Robots and thinking computers

Report of pupils' views

to the Science and Technology Select Committee inquiry into Robotics and Artificial Intelligence

Summary

- The views of 61 primary school pupils through 3 focus groups in different schools are reported.
- Pupils spoke of a wide range of uses they knew about for robots, and identified many different possible future uses, though some thought robots and thinking computers made humans lazy, and a few didn't want to see any future use of robots at all.
- In a group that considered it, there was not a majority in support of making helping robots look like animals or humans.
- Pupils voted by 36 to 21 that robots and thinking computers are a good thing, but by 29 to 26 that they were more worried than excited about them.
- The excitement came from their use to explore, do research, be fun and help people. The main worries were that they might go dangerously wrong, might develop to harm or attack humans, be hacked into, and be used for criminal purposes.

- **By 34 votes to 22, pupils thought computers and robots would indeed one day develop to have feelings of their own.**
- **Pupils' priorities for future development (top priority first) were: artificial limbs and mobility for disabled people, robot companions for old or disabled people, uses for fun, search and rescue, and helping to look after old or disabled people.**
- **Uses pupils most wanted banned (most strongly wanted first) were: transport (such as driverless cars), doing or assisting in surgical operations, walking the dog, helping to look after children, and attacking enemies in war.**
- **The one exception to banning driverless vehicles would be self-driving ambulances releasing paramedics from driving to looking after patients**
- **Main reasons for wanting uses banned were the likelihood of harm from equipment failure and lack of trust of computers and robots.**
- **Future uses with more support than opposition were: exploring space, deep mining and underwater use, and farming.**
- **Uses with more opposition than support were: diagnosing illnesses, minesweeping and destroying bombs, doing jobs around the house, watching and spying on enemies, helping teach in schools and colleges, doing maintenance work in town and country, making things in factories and 3D printing.**
- **Rules for future robot and computer use should be to limit their learning to what they need for their tasks, making equipment age appropriate, making equipment monitor its own operation and notify owners when it is beginning to malfunction, barring illegal uses, and protecting small children against small components in household equipment.**

Introduction

1. This response is made by Pupils 2 Parliament, a project to enable school pupils to consider and feed in their views to parliamentary, national government and national body public consultations and inquiries. The project has been approved by the Clerks of both Houses of Parliament to use the term 'Parliament' in its title.

2. Pupils 2 Parliament aims to bring the particular viewpoint of children and young people to those conducting inquiries and consultations - plus the uniquely fresh and often challenging analysis that children and young people bring to the making of decisions and policies.

3. The project also aims to give school pupils the opportunity to learn about and consider key decisions being made by parliament, national government and public bodies, and genuinely to participate in democracy by feeding their views into real national decisionmaking.

4. Pupils' views are independently gathered through discussions with groups of pupils led by someone from Pupils 2 Parliament, using material from the relevant consultation or inquiry document to explain the issues. We specialise in putting the issues and questions even-handedly, without leading pupils in any way or suggesting any responses. All views therefore come spontaneously from pupils, with no adult prompt.

5. This submission reports all pupil views given, without selection, comment or addition. The views in this submission are entirely pupils' own views, and nothing but pupils' views.

6. Views in this submission came from 61 pupils aged 9 and 10 in three focus groups, in three different primary schools: Priory Primary School, Dudley; Quarry Bank Primary School, Brierley Hill; and Staunton on Wye Primary School, Herefordshire.

What uses for robots have pupils heard about?

7. Here is the list (in no special order) of the uses pupils gave:

Scanning things
Exploring Mars
As robot friends
To help choose things like fashion
Developing technology
Uses in films
Fighting
Disabling bombs
Robotic arms and legs
Looking for diseases
Texting
Helping disabled people
Making coffee
In building houses
Playing
Making stuff
Fixing cars
Cooking food.

8. One pupil summed the uses of robots as "doing stuff".

9. One pupil said that robots get used "for show". Another said that one of their effects is "taking over jobs to speed production". Many thought using robots makes people lazy: "there is a need to be proactive and not lazy".

