



AI Literacy for All: A Participatory Approach

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ABSTRACT

AI is progressively being incorporated into our daily lives, however, public awareness of AI is limited. AI literacy is and will continue to be an important skill for everyone. This project aims to investigate how various members of the public – in particular, children, educators and adults – perceive AI. Finally, it intends to promote AI literacy of the public and find the best practices for developing effective educational activities.

CCS CONCEPTS

• **Social and professional topics** → **Computing education.**

KEYWORDS

Artificial Intelligence, AI literacy, AI education, participatory design

ACM Reference Format:

Maria Kasinidou. 2023. AI Literacy for All: A Participatory Approach. In *Proceedings of the 2023 Conference on Innovation and Technology in Computer Science Education V. 2 (ITiCSE 2023)*, July 8–12, 2023, Turku, Finland. ACM, New York, NY, USA, 2 pages. <https://doi.org/10.1145/3587103.3594135>

1 CONTEXT AND MOTIVATION

Technology-driven revolutions have posed new problems for education systems throughout the world in effectively preparing future generations to meet the needs of a changing world. The complicated problems of 21st-century society demand the acquisition of a broad set of skills for life and work. Digital skills are rapidly becoming basic skills comparable to reading and writing. Every individual is expected to have digital skills from a very young age, which will eventually accompany everyone throughout their life. Nevertheless, the traditional set of digital skills has now been extended to include Artificial Intelligence (AI), information, and media literacy [1].

AI has evolved rapidly, and AI applications exist in many aspects of our lives. Almost everyone, even little children, interact daily with AI systems, whether using computer vision to unlock their mobile phones, using an app that knows and suggests to them their preferences (e.g., YouTube, Netflix), or scrolling through their feeds on social media. However, they are not always aware of the principles and the technology underlying AI, nor are they aware of potential ethical issues associated with AI [10].

Previous work has been devoted mainly to the development of courses about AI for middle students and Computer Science (CS)

students. However, it is important to educate and promote AI literacy among the public even for those without a CS background. It is also important to understand how different members of the public perceive AI, so we can develop courses and educational activities, to fit their needs. To my knowledge, there has not been prior work that systematically looked into how different groups of the public perceive AI and design educational approaches tailored to their needs. Thus, the objective of this research is to work towards filling this gap and follow a participatory design approach for understanding how each group perceives AI and develop “AI literacy” educational activities based on identified needs.

2 RELATED WORK

Our society is continuing to evolve from an industrial to an information society as a result of Information and Communication Technology [15]. Due to societal changes, especially the rapid evolution of technology and its effect on how we live, work, and learn, there is a need for everyone to acquire the relevant skills. Across the globe, there is widespread recognition that to be a part of this information society, individuals need to have a set of specific skills that include digital skills (e.g. [2, 5]). Digital skills have been recognized by the EU as one of the eight key competencies for all individuals in an information-based society.¹

For today’s citizens, being literate should involve learning a variety of skills and competencies including AI literacy [1]. Even though almost everyone interacts with AI systems, many individuals do not even recognize that they are interacting with AI [3]. But there are many widespread misconceptions about AI [7]. The misconception and lack of proper understanding of AI technologies lead to limited ability to use and collaborate with them [11]. AI technologies often raise concerns (e.g., worries about a loss of control over AI, and ethical considerations). As a result, the public often does not trust and is afraid of using such technologies [4].

As such, there is a need to combine AI and literacy, *AI literacy*. It is acknowledged that AI literacy is and will be one of the most important digital skills in the 21st century that people should have [1, 14]. AI literacy is defined as a “set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace” [11], and it is recognized as a competence that should be taught at all levels including young children and individuals with no CS background [14].

Education plays a crucial role in advancing AI understanding. Several studies have been focused on the design and evaluation of curriculum and courses on AI [8], targeting primarily university students in CS [6, 16], students in majors other than CS [17], younger students in middle school, and K-12 students and teachers

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ITiCSE 2023, July 8–12, 2023, Turku, Finland

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ACM ISBN 979-8-4007-0139-9/23/07.

<https://doi.org/10.1145/3587103.3594135>

¹<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006H0962>

[9, 11, 13]. It is well established that attending training on AI concepts can change individual views about fairness, accountability, transparency, and ethics of AI systems [6, 12].

3 PROBLEM STATEMENT

Even though there is a growing effort by the research community to understand the public's perception and attitudes toward AI, there is little research on the understanding and perception of AI from specific groups of the public such as young children, educators, and adults. Moreover, despite raising research in teaching AI in middle school and CS-related degrees, the research in promoting AI literacy for individuals with no CS background remains limited. It is clear that there is a need to understand and investigate the educational needs of different members of the public and develop appropriate educational activities for everyone.

4 RESEARCH GOALS

The goal of this project is to determine how members of the public (i.e., children, educators, and adults) understand and perceive the concept of AI. Moreover, it aims at helping different members of the public to develop the necessary digital skills by promoting AI literacy through an open course and helping individuals to prepare for the rapid changes that are anticipated to happen in society and the labor market in the coming years. The final goal is to identify the best practices for the design of effective training activities for different groups of the public. More specifically, this project aims at answering the following questions:

RQ1. How do members of the public perceive AI and their own levels of AI literacy?

RQ2. How can an open course promote AI literacy to the public?

5 METHODOLOGY

To successfully answer the research questions a mixed methods study is designed that consists of two steps. In the first phase, to address RQ1, I intend to reach members of the public through local schools. Three separate questionnaire instruments have been developed for children, parents, and teachers, respectively. The research protocol has been sent for ethical evaluation to the Cyprus National Bioethics Committee, as well as from the Ministry of Education, and received approval from both organizations.

