

Dr Esyin Chew – Written evidence (AIC0166)

What are the implications of artificial intelligence? In Love and War

A. Introduction

1. I am a computer scientist and educationist who work with robots that looks like human. Collaborating with the South East Asia National Human Rights Institutions[1] including Malaysia[2], I investigate the educational implications for embedding humanoid robot activist in educating child rights in ASEAN regions[3]. The robot activist has artificial intelligent (AI) capabilities such as assessment and feedback analytics.
2. As a Welsh Crucible alumni[4], I extended the humanoid robotics research to healthcare sector with a Welsh hospital and an International Rehabilitation Centre. I am a pastor's wife who use humanoid robot to engage refugees' and autistic children in learning and teaching.
3. As a Fellow of the Higher Education Academy, I am a productive author, reviewer and editor for quality research publications; an academic trainer and a leader of advanced technology enhanced assessment and feedback for higher education in international horizon.
4. The following are my personal views grounded on the above experiences and expertise:

B. My Definition of Artificial Intelligence (AI)

1. Generally speaking, AI is perceived as intelligent technologies, from computers to robots that mimic human's intelligence and five senses for learning, analytical reasoning, decision making, real-life problem solving and companionship.
2. I would assert that the prospects and future of AI lies in the hand of robotics, naturally, a moving AI agent acts as an extension of mankind (not as a replacement); like a pair of angel's wings to human, or Doraemon's pocket attached to human.

C. The Impact of AI on Society

Question 3. How can the general public best be prepared for more widespread use of artificial intelligence?

1. There are clear disparities between those who accept or worship the 'wonder of AI' and those who against it, such as "How AI is used to transform Google Translate"[5], "Robotics Public Private Partnership in Horizon 2020"[6], "EU spends millions building robot that makes pizza"[7]; versus "AI: we are like children playing with a bomb"[8] and "AI could lead into third world war"[9]. Both camps attract general public to perceive AI differently with a mixed feeling: in love and war. The complexity arises from the complex nature of AI. At instrumental level the idea of AI is intuitively simple, to put human's brains and senses into machines. However, its social-economical and psychological implications are far more complex. The AI technological advances are pervasive but the education reform are fall behind. In last two centuries, both technology and education raced forward in the UK and US, generating rising living quality and massive economic expansion, however, 'technology sprinted ahead of limping education in the last 30 years, leading to the recent upsurge in inequality'[10]. There is an urge to raise the stagnation in the level of AI education across the UK. The key question is that how do we prepare the UK general public for the impact of AI, the disparities and the future AI leaders from the UK to shape the directions not into the devil's wings but the angel's?
2. Hence, I would recommend to commence the public awareness and readiness through the two strands of education and healthcare. By seeing the living robots and by experiencing the AI in daily life, these strands are the least threatening and have wider accessibility for general public at all age:

- a. **Education:** The educational policy makers need to have a continued passionate in embedding robot tutor in day-to-day classroom for motivation, personalised assessment and feedback: from pre-school, primary education to higher education. The personalised assessment and feedback provided by humanoid robot are featured with the real time data analytics capabilities such as individualised academic performance feedback and student sentiment (emotional / satisfaction / happiness) analysis supported with educational psychological theories. As a professional educationist, I would argue that, in the next wave of learning innovation no longer lies at e-learning or mobile learning but, a thoughtful integration of face-to-face learning with a walking AI agent, a humanoid robot tutor. However, the public preparedness need to be met. My research show that this innovation enable students to gain high level of motivation in learning engagement for futurists' perspectives after the intervention[11]. This practical suggestions are as follows:
- i. The UK government to facilitate and support the Universities-Schools collaborations. Universities that have expertise in AI can partner with local schools to develop robotic tutor for various subjects and implement it for educational intervention.
 - ii. To initiate national pilot interdisciplinary projects supported by industries and corporates for Corporate Social Responsibilities. These can be carried out with selected or volunteered schools and universities for the robot tutor intervention.
 - iii. To open industry-university research grant calls to support the AI and educational action research by key research and industrial funders. This is to accelerate the commercialisation and creativity of the robot tutors across educational sector.
 - iv. To establish the National Institution for AI and Robotics in Education as a catalyst for excellence for national and international show cases.

There are some international examples to be referenced from such as National Human Rights Institution Malaysia teach human right to schools using a humanoid robot[12], Robots are helping out in Singapore pre-school[13], Robot tutor in Japan to teach English[14] and a step forward in using robotic tutors in primary school classrooms in Spain[15].

- b. **Healthcare:** Telemedicine and AI in healthcare are increasingly pervasive in the international spectrum. Labour is costly and intensive for healthcare in the UK. There are language, communication and attitude barriers between patients and medical teams, and among medical teams. A personalised medical companion, a robotic assistant to be installed in key hospitals are recommended. This can be piloted as follows:
- i. The UK government to facilitate and support the Universities-hospital-robotic industry collaborations. Universities and companies that have expertise in AI and robotics can partner with local hospitals to develop personalised robotic assistants.
 - ii. To initiate national pilot interdisciplinary projects supported by industries and corporates for Corporate Social Responsibilities. These can be carried out with selected or volunteered hospitals, universities and companies for the intervention.
 - iii. Project grant calls to be opened to support the AI in healthcare action research by key research and industrial funders.
 - iv. The establishment of a national Institution for AI and Robotics in Healthcare as a catalyst for excellence for national and international show cases.