What do pupils think robots should be developed to do in the future?

10. Here is the pupils' list of how they wanted robots to be used in future, without any suggestions from us and not in any particular order:

Dancing and singing
Shopping
Drones flying to clean outside windows
To keep people company and be a friend

To do things that people can't do for themselves
To do homework
To help people work in their jobs
In education
To help people find the right job
To help play sports (for example, throwing a ball for practice sessions)
To do chores
Tasks in the army
To play games like chess and Go with
Taking criminals away
"To give you cuddles"
To help in farming
Developing medicines
Defusing bombs
Uses in war
Nursing people with dangerous infections, so doctors and nurses don't catch it
Rapid programming
To find wanted people
To pilot spaceships
To help explore and travel in space
To help look after people in nursing homes
To work as slave
To fight illness
To be a little pet that carries things for you
To help the police.

11.   We asked one group whether robots that are built to be friends, keep people company, or do jobs around the house, should look like humans or animals rather than just machines. They voted by 10 to 9 that robots shouldn't be made to look like humans or animals.

12.   A few pupils didn't want robots used in the future at all; "I don't like robots. I want no robots on the earth."

Are robots and thinking computers a good or a bad thing?

13.   We asked pupils whether overall they thought that robots and thinking computers are a good or a bad thing. Pupils told us these are a good rather than a bad thing, by 36 votes to 21.

14.   Reasons given for robots and thinking computers being a good thing were that they can be useful and help us learn and explore, some can help scientists find out what happened in the past and others can go and do research where we can't. Robots and computers can be a "nice friend" to us. They can help people a lot. They can be fun and help people to do things they couldn't do otherwise. They can help people with disabilities.

15. On the other hand, some pupils thought that they were a bad thing because "we don't know what might happen". They could hurt people. Robots and computers can go wrong and we don't know how they will turn out. In short, "something could go wrong".

Are pupils excited or worried about robots and thinking computers?

16. Although the majority of pupils thought robots and thinking computers were a good thing, there was a bit more worrying than excitement about them. Many people believe that children find robots and computers very exciting, but these pupils voted by 29 to 26 that they were more worried than excited about them.

17. The big worry was that it could be dangerous when robots and computers go wrong. As one pupil summed it up, "technology could endanger those they are designed to serve and protect".

18. Some were very worried about how robots and computers could develop themselves in the future. "They could take over", "if they could learn from others they could kill us", "robots could go a bit mental and start killing humans", "they might take over the world", "they could destroy the human race". We might then have to rely on the likelihood that human nature would then make us destroy them first.

19. Computers and robots that can learn for themselves worried many. "If they learn from our human ways they can improve on them and destroy our human ways". "They could make themselves indestructable". If they develop feelings and emotions, then "if we kick robots they may be offended and kick us back".

20. Some worried that if computers become too intelligent and start thinking for themselves, they could make us do their jobs, instead of the other way round.

21. There were also worries that robots and computers can be hacked into and made dangerous. They could be made to do criminal acts. Then they could try to get people into trouble for their actions. Someone could make their robot or computer pretend to be someone else's.

22. Another worry was that very complicated robots and computers could become too expensive in the future. They also use rare metals in their components, which could run out (although we can try to recycle these metals).

23. One pupil came up with a rule for dealing with worries that robots and computers could learn too much and become dangerous: "let it learn what it is supposed to – but not more".

Will robots in future develop to have feelings rather than just being clever machines, so you mustn't ill treat them?

24. A lot has been written – and asked – about whether people believe that computers, as well as becoming able to learn and develop themselves, will one day develop to have feelings of their own.

25. We asked each of our groups whether they thought robots will in future have feelings rather than just being clever machines, so mustn't be ill-treated. The majority of pupils thought robots will in future have feelings, by a vote of 34 to 22. More pupils in every group thought this.

Which uses for robots and thinking computers should be a priorities for development and spending on, and which uses should be banned?

