, there is a light source, which can sense the light transmitted through the muscles and process it into a signal that humans can easily understand. My choice of light detector is a photodiode, as it is able to detect light and transfer it into an electric current that is then analysed by a computer. However, in order for this to occur, the device will incorporate a wireless Bluetooth feature making it accessible for a computer to examine the data. Bluetooth is able to work by sending radio waves to the computer, transporting the information.(Insider 2022). When powering my design, -behind the diagram, and within the sturdy plastic case - there will be a battery compartment, for generating power to keep the product useable.

The way the figure skater will be able to use this device is by strapping it securely onto their designated muscle. Whilst they complete their skating regime, their coach will be able to study the oxidation levels in the muscle and give them valuable feedback for greater athletic achievement.

Do:

When fully manufacturing "iceoxy in muscle measurer", It will need different engineers to construct individual variables. A Water and Marine Engineer, who specialises in water devices, would ensure the device will be waterproof and safe for the product to be used. They will ensure the water environment will not affect the use of the product, by not having any water malfunction. Also, they prevent any injury to the ice skater caused by technical difficulties. (Lavalin 2021).

When piecing together the near-infrared spectroscopy aspect of the design, an Instrumentational engineer will be utilized. They are able to use the device to record and monitor the quality of data received, in order to transform it into beneficial feedback. Aside from this, they are also able to ensure the reliability and safety of the final product.(GetReskilled 2022).

When constructing any type of device, a Production or Manufacturing engineer will need to be present. Whilst designing "iceoxy in muscle measurer", they will figure out how it will be produced and assembled. Additionally, they are mainly responsible for improving the product by implementing production processes and procedures. They find more cost-effective alternatives; ensure the device is high quality and has no flaws.(AutoMotive 2016)

Improve:

One way of improving this product is by developing it to suit other sports and athletes. For instance, if this device were to be adapted to suit a basketball player, it would need to be extremely compactl and lightweight, as its mass will affect their performance while playing with the ball; it will need to be exceptionally secure, as their range of movement is vigorous, which will cause the device to fall if not constructed properly.It should have a long-lasting battery life, as basketball games can last for a long time, or have an exceptionally concentrated and strong wireless Bluetooth connection.

Further reflecting upon the device, some factors of improvement could consist of the cost. Within “iceoxy in muscle measurer”, a CCD camera is included. The complication with this is that they are quite expensive, some ranging within thousands of pounds. Changing the CCD camera into an FD-1665 Multispectral Camera would make it less costly and more accessible to a wider range of users. FD-1665 Multispectral Cameras are far less expensive, with them varying in the range of hundreds of pounds. Another benefit of this change is that FD-1665 Multispectral cameras are extremely customisable, with a variety of configurations for customized and precise imaging. (OceanInsite 2022).

Another way of improving my device is by incorporating a new way of generation. A new creation called thermoelectric generators make it possible to produce electrical energy from your body's temperature. Thermoelectric generators work by using the difference in your body's temperature against the surrounding cool air. (Delbert+Linda 2021). Embedding this into the athletic field, it is a great variant as the athlete's temperature increases when exercising and doing their specific sport. We can use this product instead of the batteries, making it more efficient and sustainable.

Conclusion:

“Iceoxy in muscle measurer” is a product designed to measure oxygen in a figure skater's muscle, by using near-infrared spectroscopy. Whilst it is strapped onto the athlete's leg, it connects to a computer- analysing the data. This is then able to be translated into important information and feedback for improvements.

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**Tutor comment:**  
"C. is a very intelligent girl. She did not say much during the tutorial, but she did a good job of jotting down most of the important things she needs to do. Her learning method is way beyond the level she is at school, which is evident in the quality of the essay she produced for her final assignment, which requires a great deal of imagination and understanding of complex biology, physics, and engineering. She was awarded a mark of 75 out of 100 (first) for her efforts, which means she is already performing to an excellent standard at GCSE."

**“You are now going to pretend to have invented a therapy that heals skin. Tomorrow you have a very important day, you are going to pitch to investors your new product. To prepare yourself you decide to write an essay on your therapy. “**  
**The assignment should be an argumentative piece where you discuss why your product is important and explain the science behind the regenerative medicine technique you selected.**

Year 10, Key Stage 4

**Pupil: R.B.**  
**School: St Michael's Catholic College**  
**Supervised by: E. Drudi**  
**Tutor University: King's College London**  
**Course Title: Regenerating skin in lab: fantasy or reality?**

Reconstructing Healthy Skin in Burn Victims

For decades, the method behind treating 3rd degree burn victims consisted largely of contingency: replacing as much damaged skin as possible with skin grafts to minimise the risk of an infection or other dangerous complications arising. This means that the regions of the skin which were burned will never regenerate fully, and the organ will forever be unable to fully carry out all its functions due to a loss of important structures like glands and hair follicles. Skin grafts or Apligraf are useful in their ability to cover the internal parts of the body but offer little more than surface level protection. However, I have discovered a new method to replace damaged skin which should also be able to carry out all the major roles of the skin. My method consists of reconstructing the whole organ in a lab, using stem cells acquired from xenologous sources, with very similar properties to humans.

