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Data-driven Approach in the Design for Sustainable Behaviour: Opportunities and Challenges for AI in the Children's Electronic Toy Design

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Interactive physical-digital play toy (i.e. Lego AR technic, Nintendo Labo and Barbie digital makeover) are shaping the way children play. Additionally, more than one-third of kids are spending more time playing video games than they were a year ago. Children's engagement with electric and electronic products is ever increasing. A growing body of literature explores the advantages of playing digital-based toys and games for improving attention span and memory, managing emotions, promoting behaviour change, and supporting treatment for mental illness (e.g., anxiety, depression, or posttraumatic stress disorder). However, the negative impact arises, describing potential harms related to aggression, addiction, and depression. What's more, electric and electronic kid's toys and gaming devices create the negative environmental impact, as most tiny circuits and toxic batteries built into the toys end up in a pile of e-wastes. Furthermore, obsoleted gaming hardware and software contributes to global warming through electronic waste and energy usage. Transformational change is needed to transition to a circular economy capable of facilitating sustainable play. Artificial Intelligence (AI) is pervading all parts of the toy and game product design in ways that indicate transformative system changes are possible. Product designers, as mediators between people, technology, and the environment have a responsibility to recognize and reflect on ways AI could bring the change needed to move to sustainable play. This literature review is situated at the intersection of the Toy and gaming industry, Design, Artificial Intelligence, and Circular economy. The transdisciplinary approach reveals what exists across the disciplines, what can be done with AI to transition to sustainable play, how design proposes to approach the change, and which ethical or philosophical considerations start to emerge. The discussion reflects on AI as a potential leverage point to bring changes in children's play and on the designer's role in establishing human-technology-environmental relationships. The paper concludes with required further research and recommendations.