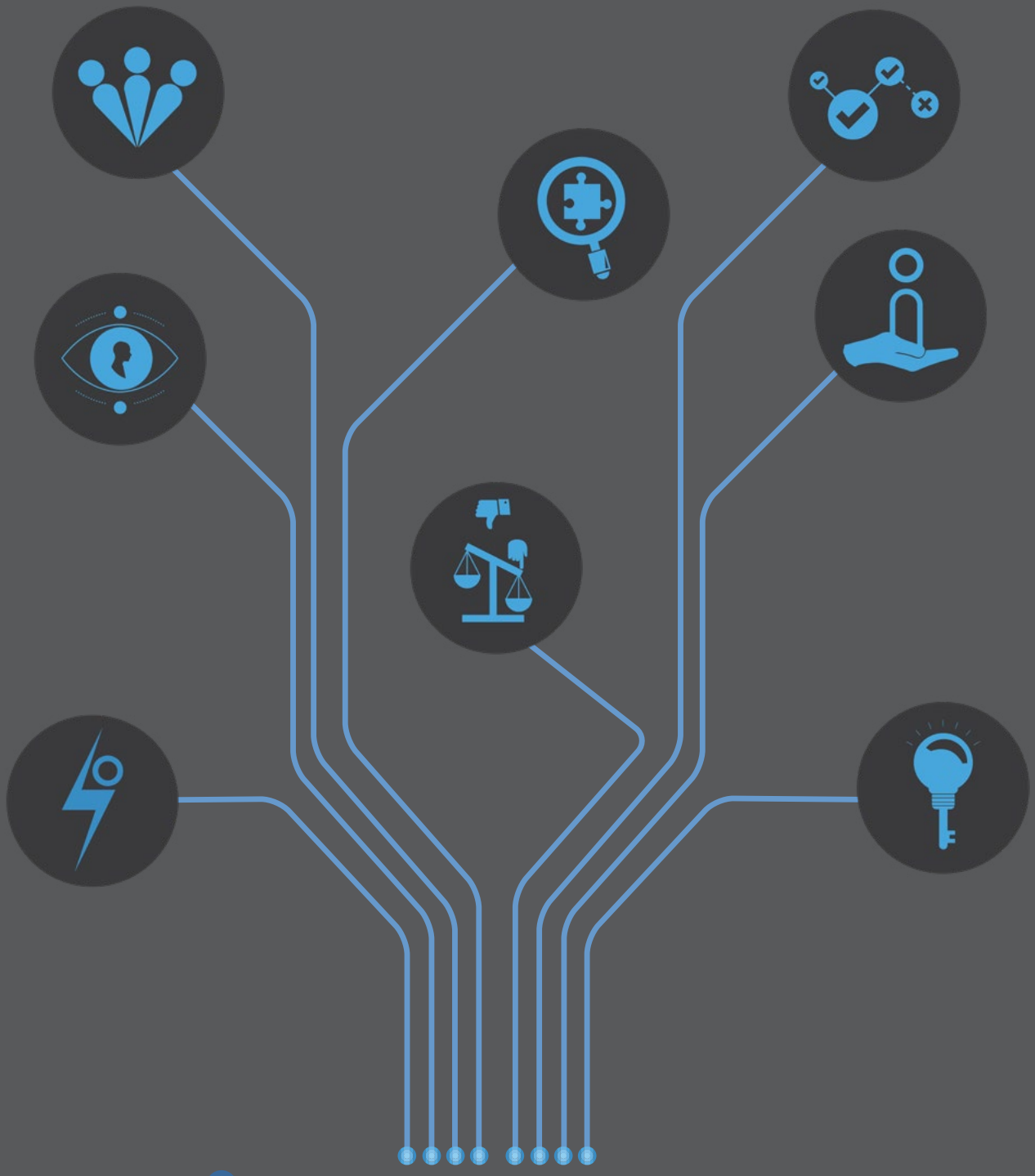

iNTEGRITY

H2020

Teachers Guide for Secondary School Research Integrity Course

Empowerment

Drawing on the work of others

Collaboration and working together

Dealing with cheating and other un ethical behaviour

Collection, analysis and presentation of data

Consent and researching with vulnerable groups

Authorship of research and who should be credited

Ethical use of data

INTEGRITY
H2020

Teachers Guide for Secondary School Research Integrity Course

contents

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824586.

“Research integrity means doing the right thing, and giving credit where credit is due”

Dr Dorian Karatzas

Head of the Sector for Ethics and Research Integrity, European Commission

01

Introduction

How to use this manual

This manual is intended to guide teachers when working through the modules which make up the INTEGRITY Project Research Integrity course. The full course consists of 9 modules, each of which has been designed to address the main research integrity issues of most relevance to secondary school students. Empowerment of the student for responsible research conduct is at the core of the INTEGRITY course and each of the modules.

The different modules present concrete situations representing different integrity challenges. It may sometimes be useful to know the formal terms for the different integrity issues, and this section gives a brief overview to terminology.

We suggest you work through the modules in the order presented and that you are guided by the module timeline for each module. We also suggest that a full module be completed in a single session where possible. A PowerPoint slide deck is provided for each of the modules, and there are also additional materials and a variety of other resources provided where appropriate. We strongly recommend that you allow time for student reflection both during and after each module, and that this be achieved by using zines. Zines are a powerful reflective pedagogical tool which are best described as a small handmade magazine which provides a great way to reflect, tell a story, or share thoughts, ideas and information. Zines can be easily made from a piece of A4 paper and a scissors (more on zines here

https://dublin.sciencegallery.com/latest/how-to-make-a-zine), and they provide an excellent way for students to reflect on what they have learned about research integrity as they progress through each module. Zines are also suitable for using as a class presentation they look great when put on display.

Although we do recommend the order of the modules and module timelines, the teacher has a high degree of flexibility with this. This flexibility will allow the teacher to adopt alternative pedagogical approaches and alternative module timelines which are more appropriate to the particular circumstances of the student cohort, class timetable, and any other school requirements. Thus, the modules can be completed more slowly or quickly than recommended, and completed over multiple class sessions if more suitable. Any particular section of any of the modules can also be completed as a stand-alone exercise (e.g. one of the discussion scenarios from the Technology module might be completed if there is only 20-30 minutes available). Also, the modules are designed to be iterated and developed, and we encourage the teacher to add material to the PowerPoint slide decks and amend any of the other material as they see fit. This may be particularly appropriate where it is possible to include material of relevance to the school, student group or locality.

The INTEGRITY Project

The INTEGRITY Project is a large European project funded by Horizon2020, and made up of a consortium of 11 European partners from 9 countries. The main objective of the INTEGRITY Project is to empower students for responsible research conduct and research integrity through evidence-based, scaffolded learning. The assumption is that research integrity should begin when students first get acquainted with research activities and academic thinking. This usually starts in primary school and continues to apply throughout secondary school for homework, group projects and exams. Research integrity is also of huge importance when the student progresses to University, further training, and the workplace.

The INTEGRITY Project is vitally important as current approaches to teaching research ethics and integrity are seen by many as insufficient to deal with the complex and changing world of research and its impacts. The objective of the INTEGRITY Project is to combine high quality training in research integrity with innovative modes of engagement in order to bring research integrity and research ethics alive in the classroom. Tools and modules have been built which have been designed to equip the next generation of students and researchers with the capabilities to conduct research in a responsible manner and to address new and unforeseen research challenges. This has been achieved by conducting an evidence-based analysis of student needs, identifying blind-spots, and uncovering expectations regarding research integrity across each of the 9 European partner countries. This process also involved mapping, categorizing and analysis of current teaching and pedagogical approaches to research integrity in order to better detect and mitigate gaps in teaching, and to help build tailor-made curricula and other tools specifically designed for secondary school students.

The ultimate goal is to empower students with knowledge that underlies principles of accuracy, honesty, reproducibility, responsibility and transparency. This will be used by students as they progress through the various education and training networks as research integrity relates to all the stages of the research process, namely from the study design through the methodology applied, the data collected and analysed, the interpretations made and the way results

are presented, where reflections on the social impacts of the research should always be taken into account.

General introduction to academic integrity

Research integrity means conducting research with responsibility and honesty so that others (e.g. the general public or the scientific community) have trust and confidence in the methods that were used and the findings that were reported. In the same way, students should act responsibly and with honesty, when doing and presenting their schoolwork, so that the teacher and peers can trust in the shared knowledge.

There are four guiding principles stating how to conduct research with integrity: **Reliability, Honesty, Respect and Accountability**. These principles are stated in the European Code of Conduct for Research Integrity (www.allea.org).

Reliability refers to the quality of the research to secure confidence in the findings that are reported. **Honesty** in research means being transparent, fair and unbiased in all aspects of the research process. **Respect** concerns not only being respectful to other people (e.g. other researchers, students, academic and non-academic peers) or institutions (e.g. Research Centres, Universities, Schools and Funding Agencies) but also being respectful to the object of the research (i.e. humans, animals, natural environment, society, etc.). **Accountability** means assuming responsibility for the research. Whether this relates with working with other people in different tasks of the study, or acknowledging that training is needed for people to perform certain tasks and providing those training options, or to assume responsibility for the findings that are reported, or to take responsibility to answer questions (e.g. from other scientists) regarding the research, being always honest, accurate and transparent.

Research misconduct refers to three actions that show a deliberate intention from the researcher engaging in them. These are **Plagiarism, Falsification and Fabrication. Plagiarism** refers to the appropriation of another person's ideas, results, processes or written material, without acknowledging it. **Falsification** refers to the manipulation of research materials, equipment or processes, or changing or omitting data results from an experiment, compromising the accuracy, transparency and reproducibility of the study. **Fabrication** refers to making up data or results and recording or reporting them as real.

There are other research practices that can also compromise the credibility and trust in the findings from scientific studies. These are often more subtle and difficult to prove an intention from the researcher engaging in such practices. These are known as *questionable research practices*. Examples of questionable research practices relate to authorship and collaboration issues. For example, when authors, who have not contributed to a study, are added to improve the chances of having that study accepted for publication, or authors, who have made a significant contribution to the study, are not given credit. Issues regarding drawing from the work of others, citing selectively and collection, analysis and reporting of data may also reflect questionable research practices.

Technology Module

→

Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- Understand and describe the key ethical and research integrity issues arising when using technology for schoolwork.
- Identify appropriate and inappropriate uses of technology when completing schoolwork and homework.
- Identify and critically examine areas of research which are ethical and unethical.
- Identify accurate and appropriate sources of news and data, and explain why some sources of data may be considered to be unreliable or ‘fake news’.
- Critically discuss social media and the potential for social media platforms to generate and spread ‘fake news’. Appreciate how using data and information from various social media sources may be inappropriate for schoolwork.

02 Overview & General Background

The Technology module is designed to focus on and explore the main issues with using technology for school work. This module is important as we interact with advanced technology and artificial intelligence (AI) on a daily basis through our mobile phones and other smart devices which may be in our homes. This means we have access to these devices and a huge variety of content when completing our schoolwork and homework. **This technology can be very helpful when we are teaching and learning, but the availability of this powerful technology can also allow us to act unethically and engage in poor research conduct.** An improved knowledge of how to use these technologies in a responsible and ethical way (research integrity) is now more important than ever, and likely to be even more important over the coming years as the technology advances.

03 Module Structure

Session Overview

This module contains a total of 6 discussion scenarios as follows:

- Voice assistants & smart devices.
- Smart & driverless cars.
- Fake news & deepfake technologies.
- Augmented reality (AR) & virtual reality (VR).
- Social media - TikTok, Instagram, Facebook, Twitch, YouTube etc.
- The Chinese Social Credit System.

The recommended teaching and pedagogical approach to be adopted for this module is as follows:

- The module begins with a broad introduction to technology and how this is relevant to research integrity. The opening slides included in the PowerPoint presentation should be used for this. The focus is kept on the main INTEGRITY learning outcomes, and how these are impacted by each of the technologies to be discussed.
- The class is then broken down into groups of 5-6 students. Each group will agree on one person within the group to report group findings/discussion back to the class.
- The teacher spends approximately 5 minutes introducing the first discussion scenario (voice assistants & smart devices). There are questions available for each of the discussion scenarios on the appropriate PowerPoint slide which can be used to prompt discussion. Not all of these questions need to be discussed, and other questions may also be discussed by the groups if there is time or if the discussion goes in a certain direction. The appropriate slide should be kept on the overhead screen during the group discussions so that the groups can see the discussion questions.
- The groups spend 20-25 minutes discussing the first discussion scenario. When group discussion is completed, the appointed person from each group reports back to the entire class in turn. The teacher can then allow a broader class discussion where the most relevant and interesting points are discussed for that particular scenario.
- This process is repeated for each of the remaining discussion scenarios.
- The teacher may wish to record the main points raised by the groups in an appropriate format. This can then be used to facilitate further discussion.
- When all discussion scenarios have been completed, the teacher may have a full class discussion on what has been reported back

by the groups. The teacher should focus on the research integrity learning outcomes. Additional slides are provided in the PowerPoint which can be used to facilitate further discussion (these slides can be displayed as the discussion is taking place).

- The teacher should conclude the module by providing a broad summary of the main points discussed, and how these relate back to the main INTEGRITY learning outcomes.

It is important to remember that there is often no definitive 'right' or 'wrong' answer to the questions in the discussion scenarios. The main objective is to use each of the discussion scenarios to empower the student for research integrity.

Pedagogical Approach and Classroom Organisation:

This module allows a flexible pedagogical approach to be adopted by the teacher. The recommended time for the module is approximately 3 hours, but the module may be completed in more or less time as deemed appropriate for the particular circumstances of the school, class size, available time etc. No detailed prior knowledge of the technologies in this module is required, but it is recommended that the teacher is aware of each of the technologies at a basic level. Links to additional resources, videos etc are provided in the notes section of the PowerPoint slide and in this teachers guide. The focus is not the technologies themselves, but on how the technologies influence the way students get their data, decide what is ethical in research, and complete their schoolwork and homework.

Key Words

Plagiarism
Fake news
Empowerment
Collaboration & authorship

Module Timeline

Estimate time: 3.5 hours total

Breakdown

→ Intro
10 mins
→ Voice assistants & smart devices
30 mins
→ Smart & driverless cars
30 mins
→ Fake news & deepfake technologies
30 mins
→ Augmented reality (AR) & virtual reality (VR)
30 mins
→ Social media - TikTok, Instagram, Facebook, Twitch, YouTube etc
30 mins
→ The Chinese Social Credit System
30 mins
→ Full class discussion and conclusions
20 mins

NOTE:

The durations mentioned for each part of the module are just a suggestion and are very flexible. The teacher/facilitator is encouraged to adapt these according to the time available for the class.

Introduction

slide 3

Learning Objective

To discuss the importance of technology for teaching and learning.

Suggested Time

10 min

Main points

- Technology is everywhere. We interact with mobile phones, computers, smart devices and the Internet multiple times every day.
- Much of this technology can be very helpful with our study and schoolwork, but only if we know how to use it properly!
- Access to this technology also allows us to act unethically in our work (poor research integrity and conduct) and provides many opportunities to cheat, copy and plagiarize material.
- A better understanding of technology allows us to think more critically and make more informed decisions about how we use the technology in our schoolwork.

Voice Assistants & Smart Devices

slide 5

Learning Objective

To discuss the potential and use of smart devices such as Amazon Alexa, Google Home and smartphones. This activity is carried out in smaller groups with one group member reporting back to the class.

Suggested Time

30 min

Discussion questions

- Should you ask a smart device (e.g. a smart phone or voice assistant) to help with your homework?
- How is this different to working with other (real) people or asking a parent, sibling, or friend for help?
- Is this any different to looking up homework answer online?
- Is it acceptable to pay someone online to complete one of your school assignments?
- Is this any different to asking Alexa or someone else for help?

Smart & Driverless Cars

slide **6&7**

Learning Objective

To discuss the use of smart cars on our roads. The focus is on the ethical decisions which need to be made by the designers of smart cars, and the social, cultural and political factors which may influence these decisions.

Suggested Time

30 min

Discussion questions

- Is it ok to disagree with or challenge research findings when they go against your own personal beliefs?
- Do you believe it is preferable to hit an “old woman” rather than a “male doctor”?
- Would these results be more useful if data was only collected in Ireland instead of worldwide? Should Irish data only be used to build cars for Irish roads?
- How do you think differences in culture in different countries might have impacted these results?
- Should we try to take culture out of this research? What value does it have?