26. We wanted to find out what pupils thought should be the priorities for scientists to work on, and for the Government to spend money on, in developing future robots and thinking computers. We also wanted to find out which uses of robots and thinking computers should be banned.

27. We asked pupils to vote on 20 different possible uses of robots and thinking computers, saying whether each one should be a priority, which were in the middle, and which should be banned. People may want to compare the views of the children in our focus groups with what came out of the "Eurobarometer" survey of people across Europe.

28. These were the pupils' top five priorities for the future development of robots and thinking computers:

Top priority	**Giving disabled people robot hands, arms or legs, or helping them move and walk**
2nd priority	**Giving robot companions to keep old or disabled people company**
3rd priority	**Using robots and thinking computers for fun**
4th priority	**Search and rescue work after disasters or in wars**
5th priority	**Helping to look after and do things for old or disabled people**

29. There was a lot of agreement that the top priority should be developing robot hands, arms or legs for disabled people, and using robots and computers to help them move about. Almost two thirds (65%) of the pupils who voted wanted this as a priority. Just over half the pupils voting wanted robot companions as a priority, just under half of the pupils voting chose fun and search and rescue work as priorities. Just over four out of ten of those voting wanted helping old or disabled people as a priority.

30.   There were only three other uses for robots and thinking computers which more pupils voted should be a priority rather than being banned. These were: **exploring space, deep mining and underwater use, and farming**.

31.   These were the uses for robots and thinking computers that from the pupils' votes came top of the list for being banned:

      1st   **Transport (such as driverless cars, trains and aircraft)**

      2nd   **Doing or assisting in surgical operations**

      3rd   **Walking the dog**

      4th   **Helping to look after children**

      5th   **Attacking enemies in war**

32.   Over two thirds of the pupils (67%) voting wanted using robots or computers to control transport like cars, trains and aircraft to be banned. The same percentage voted that they should not be used in surgical operations. Just under two thirds of those voting said robots and computers to help look after children should be banned, and 58% voted that using robots (such as drones) and computers to attack enemies in war should be banned.

33.   There were many other uses of robots and thinking computers which more pupils voted should be banned rather than being a priority. These were: **diagnosing illnesses, minesweeping and destroying bombs, doing jobs around the house, watching and spying on enemies, helping teach in schools and colleges, doing maintenance work in town and country, making things in factories and 3D printing.**

34.   There was most disagreement between pupils about using robots and thinking computers to help look after old or disabled people. Although this came out as the fifth priority, exactly the same number of pupils voted for it to be banned as those who voted for it to be a priority. There was also much disagreement over use to explore space, and to watch and spy on enemies in war.

35.   On using robots in warfare, our pupils overall were against using them to attack enemies, with 58% voting for that to be banned. Moving away from attack towards defence uses, just under half (48%) thought using robots to watch and spy on enemies should be banned, but there was a lot of disagreement among pupils about that use, and 40% thought this use should be a priority for the development of robots. There was much agreement over banning the use of robots in minesweeping and bomb disposal. 55% of those voting said this use for robots should be banned. There was a lot of agreement in support of using robots for search and rescue tasks though, with 47% voting for this to be a priority and only 16% that it should be banned.

36.   On using robots and computers in the home, the majority of pupils (53%) voted that using robots to do jobs around the house should be banned. 39% voted for this to be a

priority for developing robots. Pupils were also strongly against using robots to walk the dog (this was one of the questions in the European survey). 66% voted that this should be banned.

37.   Pupils were overall also against using robots and thinking computers in many sorts of health care. 67% thought using robots to do surgical operations on people should be banned, and 56% thought using thinking computers to help diagnose what was wrong with someone should be banned. Using robotic artificial hands, arms or legs, or to help disabled people to move, was the one health use strongly supported by pupils, coming first on their list of priorities for future robot and computer development.

38.   Pupils did not give much support to using robots and computers to help care for people. 63% thought using them to help care for children should be banned (though 29% of the children did vote for this to be a priority). There was no agreement over using them to help look after old or disabled people, with 43% voting for that to be banned but another 43% voting that it should be a priority for the future.

