Research through Design as a 'Rapid Response Methodology' for exploring Child-AI Entanglements

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The following is a position statement that was prepared for submission to the Exploring Child-AI Entanglements workshop at the ACM Interaction Design and Children Conference 2024. This work is based on the Ryelands AI Lab. You can find more information about the project and all the learning resources we developed for it here: https://designresearch.works/blog/ryelands-ai-lab.

The rapid proliferation of AI technologies into everyday life has brought both excitement and concern. As AI becomes increasingly present in children's' lives, as well as the world at large, it is crucial that we develop approaches to help young people understand, critically engage with, and thoughtfully harness these powerful technologies. Our recent project, Ryelands AI Lab, used Research through Design as an overarching methodology to co-design and test whether constructionist learning approaches [e.g., 2] are an effective pedagogical approach for equipping children with the knowledge and skills they need to live lives that are entangled with AI. The project sought to help young people acquire the skills to use and think about AI. The specific focus of this project was generative AI systems, in particular diffusion-based AI image generators that convert text to images. We worked with two classes of primary school children aged 7-8 years, delivering 6-weeks of teaching over the course of a term.

Figure 1. Delivering the project in classroom (left). Printed copies of the Ryelands AI Lab Prospectus (right).

The educational approach we adopted is called *constructionism*. This conceptualization was first described by Seymour Papert and suggests that some types of learning happen most effectively when learners are actively engaged in constructing

tangible artifacts in the real world [1]. It emphasizes hands-on exploration, tinkering, and experiential learning. We note that there are numerous related approaches to education including Active Learning, Experiential Learning, Discovery Learning, Situated Learning.

In the Ryelands AI Lab, we employed a constructionist approach to teach young people about generative AI technologies. Our interpretation of constructionism in this context was to facilitate students interacting directly with an image generation AI model, experimenting with prompts, parameters, and outputs to gain both practical skills and critical insights. While worksheets, lesson plans, and slide decks provided structure across the 6 lessons we delivered, the heart of the pedagogical engine was in the act of hands-on 'mucking about' with the AI image generator. The project culminated in the production of a prospectus (a printed booklet for advertising a school) which was made of AI-generated images created by the students and envisioned an alternative future of their school.

The results of the project were encouraging. Triangulated through our observations as researchers embedded in the school, the actual images produced by the young people, and the testimony of each class's teachers, we are confident that this active, hands-on approach, not only helped students learn how to effectively use the AI system, but also began to help them reason with deeper questions around AI's creative and disruptive potentials (FIGURE 2). Students adeptly considered issues of ownership and artist credit when generating images, debated whether AI image generation was truly creative in the same way human art is, and reflected on the societal implications of AI content generation. Hence, the constructionist approach enabled both practical and conceptual learning.

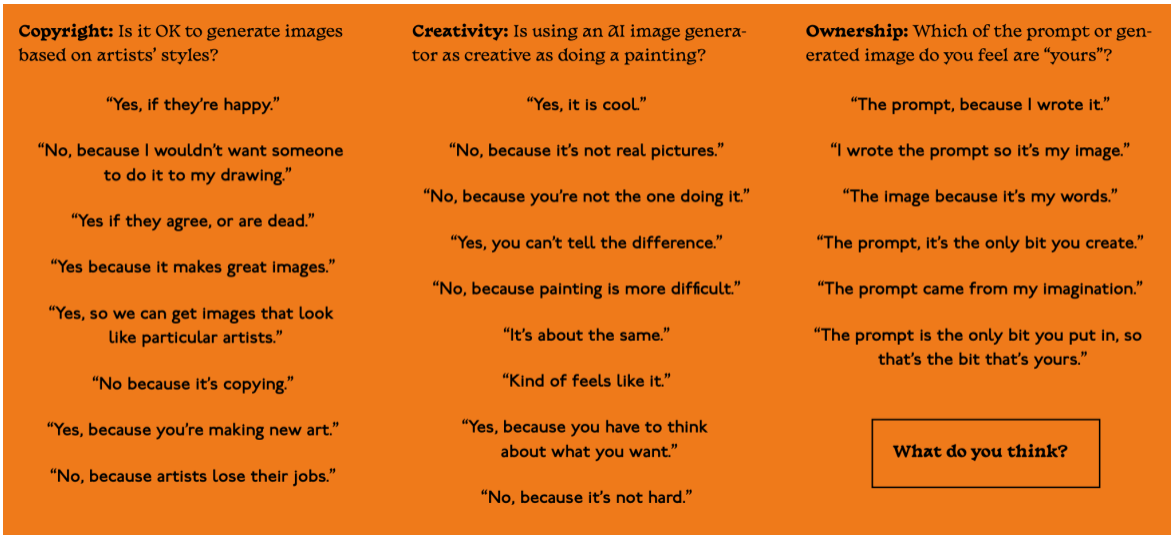

Figure 2. Quotes from pupils when asked about copyright, creativity, and ownership with respect to generative AI.

A distinctive feature of the project, and a point central to this position statement, was the use of Research through Design (RtD) as a guiding and overarching research methodology. RtD enabled the research team to engage with the uncertainties surrounding generative AI technologies in an educational context, through rapid iteration and an acceptance of emergence [4]. The approach allowed for continuous adaptation and refinement of the learning materials, tools, and strategies based on the changing needs and challenges encountered during the project. This iterative, responsive process facilitated the co-development of students' practical skills and critical understanding of AI systems. Moreover, RtD's

emphasis on generating intermediate knowledge [5] (in contrast to, for example, falsifiable generalizations) through hands-on engagement and design practice allowed the research team to rapidly derive actionable insights and propositions. Resonating with the fluidity of More-Than-Human research endeavours that exhibit *Productive Oscilliation* [6], the consequence of using RtD in this way is the production of viable contributions to the broader discourse on AI literacy and the role of design in shaping the future of AI education.

The purpose of this position statement is to advocate for RtD as a "rapid response" methodology that is well-suited for researchers to engage with the entangled complexities of emerging AI technologies quickly, nimbly, but with the ability to produce nuanced and actionable insights in the form of intermediate knowledge. This points to the profound potential of RtD in grappling with the ubiquity complex socio-technological entanglements [see 3] that adoption of AI is facilitating in brand new ways. AI technologies are not merely tools that children use; they are entry points into entangled systems that children interact and grow with, that shape children's understanding of themselves and the world. Other research approaches, focused on testing hypotheses or establishing generalizable theories, are ill-equipped to confront this relational and rapidly evolving dynamic. RtD, in contrast, can be delivered quickly and can adapt quickly. These are qualities that uniquely afford RtD the ability to work within a constantly shifting landscape of multiple entanglements. Through iterative design and reflective practice, researchers can directly explore the changing contours of child-AI entanglements guiding design practice and informing future research.

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