There are an estimated 180,000 deaths every year from burns; a vast majority of these occur from non-fatal burn

injuries. Not only is this due to the public misconceptions about burns and how to treat them, but also because current treatments are limited in how effective, stable, and permanent they are. For instance, there are some risks with skin grafts, the most commonly used treatment for 3rd degree burns, which could cause the graft to fail. These include blood or pus pooling underneath the transplanted skin, infections (including fungal, viral, and bacterial), damage to the graft site and blood circulation complications. In addition to this, there are several factors which can affect whether the skin graft will fail or not. One study, published by the Egyptian commercial publishing firm Hindawi, found that skin grafts in the lower limb have higher failure rates, as evidenced by 22 of the 70 grafts failing (around one third) after 6 weeks. In this study, the median age was 79 years, and a high proportion of patients were on immunosuppressant medication (8%). This shows that not only do grafts of the lower limb fail more often, as opposed to the average 15% to 7% range established in an article in the National Library of Medicine, but that there are other factors, such as certain lifestyle choices, age, and other conditions which may increase the risk of complications. Not only are there risks with the skin grafts themselves, but there are also complications involving this surgical procedure. An article published by Cleveland Clinic describes these as: haemorrhage, contracture, discolouration of the skin, loss of skin sensation or increased sensitivity to pain, chronic pain, and a build-up of scar tissue around the graft site. This shows that there is a risk in choosing to use conventional grafts, whether it be an autograft, allograft, or xenograft. However, my method aims to provide patients with a better choice which will not only reduce the risks and complications, but also retain full functionality of the skin, rather than the more aesthetic purpose of skin grafts, which are limited in carrying out the functions of the skin.



Figure 1

An example of a skin graft to the nose which has failed, or not 'taken'. The donor skin has become necrotic, possibly due to rejection from the body or a lack of proper blood supply, as well as a multitude of other factors.

The method for recreating skin is safe and ethical, allowing patients to feel comfortable and secure when choosing this option of treatment. The process involves harvesting embryonic stem cells from a pig foetus. The reason for using embryonic stem cells is that they can differentiate

into any type of cell, which is important when trying to recreate a whole organ, which contains lots of complex structures that an ordinary adult stem cell would be unable to differentiate into. There are other methods to obtain pluripotent cells, such as creating induced pluripotent stem cells, pioneered by Shinya Yamanaka. These cells have even begun to see usage in organ synthesis in the form of a clinical trial synthesising livers in mice. However, these cells require a larger number of resources and time to create, as well as donor somatic cells from the patient. This also indicates a greater cost compared to using embryonic stem cells. Clearly, it would be illegal and unethical to utilise embryonic stem cells from an allogenic source, as human foetuses are granted “foetal rights” in certain countries, meaning that they must not be tampered with in any way that would have adverse effects on the child and their quality of life. However, no such regulations apply to animals, which is why this method uses pig embryos, which are cheap and expendable whilst still maintaining the correct properties to synthesise an organ. In addition to this, these cells can be genetically engineered, removing the protein which leads to rejection. Rejection of organs after a transplant is very dangerous and can be fatal, and it is not uncommon. The National Kidney Federation estimates that around 15% of patients suffer acute rejection in the 3 months after a transplant. Therefore, if gene therapy can be used to stop rejection, there is a much higher chance of success with this method. Once the embryonic stem cells are obtained, the skin organ is recreated in vitro. The stem cells are stimulated to differentiate into the required specialised cells, which will then construct the various layers and structures of the skin. For third degree burns, where the epidermis and dermis are damaged tissue, all structures will need to be recreated in order to allow the skin to retain its correct function. In addition to this, enough skin will need to be synthesised to cover the parts of the body which have been burned- this is easily accomplished because the embryonic stem cells will naturally undergo mitosis (or this can be catalysed in a lab), meaning that there will be a sufficient number of cells to recreate the organ. In order to avoid the risk of infection, the patient should be kept in a sterile environment and have their wounds dressed regularly. A surgical procedure would then take place, where the damaged skin would be replaced with the new skin.