To address RQ2, I plan to recruit adults to participate in design workshops, that will help the development of a set of educational activities for AI literacy. Specifically, the aim is to eventually add the activities to an online course about AI, which is offered by the Open University of Cyprus and is open to the public. A set of parallel activities based on the topics of the course; for each activity designed for the adult learners, there will be a modified version designed for adult learners to undertake with the children in their lives (e.g., their children or grandchildren, neighbors, etc.) Thus, in summary, the project involves the design, implementation, and evaluation of the learning approach.

6 CONTRIBUTIONS

AI is becoming increasingly integrated into our daily lives; thus, to be a successful part of this new reality individuals need to acquire the relevant skills. Previous work [11] reflects the need for

educating individuals about AI. As a next step, questionnaires will be distributed to the local schools in an attempt to understand how educators, children, and adults perceive AI. Taking into account the public's knowledge and understanding of AI, appropriate learning activities and training courses will be developed. These activities will aim to help different groups of the public to acquire the necessary skills related to AI literacy.

The expected outcomes of this project are to describe in detail how different members of the public perceive and understand AI and to provide insights for identifying the best practices for promoting AI literacy in different members of the public such as children, educators, and adults. The outcomes of this project will help in the future development of learning activities, training, and courses that will be aimed at promoting AI literacy for "everyone," even individuals with no CS background.

REFERENCES

- [1] Sheena Carlisle, Stanislav Ivanov, and Corné Dijkmans. 2021. The digital skills divide: evidence from the European tourism industry. *Journal of Tourism Futures*.
- [2] European Commission. 2013. Survey of schools: ICT in education. Benchmarking access, use and attitudes to technology in Europe's schools.
- [3] Motahhare Eslami, Kristen Vaccaro, Min Kyung Lee, Amit Elazari Bar On, Eric Gilbert, and Karrie Karahalios. 2019. User attitudes towards algorithmic opacity and transparency in online reviewing platforms. In *Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems*. 1–14.
- [4] Ethan Fast and Eric Horvitz. 2017. Long-term trends in the public perception of artificial intelligence. In *Proceedings of the AAAI conference on artificial intelligence*, Vol. 31.
- [5] Barry Fishman, Chris Dede, and Barbara Means. 2016. Teaching and technology: New tools for new times. *Handbook of research on teaching* (2016), 1269–1334.
- [6] Maria Kasinidou, Styliani Kleanthous, Kalia Orphanou, and Jahna Otterbacher. 2021. Educating Computer Science Students about Algorithmic Fairness, Accountability, Transparency and Ethics. In *Proceedings of the 26th ACM Conference on Innovation and Technology in Computer Science Education V. 1*. 484–490.
- [7] Patrick Gage Kelley, Yongwei Yang, Courtney Heldreth, Christopher Moessner, Aaron Sedley, Andreas Kramm, David T Newman, and Allison Woodruff. 2021. Exciting, useful, worrying, futuristic: Public perception of artificial intelligence in 8 countries. In *Proceedings of the 2021 AAAI/ACM Conference on AI, Ethics, and Society*. 627–637.
- [8] Matthias Carl Laupichler, Alexandra Aster, Jana Schirch, and Tobias Raupach. 2022. Artificial intelligence literacy in higher and adult education: A scoping literature review. *Computers and Education: Artificial Intelligence* (2022), 100101.
- [9] Irene Lee, Safinah Ali, Helen Zhang, Daniella DiPaola, and Cynthia Breazeal. 2021. *Developing Middle School Students' AI Literacy*. Association for Computing Machinery, New York, NY, USA, 191–197. <https://doi.org/10.1145/3408877.3432513>
- [10] Duri Long, Takeria Blunt, and Brian Magerko. 2021. Co-Designing AI Literacy Exhibits for Informal Learning Spaces. *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW2 (2021), 1–35.
- [11] Duri Long and Brian Magerko. 2020. What is AI literacy? Competencies and design considerations. In *Proceedings of the 2020 CHI conference on human factors in computing systems*. 1–16.
- [12] Emma Pierson. 2017. Demographics and discussion influence views on algorithmic fairness. *arXiv preprint arXiv:1712.09124* (2017).
- [13] Alpay Sabuncuoğlu. 2020. Designing One Year Curriculum to Teach Artificial Intelligence for Middle School. In *Proceedings of the 2020 ACM Conference on Innovation and Technology in Computer Science Education* (Trondheim, Norway) (ITiCSE '20). Association for Computing Machinery, New York, NY, USA, 96–102.
- [14] Gerald Steinbauer, Martin Kandhofer, Tara Chklovski, Fredrik Heintz, and Sven Koenig. 2021. A differentiated discussion about AI education K-12. *KI-Künstliche Intelligenz* 35, 2 (2021), 131–137.
- [15] Joke Voegt and Gerald Knezek. 2008. *International handbook of information technology in primary and secondary education*. Vol. 20. Springer Science & Business Media.
- [16] Michael Wollowski, Robert Selkowitz, Laura Brown, Ashok Goel, George Luger, Jim Marshall, Andrew Neel, Todd Neller, and Peter Norvig. 2016. A survey of current practice and teaching of AI. In *Proceedings of the AAAI Conference on Artificial Intelligence*, Vol. 30.
- [17] Linus Wunderlich, Allen Higgins, and Yossi Lichtenstein. 2021. *Machine Learning for Business Students: An Experiential Learning Approach*. Association for Computing Machinery, New York, NY, USA, 512–518. <https://doi.org/10.1145/3430665.3456326>