

Neuroethics

Background

The aim of this session is to introduce students (aged 12-18) to some of the ethical questions surrounding research, both neuroscience specifically and more generally. The students will be given different ethical questions and have the opportunity to put together cases on each side of the debate. This session should be used in conjunction with the 'Secondary- Neuroethics' PPT.

Artificial intelligence

(Slide 1) Title slide. **(2)** Ask the students to suggest what artificial intelligence or AI means. Artificial intelligence is the ability a computer or robot has to think and learn. They predict the outcomes of many solutions and continuously improve how they solve problems.

(3) The process by which this works is the following: Humans make a computer chip, like a robot brain, and/or write instructions for the robot brain. These computer chips are then put into the machine or computer allowing them to think and learn. When the computer/machine makes a mistake, it will learn from it and correct itself the next time, so like us, it can learn from its experiences and mistakes. Currently, AI is still fairly limited

(4) Scientists are trying to make these computers and robots smarter so they can do things that humans currently do.

(5) These smart machines are now able to do lots of things, for example, understand our speech and language (Alexa), play games against us like chess, drive our cars for us without a human driver and predict what we are drawing.

(N.B. Click on the picture of the pencil to link to google quickdraw. You could play this game with the students.)

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(6) In the next section, you will ask the class to think about the ethical issues with artificial intelligence and what smart machines would mean for our future. You may wish to split the class into small groups to discuss each question in turn and then suggest answers which you could write up on the board. The following section outlines some questions you may ask with possible answers.

Overall discussion theme:

If AI becomes a daily life thing on future, how society will change?

Q1. If AI develops consciousness, how would society change to accommodate AI rights? How would AI fit into society?

Possible answers:

- No rights: they are still just things.
- Some rights: they feel and think, but are still not human.
- Same rights: they are so similar to us that we should not make a difference.

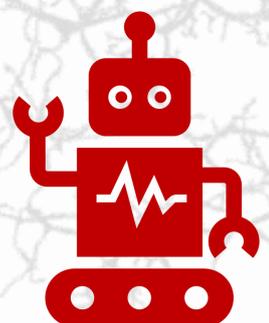
Depending on the rights given to AI, they could be working for us, working with us, controlling us or living completely separately.

Q2. Do AI need rules or a code to follow?

Ask the students if they think AI should include some sort of Artificial Moral Agent, determining how the machine acts. It would need to understand morals, values and relationships to make decisions we humans would deem "right".

Ask the students what these rules would be:

- AI should be created only to help people
- AI should be easy to understand and fair
- AI should not be used to steal someone's personal information
- Everyone should be able to grow as a person while living with AI
- AI should not be allowed to hurt, destroy or lie to humans.



(7) Some people believe that robots will take over all jobs in the future. This already happens with some repetitive jobs. Other jobs, which require more thinking or feeling are more difficult to replace with machines. But they might be able to do that in the future.

Q3. Should people spend their lives actually living instead of working?

Possible answers:

- Yes, if there are robots to do it for us then we do not have to.
- Yes, many people dislike their jobs and this means more spare time to do things they enjoy.
- No, people would get bored.
- No, there are no goals in life if you do not want a career.
- Maybe, people should be allowed to choose, some people really enjoy their jobs and want to have a career.

Q4. If so how would wealth be distributed?

Ask the students how they think people will get their income if AI takes care of the majority of jobs. Some ideas here:

- Everyone will get the same amount of money, a basic universal income, which can then change based on other tasks you do, such as helping your community or finishing school.
- There will be completely new jobs for humans that do not exist yet. For instance how internet created new jobs, like YouTube vlogging.

Q5. What if AI surpasses human intelligence? What affect could this have on human rights and society?

Ask the students about the idea of AI being superior to humans. Most experts believe that AI would not take over, as humans will design them in such a way to only carry out specific tasks and to simply serve as a tool for humans to use.

Reading Minds

(8) In the next section, ask the class to think about the ethical issues surrounding the ability to read minds. Inform the students that we can currently see changes in the brain when people think about different things or do different tasks. We do this by scanning their brains. We are far away from being able to read minds and discover everyone's thoughts, but what could be the problems with this?

Overall discussion theme:

Should we be allowed to read minds?

Q1. When should we be able to read minds?

Ask the students to come up with situations where we should and shouldn't be able to read minds.

Q2. Who should be allowed to read our minds?

Ask the students who should be in charge of deciding? A psychologist/psychiatrist? The police? The government?

Also, would a panel or just one individual be required?

Q3. Should we be able to put people in jail if they think about doing a crime in the future?

Scenario: The police have caught a person they think has been stealing. While reading their thoughts, they find out the person has not committed this crime, but they are thinking about committing it in the future. Do you put them in jail anyway because they thought they were going to commit the crime?

Ask the students whether they have thoughts that don't lead to actions. Is it fair to judge people on their thoughts alone?

