

# Co-Designing AI Literacy: Storytelling as an Accessible Tool for AI Education Targeting Children and Teenagers

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Artificial intelligence (AI) literacy is becoming increasingly crucial as AI technologies are integrated into various aspects of society. For most people, in particular children and adolescents, understanding AI is not just about learning technical concepts, but also about developing an adequate conceptual model of different AI tools, computational thinking, and ethical awareness. Suitable AI literacy learning tools need to be appropriate for the use by the target group, such as children and adolescents, in a natural setting, for example, a classroom environment. Participatory design (PD) or co-design can both be useful design approaches to ensure a learning resource can fulfill these requirements, p. My current project on co-designing a storytelling toolkit for AI literacy embodies such a design approach. By iteratively refining the toolkit based on feedback from children and teenagers, we aim to create a resource that truly resonates with its users. This process is ongoing, and I am eager to bring new insights from this workshop into the project. This position paper explores storytelling as a tool to enhance AI literacy among young people and reflects on experiences from previous projects and the current endeavors to co-design an educational resource.

CCS CONCEPTS • Human-centered computing ~ Human computer interaction (HCI)

**Additional Keywords and Phrases:** AI literacy, co-design, participatory design, storytelling

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## 1 INTRODUCTION

AI products become increasingly available to businesses and consumers alike and integrate into many aspects of our lives seamlessly. While there are many benefits to the increased use of AI technologies, we can observe a pronounced comprehension-asymmetry that affects individuals and also has societal implications. On one hand, we have the developers, individuals and entire companies, that understand their AI technologies in depth and also have a general understanding of AI systems. On the other hand, we have consumers, users, and entire institutions, that are often unaware of how the AI technology works. We notice this asymmetry when businesses are able to profit off personal and public data without restrictions, due to most individuals not comprehending the importance of data in AI systems [19] or when terms such as 'black box' are used to describe a system [6]. Most people simply do not currently have the necessary AI literacy to

comprehend the mechanisms of these complex systems [5, 21, 17]. We can also see that in many European countries the socio-economic status of a person is decisive in regard to digital literacy from an early age on [4]. This comprehension-asymmetry has direct implications. First, systems might be used in an ineffective or suboptimal way [16, 18, 1] due to an unfit conceptual model [12]. Second, users might not feel in control and might lack trust [14]. Third, most people do not have the necessary knowledge and capabilities needed to deliberately contribute to the impending technological, intellectual, and cultural change that AI is bringing along [10, 17, 11]. In other words, AI literacy is a vital factor when it comes to ensuring an inclusive co-design of future ethical, responsible, and explainable AI solutions.

The two broad approaches are efforts by the AI community to make AI more explainable [2, 15, 13] and also efforts on the educational side to increase people's understanding of AI [3, 10, 7]. For the latter, Touretzky et al. requests the AI community to supply educational resources for teachers and students [17]. Such efforts are vital in undertaking this comprehension-asymmetry, since a comprehension-asymmetry only occurs when the shared information is related to a complex system and the recipient lacks the necessary background knowledge or expertise to fully understand it [20].

Designing such resources presents an interesting opportunity, but also challenges for different types of participatory design and co-design approaches.

## **2 MY RESEARCH**

In my research, I focus on the intersection of storytelling and AI literacy, particularly targeting children and teenagers. Storytelling is a powerful tool for making complex concepts accessible and engaging. My current work is applying co-design to the creation of tools to foster AI literacy, with a particular focus on increasing AI literacy among children and teenagers through storytelling. In particular, I am co-designing a storytelling toolkit for a classroom setting that not only teaches AI and machine learning (ML) literacy, but is also meant to be accessible, engaging, fun, and inclusive. By providing an accessible educational resource, I aim to lower the barrier for active participation by reducing the perceived level of difficulty. Therefore, I intend to create educational resources that help empower future generations to not only understand and engage critically with AI technologies, but also actively participate in shaping the future of AI.