Fake News & Deepfake Technologies

slide **8**

Learning Objective

To discuss how to find reliable sources of information for our school work and research. How can we identify fake news? Does it matter whether news is fake or not for our work?

Suggested Time

30 min

Discussion questions

- When is news “fake news”? Who decides whether news is “true” or “fake”?
- How can we believe what we see and read when we are doing homework and assignments?
- When do personal biases make something “fake”?
- Does it matter whether or not news/research is “true” or “fake” when we are doing homework and assignments? Does it matter whether or not we believe it?
- What is your opinion of “deepfake” technologies?
- What is wrong about using such technologies, e.g. in elections or school?

slide 9

Augmented Reality & Virtual Reality

Learning Objective

To discuss how we can use AR and VR in our school work. Is it ethical to use such technologies for research?

Suggested Time

30 min

Discussion questions

- How can AR and VR technologies be used in our schoolwork? How can they be used for homework and assignments?
- What ways could these technologies be used for collecting data for a school assignment?
- Could such technologies be used to collaborate with others?
- Is AR and VR a replacement for school trip and actually being there?

slide 10

Social Media

Learning Objective

To discuss if we can rely on social media sources for our news, and whether or not we should use information from social media for our school work.

Suggested Time

30 min

Discussion questions

- Should you use data taken from social media for homework or assignments?
- Is this data different from data taken from a book or other research source?
- How can you trust data on social media?
- How can we best use social media platforms for our schoolwork?
- Do you think collaboration is possible across social media? Is this any different to working with a real person?
- Can you trust social media influencers?

slide

11

The Chinese Social Credit System

Learning Objective

To discuss the Chinese social credit system and whether a similar system would be effective for reducing copying and plagiarism in school.

Watch the video before this discussion.

Suggested Time

30 min

Discussion questions

- Should something similar to the “game of life” be applied in schools?
- Would this reduce copying, cheating, and plagiarism? Or could it make things worse?
- Could something similar to the game of life in schools go towards your exam results or college entry?

Wrap-Up & Reflection

Learning Objective

When all discussion scenarios have been completed, the teacher should have a full class discussion on what has been reported back by the groups. The focus should be on the research integrity learning outcomes, but the technology may also be discussed. Additional slides are provided in the PowerPoint which can be used to facilitate further discussion (these slides can be displayed as the discussion is taking place).

The teacher should conclude the module by providing a broad summary of the main points discussed, and how these relate back to the main INTEGRITY H2020 learning outcomes.

Suggested Time

20 min

ADDITIONAL RESOURCES

Voice Assistants & Smart Devices

→ Ask the students how many smart devices they have access to.
→ How many smart devices are in the classroom now?
→ Have an Alexa in the classroom to show the students. It doesn't have to be turned on but would be good in case they have never seen one before.
→ https://www.bbc.com/news/technology-50048144

Smart & Driverless Cars

→ https://www.moralmachine.net/
→ https://www.media.mit.edu/publications/the-moral-machine-experiment/
→ http://moralmachineresults.scalablecoop.org/

Fake News & Deepfake Technologies

→ The difference may be applying this technology with "intent to deceive".
→ https://www.theatlantic.com/video/index/593170/deepfake/ (some bad language in video)
→ https://www.cnet.com/features/deepfakes-threat-to-the-2020-us-election-isnt-what-youd-think/
→ https://www.brookings.edu/research/is-seeing-still-believing-the-deepfake-challenge-to-truth-in-politics/

Augmented Reality & Virtual Reality

→ https://www.businessinsider.com/what-is-augmented-reality?r=US&IR=T
→ Get Google cardboard for demonstration in the classroom if possible.
→ A Google cardboard van be made here https://www.androidauthority.com/google-cardboard-headset-how-to-644658/

The Chinese Social Credit System

→ https://www.visualcapitalist.com/the-game-of-life-visualizing-chinas-social-credit-system/
→ https://www.wired.co.uk/article/china-social-credit-system-explained
→ https://www.youtube.com/watch?v=NOk27I2EBac

At What Cost? Rethinking the Fast-Fashion Industry

→

Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- Understand and describe the key concepts and the ethical issues in the fast fashion industry.
- Understand and explain the meaning of research integrity, the four guiding principles, and how the issues relate to the fast-fashion industry.
- Discuss the research integrity issues through the practical activities and powerpoint slides, being capable of formulating their own arguments and debate them in a class discussion, to reach agreement on best strategies to avoid engaging in such practices.
- Explain the importance of avoiding engaging in misconduct and questionable practices in school assignments and in school environments.

02 Overview & General Background

This module aims to equip students with the knowledge to comprehend the meaning and importance of research integrity through the lens of a subject that is highly debated in our society and through which students can easily engage and discuss research integrity issues.

The primary focus of this module is on research integrity. We have chosen to pair it with the issue of fast-fashion to allow for a wider ethical discussion through a topic that is relevant to the target audience. Fast-fashion has gained significant traction due to the increased recognition of its impact on the environment by consequence of our own human consumption. Fashion can be an important way for a person to develop their personality and appearance, and can be especially important to young adults. In addition, this age group is subject to increasing social pressure to appear in a certain way, often through social media platforms. Therefore, this module will begin with the fast-fashion industry and its origins, and will then lead into a discussion around the unrealistic representations and expectations of the fast-fashion industry. **The topic also mirrors key issues related to research integrity such as plagiarism, authorship, collaboration and a reluctance to report unethical behaviour**. These are the key issues we aim to focus on and discuss through the topic of fast-fashion.

There are several practical activities throughout the module which aim to engage students, draw insight and comparisons between questionable research practices and questionable practices in the fashion industry. **Often, when faced with an ethical issue, the instinct is to find an immediate solution to the problem posed, however, through the collaboration and engagement of students and their peers, we can predict future issues and discuss what we can do now to mitigate them with the tools at hand**. These activities are an opportunity to encourage students to discuss the long-term impact of these issues and to ideate innovative solutions to address the issues at hand.

The practical activities aim to encourage students to identify and critically reflect on misconduct and questionable research practices, using real-life and fictional examples from the fashion industry. Students should be encouraged to discuss issues they are aware of from personal experience or otherwise. The activities should feel fun, engaging and prompt discussion of the issues. At the end of the module, students should be capable of describing different issues within the fashion industry, and be able to understand that these core issues occur in other areas such as their school-work or academic research. Students should be able to recognise and value integrity issues and the importance of not engaging in misconduct and questionable practices, and reporting it when necessary.

The fast-fashion industry has recently had a spotlight shone on it due to increasing concerns and attention to its impact on the environment, the hidden labour costs, and more importantly, the hidden human costs.

Several hard-hitting reports have been published to highlight the indecent conditions and costs created by the fashion industry, with an emphasis on those companies creating very low cost clothing at incredibly fast rates.

According to the Fixing Fashion report summary published by the UK parliament in 2019,

'The way we make, use and throw away our clothes is unsustainable.

Textile production contributes more to climate change than international aviation and shipping combined, consumes lake-sized volumes of fresh water and creates chemical and plastic pollution.

Synthetic fibres are being found in the deep sea, in Arctic Sea ice, in fish and shellfish. Our biggest retailers have 'chased the cheap needle around the planet', commissioning production in countries with low pay, little trade union representation and weak environmental protection. In many countries, poverty pay and conditions are standard for garment workers, most of whom are women. We are also concerned about the use of child labour, prison labour, forced labour and bonded labour in factories and the garment supply chain. Fast fashions' overproduction and overconsumption of clothing is based on the globalisation of indifference towards these manual workers.'

On conditions:

Several reports since the Fixing Fashion report have gone into more detail about specific issues and companies at fault within the fashion and textile industry. **One such report focused on the worker exploitation behind the alarmingly low prices of clothing, made possible by driving down minimum wages for workers, as low as £3.50 an hour in Leicester**, UK, according to one exposé by the Financial Times in 2018 by Sarah O'Connor. The alarming low wages which are illegal in the UK have become possible due to the outsourcing of work to subcontractors, where the responsibility gets passed down the supply chain until it becomes impossible to trace the origin and conditions of labour by the leading company.

Despite exposing the worker exploitation by companies such as Boohoo and Missguided who claim to source at least half their clothes in the UK, the exploitation continues.

In a recent 2020 report called Boohoo and Covid-19 , Labour Behind the Label have shown that the conditions in the Leicester factories, primarily those working for Boohoo clothing, have worsened during the COVID pandemic, putting workers at risk of infection to meet production requirements.

A large portion of these workers are migrant workers, without papers or documents to legally work. As a result they are forced to accept a wage far below the national minimum, and are in such a precarious position that they cannot report poor working conditions or the exploitation they may be subject to. According to this report, the initial attention drawn to the poor working conditions at the Leicester factories led to a clamp down on illegal immigrant workers, rather than addressing the working conditions. Now migrant workers are even more unlikely to speak up for fear of deportation.

The following is an example of the price offered to manufacture clothing in these factories:

'One example given is a very recent order for around 1 million pairs of cycling shorts to be made in Leicester by a small number of suppliers. The price offered was £1.80 per unit – this includes clothing production, factory overheads, packing – packaging, labelling and delivery costs. Both Boohoo.com and PrettyLittleThing are currently selling a variety of cycling shorts from £3 to £10 (discounted).'

Orders such as the one described above are often subject to bidding wars between the Leicester factories which in turn further drives down prices offered per unit.

On composition:

The **environmental impact of the fashion industry** is significant. It uses large amounts of resources, such as water, chemicals, fossil fuels, cotton and plastics.

According to the Fixing Fashion report, 30% of unwanted clothing in the UK went to landfill or incineration in 2012, representing £140million in value.

Often unwanted clothing is exported to East Africa causing obstructions and toxic waste. As they lack the facilities to properly dispose of these items. **In the short film discussed in the slide, *Textile Mountain*, some of the following key points are made:**

'150 billion items of clothing are produced annually'
— Sustainable Apparel Materials

'In Europe, we throw away 2 million tonnes of textiles each year.'
— Fashion Waste Index by Labfresh

'70% of our discarded clothes end up in Africa.'
— Oxfam, as quoted in The Guardian 'How second hand clothes are creating a dilemma for Kenya'

'Kenya imports over 140,000 tonnes of second hand clothes each year'
— USAID2017: Overview of The Used Clothing Market in East Africa: Analysis of Determinants & Implications)

'An estimated 20million kg of textiles are landfilled each year in Kenya alone'.
— (Africa Collect Textiles)

'Our clothing consumption has more than doubled in the last 15 years, yet each garment is now kept half as long'.
— McKinsey 2016

'Textiles make up to 12% of all landfill waste'.
— Annie Leonard, Make Good, Fashions Problem wth Waste

On culture and consumption:

Target audience for these companies are often young adults, and with the help of social media, clothing companies can influence and create a story of 'unmissable' and 'groundbreaking' prices for clothing. Young consumers are very susceptible to this advertising, and according to the Fixing Fashion report, research by the Hubbub Foundation "suggested that **17% of young people questioned said they wouldn't wear an outfit again if it had been on Instagram**." The London Waste and Recycling Board (LWARB) notes that in addition to this throwaway culture, clothing is no longer created to be repaired or altered and reused. However, there are opportunities to change the landscape of how we purchase and use clothing. Initiatives such as clothing rental companies or 'sharing' apps create an opportunity to extend the life of an item of clothing, something people are becoming more open to. These are opportunities to promote a **circular fashion industry.**

ON INTEGRITY ISSUES AND HOW IT RELATES TO THE FASHION INDUSTRY:

This module is developed around research integrity issues, using examples from the fast-fashion industry. The issues are presented in a way that relates to students of this age group, who can engage with the topic being discussed while drawing parallels with the core research integrity issues.

We aim to empower students with the tools to critically reflect on the practices within the fashion industry, and to reflect on how this may translate to their own school practices. The core research integrity issues are as follows: **plagiarism – drawing on the work of others, collaboration and authorship, the collection, analysis and presentation of data, the reluctance to report unethical behaviour.**

These core issues all contribute to research misconduct at an academic level, but can also feed into detrimental and questionable behaviours beyond the education system.

Those core integrity issues are not restricted to the academic world. As described in the background section, the fashion industry is fraught with unethical behaviour, it lacks a system to report these behaviours safely and

it leads directly to unsafe and unfair working conditions from human beings. Similarly, **plagiarism** and **issues of authorship** have grown exponentially in the last decade, as social media users such as small business owners are not protected from having their creations copied and manufactured by larger clothing companies at a rate that cannot be matched (see article on *How bots are stealing artwork from artists on twitter*).

In addition, social media influencers or 'brand ambassadors' can promote a product directly to their social media audience. Companies can now target specific audiences very accurately, and this includes vulnerable young audiences who have grown up with social media from a young age. Companies can also collect data via social media platforms and analyse to understand how to better target specific audiences. **Often the consumer is not aware of how much data can be pulled from their own personal profiles or search habits.**
The collection, analysis and presentation of data is central to academic research and must be conducted in an ethical and transparent manner. In similar ways it is as useful for marketing purposes in clothing companies, as it can be in academic research, however the methodology behind it is integral to the correct scientific process in academia. Honesty, transparency and the inclusion of all data points, with the justification of why some may be excluded, are necessary to avoid creating a false representation of the data collected.

If the fashion industry could be held to the same standards, it would make it difficult to hide behind those incredibly low-cost items of clothing, and would be forced to highlight the worker exploitation and environmental impact associated with such detrimental practices.

03 Module Structure

Session Overview

The goal of this workshop is to explore the key 'Integrity' issues in research using the fast-fashion industry as the theme.

The end goal is not to become an expert in the issues around fast-fashion, but to use it as a vehicle to address the key Integrity issues and to encourage students to question behaviours around fast-fashion, which may parallel ethical behaviours in research.

The theme will be explored using current core issues around the fast-fashion industry, while encouraging creative thought and innovation around what we can do to alter our habits and behaviours as individuals in a positive way.

There will be several activities for students to consider the impact of our collective actions, and to demonstrate how a change in our individual behaviours can affect a positive change in wider society.

Each slide is an opportunity to prompt discussion amongst students.

Key Words

Empowerment
Plagiarism
Collaboration and Authorship
Data collection

Materials Needed

- [ ] Item of clothing/ accessory/ device

Module Timeline

Estimate time: 140 minutes – total

→ Introduction: What is Fast-Fashion?
10 mins

→ Section One: Conditions:
30 mins

→ Section Two: Composition:
10 mins

→ Section Three**:** Culture:
30 mins

→ Section Four: Consumption:
20 mins

→ Section Five: Collaborate and Create:
30 mins

→ Zine time + Conclusion/Wrap-up:
10 mins

NOTE:
The durations mentioned for each part of the module are just a suggestion and are very flexible. The teacher/facilitator is encouraged to adapt these according to the time available for the class.

→

slide **3**

Introduction: What is Fast-Fashion?

Learning Objective

To explore the students' current understanding of the fast-fashion industry.

Suggested Time

10 min

Section Description

- What do these images say to you?
- What does fast-fashion mean to you?
- Do you think it applies to boys as much as girls?
- Is it something you have thought about before/ are aware of?

Section One: Conditions

slide
4–9

Learning Objective

To encourage the 'Collection, analysis and presentation of data' by tracing the origin of an item of clothing.

Suggested Time

30 min

Section Description

Activity: where are my clothes made? (slide 4)

Before any questions are posed to the students, emphasise that students are expected to be kind, respectful and listen when others are talking. It is important to be especially sensitive to cultural, social and religious differences within the group.

- Ask students to select an item of clothing they have brought from home or are wearing. A piece of technology they have, or a schoolbag, will also work.
- Analyse the information included on the label.
- Encourage them to discuss in small groups what information they have found:
  - As a group, or individually, ask students to find these countries on a world map and highlight them (use map provided).
  - Ask students to work out which countries are most popular for making their clothes.
  - Ask students to draw lines on their maps between the country in which they live and those where their items of clothing were made.
  - Discuss findings.

Section Two: Composition

slide
10–11

Learning Objective

To understand the origin of one item of clothing, the resources needed to create it and the impact it has on the environment.