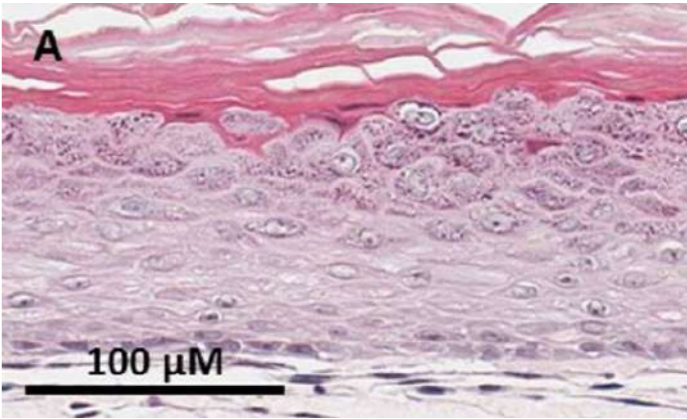


Figure 2

A close-up image of an organotypic culture of the skin.

Scientists have already been able to create cultures that resemble organs; however, this is mainly for research purposes, unlike my method which aims to recreate organs accurately and effectively.

There are many advantages to using this method, as opposed to other alternatives currently in the industry. Not only does it cover areas of the body susceptible to infection due to skin damaged by burns (which is the main aim of skin grafts), but it also allows for other functions of the skin to be restored. For instance, this skin can aid the body in maintaining homeostasis- there are hair follicles in this skin as well as a good blood supply, which means that the skin can help to trap thermal energy when it is too cold or release it when it is too hot. Another core function of the skin, which cannot be replicated by skin grafts, is sensation- the ability to detect changes in pressure and temperature are essential and require the skin to have receptors connected to the central nervous system via a sensory neurone. Provided that the nervous tissue is not damaged by the burn, or that a nerve can be grafted from an allogenic or autologous source, then sensation could very easily be returned to the parts of the body. Skin grafts are simply unable to do this, as they are not a full reconstruction of the organ, but rather a suitable alternative for cosmetic and protection purposes. Animal cells are also very abundant, and they can be genetically modified as discussed before, to contain the most desired properties. For this reason, they could be made much cheaper than conventional treatments in the future once the technology to mass produce xenogeneic skin organs. However, there are some potential disadvantages to choosing this method of treatment. As it is very new and experimental, it would require a full-scale clinical trial on burn patients, to test for its efficacy and safety. There is a chance that it may experience similar risks to skin grafts, but the full reconstruction of the skin as well as genetically modified cells which do not trigger an immune response should allow the new skin to thrive within the body. The risk of rejection is made significantly lower through the gene replacement. Whilst reconstructing the skin may take some time, it is clearly a long-term solution, which should not need to be replaced or reapplied after some time, like shorter term products (Epitel and others). A simple solution to overcome this is temporary skin grafts and other synthetic alternatives, to seal the wounds and limit risk of infection until the organ has been grown fully.

There is also a huge interest in this particular branch of regenerative medicine, stretching beyond the realms of skin reconstruction: due to the deficit of donor organs and number of patients requiring a transplant desperately, researchers are very keen on finding a way synthesise organs. The NHS transplant activity report actually states that there is a decrease in the overall number of organ donors between 2020 and 2021, due to a 25% fall in the number of deceased donors, 19% decrease in donors with brain death and 35% drop in the number of donors with circulatory death. This goes to show the significance of organ reconstruction in the current day and age, as the pandemic among other factors has made organ donors increasingly difficult to find, resulting in a greater loss of life. Some researchers at the Biopole Medicine Faculty in France speculate that it is possible to reconstruct organs

by using the extracellular matrix from xenogeneic organs and replacing the cells with autologous cells, in order to quash the risk of rejection. With the abundance of animal organs, it seems that this would be the next logical step in the evolution of transplantation. These researchers have also concluded that it is very difficult to reconstruct more complex organs such as the kidneys, heart, and liver due to their three dimensional and complex structure - this is not even a problem for my method, as the skin is a simpler organ structurally. The skin is made up of layers, giving it a two-dimensional structure, where the different structures sit on top of each other. For this reason, it is much simpler to recreate the skin, so if it is possible to reconstruct a heart then it is much easier to reconstruct the skin. In fact, researchers at the Texas Heart Institute have even theorised that bioartificial organs could be made completely from scratch using induced pluripotent stem cells to differentiate into cardiac cells, for instance. However, these methods still require some use of decellularised scaffolding, which brings in more complications and makes the whole procedure more complex: this shows that my method is much simpler and will therefore work much better on a large scale when it is used.