39.   There was however support from a majority of pupils for developing robots as companions to keep lonely old or disabled people company. 53% voted for this as a priority.

40.   Overall, there were 27% more pupil votes for bans on future uses of robots and thinking computers, than there were for making future uses a priority. Just as pupils had been slightly more worried than excited about robots and thinking computers, they were on balance rather more negative than positive about the development of future uses for them.

41.   We asked pupils to give their reasons for voting that some uses should be banned. Here is the list of reasons given:

Exploring space: robots sent to space could evolve and return to attack us; sending them could warn aliens that we are here

Making things in factories: faults could cost a lot of money; information and instructions could be leaked or hacked

Diagnosing illnesses: they could make mistakes and give wrong medicines or poisons, possibly killing a human; might mix up results from different people; risk of the computer "getting bored on the job and making mistakes"; risky if someone has an illness the computer hasn't got in its system; pupils have more trust in human doctors

Doing surgery: their training or design might not be good enough; could malfunction and harm the patient or leave something behind – "malfunctions happen and it can all go wrong"; could suffer a power failure during an operation; could purposely harm the patient; could "lose its focus" and get something wrong

Robot hands, arms or legs for disabled people: it is not for us to decide what is right for disabled people – you need to ask disabled people themselves; could break or malfunction, could give a harmful electric shock

Attacking enemies in war: although this would protect our troops and "lose metal not people", it could be costly if many are destroyed; risk of hacking and being taken over; problems of keeping proper wifi control from a distance away; troops are still needed once robots are countered and destroyed

Watching and spying on enemies: could be made to turn on ourselves; high cost

Minesweeping and destroying bombs; risk of losing control; risk of explosions from robot error; cost of lost robots

Search and rescue: could provide care for injured in disaster or war, but don't know what will happen; people "can't trust a robot"

Helping look after children: "my mam and dad can do a better job than a piece of scrap metal!"

Robot companions: "in a way this is mocking old people and saying they are not worthy of giving them a person for companionship"

Use in education: "against this but not sure why"; robots may know more but humans are better at communicating and answering questions properly

Fun: may be good as a friend to play with if your friends live a long way away, but "a bit weird"; could go wrong; "why waste money on a robot when you can have a good real friend?"

Doing household jobs: would be good if Mum is poorly and could do chores instead of getting children to do them, but it would encourage parents and children to become lazy

Walking the dog: encourages laziness; could fail to keep hold of the dog's lead; could get lost

Doing outside maintenance inspections and jobs in towns and countryside: will take away people's jobs; better to use drones to help check the community generally

Driverless cars, trains and planes: too dangerous and could cause crashes; could fail and lose control; feels unsafe; vehicle control could be hacked into; failure would risk people's lives. (One exception to this was the pupil proposal that driverless ambulances could free up paramedics to be with their patients rather than having to drive)

Farming: safety concerns; encourages laziness; might make errors or fail; humans will do a better job because "robots are not as intelligent as humans" on farms.

What rules should there be to make sure robots and thinking computers are used safely and to do good things?

42.   Apart from the one rule already proposed – that robots and computers should only be allowed to learn what they need to learn for the task they are for – pupils came up with these further rules:

Anyone under 16 or 18 using any computer should have to know what is appropriate for its use

Very young children should be protected from the risks of tiny components if a computer or robot is broken or under repair

Robots should be age appropriate for use by children or adults

Robots and computers should self-monitor and warn their owner if they need to be checked or repaired, and should shut down if they are beginning to break down

Computers should not photograph people's number plates

Computers and robots should only be used or designed to do things that are legal.

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43.   I am grateful to the Heads and staff of the three schools for letting me carry out these focus discussion groups, especially grateful to the members of staff at each school who worked hard to take notes of the views of pupils at each group, and above all I am grateful to the pupils themselves who gave their thinking, views and ideas for this report.

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Pupils 2 Parliament

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