Suggested Time

10 min

Section Description

2.1 A close look at a t-shirt

Discuss:

- Do you think that is too much water for one t-shirt?
- What other kinds of resources are needed?
- Do you know any fabrics that are biodegradable?
- What fabrics are not?
- How often do you check the label on your clothing to see what it is made of and where?
- Do you think it is important to do so?

Section Three: Culture

slide
12–17

Learning Objective

To reflect on one's own actions or the actions of society and to create your own statement of truth ***(authorship).***

Suggested Time

30 min

Section Description

3.1 Activity: what's your honest label (slide 13)

- Ask students to create their own transparent or honest label (a short slogan reflecting their own buying habits or a statement on the realities of fast-fashion)
- Ask students to present and discuss their 'honest label'
- Can they relate to each others' labels?

3.2 Debate: social media influencers have the ability to create change (slide 15–17) **Do you agree?**

Topic: Social media influencers (brand ambassadors) and the new wave of ethical greenwashing

- What responsibility does someone with a social media following have when promoting a product?
- If you knew that the influencer was only promoting the item because they were paid, would that impact your decision?
- What other impacts can a social media influencer have on an individual?
- Similarly, brands often promote sustainability and diversity in a bid to appear more ethical, but how often is it true once you look behind the scenes and behind the images.

Section Four: Consumption

slide
18–19

Learning Objective

To understand the impact our buying habits have on our global environment, and the full life span of one simple item of clothing.

Suggested Time

20 min

Section Description

Textile Mountain:
The Hidden Burden of Fashion Waste

Discuss the video:

- How do our buying habits impact the environment?
- Who is impacted the most?
- What can we do to prevent this from happening?
- Does this information make you want to change your habits?

Section Five: Collaborate, Create and Innovate

slide
21–24

Learning Objective

To discover the future of innovative materials, sustainable companies and how to break the fast-fashion industry.

Suggested Time

30 min

Section Description

Watch the video from the Financial Times: Forests into Fashion – How the Fashion Industry is Turning to Forests for the Fibres of the Future

Discuss:

- Have you seen any of these materials on the market?
- Do you think it is a good idea?
- Are there any risks to this kind of development?
- Can we do anything else to help improve the circularity of sustainable fashion?

See following slides for examples and further discussion.

Wrap up & Reflections

slide
25–27

Learning Objective

To reflect individually on the ethical issues surrounding the fast-fashion industry and to ideate creative solutions to the problems discussed.

Suggested Time

10 min

Section Description

- Zine time (or other reflective approach) to encourage students to reflect individually on the contents of the session.
- Students are asked to come up with an idea that could work to break the fast-fashion industry e.g. an app, a piece of clothing or an advertisement.
- Use the opportunity to highlight links back to academia and research integrity issues (see page one) using the prompt questions.

Discussion Prompts

- Is it created from a byproduct like seaweed or mushroom or recycled waste?
- Can it be used as more than just a piece of clothing? Is it biodegradable?
- Does it inspire others to collaborate and create a fair work environment?

Useful links and resources
(via fashionrevolution.Org)

CAMPAIGNS, PLATFORMS AND OTHER KEY ORGANISATIONS

- Clean Clothes Campaign
  www.cleanclothes.org
- Ethical Fashion Forum
  www.ethicalfashionforum.com
- Fair Trade Foundation
  www.fairtrade.org.uk
- Environmental Justice Foundation
  ejfoundation.org
- The Good Guide
  www.goodguide.com
- Greenpeace Detox Campaign
  www.greenpeace.org/international/en/campaigns/toxics/detox/
- Labour Behind the Label
  www.labourbehindthelabel.org
- Nordic Initiative, Clean and Ethical
  www.nordicfashionassociation.com
- Oxfam
  www.oxfam.org/en/campaigns/trade
- Traidcraft's Justice Campaign
  http://www.traidcraft.org.uk/
- TRAID
  www.traid.org.uk/education/resources/
- War on Want
  www.waronwant.org
- World Fair Trade Organisation
  www.wfto.com
- UN Global Compact
  www.unglobalcompact.org/index.html
- Goodonyou.eco
- Fashionrevolution.org
- Global Garbs
- Project Stopshop

KEY REPORTS

- United Nations Global Compact/BSR | *A Guide to Traceability: A Practical Approach to Advance Sustainability in Global Supply Chains*
- http://www.bsr.org/reports/BSR_UNGC_Guide_to_Traceability.pdf
- Clean Clothes Campaign | *Tailored Wages*
- www.cleanclothes.org/livingwage/tailoredwages/tailored-wage-report
- Labour Behind the Label | *Boohoo and COVID-19*, June 2020.
- https://labourbehindthelabel.net/wp-content/uploads/2020/06/LBL-Boohoo-WEB.pdf
- Labour Behind the Label | *Tailored Wages UK*
- www.labourbehindthelabel.org/campaigns/itemlist/category/294-report
- Ethical Fashion Forum | *Value Chain Call to Action*
- source.ethicalfashionforum.com/article/value-chain-call-to-action-1st-Draft
- Baptist World Aid Australia | *Behind the Barcode*
- www.baptistworldaid.org.au/behind-the-barcode/
- International Labor Rights Forum | *Deadly Secrets*
- laborrights.org/publications/deadly-secrets-how-apparel-brands-cover-safety-hazards
- UN Global Compact | *The Global Corporate Sustainability Report 2013*
- www.unglobalcompact.org/AboutTheGC/global_corporate_sustainability_report.html
- Fair Trade Foundation | I*mpact of Fairtrade Cotton*
- www.fairtrade.org.uk/includes/documents/cm_docs/2012/F/2_FTF%20Cotton%20summary%20and%20response%20May%202012.pdf
- Deloitte | *Fashioning Sustainability 2013*
- https://www2.deloitte.com/content/dam/Deloitte/dk/Documents/strategy/Deloitte-Fashioning-Sustainability-2013.pdf
- Greenpeace | *A Fashionable Lie, Detox*
- www.greenpeace.org/international/Global/international/publications/toxics/2014/A-Fashionable-Lie.pdf
- WRAP | *Valuing Our Clothes*
- www.wrap.org.uk/sites/files/wrap/VoC%20FINAL%20online%202012%2007%2011.pdf

- Centre for Sustainable Fashion | *Steps Towards Sustainability in Fashion: Snapshot Bangladesh*
- ualresearchonline.arts.ac.uk/5671/1/CSF_Vol.6_Steps_towards_Sustainability_in_Fashion_Snapshot_Bangladesh.pdf
- University of Cambridge | *Well Dressed?*
- www.cam.ac.uk/research/news/well-dressed
- BSR | *Sustainable Fashion Design: Oxymoron No More?*
- www.bsr.org/reports/BSR_Sustainable_Fashion_Design.pdf
- Rank A Brand | *Feel Good Fashion: Transparency & Corporate Social Responsibility 2014*
- rankabrand.org/static/FeelGoodFashion_2014_Summary.pdf
- Traidcraft | *Material Concerns: How responsible sourcing can deliver the goods for business and workers in the garment industry*
- http://www.traidcraft.org.uk/

REFERENCES

- Gerken, Tom, *How bots are stealing artwork. From artists on Twitter*, BBC News, 2019. https://www.bbc.co.uk/news/technology-50817561
- Hammer, Nik, Dr, *Rethinking recovery: growth and degradation in UK apparel manufacturing*. Blog post on Ethical Trading Initiative, 2016. https://www.ethicaltrade.org/blog/rethinking-recovery-growth-and-degradation-uk-apparel-manufacturing
- Labour Behind the Label | *Boohoo and COVID-19,* June 2020. https://labourbehindthelabel.net/wp-content/uploads/2020/06/LBL-Boohoo-WEB.pdf
- O'Connor, Sarah, *Dark Factories: labour exploitation in Britain's garment industry,* Financial Times, 2018. https://www.ft.com/content/e427327e-5892-11e8-b8b2-d6ceb45fa9d0
- *Fixing Fashion Report*, House of Commons, Environmental Audit Committee, HC 1952, 19 Feb 2019. https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/1952/1952.pdf
- Natascha Radclyffe-Thomas, The Fashion Law, 2021. What Role do Schools Play in the Fashion Industry's Push to Become More Sustainable? https://www.thefashionlaw.com/what-role-do-schools-play-in-the-fashion-industrys-push-to-become-more-sustainable/

04

Sounds in the Age of Social Media: A Music Module

→

Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- Understand and describe the key concepts and the ethical issues in the music industry.
- Understand and explain the meaning of research integrity, the four guiding principles, and how the issues relate to the music industry.
- Discuss the research integrity issues through the practical activities and powerpoint slides, being capable of formulating their own arguments and debate them in a class discussion, to reach agreement on best strategies to avoid engaging in such practices.
- Explain the importance of avoiding engaging in misconduct and questionable practices in school assignments and in school environments.

02 Overview & General background

This module aims to equip students with the knowledge to understand the meaning and importance of research integrity through the lens of a subject that is highly relatable in our society and through which students can easily engage and discuss research integrity issues.

The primary focus of this module is on research integrity. We have chosen to pair it with the subject of music to allow for a wider ethical discussion through a subject that is relevant to the target audience. The music industry has changed significantly in the last decade, along with the listening habits of those under 25.

Streaming has become the primary method of listening to and discovering music, while creating a landscape in which artists can create groundbreaking albums from their very own bedrooms with just a few pieces of technology.

This is the future of the music industry, this is the platform through which young adults communicate, socialise and develop their own skills and creativity.

Therefore this module will explore the core research integrity issues of **empowerment, plagiarism, authorship, collaboration** and a **reluctance to report unethical behaviour** through the music industry and how it functions today.

There are several practical activities throughout the module which aim to engage students, draw insight and comparisons between questionable research practices and questionable practices in the music industry today. These activities are an opportunity to encourage students to reflect on the long term impact of these issues, to ideate innovative solutions to address the issues at hand and to draw comparisons with their own day-to-day practices at school, with homework, or with peers.

Students should be encouraged to discuss issues they are aware of from experience or otherwise. The activities should feel fun, engaging and prompt discussion of the issues. At the end of the module, students should be capable of describing different issues within the music industry, and be able to draw comparisons with areas such as their school work or academic research. Students should be able to recognise and value integrity issues and the importance of not engaging in misconduct nor questionable practices, and reporting it when necessary.

As mentioned above, the music industry has changed significantly in the last decade, along with the listening habits of those under 25. Streaming has become the primary method of listening to and discovering music, while creating a landscape in which artists can create groundbreaking albums from their very own bedrooms with just a few pieces of technology.

What is Bedroom Pop? **Bedroom pop is the musician's version of 'work from home'**. Some argue it is the evolution of indie, a focus on the atmospheric sounds and soft dreamy lo-fi textures, rather than the music label or the live presence of the artist. It is a return to basement music, created for the eyes and ears of those paying attention over social media.

The addition of sharing platforms through social media has meant that artists can skip the middleman and communicate directly with their audience, in a personal and intimate way.

One example is Billie Eilish, an artist, who was only 18years old when she released her first 'bedroom' album and won several Grammy awards. And how she was only 14years old when she and her brother recorded her single, Ocean Eyes. It is due to the advances of new technology and social media platforms such as tik tok, instagram and snapchat that the younger generations can now have a voice from their very own bedrooms.

Other changes in the music industry **include a preference of playlists over albums due to the popularity of streaming.** Algorithms now create specified playlists for individuals, 'feeding' them the music they want to hear without having to listen through entire albums. Discovering music is now also done in large part through social media platforms, you might 'follow' an artist's page and they release a short clip of a new track or trending videos feature new unknown tracks for followers to discover.

The emphasis on streaming platform algorithms and social media has meant that artists adapt to this changing audience, and with it, the rules of copyright, authorship, and collaboration have evolved.

Who is Lil Miquela? **The next evolution of the artist is** an instagram celebrity, someone who is relatable to young adults, who shares their concerns and anxieties, and who shows them through music, how to live in the world today. The only catch is she is not a human.

Lil Miquela is a CGI influencer created by a digital media company called Brud. Their website page states 'Since day one, Brud has aimed to create new models for storytelling. And we did. We created Miquela, and 8 million fans stepped in to help her make a massive impact on culture...'.

Lil Miquela is politically engaged, emotionally vulnerable, self-aware and although she originally did not reveal whether she was real or not, she now talks about being a robot while still discussing and relating to human issues and experiences. Her online videos

have streams of comments from young adults claiming to relate and respond to her, and her music videos continue to have a lot of views. Although she is not the first cyber artist created (see vocaloid artists), she has shone a spotlight on the ability to blur the lines between reality and fiction.

On integrity issues and how it relates to the music industry:

This module is developed around research integrity issues, using examples from the music industry. The issues are presented in an engaging way to students of this age group, who can relate with the topic being discussed while drawing comparisons with the core research integrity issues.

We aim to empower students with the tools to critically reflect on the practices within the music industry and through social media, and to reflect on how this may translate to their own school practices. The core research integrity issues are as follows: **plagiarism – drawing on the work of others, collaboration and authorship, the collection, analysis and presentation of data, the reluctance to report unethical behaviour.** These core issues all contribute to research misconduct at an academic level, but can also feed into detrimental and questionable behaviours beyond the education system.

Those core integrity issues are not restricted to the academic world. This module will show that **empowerment** is central to the way music and social media is now influencing younger generations. They have more power at the tips of their fingers to speak up via social media, and make statements or express themselves creatively. However, it comes with risks, for some there is pressure to perform, to conform, to create something 'as' original or trend-worthy as someone else, to say the right thing or wear the right thing.

Everything is exposed and some encounter difficulties in managing these expectations, without feeling like they have to copy someone else's work.

Similarly, **plagiarism** and **issues of authorship** have grown exponentially in the last decade, as social media users are not protected from having their creations copied and reworked or utilised in a different manner, such as the dance challenges on Tik Tok, whose original creator is often forgotten and uncredited by the time it has gone 'viral'. One example is the Tik Tok user Addison Rae who came under fire for taking credit for dances created by BIPOC users who, it is argued, have less opportunities to make an income from these platforms than someone like Addison Rae. Addison Rae came under fire when she was invited on the Jimmy Fallon show to perform these dances, without crediting the original creators. Again this will be discussed in the powerpoint slides, and students should reflect on how these problems of authorship, crediting and plagiarism can be dealt with effectively by acknowledging the source of their information, and building on it with their own opinions and values.

.

03 Module Structure

Session Overview

The goal of this workshop is to explore the ethical issues that arise within the creative world of music, within an open and supportive space where students can voice their opinions and insights.

The following outline is aimed only as a suggestion of what can be asked. Teachers should feel encouraged and free to tailor the following outline to their own preference, while keeping the core Integrity learning outcomes in mind.

Key Words

Empowerment
Plagiarism
Collaboration
and Authorship
Copyright

Module Timeline

Estimate time: 130 minutes – total

→ Introduction: How Bedroom Pop Evolved: **5 mins**
→ Icebreaker Activity – Create a Sound Creature: **10 mins**
→ Section One: Copyright and Blurred Lines: **30 mins**
→ Section Two: #DANCECHALLENGE: **30 mins**
→ Section Three**:** Artificial Music: **40 mins**
→ Zine time + Conclusion/Wrap-up: **15 mins**

NOTE:

The durations mentioned for each part of the module are just a suggestion and are very flexible. The teacher/facilitator is encouraged to adapt these according to the time available for the class.

slide 4

Introduction: How Bedroom Pop Evolved

Learning Objective

To explore the students' current understanding of the music industry.

Suggested Time

5 min

Section Description

- Who is familiar with the term bedroom pop?
- Do you know any artists that fit in this description?
- Do you think it is easier for artists to create and promote their music today? Are there any downsides? (i.e. more artists // harder to get noticed than before // more competitive // only successful if you have the right image // less privacy).

slide 5

Icebreaker Activity: Create a Sound Creature

Learning Objective

To encourage students to think creatively and reflect on their own interpretations of the sounds heard.

Suggested Time

10 min

Section Description

- Needed: Pen, paper, LINK to sound clips.
- Look at the art piece created by Arthur Boyd called Butterfly Man (red), 1970.
- What does it look like?
- Follow the LINK and listen to the sound clips provided (scroll down page).
- Draw or design your own sound creature based on the sound you hear (offer to repeat sounds).

Reflect:

- Did you draw something based only on your imagination or did the sound inspire a creature from something they were reminded of, like a film or a memory, or a song or story?
- Our creations are not always completely new and original, sometimes we draw on the work of others and adapt or build on it. This is what we will emphasise today. It is encouraged to do so, once you credit the original creator.