In order to ensure that my method works within the law and ethical framework surrounding medicine, I have closely consulted with the Animals in Science Regulation Unit. When housing pigs, which I need to create embryos, I make sure "provide an environment which takes into account the physiological and ethological needs of the species kept in them" (in this case, pigs) in accordance with the Code of Practice for the House and Care of Animals Bred, Supplied or Used for Scientific Purposes. In addition, I have completed a harm-benefit analysis of my method. The use of pig embryos is not banned, and it only results in the termination of a pig foetus. In exchange for this, organs are synthesised, which can help save the lives of thousands of burn victims who might otherwise never retain full function of their skin again. It is also a proven fact that foetuses younger than 12 weeks definitely cannot feel pain, and that in most cases this extends to 20 weeks gestational age. Ultimately, my method is a ground-breaking advancement in not just the fields of burn treatments, but also regenerative medicine as a whole. Facilitating the reconstruction of a simpler, yet vital, organ such as the skin acts as a gateway for scientific discoveries in other branches of regenerative medicine. As for burn patients, this is clearly the best way for them to have a good quality of life, without having to worry about the aesthetics or functionality of their skin. Though this method is most useful in third degree burn patients, there is no reason why this method cannot replace skin grafting entirely.

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Tutor comment:

"I really enjoyed my time at St Michael's Catholic College. The whole group was excellent and engaged throughout all the tutorials. R showed a real in-depth understanding of the topic of regenerative medicine. He showed great critical thinking skills and proved to be an independent thinker, great characteristics to have for university. I am sure he will be successful whichever his next steps will be."

Identify and critique 3 techniques using neurodegenerative disease

Year 9, Key Stage 4

Pupil: C.B.  
School: Marple Hall High School  
Supervised by: A. Burrows  
Tutor University: Manchester Metropolitan University  
Course Title: How (and Why) to Make a Brain Cell

Critical Evaluation of Cell-Based Techniques Used to Investigate Neurodegenerative Disease

Alzheimer's disease is a common neurodegenerative disease. Today, over 25 million people are affected by the condition. (Qiu et al., 2009). The main symptoms are cognitive disorders and a progressive degeneration of memory, eventually causing language difficulties, visual impairments and behavioural issues. Alzheimer's is categorised into early onset (cases in under 65s) and late onset (cases in over 65s). Due to the world's ageing population, the prevalence of the disease continues to grow at a rapid pace. This creates a large burden on caregivers as they must give up free time and independence and it increases strain on health and care services due to Alzheimer's-related hospitalisations and deaths (Pudelewicz et al., 2019)

Currently, little is known about the causes of Alzheimer's and how genetic mutations can lead to the disease. Research in this field would open up the possibility for treatment and possibly a cure, which is currently unavailable. However, a

single drug to cure Alzheimer's is unlikely to be developed with current medical technology, so any treatment would have to be tailored to the specific patient and type of disease. (Mangialasche et al., 2010). For this reason, further information about the genetic mechanisms of Alzheimer's would enable more targeted and effective treatment.

Cells use DNA (Deoxyribonucleic Acid) to store genetic information. The main information stored is the instructions to create proteins. DNA stores information through the base pairs Cytosine (C), Guanine (G), Adenine (A), Thymine (T). A is always opposite T, likewise C is always opposite G. When a protein needs to be made, a single strand of RNA which holds a copy of the section of DNA needed to produce a protein is generated in a process called transcription. The RNA is then transported to the ribosomes, where translation occurs. Each 3 bases on the RNA strand code for a specific amino acid. The strand as a whole codes for the entire protein, which is made up of a long string of amino acids. Differences in gene expression, rather than the genes themselves, are powerful drivers of biological processes, and are believed to be the dominant cause of variation between organisms (De Klerk et al., 2015).

When a mutation occurs in the DNA, one or more bases may be added, shifted or removed entirely. This causes the protein to be formed incorrectly, affecting its ability to bind to other proteins. This can disrupt many vital functions in the body. For example, in early onset Alzheimer's, the genes APP, PSEN1 and PSEN2 affect production of a protein called Amyloid Beta (Abeta). When there is an abnormal concentration of Abeta in the brain, plaques can form, disrupting normal brain function and leading to Alzheimer's disease (Chen et al., 2017).