3. The issues raised in point 1 above and the measures proposed in point 2 will need broader and interdisciplinary stakeholder consultations and an in-depth results analysis of their educational, psychological and economic impact. The findings are exemplars, good case studies and lessons learnt for widening participations. This can get educators, students, parents, patients, medical teams, general publics and industry more ready for the AI intervention and be the first country in the global scene to embed robotic companion in a systematic phases and large scale. Only after these empirical evidence are available and facts have been established can we conclude how to

move forward, especially as regards legislative and ethical measures for AI and robotics used in the UK.

4. In addition, a holistic framework of providing education and healthcare with AI based on the larger scale of experimental research are required. Without analysis on the human-robot interaction from interdisciplinary aspects, i.e. psychological, socio-economical, educational, medical intervention, the effectiveness of robots in classrooms and hospital is questionable. Future research and design should leverage more refined data analysis techniques such as learning and medical analytics to directly focus on interaction and conversation dynamics[16].

C. The role of the Government

1. As a skilled AI and robotic researcher, I disagree with the speculative view of AI and robots will substitute human as depicted in some Hollywood movies. Instead, it is the installation of a pair of angel's wings (or devil's) subject to the designer. I am well aware of the ethical and humanities debates and how far does it make sense to various industries when the AI and robots came to commercialisation and mass productions. The value of a robot with AI capabilities reflects the values of those who make it and use it. I would recommend that, therefore, the role of UK Government is the key influential and guardian to set the boundary of the 'personhood' of AI and robotics in real-life implications. Following the European Parliament Legal Affairs Committee[17], the civil laws on the 'personhood' of robotics and AI from research and design, program and development to manufacturing and commercialisation ought to be defined and debated.
2. It is suggested that an enhanced educational programmes or curriculums need to be reflected from pre-school way up to higher education for developing graduates with the skills that will never be replaced by AI and robots. Since the industrial revolution, our students have been educated for being better skilled labours in the educational sausage factories. When these jobs are being taken by AI and robots, it is the time to reflect what knowledge and skillsets are belonged to human, truly human education. A national forum, in-depth study, or oral evidence can be carried for relevant experts to discuss all possible jobs to be taken by AI and those which aren't, and why in order to create public awareness and to influence educational policymakers' decision.
3. AI research and design, the robotics code of conduct and ethical implications for industrial, universities and general public are the foundation of the promising side of AI, the angel's wings. Thus, the government should call for regular consultations with stakeholders in all industries and expert groups consists of legal experts, robotics researchers, industrial leaders, economics, humanists, educationists, psychologists and relevant panels to iteratively establish general regulations for the country, and specific legal affairs to govern various industries and fields that may be varying. For instance, (1) whether to give robots 'personhood' status as argued by EU committee[18], (2) to penalise unethical conduct in designing AI algorithms and robotic programs; or (3) to introduce robot tax to fund support for or retaining of workers put out of job by robots[19].

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[3] **Chew, E.**, Lee, P. H., DharmaratneA., Chen, B. W. & Raju, D. S. (2016) SUHAKAM - Going Digital with Monash, [The 3rd Asian Symposium on Human Rights Education](#), 4-6 Aug 2016, Fukuoka, Japan.

[4] <http://www.welshcrucible.org.uk/esyin-chew/> ; <http://www.welshcrucible.org.uk/2017-2/>

[5] <https://www.nytimes.com/2016/12/14/magazine/the-great-ai-awakening.html>

[6] <https://ec.europa.eu/digital-single-market/en/robotics-public-private-partnership-horizon-2020>

[7] <http://www.telegraph.co.uk/news/2017/08/11/waste-dough-eu-spends-millions-robot-makes-pizza/>

[8] <https://www.theguardian.com/technology/2016/jun/12/nick-bostrom-artificial-intelligence-machine>

- [9] <https://www.theguardian.com/technology/2017/sep/04/elon-musk-ai-third-world-war-vladimir-putin>
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- [13] <http://www.straitstimes.com/singapore/2-humanoid-robots-are-helping-out-in-pre-schools>
- [14] <https://techcrunch.com/2017/04/14/robot-tutor-musio-makes-its-retail-debut-in-japan/>
- [15] <https://www.sciencedaily.com/releases/2016/10/161024095238.htm>
- [16] Wong, N. W. H., **Chew, E.** & Wong, J. S-M. (2016). A review of educational robotics and the need for real-world learning analytics. Paper presented at the [14th International Conference on Control, Automation, Robotics and Vision \(ICARCV\)](#), Phuket, Thailand 13 November 2016. <http://ieeexplore.ieee.org/document/7838707/?reload=true>
- [17] <https://ec.europa.eu/digital-single-market/en/blog/future-robotics-and-artificial-intelligence-europe>
- [18] <https://www.theguardian.com/technology/2017/jan/12/give-robots-personhood-status-eu-committee-argues>
- [19] <http://www.reuters.com/article/us-europe-robots-lawmaking/european-parliament-calls-for-robot-law-rejects-robot-tax-idUSKBN15V2KM>