Section One: Copyright & Blurred Lines

slide
7–11

Learning Objective

To reflect on plagiarism, authorship and copyright issues. Although it is not a clear case, issues can be avoided by correctly crediting the original author.

Suggested Time

20 min

Section Description

Discuss the Robin Thicke vs. Marvin Gaye case

- Should copyright and plagiarism be kept to the salient parts, like lyrics and instrumentals?
- Can copyright include the 'feeling' or rhythm of a song?
- Where would you draw the line in copyright?
- Is it unreasonable to expect an artist to create a song without any inspiration?
- Can you relate this to different industries, such as painting, film, journalism or research.

Section Two: #DANCECHALLENGE

slide
12–15

Learning Objective

To relate authorship and plagiarism to current issues of culture and appropriation on social media platforms.

Suggested Time

20 min

Section Description

Addison Rae and the viral #DANCECHALLENGE

Watch video on slide 13: 1:17-1:32 mins

- Who here has seen or even done this dance challenge?
- Who created this dance?

Watch video on slide 14: 1:42-2:02mins (muted)

- Do you credit the creators of original dance challenges?
- Should they be credited or does it not matter on tiktok?
- Can you think of some repercussions of the creators not being credited for their work?
- Did you notice a difference in the two dances and does this matter?
- Can you think of some other examples of this outside of tiktok?

Watch video on slide 15: 0:33-3:31 mins

- What are the repercussions of stealing work from others?
- Can you think of examples that are not on TikTok?
- What can you do to empower those who create something original?
- Do you think this is similar to copying an article online without crediting them?

Section Three: Artificial Music

slide
16–23

Learning Objective

To explore the growing world of artificial technologies which blur the line between the real and fake. Students can question whether there are risks to these technological advances or whether they will improve our society. If there are risks, what can we do to mitigate them?

Suggested Time

40 min

Section Description

3.1 Meet Miquela (slide 17–19)
Watch the two video clips and discuss the following:

- Can you relate to Miquela emotionally even though she is a robot? Why?
- Miquela also acts as a model and influencer online, are there downsides to this?
- What does this mean for the world of music? Do you think the future will have more of this?

3.2 Activity: Design your own AI popstar or influencer (slide 20–22)

- Ask students to design their own AI popstar. This can be done on paper or using an online platform such as Google Jamboard.
- They should include the name of their AI popstar, their music genre, background information (gender/ethnicity/etc).
- As well as this students will need to write a short explanation of one of the two speculative headlines (distributed as you choose):
  SCANDAL FOR AI POPSTAR
  Or
  TRIUMPH FOR AI POPSTAR
- Ask students to write a few ideas down explaining a story behind the headline. Students should work in small groups or pairs and have 10 minutes maximum for creating their AI popstar and explaining the headline they are given.
  The session can end with a final shareback of students' creations and final thoughts from the group.

Through teasing out positive and negative storylines associated with this new technology we can further understand ethical and moral issues, what students perceive as 'good' or bad' and what influences these decisions, imagining how these questions and dilemmas might evolve in an imaginative technological future that we aim to shape and predict.

3.3 AI text generator (slide 23)
LINK

All of these are AI music or text generator systems.

Today you can find programs like this that create art/ homework/ music for you based on algorithms that collect data for you to create something.

Try for yourself: Go to this AI text generator and enter a sentence, or copy and paste the following: the music industry has changed a lot

- What are the upsides to this technology? And what are the downsides?
- What if in the future, you could have your own avatar like Miquela to represent you in school or exams etc online! Do you think there are long term effects of letting technology such as artificial intelligence do the work for you?
- Will the technology make it increasingly difficult to find the line between what is plagiarism and what is acceptable?

Wrap up & Reflections

slide
24

Learning Objective

To reflect individually on the ethical issues surrounding the music industry and to ideate creative solutions to the problems discussed and find comparisons with the students' own work and practices.

Suggested Time

10 min

Section Description

Reflect and discuss the following key points with students:

- Can an AI create original music? Explain your thinking on this.
- Do you think you have a better understanding of authorship in the world of social media? Can you think of your own examples?
- Where is the line for plagiarism? Is there an acceptable way to use someone else's work?
- Miquela was created by a collaboration of artists and engineers, is that the future of music?
- Is plagiarism when creating music different from when writing an essay or selling a product for a business? Discuss.
- When should you seek consent or permission when using someone else's work?

Use the opportunity to highlight links back to academia and research integrity issues using the prompt questions.

05

Genetic Testing Module

Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- Comprehend the meaning of genetics, genetic tests and the reasons for their use.
- Comprehend and describe the methodological process involved in genetic tests.
- Comprehend the meaning and importance of informed consent, data privacy and confidentiality in genetic databases and biobanks
- Explain the meaning of research integrity and the four guiding principles.
- Explain the meaning of research misconduct and questionable research practices, and relate such practices with students' own actions when doing school assignments.
- Explain the importance of avoiding such practices in school work and life.

02 Overview & General Background

This session aims to equip students with the knowledge to comprehend the meaning and importance of research integrity. This will be achieved through a practical hands-on approach, where videos about key aspects of genetic tests, followed by fictional cases, outlining research integrity issues in genetic tests research, will be presented. We aim for students to identify and relate such examples of research misconduct and questionable research practices in genetic tests research, with their own practices when doing school assignments. This will engage students in a group discussion and to critically reflect on the importance of acting with responsibility and honesty in their own school work and life.

Background to the Module Theme

Genetics is a branch of biology that studies the genes, genetic variation and heredity in organisms. In other words, genetics aims to understand how different qualities (i.e. traits) are passed down from individuals (i.e. from parents to their offspring). Genetics helps people to understand why each person is unique, why family members look alike, the reason for some genetic diseases and why some diseases occur within a family. Each living organism is unique due to some level of genetic variation. Genetic variation refers to the differences found in DNA among individuals, which can be identified at many levels (e.g. phenotypic variation). DNA (i.e. deoxyribonucleic acid) is known as the molecule of life since it carries genetic instructions that are responsible for the development, functioning, growth and reproduction of all known organisms and many viruses. The human body is made of trillions of cells. Each cell has 46 human chromosomes. A chromosome is a DNA molecule containing part or all of the genetic material of an organism. Each of the 46 human chromosomes are made of 2 meters of DNA that form a double helix made of subunits known as the bases (A, T, C and G). The sequence of DNA subunits is known as gene. Approximately 30,000 genes in the human body code for proteins that perform most life functions. This occurs during gene expression. If a problem occurs during gene expression it may result in profound genetic variations (e.g. mutations), which can cause genetic-based diseases.

Genetic tests are used to identify changes in DNA sequences, chromosome structure, genes or proteins. Genetic tests have been applied for clinical diagnosis (e.g. identify a genetic-based disease), for biomedical research studies (e.g. to assess the reasons and prevalence of a certain genetic mutation, to develop effective medical treatment, care or procedures, among others), for forensics (e.g. for crime investigations) and for personal or recreational use (e.g. use of homemade genetic test kits to search for ancestry, make a genetic horoscope, find a partner, etc. see more in https://www.23andme.com/en-int/). To this end, the reasons behind the use of genetic tests are to confirm or dismiss a suspected genetic condition, to predict the chances of a person to develop or to pass on a genetic disorder, to gain key information to customise medical treatments, care or procedures, to gain information for criminal investigations (e.g. identify a suspect) and for personal or recreational use, for example, to search for ancestry, make a genetic horoscope, find a partner, etc.

The methodological process applied in genetic tests involves the collection of blood, hair, skin, amniotic fluid or other tissues. The sample is then sent to a laboratory or analysed at a research centre, where trained technicians or researchers perform certain analyses (e.g. DNA sequencing) to assess for specific changes in chromosomes, DNA or proteins. The results of the test are then gathered in a report that is sent to a person's doctor or genetic counsellor, or directly to the person, if requested. It is important to note that this methodological process follows standard protocols. This is important to secure accuracy and confidence in the way samples were collected and analysed, and in the findings that are reported in the test report. There are three types of test results: positive, negative and uninformative, indeterminate, inconclusive or ambiguous. A positive test result means that a change in a particular gene, chromosome or protein was detected. **Depending on the purpose of the test, this result may confirm a diagnosis, identify the chances of a person to develop a disease or suggest a need for further testing**. A negative test result means that no change in the gene, chromosome or protein under evaluation was detected. This may indicate that a person is not affected by a particular condition, is not a carrier of a specific genetic mutation or does not have an increased risk of developing a certain disease. Yet, a negative result does not mean that a person will not develop a certain disease, since in many cases

there are other factors that may contribute to it (e.g. environment, lifestyle, etc.). It is also possible that the test missed the detection of such particular genetic alteration since some tests cannot detect all genetic changes. In some cases, the results of a test might not give any useful information. This type of result is known as uninformative, indeterminate, inconclusive or ambiguous. An uninformative test result cannot confirm nor dismiss a diagnosis, the same way it cannot indicate whether a person has an increased probability of developing a disorder. In some cases, further testing is needed to clarify this type of result or testing other affected and unaffected family members can help to clarify this result. Finally, it is also possible to have an incidental finding which is a result not related to the reason why the test was conducted but a finding that may be of health importance.

The genetic information of a person, although individual and private, may impact a person's life and decisions, and of their family. This is because a positive result for a certain genetic mutation that causes a particular disease, may not only affect a person's individual decision on the treatment to take, but also on the decision to share such information with their family, since such a mutation may run within the family. For example, a woman might discover that she carries the BRCA1 and BRCA2 genes. These genes have a 72% and 69%, respectively, probability of such a woman to develop breast cancer and a 40-50% and 10-20% probability, respectively, of such woman to develop ovarian cancer. Also, a mutation in one of these genes is 50% more likely to be transmitted to the offspring. Consequently, this woman may feel obliged to disclose this information to her family. This opens a key discussion on privacy and confidentiality issues, on an individual's own right to decide whether to keep or share genetic information that might affect others and on potential consequences (e.g. social discrimination). Moreover, a person's genetic information may result in incidental findings that might affect both physically and mentally (e.g. depression) the person receiving such information, since the genetic make-up of a person holds more information than the one expected from the genetic test taken.

Informed consents are a vital component of genetic tests research and of clinical practices. Informed consent refers to the process (i.e. usually through a form) by which a doctor, a medical geneticist or a genetic counselor (or a researcher) detail (i.e. communicate) all relevant aspects (see below) of a treatment, procedure, care (or study) to a person (or to the public), which often leads to their permission to conduct such intervention. Yet, a person has the right to refuse such intervention, after being fully informed about it. Informed consent is required for medical treatments, for the dissemination of information about patients or research participants, for research involving humans, for anaesthesia, blood transfusion and surgery. Informed consent should provide the following aspects: detailed description of the procedure, test, treatment or care to be conducted; purpose and methodology that will be applied; benefits, limitations, potential risks and the likelihood of those (i.e. both the benefits and risks) to happen; suitable alternatives available; types of results provided (e.g. in genetic tests) and information about data use and storage. Informed consents are both an ethical and legal obligation, as it results from a person's individual right to choose what happens to their body. Moreover, these are a collaborative process between the person and their doctor, researcher or genetic counsellor, where both should discuss and make decisions together, about the procedure, test, treatment or care being conducted, which may result, during the process, in modifications or even a decision to stop it, if the person expresses such desire. Importantly, informed consent must be obtained before the research procedure or medical practice is conducted. Also, every person has the right to ask and clarify any doubts about the intervention to be conducted. For example, in genetic tests research, this also means that a person has the right to know how their genetic information will be used and stored, and whether their personal data will remain private and confidential. By signing an informed consent, a person is agreeing to undertake a medical intervention or to take part in clinical research. There are 4 principles in informed consents: 1) a person must have the capacity or ability to make a

decision; 2) the doctor, researcher or genetic counsellor must disclose all relevant information about the treatment, test, procedure or care to be conducted, including the expected benefits, limitations, risks and the likelihood of those (i.e. both the benefits and risks) to occur; 3) the person must comprehend the relevant information provided; and 4) the person must voluntarily grant consent, without coercion or duress. These 4 principles reflect a person's decision-making capacity, concerning the ability to understand their options, the consequences of choosing such options and to evaluate the personal cost and benefit of each of the consequences and relate them to their own set of values and priorities. If a person is not capable of fulfilling all of these components (e.g. mental illness), family members, court-appointed guardians or others determined by law, may make decisions on a person's behalf. However, in certain situations (e.g. life-death emergencies) an informed consent may be discarded due to inadequate time to obtain it.

Genetic databases and biobanks are another key component of genetic tests research or for clinical purposes. This is because, when a person takes a genetic test, their genetic information is stored in genetic databases or biobanks. A genetic database is one or more sets of genetic data (e.g. genes, phenotypes, etc.) that is stored together with software to enable users to retrieve genetic data, add genetic data and extract information from the data. This way, genetic databases (e.g. GenBank; https://www.ncbi.nlm.nih.gov/genbank/) are repositories of organised data that are a useful resource for researchers, doctors or genetic counsellors to understand how organisms function, to estimate the prevalence of genes in populations, to differentiate among subtypes of diseases, to comprehend and trace how certain genes may predispose to or protect against illnesses and to improve medical care, treatments and procedures. A biobank or biorepository is a collection and storage of human biological samples (e.g. blood, tissue – e.g. the umbilical cord, among others) and the medical information about the person that gave their samples. Biobanks involve cryogenic storage facilities for the samples (i.e. storage of samples at very low temperatures – e.g. -100 °C). Also, biobanks must contain information about the donor, which must be kept private and confidential. The same applies to genetic databases, where any personal information or information about the genetic condition of a person should be kept private and confidential, and only shared between the person and their doctor, researcher or genetic counsellor. Having said that, the use of genetic data from individuals in research should be done in such a way that it is impossible for the researcher to identify the person whose genetic data belongs to. This means a person's genetic data should be anonymised and only disclosed if, in the informed consent form, the person explicitly states that they are available to collaborate and receive information from the researcher. Therefore, data protection in genetic tests is of key importance to preserve the identity of a person, their sensitive information and to avoid any potential misuses of their genetic information. However, both genetic databases and biobanks have been raising key ethical and legal debates, concerning privacy, confidentiality and ownership issues. This is due to an increasing number of different uses of large sets of genetic data from biobanks and databases (e.g. for research purposes). In fact, questions have been raised on whether the donor's identity should be disclosed to consent on using their data, whether a person legally owns their data, who owns the data, to what extent such data can be used and what information can be shared. Such privacy and confidentiality discussions have also been under current spotlight due to the increase in the use of genetic tests for recreational purposes (e.g. for ancestry search, genetic horoscope, etc.), where the easy upload of such genetic data on public databases, allows people to access it and track, for example, relatives that have also taken a genetic test and uploaded their genetic information to a public database. This was recently debated in the criminal case of the "Golden State Killer". In 2018, the serial killer, Joseph James DeAngelo Jr, was finally caught and sentenced to 26 life sentences, thanks to the use of genetic test technology (https://www.latimes.com/california/story/2020-12-08/man-in-the-window). Briefly, this case became famous after police

were able to identify the killer, through genetic data retrieved from a public DNA database (i.e. GenMatch). After over 35 years of criminal investigations, it only took a couple of weeks for the police to match the DNA found at the crime scene with the DNA uploaded by a distant relative of the serial killer, since this person had taken a genetic test for recreational purposes and uploaded his genetic information into the public database. Other evidence was then collected that allowed them to make a trustworthy profile of the killer and sentence Joseph to jail. Despite the advances in genetic technology allowed to close a long-time crime investigation, it also opened serious privacy and confidentiality questions, particularly concerning the disclaiming of the identity of a person, through their genetic data and the easy access and retrieval of such data, without consent being given.

Research integrity means conducting research with responsibility and honesty, so that others have trust and confidence in methods and findings. In the same way, students should act with responsibility and honesty, when doing and presenting their own school work, so that the teacher and peers can trust in the knowledge shared.

There are four guiding principles stating how to conduct research with integrity: Reliability, Honesty, Respect and Accountability. You will find the principles presented in more detail in the introduction.