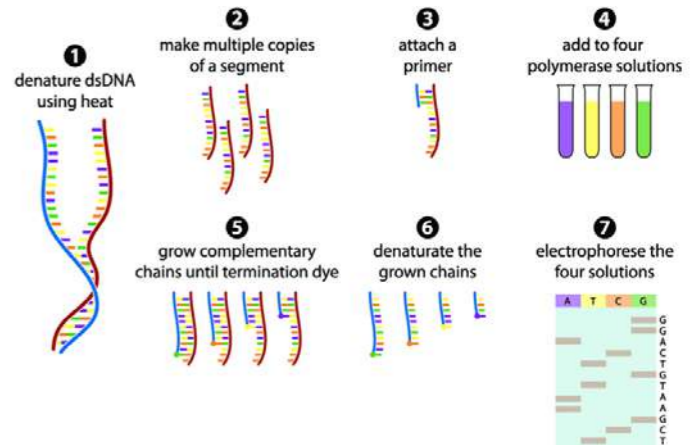


Figure 1 – DNA is sequenced by isolating the DNA and using primers to look at a particular part of the genome (Gauthier, 2007)

DNA-based investigation is the process of looking at a cell's DNA to determine if there are any mutations present. It involves lysing the cell to expose the intracellular and genetic material. Once isolated, primers are prepared as only a small section of the genome can be sequenced at one time. A pair of primers are attached to the DNA strand to define the region to be sequenced, as shown in figure 1 (step 3) (Loftus, n.d.).

DNA-based investigation is most useful when scientists want to find out exactly what mutation is present in a diseased cell. Information about mutations is useful for understanding the genetic causes of a disease. However,

DNA sequencing does not always reveal how a mutation actually leads to the disease, only that a mutation is present. Usually, it is necessary to sequence the genome of a control cell as well as a diseased cell, to identify the mutations present in a diseased organism.

When studying Alzheimer's, this method of investigation could be used to sequence cells for the main mutations that cause the disease (APP, PSEN1 and PSEN2). By comparing the genomes of cells from Alzheimer's patients with control cells, additional genes that cause the disease can be identified and researched further.

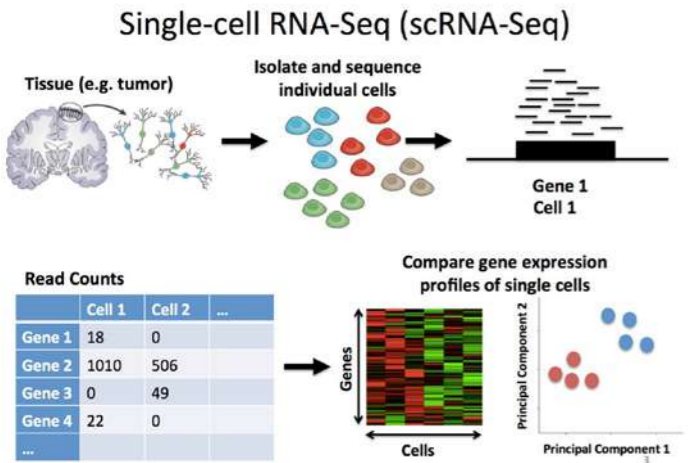


Figure 2 - Each RNA strand is sequenced to identify which genes are expressed more in a diseased cell [Single cell RNA sequencing, n.d.]

RNA-based investigation involves isolating all of the RNA strands currently in the cell and sequencing them to identify which genes are expressed the most. All the RNA in a cell combined contains vital information on what genes are being expressed and made into proteins. Collectively, this is known as the transcriptome. To investigate gene expression, you must sequence all the RNA strands in a cell and compare them to the human genome. By matching RNA strands to specific genes, scientists can see which genes are expressed more in a particular cell. By comparing a diseased cell to a control cell, RNA sequencing allows investigation of which genes are over-expressed or under-expressed due to disease (Kukurba et al., 2015)

This is useful to investigate the effects of a disease on protein production and gene expression. When a certain strand of RNA occurs more in a cell, it implies that the production of its corresponding protein has increased. For example, when comparing a brain afflicted by Alzheimer's with a control sample, researchers found that certain genes related to immune function were upregulated (expressed more) in the Alzheimer's sample (Guennewig et al., 2021) This allows scientists to see the effects of Alzheimer's more clearly on the cellular level. If a gene is found to be expressed more in a cell from an Alzheimer's patient, this could be used as a test to determine whether other patients have Alzheimer's disease.