(9) Q4. What if reading minds did not inform you about a person's intent? (They did something they shouldn't have but with good intentions). Should you be able to read their mind then?

- Yes, it will still help you understand what happened/give you more information.
- No, if a person did something wrong for the right reasons and you just see what they did, it will skew your view of them and make you already draw a conclusion.

Q5. What if reading minds did not inform you of neurological medical conditions? (They did something they shouldn't have but had mental health issues, i.e. Schizophrenia, depression, ADHD, etc.). Should you be able to read their mind then?

- Yes, maybe the neurological condition is not linked to what they did and this makes it more objective.
- Yes, it will still help you understand what happened/give you more information.
- No, the neurological medical condition could have caused or worsened what they did
- No, it makes it so that there is no difference between a mentally ill person and a normal person that both did something wrong.

Q6. Should we read the minds of people in a vegetative state (coma)?

Nowadays brain scans and EEGs are used to determine the status of a patient in a vegetative state. In the future, these could be scanners that can read minds. Ask the students if they would agree to using this to communicate with those in a coma and why.



Changing Memories

(10) In this section, ask students to think about the ethical issues surrounding the ability to change memories. Ask students to suggest what a memory is. Encourage answers through asking where memories are stored.

Ask whether they think memories change. Mention that although we think memories are static, they do change with time. So the memory we made of an event may be different from what actually happened.

Inform the students that in the future, there will probably be techniques and drugs that can change memories completely

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Overall discussion theme:

Should we be allowed to change memories?

Q1. When should we be able to change memories?

Ask the students to come up with situations where we may want to change a memory.

This could relate to something bad that has happened to us - If someone experienced a traumatic event the memories could result in fear and sadness every time they think of it. Sometimes this is so bad that it affects people's lives a lot – this is called Post-Traumatic Stress Disorder. Scientists want to help these people by changing their memories, for example by giving them medication that makes the experience seem less negative.

Q2. Who should be able to change memories?

Should the government/a doctor/etc. be able to change someone's memory? How would we know what is real anymore if our memories are changing all the time?

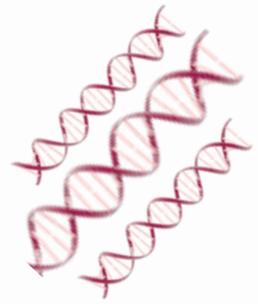
Q3. Should there be a limit on which memories we can change?

Ask the students if they think there would be regulations and limits regarding to the memories we could change. Take suggestions.

Q4. What affect does changing memories have on personal growth, development of morals, etc.? What effect could this have on society?

Memories are important for knowledge, self-insight and our behaviour. Changing valuable parts of these aspects could result in personality changes or a different relationship with others. Additionally, research has found that people behave better when they recall their childhood memories, so changing these memories could change their morals.

Genetic Modification



(11) Ask students if they know what genetic modification is. Encourage the answer of changing parts of the genome by removing, repairing or adding genes.

Explain that techniques that can be used to edit genes, like ZFN and CRISPR/Cas9, meaning that certain genes can be turned off, added or repaired.

This can be used to cure genetic diseases or change animals allowing them to adapt them to the environment better. The use of genetic modification entails certain risks and ethical issues, but many experts think that the usage of gene editing on humans is inevitable.

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Overall discussion theme:

Should we be allowed to do genetic modification?

Q1. Should we use gene editing to get rid of disorders caused by genetic mutations?

Ask if we should be allowed to use it or not, and why. Possible answers:

- Yes, less people would suffer from disorders.
- Yes, we can get rid of these disorders completely and will not be present in the next generation.
- No, these people deserve to live the way they originally were as much as anyone else.
- No, it can be difficult to predict how much of a burden the disorder will be, meaning that the child may have been fine if left the way it was.

Q2. Should we improve people's brains such as in terms of their intelligence, personality or reflexes using genetic modification?

Ask the students what they think about using genetic modification to improve some brain functions ranging from intelligence to reflexes. Do they think it should be allowed? Why?

Q3. What limitations should there be for genetic modification and who decides what will be changed?

In the scenario of genetic modification being legal, should we allow a lot of modification to improve the human race or only for disorders?

Ask them who they think it should be in charge of deciding? The parents, the doctors, the government, etc.

Q4. Should employers only hire people that have been genetically modified to the suitable level for the job?

Possible answers:

- Yes, that way the employee gets a job that fits in more with what they can do and like and they will be more satisfied with their job.
- No, these traits do not predict how well a person would perform at that job.

Additional material

To make the topic more appealing and related to the students, real studies or news can be use during the session. We encourage the presenter/s to find some recent news and use them as case-studies to make the ethics discussion more relatable and applicable to daily-life situations.

Some news can be found in the following link: <http://www.theneuroethicsblog.com/>