Relating the integrity principles with genetic tests, it is important to act with integrity, because of the sensitivity of a person's genetic information and its wider impacts. To this end, it is important to employ reliable and honest data collection and analysis, as these will have implications for the accuracy, transparency and unbiased results of the test that will be reported, which may then impact a person's individual life and of their family. Moreover, respecting other people's individual choices, the privacy and confidentiality of their genetic information, and detailing all aspects of a genetic test, through a detailed informed consent form, means acknowledging the research integrity principle of Respect.

The principle of Accountability in genetic tests means assuming responsibility for all aspects of a genetic test. This means assuming responsibility for providing all relevant information about a genetic test and answering all questions a person might have, before deciding whether to consent to taking such a test. It also means, assuming responsibility for the test procedure and data analysis (including securing privacy and confidentiality), and for the accuracy and honesty of the findings that are reported.

Research misconduct refers to three actions that show a deliberate intention from the researcher engaging in those. These are: **Plagiarism, Falsification and Fabrication**. Plagiarism refers to the appropriation of another person's material without acknowledging them. Falsification refers to the manipulation of research materials, equipment or processes, or changing or omitting data results from an experiment. Fabrication means making up data or results, and recording or reporting them as if they resulted from an actual observation or experiment. Students can relate with these three research misconduct practices when, for example, they copy an entire paragraph from a book to their own school assignment, or write down numbers, in school work, that did not result from any actual experiment or observation, or when they change answers given by their peers in questionnaires for a school project.

Questionable research practices can also compromise the credibility and trust in the findings from scientific studies. These are often more subtle and may not result from a conscious intention from the researcher.

Examples of questionable research practices relate to authorship and collaboration issues. For example, when authors, who have not contributed to a study, are added to improve the chances of having that study accepted for publication, or authors, who have made a significant contribution to the study, are not given credit. Students can relate with authorship and collaboration issues when, for example, in a group work, only one student did all the work, while the others, who

have not contributed to the group work, have their names in it. Issues regarding drawing from the work of others, citing selectively and collection, analysis and reporting of data may also reflect questionable research practices. These may happen in genetic tests research, when, for example, a certain genetic test, which was developed to detect a particular gene mutation, reveals to be ineffective, because it was drawn from previous research studies that employed an unreliable methodology or produced non-reproducible results. The same way, when researchers only cite certain studies to support their results, and omit or cherry-pick (i.e. choose) data, results or relationships established from the data analysis, to prove that a particular result or relationship is the only one found to answer their research hypothesis, they are engaging in questionable research practices. Students may relate with such examples when, for example, in a school project, they only include work that corroborates the idea they want to demonstrate, or when they have structured their work based on unreliable literature they found on the Internet. In the same way, in a school assignment that involves collecting questionnaires from their peers at school, students stop collecting questionnaires, when they think they have all the data needed. Yet, the decision to stop collecting data did not result from a validated methodology. Issues regarding mentoring may also reflect questionable research practices. This may happen in genetic tests research, when, for example, senior researchers from a genetic laboratory, who have students to supervise on the work being carried at the laboratory, are often not available, or do not make time to look into the experimental design, procedure, data analysis and reporting of the findings made by their students. Students may relate with mentoring issues, when, for example, they try to reach their teachers for guidance and support on their final year school project, and their teachers do not make time to discuss the project or do not reply to students' request to speak about potential doubts on data analysis. To sum up, acting with integrity, when doing research or schoolwork, is key to securing findings that people can trust. Having said that, when doing school assignments, students should not plagiarize text they found on the Internet or that they read in a book. Instead, students should learn that they may use such text to collect knowledge and ideas, which they can then use to write their own assignments. Moreover, students should not change or made-up data, as these actions will produce unreliable knowledge. In the same way, when doing group work, students should contribute effectively to it and not give undeserved credit based on friendship. To this end, it is important that students understand that acting with responsibility and honesty in their school work and environment, not only secures trust in the knowledge they share with others, but also it is the first step for becoming responsible researchers and citizens. Therefore, claiming a lack of knowledge on correct scientific practices, does not make students not accountable, when engaging in misconduct or questionable practices. This is the same with the law, where a lack of knowledge of rules does not make a person innocent of a crime. Thus, it is important that students learn about research integrity, to understand the importance of avoiding engaging in misconduct or questionable practices, when doing school work or when doing research.

03 Module Structure

Session Overview

Key Words

Biobanks
Data Privacy
Genetic Tests
Informed consent
Plagiarism
Research
School assignment

Module Timeline

Estimate time: 90 minutes total

→ Part 1 — Introduction
30 mins

→ Part 2 — Practical Activity
55 mins

→ Part 3 — Conclusion
5 mins

NOTE:

The durations mentioned to each part of the module are just a suggestion. The teacher/facilitator is free to adapt these according to the time available for the class.

→

Introduction

Activity Introduction for Students

Students will get acquainted with the meaning of genetics, genetic tests, the methodological process, the importance of an informed consent form and of data privacy and confidentiality in genetic databases and biobanks. Students will also learn about the meaning of research integrity and the four guiding principles, the meaning of research misconduct and questionable research practices, and the importance of avoiding such practices when doing school assignments.

Suggested Time

30 min

Classroom Setup and Guidelines

Classroom Setup: the teacher/facilitator should use the PowerPoint presentation to present the content that students should learn about:

- Genetic Tests (slides 3–5).
- The methodological process (slides 6–7).
- Informed consent and Genetic databases (slides 9–13).
- Research Integrity: meaning, 4 guiding principles, research misconduct, questionable research practices and importance at high school level (slides 15–18).

Before moving within the different topics, we suggest the teacher/facilitator engage students in an interactive discussion, by asking them to explain their perceptions of genetic tests, the methodological process, the importance of an informed consent form and of data privacy and confidentiality in genetic databases and biobanks. Students may also explain their perceptions of research integrity, research misconduct and questionable research practices, by providing examples connected with their own practices when doing school assignments.

Learning Objective

Students should comprehend and be capable of explaining, by providing examples related with their own practices when doing school assignments, the meaning of:

- Research integrity: principles and importance
- Research misconduct and questionable research practices:

→ Practical Activity

Activity Introduction for Students

Students will be organised in 4 groups. Each group will receive an individual board (1 from the 4 available), outlining a specific case of misconduct or questionable practices in school work or research involving genetic tests. Each group will first watch the video mentioned in their board (link and QR code in the board). Students will then discuss and critically reflect on the two dilemmas of their board and each group should write their ideas and solutions to deal with the dilemmas.

Materials Provided

- [ ] PowerPoint presentation: structure of the practical activity – slide 20.
- [ ] Board 01. Case of the researcher who misused private data.
- [ ] Board 02. Case of the student who used data without consent.*
- [ ] Board 03. Case of the cheating student.
- [ ] Board 04. Case of the sloppy research partner.
- [ ] Set of post-its (distribute one per group).

Suggested Time

55 min

Classroom Setup and Guidelines

If the session is facilitated online, the teacher/facilitator should prepare 4 individual breakout rooms, before the session, to where each group should migrate to discuss their case (i.e. board). Students should first get acquainted with the structure of the activity, in the main online class, and then migrate to their breakout rooms.

If the session is facilitated face-to-face, the teacher/facilitator should first present the students with the structure of the activity and then each group should discuss their case (i.e. board).

Guidelines: the teacher/facilitator presents the structure of the practical activity outlined on slide 20.

- 4 groups of 5–6 students.
- Each group receives 1 board (the teacher/facilitator chooses 1 from the 4 boards available) and 1 set of post-its (if face-to-face session).
- Each group watches the video mentioned in their boards (link and QR code in the boards).
- Each group nominates a spokesperson to represent the group and to write their ideas and solutions on their boards.
- Each group discusses the two dilemmas and proposes solutions. The spokesperson writes it down using post-its or sticky notes (online session only!).
- Each spokesperson presents their boards.
- Class discussion about the ideas and solutions presented by the spokespersons.

Learning Objective

Students should be capable of identifying and relating the content of their video with the misconduct or questionable research practices outlined in the two dilemmas of their boards. Students should be capable of formulating their ideas and discussing them, first in their group and then in a class discussion. This is in order to share their opinions and solutions on how to best deal with such dilemmas, if these occur when doing school assignments or if conducting research.

NOTE:

The Case of the student who used data without consent (i.e. Board 02), focuses on the *Carrier Screening Program*. Likely, students are not aware of the meaning and purpose of such a program. To this end, here we provide some useful information for the teacher/facilitator to be able to answer questions students might ask. Carrier screening is a type of genetic test that can tell if a person carries a gene for a certain genetic disorder. For example, when applied before or during pregnancy, it allows parents to know the chances of having a child with a genetic disorder. The *Carrier Screening Program* has been running in, the USA, and is performed on people who display no symptoms for a genetic disorder but may be at risk for passing it on to their children. Thus, the program particularly targets young adults, who are at a stage to build their family (i.e. have children). Moreover, prospective parents with a family history of a genetic disorder are candidates for carrier screenings tests. For more information, please read it here: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4449659/

→

Wrap up & Reflections

Activity Introduction for Students

Class discussion about the learning outcomes that resulted from the session and clarification of any remaining doubts/questions.

Suggested Time

5 min

Classroom Setup & Guidelines

The teacher/facilitator promotes a class discussion about the learning outcomes from the session. Students should demonstrate knowledge and be capable of explaining:

Thematic (general) outcomes:
What are genetic tests? How may your genetic information impact you? Why are informed consent forms and data protection important?

Main outcomes:
What is research integrity and how does it apply to your schoolwork? What are research misconduct and questionable research practices, and how does it apply to your practices when doing school assignments? Why is it important to avoid such practices?

06

Data Transmission

→

Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- Appreciate how data and information can get distorted, reinterpreted and misunderstood as it moves between people.
- Understand the importance of tracking the source of data for research.
- Identify how different interpretations of data or information can lead to different research results and outcomes.
- Recognize the difference between trust and science.
- Understand the importance of accurately citing references and other sources of data.
- Demonstrate an awareness of the subjective interpretation of reality, and understand the role of trust in interpreting reality.

02 Overview & General background

The Data Transmission module is designed to provide a practical experience of how information and data gets misunderstood, distorted, and reinterpreted as it is transmitted between people. This module is based on the ‘childrens game of ‘Telephone’’ which is used to illustrate the importance of tracking down the original source of any story or piece of data, especially if this data is to be used for research or schoolwork. By systematically playing the game and reflecting on its results, the importance of responsibility in research; how and when to verify a message; how to recognize a piece of information as trustworthy; and the role played by trust in data transmission protocols will be highlighted. In addition, the student will develop a personal awareness of how information is transmitted through listening, hearing, and understanding. Students will also develop an appreciation of how this is closely linked to the data protocols of sending, accepting, and processing.

03 Module Structure

Session Overview

This module is broken down into three main activities as described in the following sections. The module allows for a flexible pedagogical approach to be adopted by the teacher. The recommended time for the module is approximately 2 hours, but the module may be completed in more or less time as deemed appropriate for the particular circumstances of the school, class size, available time etc.

Key Words

Data transmission
Data quality
Referencing data
Fake news

Module Timeline

Estimate time: 2 hours total

→ Activity 1: 'Telephone':
50 mins

→ Activity 2: Discussion:
40 mins

→ Activity 3: Recap:
30 mins

NOTE:

The durations mentioned for each part of the module are just a suggestion and are very flexible. The teacher/facilitator is encouraged to adapt these according to the time available for the class.

→

Activity 1 – 'Telephone' game:

Learning Objective

To demonstrate how data can be misinterpreted as it passes between people by playing the 'Telephone' game in groups.

Suggested Time

40 min

Activity

The teacher introduces the workshop and divides the class into groups of 5-7 students. One student 'reader' is assigned by the teacher to read the story and observe the game. This student is not part of any student group.

Each student group selects an 'observer' and a 'note-taker' from within their group. Every student takes part as a transmitter (receiver, processor, provider) of information. The groups will also decide on the first in line (observer) and the last in line (note-taker) for each group.

The reader and the observer from each group leave the classroom and the reader reads the story to each of the observers. The story provided at the end of this section can be used, but the teacher can choose another story if more appropriate or if repeating the activity.

The observers return to the classroom and rejoin their groups. Each group forms a straight line so that the students can whisper the story to each other. Each observer passes the story in a whisper to the first person in line. That person then whispers the story to the second person in line, and so on until the last member of the group. The last person in the group – the note-taker – writes the story on a piece of paper. The note-taker then reads the story to the whole class.

Activity 2 – Discussion

Learning Objective

Students have now had a personal experience of sharing data, and may be able to see how data is distorted and reinterpreted as it moves through a group of people. The teacher now leads a discussion about this. The main question is what happened to the story as it passed between people? The following questions can be used to guide the discussion.

Suggested Time

40 minutes (20 minutes for group work, and 20 minutes for discussion between groups).

Activity

Tracing the source

- How does the final version of the story compare to the original story?
- What happened to the information?
- What information can be traced in the first and last versions?
- Is the story true or credible?
- Can you trace the source of the story?

Understand the context

- What are the key factors in finding meaning in this story? Why are some things easier to remember, and some harder?
- How important is it to follow the source of this story?
- How do we prioritise when filtering messages?

Different interpretations

- What did I remember about this story?
- Is it possible to avoid biased information?
- How is it that some of the information in this story was conveyed and some was not?

Recognise the difference between trust and science

- How do we check the actual facts of this story?
- What data and information in this story is most valuable?
- Is truth important in this story?
- Do we trust the news in the media?
- Do we trust a person we know or a person in a position of power?
- Do we trust influencers on social media or do we trust scientists?
- Why do we trust these people?

Wrap up & Reflections

Learning Objective

The wrap-up involves a whole class discussion on the 'Telephone game', and is designed to give students an opportunity to reflect on the workshop and what has been learned. The teacher begins by recapping the main findings of the activity by summarising the main lessons and conclusions that the groups have reached. Students should be given time for reflection by using their Zines.

The wrap-up activity is designed to explore both the story and the process of data transmission. It is important to make students aware of the importance of:

- The ways in which data can be distorted and reinterpreted.
- The importance of accurately citing references and finding original sources of data.
- The selectivity of personal memory.
- The role of trust in interpreting reality and data.

Suggested Time

30 minutes

The story

The following story is given as an example. This story may be used, and an alternative story may also be used for the module activity.

Linda Burnett, 23, a resident of San Diego, was visiting her in-laws, and while there, she went to a nearby supermarket to pick up some groceries.

Several people noticed her sitting in her car with the windows rolled up. Her eyes were closed, and both of her hands were behind the back of her head.

One customer who had been at the store for a while became concerned and walked over to the car. He noticed that Linda's eyes were now open and she looked very strange.

He asked her if she was okay, and she replied that she had been shot in the back of the head and had been holding her brains in for over an hour.

The man called the paramedics who broke into the car because the doors were locked and Linda refused to remove her hands from her head. When they finally got in, they found that she had a lump of biscuit dough on the back of her head.

A biscuit canister had exploded from the heat, making a loud noise that sounded like a gunshot, and the wad of dough hit her in the back of her head. When she reached back to find out what it was, she felt the dough and thought it was her brains. She had initially passed out, but quickly recovered and tried to hold her brains in for over an hour until someone noticed and came to her aid.

When everyone realised what had happened, they all had a good laugh!

07

Art, Activism & Awareness: An Art Module

→

Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- Understand and describe the key concepts and the ethical issues in the art world.
- Understand and explain the meaning of research integrity, the four guiding principles, and how the issues relate to the art world.
- Discuss the research integrity issues through the practical activities and powerpoint slides, being capable of formulating their own arguments and debate them in a class discussion, to reach agreement on best strategies to avoid engaging in such practices.
- Explain the importance of avoiding engaging in misconduct and questionable practices in school assignments and in school environments.

02 Overview & General Background

This module aims to equip students with the knowledge to comprehend the meaning and importance of research integrity through the lens of a subject that is highly relatable in our society and through which students can easily engage and discuss research integrity issues.

The primary focus of this module is on research integrity. We have chosen to pair it with the subject of Art to allow for a wider ethical discussion through a subject that is relevant to the target audience.

Art and creativity have evolved to reflect the current issues at heart in the 21st-century. According to Khan Academy, art today is comprised of bio art– created from living organisms, reflecting our need to explore sustainable and biodegradable materials, relational aesthetics and performative art, which invites viewer participation and interaction, feminism in art, AI art, digital technologies and 3D printing, mixed medias of salvaged and recycled materials and an acute awareness of our past, our present and our future.