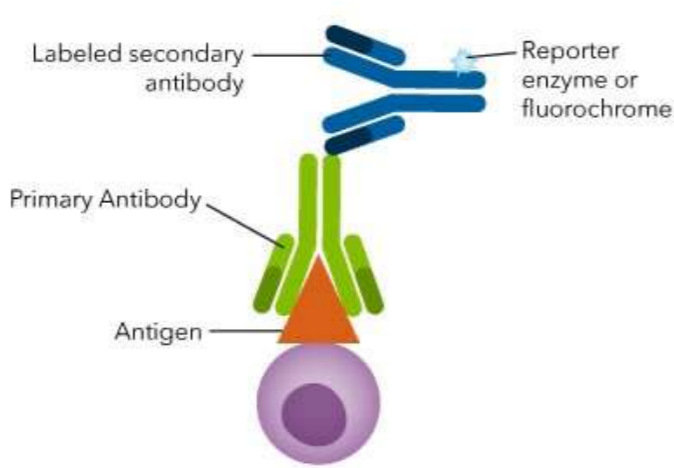


Figure 3 - First, a primary antibody is attached, then a fluorescent secondary antibody is added (Flow Cytometry Services, 2021)

Protein-based investigation involves the use of antibodies to signal the concentration of a certain protein in a particular cell or area. Antibodies are proteins that bind to specific molecules and are often used in the immune response to attack certain pathogens. First, a primary antibody is designed that will bind to a specific protein. Once the primary antibody has bound, a secondary antibody is attached. These contain fluorescent molecules that will emit light when they find a primary antibody. Scientists can then look through a microscope to observe the amount of fluorescence produced. This can be used to compare the concentration of proteins between different cells. Cells from a patient affected by the disease are compared against control cells to study the effects of the disease on protein concentrations. For example, scientists have used antibody-based protein investigation to deduce that, in Alzheimer's patients, there is an increased ratio of Abeta42 to Abeta40. Usually, this is manifested through a decrease in Abeta40 production, although some mutations lead to significantly higher Abeta42 production (Kumar-Singh et al., 2006)

One of the main advantages of RNA sequencing is its high sensitivity. Using this technology, it is possible to research gene expression in incredibly high detail and accuracy. RNA sequencing can detect minute changes in gene expression, allowing more thorough research of the more subtle effects of diseases (Whiteley et al., 2016). This could be used to detect the changes in APP, PSEN1 and PSEN2 expression in Alzheimer's Disease as much is not yet known about how the genes – and their effect on Amyloid Beta production – actually cause the disease. By using the technology in tandem with protein investigation, scientists could research the link between the upregulation of a certain gene and the increase in production of a corresponding protein. This could facilitate further discoveries on the process of protein production and how RNA expression affects the behaviour of the body, especially when that expression is impacted by disease.

However, there are also many drawbacks to RNA-based investigation. Sampling costs can range from \$125 per sample for lower-fidelity investigation while higher-fidelity can cost upwards of \$250 (Getting Started, n.d.). This can make RNA sequencing prohibitively expensive for

large-scale projects, such as research based on a wide population sample. It also limits the technology's use for personal health, as the costs are too high to be used as a routine health test.

Protein-based investigation is extremely useful for investigating the direct effects of a disease. It is the only main investigation technique that looks at the outcomes, rather than the causes or processes. As proteins are the main building blocks of the body, a disease which affects protein production will have wide-ranging effects all across the body. This can give scientists an insight into the symptoms of the disease on the cellular level. In addition, multiple proteins can be tagged with different colours, allowing a comparison of the effect on a wide variety of proteins and structures.

On the other hand, antibodies used for research may decay or become unusable after a short time. This can limit the reproducibility of some discoveries made using the technology (Weller, 2016). In addition, if a lesser-known antibody is being tested, a new type of antibody may need to be designed, increasing the cost and complexity of experiments.

One of the advantages of DNA-based investigation is that it is specialised for one specific section of the DNA. This makes analysis of the data much less costly and time-consuming and allows researchers to focus on a specific mutation and its effects. It also allows direct analysis of the genome and discovery of the exact mutation a disease is caused by. This is in contrast to other methods such as RNA sequencing and protein analysis, which only allow indirect observation of the genetic causes of a disease.

However, its specificity is also a key downside of DNA sequencing. As you can only affordably sequence a very small portion of the genome, it is not an optimal investigation method for diseases that may be caused by multiple genes. In addition, to know what segment of the DNA needs to be investigated, scientists need to already have an idea of the type of gene that may cause it. If the cause is completely unknown, researchers may need to use more costly whole-genome sequencing. Currently, this can cost above \$600, making it less economical than primer-based sequencing of a small section of DNA (Preston et al., 2021).