### **2.1 Previous Research**

My previous work has also inspired my approach and interest in PD and co-design. Before my current project, I was part of a research team working on a project at the intersection of participation, disability, and society. This was a participatory study design where people with severe cognitive impairments decided how the research was conducted. There I learned the importance of staying flexible and reacting to the needs and wishes of participants dynamically in the design process and throughout the study. I found that allowing participants to shape the narrative often leads to more authentic and meaningful outcomes. This experience and way of conducting research has informed my research. In particular, I found great value in design science research, co-designing, and PD strategies.

In another component of my PhD research, we developed guidelines for picture book authors aspiring to create AI-focused children's books. The guidelines aimed to support a meaningful and conceptually sound depiction of AI in children's books aimed at kindergartners. Here, learning more about the worldview of kindergartners was crucial to ensure the guidelines focused on age-appropriate concepts. This process involved gathering feedback from both domain experts and children as experts. In another research project we looked at portrayals of AI in entertainment media consumed by children and teenagers. We looked at 64 media items consisting of movies, tv shows, YouTube videos, books (including mangas and comics), games, and audio plays. After analyzing the media items, we conducted an interdisciplinary expert

workshop to examine the potential educational value of these depictions of AI. We also collaborated with a high school student to gain insights from the target demographic.

### **3 CHALLENGES AND OPPORTUNITIES**

Integrating AI literacy into educational materials for children and adolescents presents several challenges and opportunities. First and foremost, it is challenging to use participatory design approaches in every aspect of the design of an educational tool. This is due to the target group not yet being educated on the topic that the educational tool is meant to teach. Hence, so far we opted for iterative co-design approaches where we aim to get regular feedback from the target audience that then guides our design process, rather than have the target audience involved in every aspect of the design. I would be very keen in learning more about other experiences and potentially being inspired to try different approaches.

Another challenge is ensuring that AI concepts are communicated in a way that is both accurate and age-appropriate. While there has been prior work published on some aspects of this challenge [8], more practical information is often missing. Similarly, gathering meaningful feedback from young participants requires careful consideration of their developmental stages and communication skills. It would be helpful to learn more about using PD or co-design approaches with different types of target groups.

There are also a variety of opportunities in the design space. For instance, by using a co-design approach we can ensure that the storytelling toolkit supports the target group and increases their AI literacy in an engaging and enjoyable way. Moreover, by using a design science research approach [9], co-design and PD can be used in all three cycles, the design cycle, the relevance cycle and the rigor cycle [9]. In the design cycle, co-design means user testing and ensuring the design works for the intended use. In the relevance cycle co-design can mean querying experts, such as educators and other researchers, or studying the behavior and needs in a classroom setting and talking to students as well as teachers. In the rigor cycle, co-design means looking at artifacts and collaborating with other researchers that might have worked in the same design space to ensure the design is well grounded and well thought out.

Mutual learning reveals another opportunity in this research setting. Learning is at the center of my current research, in particular concerning AI literacy. Hence, by working with the target group and various domain experts, knowledge is transferred between different stakeholders, and new knowledge can be created, mutually benefiting the stakeholders and the co-design. In my previous projects, mutual learning has been a core component. For example, while developing guidelines for AI-themed children's books, feedback from kindergartners and domain experts enriched the final design and insights. This process highlighted the importance of listening to both the intended audience and subject matter experts.

Lastly, storytelling can also be a medium that offers an opportunity for participatory design. It engages participants not just as learners, but also as co-creators. This approach can lead to more effective and relevant educational tools that are shaped by the very audience they are meant to serve.

### **4 FUTURE DIRECTIONS**

I am particularly interested in exploring how participatory design practices can be further refined and adapted for different age groups and various settings, and how storytelling can be leveraged more effectively in this context. I see potential for collaboration in developing new tools, including AI tools, and methods for PD and co-design, in particular for AI literacy, that can be tested and refined across different settings. Moreover, I hope to contribute to joint publications that explore the intersections of AI literacy and PD or co-design, particularly focusing on how these approaches can be used to develop responsible and ethical AI literacy programs for children and adolescents.

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ChatGPT was used as a generative AI tool to assist in writing this position paper in two different ways. First, it was used to ideate the content, structure, and general tone of the paper. These suggestions were based on the workshop description and my previous work, research designs, and research topics. Second, ChatGPT was used to inspire new sentence structure and phrase content according to context.

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