Globalisation has changed the landscape for artists, as ideas and issues are echoed and heard across the world through social media or other technologies.

The line between high art and popular culture is blurred and played with by artists today, while addressing the social and political issues of the moment. Identity, culture, gender and sexuality, religiosity and spirituality are all interpreted as fluid models of the self, as those who construct their self, assign their own priorities to favour their very individual identities.

Fluidity between categories is emphasised today, and reflects how the under 25s approach the world with a different perspective.

Conforming is no longer favoured by the under 25s.

In Art today, we recognise plagiarism as appropriation. Today we seek to **empower those that have been voiceless**, to recognise them as the authors of their experiences and to create the room for those stories to be told without theft or opportunism by those whose turn it is to listen.

Plagiarism is at risk of appropriating the ideas, identities and experiences of those who were voiceless and should have the opportunity to be heard.

The core Integrity issues will be discussed through the art world and the impact it has today – **from artificial art, to activism and performance.** There are several practical activities throughout the module which aim to engage students, draw insight and comparisons between questionable research practices and questionable practices in the art industry today. These activities are an opportunity to encourage students to reflect on the long-term impact of these issues, to ideate innovative solutions to address the issues at hand and to draw comparisons with their own day-to-day practices at school, with homework, or with peers.

Students should be encouraged to discuss issues they are aware of from experience or otherwise. The activities should feel fun, engaging and prompt discussion of the issues. **At the end of the module, students should be capable of describing different issues within the Art industry, and be able to draw comparisons with areas such as their school-work or academic research.** Students should be able to recognise and value integrity issues and the importance of not engaging in misconduct nor questionable practices, and reporting it when necessary.

On integrity issues and how it relates to the music industry:
This module is developed around **research integrity issues**, using examples from the Art world today. The issues are presented in an engaging way to students of this age group, who can relate with the topic being discussed while drawing comparisons with the core research integrity issues.

We aim to empower students with the tools to critically reflect on the practices within the art world today, and to reflect on how this may translate to their own school practices. The core research integrity issues are as follows: **plagiarism – drawing on the work of others, collaboration and authorship, the collection, analysis and presentation of data, the reluctance to report unethical behaviour.** These core issues all contribute to research misconduct at an academic level, but can also feed into detrimental and questionable behaviours beyond the education system.

Those core integrity issues are not restricted to the academic world. This module will show that **empowerment** is central to the way art and the artist can create a platform for those that need to be heard by influencing younger generations or simply those that have a desire to speak up about the social or political issues at stake. Through social media today, art can catalyse change in a powerful way, enough to move people to activism and protest.

The continued empowerment of the younger generations is essential to compel change.

However, it is imperative that those who need to be heard are given the opportunity to speak, rather than be spoken for or worse, to have social issues such as the suppression of identity and gender and sexual fluidity be absorbed and discussed by those who have not experienced it. These **issues of authorship** and plagiarism are important to reflect on. This is why the research integrity issues will be discussed through the topic of art and creativity. Students will learn to reflect on their own actions, both inside and outside the education system, including how empowerment, authorship and collaboration can be dealt with effectively by acknowledging the source of their information, and building on it with their own opinions and values.

03 Module Structure

Session Overview

The goal of this workshop is to explore the ethical issues that arise within the creative world of art, within an open and supportive space where students can voice their opinions and insights.

The following outline is aimed only as a suggestion of what can be asked. Teachers should feel encouraged and free to tailor the following outline to their own preference, while keeping the core Integrity learning outcomes in mind.

Key Words

Empowerment
Plagiarism
Collaboration and Authorship
Appropriation
Activism

Module Timeline

Estimate time: 125 minutes — total

→ Section One: What if Everything is A Remix?: **30mins**
→ Section Two: Artificial Art :20minutes
→ Section Three: Art is Activism: **30mins**
→ Section Four: Collaboration vs Isolation: **30mins**
→ Wrap up & Reflections: **15 mins**

NOTE:
The durations mentioned for each part of the module are just a suggestion and are very flexible. The teacher/facilitator is encouraged to adapt these according to the time available for the class.

→

slide **4–8**

Section One: What if Everything is a Remix?

Learning Objective

To recognise that all work is inspired or derived from a pre-existing body of work and to encourage the correct use of this work by acknowledging the source.

Suggested Time

30 min

Section Description

How and why we need to 'remix' the work of others to create new work:

1.1 Watch the video (slide 5) **from 13:54mins- 16:58mins reflect and discuss the following after:**

- Why is creativity described as 'not magic'?
- How is copying useful and what can it lead to?
- How has the internet developed over the years?

1.2 Which is a Picasso? (slide 6–7)

How creativity and originality develop over time.

- Picasso's early paintings are a reflection of the work from his peers. His early work could be called an 'imitation', before he developed his own style, and created truly original work. This is the case for many artists.

1.3 Activity – Let's Remix (slide 8)

- Ask students to write on piece of paper the following:
- Types of hobbies.
- General tasks/activities (e.g. brushing teeth).
- (using stuff that already exists and build on it)
- Come up with a new invention based on a pairing from first and second question from the suggestions.
- Eg. Music + brushing your teeth – singing toothbrush.
- Group work then share back.

How 'new' is the invention? Is it completely original or has it been created before?

Section Two: Artificial Art

slide
9–11

Learning Objective

To reflect on the future of technology, how it may impact the art world, and whether the line between human creation and machine creation will disappear.

Suggested Time

20 min

Section Description

The Next Rembrandt (slide 10):

Watch to 01:35mins

Today we have technology that can simulate art, life and creativity. For example, this AI created artwork based on the work of Rembrandt van Rijn.

: THE NEXT REMBRANDT J. Walter Thompson Amsterdam (NL) This project set out to create a painting that Rembrandt van Rijn (1606–1669) might have made, had he lived longer. According to its creators, this image of a man was developed using artificial intelligence that learned from scans of works by the famous Dutch artist. Based on these data, it devised attributes for this painting like subject, composition, lighting, and even brush strokes. The stunning 3D printed painting looks quite convincing but it is unclear exactly how much of the work is due to autonomous computer generation and how much was done by human designers and artisans.

Discuss.

- Is this original art, and is it worthy of the same praise as an artist like Rembrandt or Picasso?
- Who is the author of this work? Is it the programmer? Or the algorithm used? Or someone else?
- Another AI Generated painting called “Edmond de Belamy, from La Famille de Belamy” sold for $432,500 at Christie’s in October 2018. What do you think of this?

When AI Meets Art (slide 11)

https://www.ai-darobot.com/

Discuss.

- Can artificially created art be as meaningful as human art?
- If the artwork is created by feeding it data based on the artwork of others, is that plagiarism? Or can it still be an original piece of work?
- Some argue that AI art can be thought of as just another artistic tool, for humans to collaborate with. Do you agree?

Section Three: Art is Activism

slide
12–18

Learning Objective

To understand that art can be an expression of self and of others, that it can have a great impact and help to create change, as much as scientific research can.

Suggested Time

30 min

Section Description

3.1 Watch How Art Became Active: Episode 5 – Performance and Protest, video created by The Tate Modern (slide 13) **– 4:40 mins**

- Discuss the impact art can have in the streets, and how it can effectuate change today.
- Can you name some other examples?
- Should art always be about a societal issue?

3.2 A Closer look: Watch the video about artist Zanele Muholi (slide 16-17) **– 6:55 mins**

'Visual activist, Zanele Muholi, uses photography and film to document and explore issues of race and representation and to celebrate the LGBTQIA+ community in South Africa and beyond.

Here they talk about how the power of images can show LGBTQIA+ people of South Africa, and QTIPOC people worldwide, that they are not alone. Watch as they introduce us to four key bodies of work and the ideas behind them.'

Based on the video from the previous slide, discuss the following:

- Why is the photography from Muholi powerful?
- How do they relate to the subjects of their photos?
- Do you find these images more powerful after listening to the author's explanation and understanding their process?
- How can we help to further recognise and welcome the people who feel excluded from society?

Section Four: Collaboration vs Isolation

slide
19–22

Learning Objective

To understand the benefits of working with others or using the work of others to explore ideas and gain different perspectives and to consider how collaboration can be an opportunity, whether in research, or in creative work.

Suggested Time

30 min

Section Description

4.1 The Artist is Present, MoMA, 2010 (slide 19)

Watch the reunion of artists Marina Abramovic and ULAY, who collaborated for years together, only to go their separate ways until this point.

Discuss.

4.2 Rest Energy, Abramovic and ULAY, 1980 (slide 20)
The image shows artists Abramovíc and ULAY in their piece, Rest Energy, 1980.

Discuss the following:

- How are they collaborating?
- What does the image make you think of or feel?
- Could this be replicated as one person?
- Do you think humans and AI could collaborate like this?
- Why is effective collaboration increasingly important in the world today?

Suggested Answers:

- To 'transcend' our own limitations of what we already know, by collaborating with others and combining knowledge to create something new and maybe even, original.
- We can see a lot more collaborative work today, such as musicians with filmmakers or different media. Similarly, we see a lot more interdisciplinary work, in research and business, as much as art and music.
- To avoid the 'silo effect', where a lack of communication leads to duplication of work and a waste of resources.

4.3 *Rhythm 0, Abramovic*, 1974 (slide 21)

Collaboration requires trust in the other. In a piece entitled 'Rhythm 0' 1974, by Abramovic, she stood in the exhibition, next to a table with the following instructions:

Instructions.

There are 72 objects on the table that one can use on me as desired.

Performance.

I am the object.

During this period I take full responsibility.

Duration: 6 hours (8 pm – 2 am).

In this piece, the line was blurred between spectator and participant. Visitors were gentle to begin but became more aggressive with their actions.

As Abramović described it later: "What I learned was that … if you leave it up to the audience, they can kill you … I felt really violated: they cut up my clothes, stuck rose thorns in my stomach, one person aimed the gun at my head, and another took it away. It created an aggressive atmosphere. After exactly 6 hours, as planned, I stood up and started walking toward the audience. Everyone ran away, to escape an actual confrontation."

4.4 Real bodies: the exhibition (slide 22)

The Real Bodies exhibition opened in 2018, stirring controversy and protests as objectors claimed that some of the human bodies were executed Chinese inmates, and possibly political prisoners. However the organisers argue the 20 bodies were legally acquired after being determined as "unclaimed corpses". The exhibition continues to tour today.

- IS there a line in art? In terms of content/ technique methods etc (collection and presentation of data as human subjects)
- Did either of these examples cross the line in performative or visual art?
- Should art be subject to the same regulation and restrictions as science?
- Should consent have been part of these art pieces? Today across all fields of research,you must have the full detailed consent of the participant before proceeding with any research or using any data collected. Should the same rules apply for artistic research?
- If not, how can you make sure you represent others appropriately in your art pieces?
- Should it be done without permission, such as using an image of someone without their knowledge or such as the Human Bodies exhibition?

→

Wrap up & Reflections

slide
23

Learning Objective

To reflect on the ethical issues surrounding the art world and discuss the impact the key concerns have and whether they relate to the students own experience in their work environment.

Suggested Time

15 min

Section Description

- Can an AI create an art piece? Is it original? Explain your thinking on this.
- Should there be strict guidelines on consent and the collection of data in the creative world, as there are in scientific research? Can one learn from the other?
- Where is the line for plagiarism? Is there an acceptable way to use someone else's work?
- Is plagiarism when creating art or music different from when writing an essay or selling a product for a business? Discuss.
- Does collaboration when creating bring advantages to working in isolation? Can you think of examples outside of the art world?

Space Exploration

→

Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- Articulate a variety of opinions and insights on the topics of research integrity in space science and space exploration.
- Create a model of a dystopian or idealistic society as a tool to question research integrity issues in a group challenge.
- Develop a variety of creativity, collaboration, critical thinking, and communication skills, and use these skills to challenge what research integrity should look like in a design challenge.
- Demonstrate an ability to apply research integrity concepts to speculative group challenges.

02 Overview & General Background

The goal of this module is to explore and question ethical issues in research using the themes of space science and space exploration. The end goal is not to become a topic expert, but to use space exploration as a vehicle to speculate and question issues around research integrity and research ethics. The themes will be explored using various teaching approaches including a walking debate and a design task which involves building a space habitat. These are designed to challenge students to create, collaborate and question what research integrity looks like in an applied group challenge.

03 Module Structure

Session Overview

This module is designed as a workshop to explore moral dilemmas and research integrity issues that are relevant to the topic of space exploration. The first activity is a series of walking debates where students have the opportunity to examine a variety of moral dilemmas in space science and technology. The second activity is a design challenge which requires the students to design a space colony and make a variety of decisions when disaster strikes the colony.

Key Words

Space
Ethics
Empowerment
Collaboration and groupwork

Module Timeline

Estimate time: 120 minutes – total

→ Activity One – A Question of Space
60mins

→ Activity Two – Design a Space Colony
60mins

NOTE:
The durations mentioned for each part of the module are just a suggestion and are very flexible. The teacher/facilitator is encouraged to adapt these according to the time available for the class.

→

Activity 1 – A Question of Space

Learning Objective

The main objective of activity 1 is to allow students to explore research integrity issues and moral dilemmas in space science and technology through walking debates.

Suggested Time

Up to 60 minutes

Main points

This activity uses the pedagogical approach of walking debates and thus requires physical space in the classroom so that students can position themselves in a line and change position as the debate evolves. The teacher will introduce some or all of the 12 questions provided, and then invite students holding different positions (from strongly agree to strongly disagree) to take their place in the line and explain why they have chosen to stand in that particular position. The prompts provided can be used to probe each question more deeply, and the teacher can add additional prompts and questions if they wish. The teacher can also play devil's advocate and represent a variety of polar opposite opinions to allow students to reflect on their chosen position in the walking debate. Students should be invited to change position on the spectrum on hearing explanations from their teacher and peers if their opinion on the initial statement changes.

It is recommended that you take at least three of the questions and prompts to carry out the walking debate activity, but this can be more or less depending on the requirements of the teacher and time available for this activity. To help you choose a selection each is given a LOW, MEDIUM and HIGH rating for complexity. The higher the complexity, the more morally grey the topic is. In this way you can build students up from LOW to MEDIUM to HIGH in opening up discussion and dialogue over the research integrity and ethical issues. The explanations can be read before students make up their mind and each vote can be followed with one or more of the prompts listed. You should use your discretion on the amount of background that you provide for each question.

Walking Debate Questions

- Warm up statements – **Pineapple should never go on pizza** and/or **cats are better than dogs.** These should be used to demonstrate how the workshop works before diving into the main questions.

- **Asteroid mining should remain legal (LOW)**
  - **Background info:** Asteroid mining involves the extraction of raw materials from asteroids and other small solar system bodies. Precious metals such as gold, silver and platinum could be transported back to Earth, whilst iron and other common metals could be used for construction in space. Difficulties include the current high cost of spaceflight, unreliable identification of asteroids which are suitable or lucrative for mining, and ore extraction challenges.
  - Should we mine asteroids in space?
  - Does the availability of abundant precious minerals off Earth devalue these materials on Earth?
  - These precious materials are often mined in dangerous conditions on Earth, and there is a great cost to human life to obtain them. If they could be mined by machines which minimize the harm to human life should we pursue that?
  - Is the use of naturally occurring precious metals essential for humanity's future?
- **It is ethically acceptable to create artworks in space? (LOW)**
  - **Background info:** Use the example of The Humanity Star which was launched into space in January 2018. The sphere was designed to spin rapidly, reflecting the sun's rays back to Earth and creating a flashing light that can be seen against a backdrop of stars. Orbiting the Earth every ninety minutes and visible from anywhere on the globe, The Humanity Star was designed to be a bright symbol and reminder to all on Earth about our fragile place in the universe. The Humanity Star began its final descent to Earth in March 2018. It burned up on reentry, leaving no trace. The Humanity Star had reflective properties, and this led to fears about it disrupting astronomical observations. The creators faced criticism from astronomers after they secretly launched what basically equates to an artificial star into orbit. At times it was called a giant 'disco ball' and 'space graffiti'.
  - Is space our new canvas for art?
  - Should we put art in low Earth orbit?
  - Does the temporary nature of a low Earth orbit artwork make up for it being a nuisance to astronomers?
  - Who should be allowed to make space art? Countries? Space companies? Advertising agencies? Individual artists? Anyone?
  - Who should regulate space art?
  - Is it art if it is made by a scientist (as opposed to an artist)?