In summary, the high sensitivity of RNA sequencing allows greater insight into gene expression, as even the smallest changes can be identified and researched thoroughly. However, prohibitively high costs pose a barrier to large-scale research and personal health uses. Protein-based investigation is enormously useful for studying the effects of a disease on the body, as most main biological structures and processes rely on proteins. Its main drawback is antibody decay which is a serious challenge for researchers and can increase cost and complexity. DNA sequencing is relatively inexpensive and directly examines the genome, although it usually focuses on a small part of the genome, limiting its applications for the investigation of diseases with multiple causes.

Overall, any substantive investigation of Alzheimer's Disease would require a combination of multiple investigation methods. DNA sequencing would be

effective at identifying the genetic causes, although whole genome sequencing may need to be used; RNA sequencing would be effective at examining the disease's effects on gene expression and regulation; Protein-based investigation would be effective at examining the effects on protein production. By combining these methods and more, scientists may one day come to better understand – and potentially cure- Alzheimer's disease.

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Tutor comment:

"The students at Marple Hall High school all worked incredibly hard to develop their understanding of complex scientific techniques used in the lab to investigate disease. I was so impressed by every final assignment, especially this one from C.. C. was engaged throughout the course, asked questions, took comments on board and carried out his own research outside of the tutorials. He also used critical thinking to evaluate techniques and produced an excellent piece of work which shows university level understanding."

# Discuss the prevention strategies for malaria outbreak in a village

Year 8, Key Stage 3

**Pupil Name:** J.G.  
**School Name:** The Thomas Aveling School, Rochester  
**Supervised by:** Y. Choo  
**Tutor University:** Soka University of Japan  
**Course Title:** Discuss the prevention strategies for malaria outbreak in a village

Malaria

Pt1 - What it is and How it Works.

Malaria is a disease spread by a parasite plasmodia living within the mosquito vector. Infection by malaria always begins with an insect bite, usually from mosquitos. In 2015 Malaria infected 200,000,000 people and caused the deaths of 500,000. After infection begins plasmodia heads directly for the liver where they enter your cells to hide from your immune system. After fully harvesting the resources available in the liver cells they move out to target your red blood cells, in order to avoid detection, they envelope themselves in the membranes of the liver's cells. In order to attack your cells, they penetrate the outer membrane before multiplying until the cells burst. This sends dead organic matter into your bloodstream. The scattered dead cells matter is recognised by your immune system as a threat which leads to a response by said immune system, the development of symptom which resemble the flu. Among the symptoms are:

- High fever
- Sweats
- Chills
- Convulsions
- Headaches
- Vomiting
- Diarrhoea.

However, the true horrors of this parasitic infection occur when it pierces the blood brain barrier, if it reaches this point it can cause Coma or, in some cases, death. At that point, the parasites are ready to disembark from their current victim and upon the next mosquito bite they flee with the new insect.

Given how mosquitos operate we are lucky that every disease is not spread by them. Functionally, as a species, they are immortal. Each one can lay up to 300 eggs so the gene pool can diversify at lightning speed and there are already TRILLIONS of them. As well as this they can reproduce in impressively small bodies of water, like rainwater collected in a gutter or persistent puddles. And it only takes them roughly 14 days to lay their eggs and for said eggs to hatch. So, it is nearly impossible to completely remove them from any large area permanently.

Pt2 - The Basic Anti Being Bitten Prevention Measures.

As malaria's infection always begins with an insect

bite, specifically that of a mosquito, this brings a simple preventative measure to mind, not being bitten. Obviously, this is easier said than done however there are a few mostly effective ways that it can be achieved. Of course, there are the simple solutions like screened windows doors and mosquito nets. Air conditioning also helps as mosquitos prefer warmer and more humid climates, which are similar to where they breed.

And the other solution is our lord and saviour insect repellent, specifically ones containing diethyltoluamide (or DEET) are effective against mosquitos. Some people say garlic works as a repellent to mosquitos, just because they drink blood does not make them vampires, this is not true.

As well as this, avoid areas with high amounts of stagnant water as this is where mosquito's breed, only the females bite which means that a breeding ground probably is not the best place to be. You should also clear out any areas of stagnant water around your residence if you are in an at-risk area, mosquitoes can reproduce in remarkably small areas of water, like residue in flower pots or small puddles in the dirt.

