

Activity 1.1.3 - A smart piece of paper

Estimated duration	40 minutes
Requirements	None
Hardware and Software tools used	- Whiteboard + markers - Copy of “the intelligent paper”
Type of assessment	Experiment
Glossary	Algorithm, Machine learning

Procedure

1. **Anticipatory set:** the teacher introduces to the class a piece of paper, claiming that it's more intelligent than any human being and asks students if they believe this. A short discussion can be held about what can make a piece of paper intelligent, what intelligence means, if it is the same thing as knowledge, etc. Whenever a student asks why the piece of paper is more intelligent than people, the teachers should point out that it can't lose the tic tac toe game and propose to give a demonstration.
2. **Guided practice:** the teacher explains the simple rules of the tic-tac-toe game to the students (if needed) and draws a big tic-tac-toe board visible for everyone to see. The teacher then picks 2 volunteers from the students. The first volunteer will play the game on their own while the second volunteer follows the rules of the piece of paper. The person playing according to the rules of the piece of paper should read the written instructions out loud so that everyone can follow. The rest of the students might help the first volunteer during their moves. A detailed description of the steps to follow can be found in the document linked under resources for Teachers. The game might be repeated a few times with new volunteers to prove that the piece of paper will never lose the game.
3. **Direct instruction:** after the game has been played a few times, the teacher can ask the students again whether they believe the piece of paper to be intelligent. A short discussion could follow on the “why”. Now the teacher can explain how the instructions for the piece of paper were written by a programmer as part of an algorithm. This can be followed by an explanation of the main function of an algorithm, highlighting that AI systems use algorithms to function.

4. **Closing:** after having been introduced to the concept of algorithms, a final discussion could be held about who is the intelligent agent: the programmer who writes the program or the machine following the program? (or neither or both).
5. **Follow-up:** this activity could be a good opportunity to tell the story of chess world champion Kasparov vs. chess computer Deep Blue (as one, non-exhaustive example of human intelligence vs AI)

Troubleshooting

Possible issue	Possible solution
For the purpose of the activity it would be best to have the paper win.	It is suggested to pick maybe not the most keen-to-win student for the demonstration.
The student might give up when they think they can no longer win.	It would be good to encourage the student to continue as the paper might still mess up.
It's not possible to print the instructions on the piece of paper.	Instructions can be handwritten.

Resources for teachers

General:

- Template tha can be used in class
https://docs.google.com/document/d/1ip43fR633MBFngt7T_zGWdzdXFV_h07t24VuN0hO-Og/
https://docs.google.com/document/d/16bb_dOvHXBkaklkMyaqKNHO_EKfRwUfO96YpJQXL5s (ITALIAN)
- Detailed outline of the activity in English:
<https://classic.csunplugged.org/documents/activities/community-activities/artificial-intelligence/intelligentpaper.pdf>
- Detailed outline of the activity in Greek:
https://classic.csunplugged.org/wp-content/uploads/2014/12/intelligent-piece-of-paper-el_v6.pdf

Follow-up

This activity could be a good opportunity to tell the story of chess world champion Kasparov vs chess computer Deep Blue (as one, non-exhaustive example of human intelligence vs AI)

- [https://en.wikipedia.org/wiki/Deep_Blue_\(chess_computer\)](https://en.wikipedia.org/wiki/Deep_Blue_(chess_computer))
- <https://theconversation.com/twenty-years-on-from-deep-blue-vs-kasparov-how-a-chess-match-started-the-big-data-revolution-76882>
- <https://www.news247.gr/sunday-edition/kasparof-vs-deep-blue-otan-i-michani-kerdis-ton-anthro.9521716.html> (GREEK article)