- **Space tourism should be banned (LOW)**
  - **Background info:** A number of companies including SpaceX, Blue Orbital and Virgin Galactic have entered and disrupted the space travel market. By creating privately funded, partly or fully reusable spacecraft, these companies have been able to reduce the financial barrier to space exploration and lower the personal requirements for human spaceflight. In the early days of space exploration in the early 1960s, astronauts were often test pilots or defense force personnel. Now, passengers on flights run by these private companies will not have to come from those backgrounds. Also, in the space shuttle era the NASA cost per kilogram for launching items into space was over $50,000. Private space companies have reduced this cost by a factor of ten or more. However, currently private companies are planning to charge at least hundreds of thousands of dollars per person for even short flights near or into low Earth orbit. It is hoped that improved, reduced-cost technology and early investments from high-paying initial customers will help reduce ticket costs in the coming decades.
  - Should space tourism be allowed? Is space tourism ethical as it uses a huge amount of resources and potentially damages the environment.
  - Who owns space? On Earth when we visit hotels, hotel owners own the property and surrounding land and have a legal right to earn money from it. Is it possible (or ethical) to do that in space?
  - Is it unethical to pursue this when only the very wealthy can afford it?
  - There are significant health risks to space travel such as loss of bone density due to the loss of calcium, decreased muscle strength, decreased blood plasma, decreased cardiovascular efficiency, increased exposure to radiation, and immune system suppression. Should space tourism companies be responsible for any health impairment to a space tourist – short or long term?
  - How does this activity compare to the risks undertaken in other tourism activities such as scuba diving or mountain climbing?
  - What is the value of this type of space-based activity and research for humans generally?

- **Animal testing in space is ethically acceptable for research? (MEDIUM)**
  - **Background info:** In order to plan for long-term human space exploration, space agencies have programmes which use animals for research that would not normally be possible for humans to undergo. This includes altering the gene make up in animals to test what genetic traits work best in space and inbreeding to compare near-identical animals in space and on Earth.
  - Is it ok to research and test animals for cosmetics?
  - Is it ok to research and test animals to safeguard human lives or develop new medicines and vaccines?
  - Is human life more important than animal life?
  - Is it problematic that animals can't consent?
  - If it is proven that a high percentage of animals used in space research survive and lead long lives, does that make the practice more acceptable?
  - Can humans consent to being tested when there is a monetary incentive? If so, does this encourage people in low economic positions to participate in a potentially dangerous experiment or testing procedure?
- **Humans should have a 'leave no trace' policy for planetary exploration (MEDIUM)**
  - **Background info:** The Soviets and Americans left hundreds of items on the surface of the moon, including pieces of rockets, satellites, and thousands of smaller items (like numerous bags of human waste). Some items were left in commemoration and celebration, such as flags, family photos of astronauts, commemorative plaques, and goodwill messages from country leaders. Other items were left to avoid extra weight on the return journey.
  - Do you think this is acceptable? Should this be considered as littering the moon and space?
  - Among the items left on the moon to represent humankind was a Bible. Was this unethical?
  - If the technical success of return flights are dependent on leaving items behind, does the technology need to change or is it an acceptable trade-off?
  - Should space companies dedicate resources to clean up programmes to offset items being left behind on the moon or in orbit?
  - Should the polluter pay for what they leave behind?

- **If we find life on another planet, is it ethically acceptable to take it back to Earth for study and research? (MEDIUM)**
  - **Background info:** The planning of many robotic missions to planets in our solar system includes directives to ensure a spacecraft is completely destroyed by a planetary atmosphere. This is to avoid contaminating a potential habitat for alien lifeforms. For example, the NASA/ESA Cassini spacecraft was deliberately crashed into the gas giant Saturn after its mission ended in case it would accidentally crash into one of its moons. Some moons of Saturn have water in the form of ice and may even have liquid water underneath the surface that could contain life. As yet, there are no missions dedicated to collecting life forms as none have yet been discovered away from Earth. However, NASA's Office of Planetary Protection also includes the following objective: To rigorously preclude backward contamination of Earth by extraterrestrial life or bioactive molecules in returned samples from habitable worlds in order to prevent potentially harmful consequences for humans and the Earth's biosphere.
  - Is it acceptable to take an alien life form to a human research lab on Earth or the moon?
  - Does it make a difference if robots do all the work, and no human sees or interacts with the alien life form?
  - Is it okay to investigate a wild habitat on another planet or moon to understand alien creatures better?
  - Is it acceptable to make money from this research? Is it more acceptable if the research is for the overall good of humanity?
  - If there is not complete certainty that another planet is uninhabited by intelligent alien life should humans live there? Does your answer change if there are other lifeforms living on the alien planet?
- **Human colonization on other planets is unethical (MEDIUM)**
  - **Background info:** Plans are underway to build permanent bases on the Moon and Mars. Humans have a history of colonizing countries on Earth, but they would often be inhabited unlike the Moon and Mars. Initially these will be the equivalent of bringing the International Space Station to the ground. That contains living space no bigger than a couple of Boeing 747s. However, when more countries land on alien planets, bigger and more complex structures could be built and planning infrastructure, communications, ownership and responsibility will be vital for successful co-existence off-earth.
  - Is it ethical for humans to colonize the moon and other planets?
  - What is the difference between exploration, colonization, and carrying out research?
  - Is the potential 'Plan B' of colonizing other planets distracting us from tackling climate change on Earth? Does it make planet Earth seem less important if we can survive on another planet?
  - If humans make Earth uninhabitable, do you think we will be able to live sustainably on another planet?

- **Is it unethical to build telescopes on sacred land? (HIGH)**
  - **Background info:** Mauna Kea is a site in Hawaii that was sacred land to native Hawaiians. In the 1960s an observatory was built, and the site has expanded into the world's largest observatory for infrared telescopes. Currently there is a plan to build a Thirty Meter Telescope (TMT), at the summit which protesters blocked plans to build, and several have been arrested as government officials debate how to move forward.
  - Is it right to build telescopes on sacred land? Should we build telescopes on top of remote mountains or in protected areas of natural beauty?
  - If the research can be beneficial to many, and the land is sacred to only a few, does that justify building these telescopes and laboratories?
  - How do we classify 'sacred land'? Who decides on this classification?
  - Is building the telescopes and laboratories on sacred land acceptable if indigenous people agree?
  - Should such infrastructure be built if no one will even see it (e.g. on top of a mountain)?
- **We should establish a planetary protection system on the Moon (HIGH)**
  - **Background info:** The Czech-based political scientist Nikola Schmidt and his team advocate for the development of laser defense systems on the dark side of the Moon. This should have the capability to deflect asteroids on an impact trajectory with Earth. By positioning the laser facilities on the far side of the Moon they can never be aimed directly at Earth as the Moon is tidally locked with one side of the Moon always facing Earth (the near side).
  - Do you agree with building a laser defense system on the moon? Does this change if the laser defense system is built on the dark/far side of the moon?
  - Should this facility be owned by the country which builds it or all of humanity? Who should make this decision?
  - If an asteroid could only be partially diverted by this system, who decides which areas of the planet are protected from any impact?
  - How should we regulate who controls the planetary defense technology to ensure they are not used as weapons in warfare? Even if the technology cannot be directly aimed at Earth, it could be weaponized to destroy something in orbit around the Moon.
- **Military activity should be able to take place in space (LOW)**
  - **Background info:** There are only five global treaties specific to space including the 1967 Outer Space Treaty. However, only one of its provisions deals with military activity – it prohibits the placement of weapons of mass destruction in space. Other means and methods of destroying or interfering with a satellite are not prohibited, although other areas of law regulate their use. This includes things such as anti-satellite missiles, directed energy weapons (including lasers), electronic warfare, cyber warfare and dual-use technology (such as global satellite navigation systems that can have both civilian and military applications).
  - Is it ethical to build weapons in space?
  - Should the laws we have on Earth be applied in space? Who should make these decisions? An individual country, or all of humanity acting together?
  - Who would apply these laws?
  - If someone kills in space, should they be brought to justice? Where and by who?

Activity 2 – Design a Space Colony

Learning Objective

The main objective of this activity is to create a dystopian or idealistic colony as a tool to question research integrity issues in a group challenge. A further objective is to develop creativity, collaboration, critical thinking and communication skills in order to challenge what research integrity should look like in this context.

Suggested Time

30 minutes to create and 30 to share back results and conclusions to the group.

Main points

This is a design challenge where students split into groups with 4-6 participants. Each group will each be tasked with creating a city or colony on another planet that can sustain 1,000 people. One student in each team will be secretly identified as a 'devil's advocate' - their job is to suggest unethical behaviour in the group task. Finally, each group will be invited to present their colony to the whole class.

During the workshop the teacher should prompt students to think about what kind of society they are aiming to construct, as well as the ethical and research integrity implications that may arise when building this colony.

The following script can be used to introduce the students to the workshop:

The year is 2090, and climate change and pollution have destroyed almost all of Earth's habitats for plants and animals. The air is becoming too toxic to sustain life. Water sources are contaminated, and temperatures have risen to dangerous levels. Several governments and research teams have come together to try and save humanity. It is believed that our best chance at survival is to look at developing human colonies on other planets. Several planets have been put forward as having the potential to host human life. A strategy has been developed to send several teams of humans to different locations to build a colony and live there. All of these colonies may not survive, each one that does will safeguard the future of human life. This is a chance to build a new idyllic society free from crime, lying, cheating, stealing and Earth's other problems. Your design task is to build a city for these 1,000 people to achieve this dream. You must account for their basic and physiological needs but also their higher needs such as community and culture.

Share the following points with students before they start their design challenge:

- The habitable planets are so distant that it would take years for any resupply spacecraft to arrive from what resources are left on Earth. Students cannot rely on 'Earth sends more of x y or z'.
- The equipment the colony starts with is not a strict list, students should be as playful and inventive as possible.
- Although habitable, these planets are all still harsh environments. Every one of the colonies will be dealing with solar radiation issues, lower amounts of O2 in the atmosphere and limited natural water supplies. Students cannot rely on an entirely open and safe world that includes freedom to start completely copying exactly what can be done Earth, though the notion of terraforming is something students may and can bring into play.
- In the strategy it was decided that habitable planets should have 2-3 colonies on them. The colonies should work independently but have the freedom to communicate with each other for assistance and trade.
- After the design sprint and presentation it will be important to pair groups up for the last stage of the activity.

Further prompts

- How are decisions made and who makes them?
- What are the basic needs for survival?
- How can you make the colony self-sufficient?
- What system will be in place for progression in life? For example, the more you produce (research/food/education) the more you earn. Is money a thing in your colony?
- How will the distribution of goods (e.g. food) and services (e.g. healthcare) be decided?
- How will you deal with crime? What laws will you apply?
- As this is an alien world new discoveries will be made. What rules or guidelines will you put in place about sharing and crediting these discoveries? If two research teams claim to have discovered the same thing at the same time how would you deal with it?
- Would you share scientific discoveries with other colonies?
- What creative and artistic opportunities will there be for colonists?

Group presentation and reflection

- Invite groups to speak about the colony they have created and present back to the entire class.
- Ask each group to describe the thinking behind their colony including layout, ground rules, power structure, etc.
- How did groups provide for all the needs of their colony?
- Groups can give feedback and critique each other's design.
- Identify the 'devils advocate' in each group - what actions did they suggest that other team members struggled with?
- How did the team work together when designing the colony? What were the most difficult ethical and research integrity challenges?
- Did other team members feel comfortable with a team member who wanted to approach the design task recklessly or in an unethical manner? Did team members call them out on those actions?

Disaster strikes!

Explain to students that two years have passed but all is not well, and the colonies are struggling to address a variety of challenges. On each planet one of the colonies has experienced a disaster that puts that colony in danger of failing completely. As the design challenge facilitator, you can choose from the following scenarios to give each group:

- A meteorite impact punctures the O2 processing facility in the colony. The colony is now running on reserves that will last 4–6 weeks depending on measures taken.
- A change of leadership results in a class structure where management takes more resources for themselves. This includes vital resources such as food, medicine and water and leads to vital technicians getting sick or going on strike. Without more skilled staff key systems will fail within 6 months depending on measures taken.
- Radiation shielding for the hydroponics bay was damaged during installation making that food supply inedible although not visually obvious. Existing food stocks due to run out in 1–3 months depending on measures taken.

Each group now has to decide what they should do – to help or be helped. Different colonies can communicate and negotiate. After they have made their decisions, ask a selection of these prompt questions where relevant to open up discussions. When sharing back, ask students to stick with their original thoughts even if they hear what they feel is a better idea or course of action from another pair or trio of groups.

Final Reflections

- Did any group make promises that they think they would have broken later?
- Is it ever okay for colony leaders to keep some information from the colony population?
- Did any group feel another group was untrustworthy? If so, why?
- Were groups willing to share resources and research with other colonies? Were groups willing to steal research from other colonies if it meant survival?
- What might be the worst implications of falsifying research results in this setting?
- Finally: In the very distant future, all groups decide to move on to other worlds. They decide to leave a plaque behind with a few words or images to explain what they accomplished together. What would it say or look like? Ask the students to design this plaque (this could be done in the Zine).

09 Animal Experimentation

→ Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- To comprehend the key concepts and ethical. issues in animal experimentation.
- To comprehend and describe the steps. involved in the research process.
- To explain the meaning of research integrity and the four principles.
- To explain the meaning of research misconduct and questionable research practices, and relate such practices with students' school work practices.
- To explain the importance of avoiding such practices in school work and life.

02 Overview & General Background

This session aims to equip students with the knowledge to comprehend the meaning and importance of research integrity. This will be achieved through a practical hands-on approach, where real and fictional cases, outlining research integrity issues in biomedical research using animals, will be presented. We aim for students to identify and relate such examples of research misconduct and questionable research practices, with their own school work practices and environment. This will engage students in a group discussion and critical reflection about the importance of acting responsibly and with honesty in their own school work and within their life.

Background to the theme

Animal experimentation is a controversial topic that raises **key ethical questions**, particularly concerning **animal welfare**. Animal experimentation is defined by the use of non-human animals in experiments, where the aim is to control a set of variables or procedures that will affect the tested animal, so that the result can be translated into human or animal biology. It is applied in **biological and biomedical research, in toxicology and safety testing and in teaching**, at higher education level only. The main purposes have been to improve the knowledge about certain diseases affecting humans or animals, to test the safety of new chemical and pharmaceutical products and to test new medicines or treatments or medical procedures. Animals have also been used to improve the knowledge about the basic biology of humans or animals. Experimentation with animals are regulated by the **Directive 2010/63/EU**. It sets the norms and guidelines regarding which experimental and methodological procedures are allowed and which animals can be used (i.e. mice, rats, fish, guinea pigs, rabbits, frogs, cats, dogs, hamsters and, only for conservation and certain biomedical studies, primates; the use of wild monkeys is forbidden). The directive aims to minimize the number of animals used and avoid pain, distress, suffering and lasting harm. Thus, **animal welfare** is an important consideration in animal experimentation, where only trained people are allowed in the animal facilities and to perform experiments on animals. In addition, animals are kept in proper housing conditions (e.g. cages) with close monitoring of their health and environmental conditions, and daily provision of food and water. **Anaesthesia** is always recommended to avoid any pain, suffering or distress to the animals and death as an end-point should always be avoided. Yet, if animals are too ill or are in too much pain, they should be euthanized, but most research in animals cause mild pain, similar to pets that are brought to the vet. Consequently, most claims stating that animal experimentation causes severe pain and that animals are badly treated are simply false, since experiments are strictly monitored and performed to minimise any pain and suffering to the animals. Moreover, **animal experimentation benefits not only humans but also animals**, by improving the knowledge of their basic biology and developing and testing the safety of new drugs and medical treatments. Nevertheless, the **harm-benefit balance** raises **key ethical considerations**, with people sharing different views on the justifications for using animals in experimental research.

The **research process** involves key steps: **design, methodology, experiment, data analysis and the reporting of the findings**. Each step involves a series of aspects that should be considered to produce accurate and trustworthy findings. These aspects include a literature search to acquire further knowledge on the scope of the study, design a proper methodology and experimental setting (e.g. decide on the variables to use, the statistical test to apply, the number of animals to use, etc.) and choose the most practical, reliable and desirable animal, taking into consideration that knowledge about animal biology is key and the chosen animal will influence the results.