However, all of these measures do not tackle the main issue of malaria, the area's it attacks are by and large developing nations. As well as that diagnosing it requires equipment that requires electricity, this is a problem. So, when avoiding being bitten becomes impossible the question becomes, how can we avoid or diagnose infection by plasmodia in these areas. Fortunately, there are answers to both of these problems. The diagnosis problem was solved by Manu Prakash, who designed a paper microscope and centrifuge that can be made for less the \$5.00. The centrifuge was inspired by a children's toy called a whirligig. It uses string rather than gears to reduce cost and operates exclusively with human power, no electricity is needed. The paper centrifuge or paperfuge, is capable of reaching 125,000rpm (and apparently theoretically can achieve far higher speeds) (<https://www.biorxiv.org/content/10.1101/072207v1>) which is more than sufficient for separating the red blood cells and the plasma. Using this and the paper microscope low cost accurate diagnosis can be achieved which allows for medical attention to be given when needed, which prevents fatalities in the infected individuals.

The other problem has 2 solutions, a vaccine, and a piece of recently discovered genetic engineering technology called C.R.I.S.P.R.

Vaccination

Currently the most, and only, effective Malaria vaccine is RTS, S which was made by scientists working at SmithKline Beecham Biologicals (Now known as GlaxoSmithKline Vaccines) In terms of efficiency this vaccine was subjected to a 5 year trial. During this trial it proved effective in preventing 39% of malaria cases in children of five to seventeen months and 29% of severe malaria cases in that same age range. It also drastically lowered the rate of hospital admissions due to the infection or

severe anaemia. The vaccine also lowered the demand for blood transfusions, which may be needed to treat malaria by 29%. One of the reasons this vaccine has not been deployed to all of these areas in the over 30 years it has been available is the obvious cost factor. Creating one shot of this medicine costs 5USD and it is a 4-course vaccination. That is not including the cost of shipping these products to the afflicted areas and hiring medical professionals to administer the immunization. On top of that while a 39% decrease in cases is great many would argue it is not worth the overwhelming cost of using the vaccine on everyone susceptible to infection. Which brings us to our next solution which, in a perfect world, may have a 100% success rate. We do not live in that world, but it is promising none the less.

Genetic engineering

This solution would be, genetically redesigning an entire population to eradicate the disease. Mosquitoes are biological vectors, meaning that they transmit the parasite, plasmodia, into other hosts. Plasmodia entirely depends on mosquitos to survive so if we found a way to immunize mosquitos to this parasite malaria would essentially disappear.

Fortunately, we have found a way to do this, and it is called C.R.I.S.P.R. C.R.I.S.P.R allows for precise editing of genetic information in a way that was not possible up until its discovery. Using C.R.I.S.P.R Scientists have already engineered these plasmodia resistant mosquitos; however, they are locked inside a lab. As well as this, because offspring have sets of genes from both parents it would not take a significant amount of time for all of that time, effort, and money to have been completely erased from the gene pool. However, the power of science has presented a solution to this as well, Gene drive. A gene drive is a way of forcing genes into a population's offspring raising the 50-50 chance of the plasmodia resistant gene being passed on to nearly 100%. The question is whether we should release these insects on a large scale and potentially permanently alter the gene pool of mosquitos or pursue other methods. There are arguments for either side, however when every 30 seconds a child dies is there really a moral way of saying no? Some would say that yes, it is because if gene editing of an entire species goes wrong the consequences could be colossal. However, in this specific instance the editing that is taking place is relatively minor the worst case is most likely that it will not work as intended or that the plasmodia will manage to adapt to the change. If that did happen it would be a lot of money wasted but it would prove that this is a promising route and that it did work, at least for a limited time. Using this method provides more of an ethical question than a scientific one, as it is clearly within our capabilities to do this. So ethically, should we play god with other animals to save ourselves? Some would say it is a more sophisticated version of other animals using tools to catch their own prey, others are starkly opposed to the idea of trying to exercise control over other animals, whether it be horses drawing ploughs or our editing of their genome.

Conclusion  
However, we must state once more that in the estimated time it will have taken you to read this 15 children have died of malaria alone. Everyone agrees it should be stopped the only variable really is how much money they are willing to invest. Think that every 30 Seconds a child dies of this disease on average. 3000 innocent children die every day. In fact, the majority of victims are children, imagine how many geniuses' prodigies and kind people that we desperately need were snuffed out. This disease is slowing down our progress as a species.

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**Tutor comment:**  
"Although J. may appear somewhat reserved throughout the online tutorials, his essay was effective in that 'a line of critical thoughts were displayed throughout'. That his essay also presented additional prevention methods which was not covered in class amazed me with not only the level of interest he took to complete the essay, but his ability to capture new information and use it successfully to construct arguments. No doubt, this formation of 'independent learning' will be useful to any undergraduate programme J. may wish to pursue."



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