Research integrity means conducting research with responsibility and honesty so that others (e.g. the general public or the scientific community) have trust and confidence in the methods that were used and the findings that were reported. In the same way, students should act responsibly and with honesty, when doing and presenting their schoolwork, so that the teacher and peers can trust in the shared knowledge. There are four guiding principles stating how to conduct research with integrity: **Reliability, Honesty, Respect and Accountability**. You will find the principles presented in more detail in the introduction.

Research misconduct refers to three actions that show a deliberate intention from the researcher engaging in them. These are **Plagiarism, Falsification and Fabrication. Plagiarism** refers to the appropriation of another person's ideas, results, processes or written material, without acknowledging it. **Falsification** refers to the manipulation of research materials, equipment or processes, or changing or omitting data results from an experiment, compromising the accuracy, transparency and reproducibility of the study. **Fabrication** refers to making up data or results and recording or reporting them. Students can relate with these three practices when, for example, they **copy at an exam**, or **write down numbers in schoolwork** that did not result from any experiment or measurement, or when they **modify a written work**. There are other research practices that can also compromise the credibility and trust in the findings from studies. These are often more subtle and difficult to prove an intention from the researcher. These practices are known as **questionable research practices**. Examples of questionable research practices relate to **authorship and collaboration issues**. For example, when authors, who have not contributed to the study, are added to improve the chances of having the study accepted for publication or authors, who have made a significant contribution to the study, are not given credit. Students can relate with authorship and collaboration issues in, for example, a group work assignment, where only one student did all the work, while the peers, who have not contributed to the assignment, have their names in it. Issues regarding **drawing from the work of others** and **collection, analysis and reporting of data** may also reflect questionable research practices. These can be seen in animal research when relying on experimental data collected by other researchers, or the statistical method applied could not be used to that particular set of variables, or the researchers omit any data or relationships established from the data analysis, to prove that a particular relationship is the only one found to answer the research hypothesis. Students can relate to such practices, when, for example, in a school project, they only include work that corroborates the idea they want to demonstrate. In the same way, in schoolwork that involves collecting questionnaires, students stop collecting questionnaires when they think they have all the data needed. Yet, the decision to stop collecting data did not result from a validated methodology.

03 Module Structure

Session Overview

Key Words

Animal Research

Data

Ethics

Honesty

Integrity

Plagiarism

Responsibility

Schoolwork

Timeline Overview

Structure Duration (90 minutes)

→ Part 1 — Introduction:
30 mins

→ Part 2 — Practical Activity:
55 mins

→ Part 3 — Conclusion/Wrap-up:
5 mins

NOTE:

The durations mentioned to each part of the module are just a suggestion. The teacher/facilitator is free to adapt these according to the time available for the class.

→

Introduction

Activity Introduction for Students

Students will get acquainted with the meaning of animal experimentation, the ethical issues concerning animal welfare and the steps involved in the research process. Students will also learn about the meaning of research integrity and the four guiding principles, the meaning of research misconduct and questionable research practices and the importance of avoiding such practices.

Suggested Time

30 mins

Classroom Setup and Guidelines

Classroom Setup: main online class (if online session) or classroom (if face-to-face session).

Guidelines: the teacher/facilitator should use the PowerPoint presentation to present the content so students can learn about:

- Animal experimentation (slides 3–5).
- Animal Experimentation.
- Teacher Guide – Page 7 of 10.
- Animal welfare and the ethical issues (slides 7–9).
- The research process (slides 11–13).
- Research Integrity: definition and importance, 4 guiding principles and research misconduct (slide 15 – video 1: a link is provided for students to watch the video. Internet connection is required.)
- Research Integrity: questionable research practices and examples (slide 16 – video 2: a link is provided for students to watch the video. Internet connection is required.)

Before moving within the different topics, we suggest the teacher/facilitator engage students in an interactive discussion, by asking them to explain their perceptions of animal experimentation, the ethical issues and the steps involved in the research process. Students may also explain their perceptions of research integrity, research misconduct and questionable research practices, by providing examples connected with their own school work and life.research integrity, research misconduct and questionable research practices, by providing examples connected with their own practices when doing school assignments.

Learning Objective

Students should comprehend and be capable of explaining, by providing examples related to their own schoolwork, the meaning of:

- Research integrity: principles and importance.
- Research misconduct and questionable research practices.

Practical Activity

Activity Introduction for Students

Students will be organised into 4 groups. Each group will receive an individual board (1 from the 4 available), outlining a specific case of research misconduct or questionable research practices in animal research. Each group will first watch the video mentioned on their board (link and QR code on the board). Students will then relate such actions with their own school practices, by discussing and critically reflecting on two proposed dilemmas. Each group should write their ideas and solutions to deal with the dilemmas presented in their own boards.

Suggested Time

55 mins

Materials Provided

- [ ] PowerPoint presentation: structure of the practical activity – slide 18.
- [ ] Board 01. Case of the researcher who painted rats.
- [ ] Board 02. Case of the Lab Technician who spoke up.
- [ ] Board 03. Case of the football fan student.
- [ ] Board 04. Case of the ingenious student.
- [ ] Set of post-its (distribute one per group).

Classroom Setup and Guidelines

If the session is facilitated online, the teacher/facilitator should prepare 4 individual breakout rooms, prior to the session, to where each group should migrate to discuss their case (i.e. board). Students should first get acquainted with the structure of the activity, in the main online class, and then migrate to their individual breakout rooms.

If the session is facilitated face-to-face, the teacher/facilitator should first present the students with the structure of the activity and then each group should discuss their case (i.e. board).

Guidelines: the teacher/facilitator presents the structure of the practical activity outlined on slide 18:

- 4 groups of 5–6 students.
- Each group receives 1 board (the teacher/facilitator chooses 1 from the 4 boards available) and 1 set of post-its (if face-to-face session).
- Each group watches the video mentioned in their individual boards (link and QR code in the boards).
- Each group nominates a spokesperson to represent the group and to write their ideas and solutions on their boards.
- Each group discusses the two dilemmas and proposes solutions. The spokesperson writes it down using post-its or sticky notes (online session only!).
- Each spokesperson presents their boards.
- Class discussion about the ideas and solutions presented by the spokespersons.

Learning Objective

Students should be capable of identifying the misconduct and questionable research practices outlined in the videos and be capable of relating such practices with their own school work actions, by discussing the dilemmas presented in their boards. Students should be capable of formulating their own ideas and discussing them, first in their group and then in a class discussion, to share their opinions and solutions to deal with the dilemmas presented in the 4 boards.

Wrap up & Reflections:

Activity Introduction for Students

Class discussion about the learning outcomes that resulted from the session and clarification of any remaining doubts/questions.

Suggested Time

5 mins

Classroom Setup and Guidelines

The teacher/facilitator promotes a class discussion about the learning outcomes from the session. Students should demonstrate knowledge and be capable of explaining:

Thematic (general) outcomes:

What is animal experimentation? Why is animal welfare an important consideration? What are the key ethical issues? What are the steps involved in the research process?

Main outcomes:

What is research integrity and how does it apply to students' school work? What are research misconduct and questionable research practices, and how does it apply to students' school work? Why is it important to avoid engaging in such practices?

10

Epidemiology Module

Facilitation Guide

01 Learning Outcomes

After completion of this module, students should be able to:

- Understand the importance of working in teams and collaborating with others.
- Identify areas of research and research decisions which are ethical and unethical.
- Identify accurate and appropriate sources of data, and explain why some sources of data may be considered to be unreliable.
- Critically discuss how to identify unethical behaviours in research, and develop strategies for reporting any unethical behaviour.

02 Overview & General background

Epidemiology is the branch of medicine which deals with the incidence, distribution, and control of diseases and other factors relating to health. The word ‘epidemiology’ is derived from Greek and literally means ‘the study of what is upon the people’. Epidemiology is widely applied to cover the description and causation of epidemic and infectious diseases such as COVID-19, but also of diseases in general including their related conditions. Thus, epidemiologists are interested in examining other areas of healthcare such as high blood pressure, mental illness, diabetes and obesity.

03 Module Structure

Session Overview

The activity takes the form of a decision tree with branching consequences that feed into the next decision. The purpose of the activity is not to guide students along the 'correct' or most ethical path. Instead, the purpose is to follow the journey on repeat and see how it unfolds each time, discussing and dealing with any consequences as they arise.

Students can complete this activity individually or in a small class group of 2–3 students. Each student or group will need access to a laptop, computer, or iPad. If students are working in groups there must be consensus on each decision before the group can proceed to the next decision. Students will be relying on their collective moral compass rather than an in-depth understanding of epidemiology.

Key Words

Plagiarism
Falsification of data
Informed Consent
Exploitation of vulnerable people

Module Timeline

Estimate time: 2.5 hours total

→ Warm up
15 mins

→ Introduction to Epidemiology
15 mins

→ The 'situation room' activity
20 mins

→ Teacher preparation and getting set up – **10 minutes (teacher preparation 30 mins)**

→ Playing the game
(and some variations)
60 mins.

→ Wrap up and reflection
30 mins

NOTE:

The durations mentioned for each part of the module are just a suggestion and are very flexible. The teacher/facilitator is encouraged to adapt these according to the time available for the class.

→

Warm Up

slide
2–3

Learning Objective

Preparation for the activity.

Suggested Time

15 min

Main Points

- The activity starts by using the presentation slides as a warmup. The teacher will show students the illustration ('Life in 2020' by Walter Molino, 1962) and ask them what they think what the image is showing or might be talking about.
- Explain to the students that this illustration went viral in 2020 as a depiction of what 2022 would look like, and that people noticed similarities between the people in the painting and the social distancing measures brought in to manage the spread of COVID-19.
- This image has nothing to do with COVID-19 - the artist drew this illustration to suggest his solution to traffic congestion.
- This is an interesting example to get students thinking about how humans are always speculating about the future and coming up with solutions to problems we are experiencing in our lives.

→

Introduction to Epidemiology

slide **4–5**

Learning Objective

To provide the students with some basic information on epidemiology.

Suggested Time

15 min

Main Points

- Using the presentation slides, play the short video primer on epidemiology. This will give students a quick grounding in who they will be role playing for the main activity.
- Follow this with an open discussion around the prompt: *What uncertain futures are we concerned about right now?*
- These can be related to students' concerns around local, national, or international concerns.

→

The 'Situation Room' Activity

slide **6–11**

Learning Objective

To introduce students to the 'situation room' activity.

Suggested Time

20 min

Main Points

- Play the video overview of the 2017/18 Science Gallery Dublin exhibition 'in case of emergency'.
- At the end of the video it mentions 'the situation room' in which visitors made decisions that had global impact. Students in the classroom can now be put in this position.
- Use the 2080 scenario slide to show the students the context of the game they're about take part in.
- The game is introduced by reading out the following text to the students:

  It is the year 2080, almost 60 years after the COVID-19 pandemic broke out across the globe.

Humans had hoped we would have learnt from the lessons of COVID-19 and the Spanish Flu, but it seems as though we have not. Climate change has been accelerating due to increased human/animal contact, there are higher levels of urbanization, temperatures and sea levels are rising, and there continues to be a migration of health care workers away from the poorest countries in Africa and Asia.

All of this had led to another global health emergency. This one has been the VECTOR VIRUS.

You have been cast as independent experts. You are the people making the decisions, and you have the responsibility to tell Governments and entire populations how to handle this crisis. What has been learned from the COVID-19 crisis all those years ago? How will we choose to act now? How do we know what is right or wrong, ethical or unethical?

The fate of humanity is in your hands …

Teacher Preparation & Getting Set Up

slide **11–19**

Learning Objective

Describe how to play the game.

Suggested Time

10 minutes (plus 30 minutes for playing the game in advance of presenting to the students).

Main Points

- Before presenting the game to the students and going through the steps below, it is recommended that you try the game out privately to get a feel for some of the pathways and consequences involved. This will also help with post-game reflection and discussion with students.
- If students have their own devices, split the group into small teams (3 or 4) with someone assigned as the narrator or games master. If only one device is available, the teacher should act as narrator/games master, with the game being played by all students on the main computer.
- In both cases, the PowerPoint presentation should be played in 'presenter' view so that notes are visible to the games master and YES or NO can be clicked for each decision depending on the group's consensus.
- It is assumed that in the case of a teacher-led game, that there is a two-display setup so that the main slide is presented to the class on a larger display while another screen displays the notes and slide which can be seen by the teacher.

Playing the Game

slide **20–58**

Learning Objective

To play the game from start to finish.

Suggested Time

Up to 60 minutes (depending on the gameplay options chosen).

Main Points

- The game commences on slide 20.
- The notes available with each slide should be read carefully when playing.
- Clicking YES or NO on each slide links to the relevant slide in the decision path for the next decision to be discussed and chosen. Please note that the smaller slide in the top right of the screen can be ignored as it is not related to the text and may not be the next slide depending on whether YES or NO is chosen.
- It is expected that students should be able to repeat the process of making decisions to experience collaboration challenges and consequences to ethical and unethical choices.

GAMEPLAY OPTIONS

To help gamify the experience teachers can facilitate several variations on the gameplay as follows:

- **Time Travel**
  Depending on the speed of group decision making and the length of the paths they go down, a group or groups may have a short experience. Instead of ending when they reach one of the game's end points, play to a time limit in which students can repeat the process to explore as many paths as possible in the given time.

- **Angels and Demons**
  Give half the class the role of 'angels' who will only pick what they see as the most ethically sound or 'good' choices. Give the other half the role of 'demons' whose goal is to only pick what they see as the least ethically sound or 'bad' choices. After one run, reverse the roles and discuss their experiences.

- **Secret Saboteur**
  Select at random several students and take them to one side. Explain that they are secret saboteurs and must (without revealing their nature) try to nudge the group towards unethical decisions. To allay suspicions in the rest of the group, then ask the secret saboteurs to step outside or out of earshot so that you can tell the other students a secret piece of information. As this 'secret piece of information' for the main group is to deter suspicion it can be made up on the spot, informed perhaps by discussions that have taken place already, or something as simple as saying - we are experimenting with a placebo effect – if people feel they are being left out of discussions or receiving certain information does it impact gameplay? This dynamic may or may not affect decision makers in real life negotiations and discussions.

  If working in groups, select a student per group and tell them that they have the final say on any decisions that are not unanimous. They must not let their classmates who have been sent out know who those final decision makers are while playing. If working as a whole class group, select at random a number of students that can take turns in the final decision maker role, again without revealing their identities to the others (who students don't know are secret saboteurs).

→

Wrap-up & Reflections

slide **59**

Learning Objective

The purpose of post-game reflection is to allow time and space for students to reflect on their experiences of playing the game and any variations.

Suggested Time

30 mins

Main Points

- To conclude the gameplay and lead into post-game reflections, the teacher should return to the slide with the title "05 UPTAKE" which includes a link to play the following video: Who should get a Covid-19 vaccine first? https://www.youtube.com/watch?v=SOAKfRLge34
- This is designed to provide some background on the real-world process of deciding which groups should receive a pandemic vaccine first.
- The wrap up discussion can include asking students some of the following questions:
  - Did you discover something new when playing the game and making your decisions?
  - Was it easy or hard to reach a consensus? Why or why not?
  - Which were the toughest decisions to make?
  - What type of people do you think should have a place in the 'Situation Room' to make the best decisions for society in these circumstances?

- Is falsifying data worth it? What are the consequences?
- Would you call out unethical behaviour in the 'Situation Room'? If so, how would you go about it?

- Students should be encouraged to use Zines for their reflection.
- In conclusion, the final slide of the presentation features a 'success snapshot' from the University of Sheffield. This is an example of what nations can learn when facing research integrity challenges during a global pandemic.

INTEGRITY is made up of a consortium of 11 European partners from 9 countries led by the University of Utrecht. The development of the secondary school tools in this manual was led by Trinity College Dublin. The team consisted of researchers from the Universidade do Porto, the University of Ljubljana, and Science Gallery Dublin.

You can visit the INTEGRITY H2020 website https://h2020integrity.eu at any time to find out more about the project, meet the researchers behind INTEGRITY H2020, and get access to many additional tools & resources.

This project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 824586.

Design: Studio Suss