Teachers as designers to support young children's technologically assisted experiential learning using IoToys

Sarika Kewalramani, Ioanna Palaiologou, Lorna Arnott and Maria Dardanou
The Project: An Ecological Exploration of the Internet of Toys in Early Childhood Everyday Life

Overarching aims for the larger project – to explore:
1. Parents’ and practitioners’ dispositions, attitudes and aptitudes towards children (ages 0–8) engaging with IoToys.
2. Ecological factors shaping young children’s (ages 0–8) experiences with IoToys.
Focus of this paper
Research questions

- What are the influences of pedagogic and curricula cultures when EC educators integrate IoToys in their classrooms?
- What types of instructions/interactions take place to impact children’s learning when IoToys are used in the EC classrooms?
Theoretical frame

Vygotsky’s Significant Other

Exploring the ways that IoToys, as an auxiliary artefact, when placed in the child’s environment, mediates to conceptualise their learning and cognitive development

Ecological
## Methods

### Data Collection

<table>
<thead>
<tr>
<th>Interviews with parents (part of ongoing larger project)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Interviews with educators</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Participant observations by the researchers of children's play with IoToys in childcare;</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Written observation notes</td>
</tr>
<tr>
<td>• Still digital images</td>
</tr>
<tr>
<td>• iPad recordings</td>
</tr>
<tr>
<td>• Practitioner reflections</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Multimedia messages (pictures, videos, short written reflections from parents) of case study children's play in the home, submitted by parents and practitioners.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Consultation with children (aged 3-5 years old) – storyboards, modelling with playdough and arts materials, Book Creator, peer/community presentations.</th>
</tr>
</thead>
</table>

Data collection is negotiated in each country with participants so not all approaches are applied in each country. The examples here are indicative.
Findings 1: Influence of pedagogic and curricular cultures in valuing play with IoToys

Creativity and STEM (Australia):
In our centre we see technologies as promoting thinking and learning using another medium for children to be creative, make things work, make their obstacle course for the robot to move. Our EC curriculum is inquiry focused where we harness children’s imagination, interests and excitements. And with the Reggio Emilia approach we don’t have an outcome in mind. It is very open where drawing on the languages of children such as drawings, children creating and representing the robots in clay and drawings, challenging them to make their own robots using batteries, and presenting their work and learning to the parental community. We also have a new STEM room where we can incorporate robotics in our curriculum along with the junior school. (Interview, Australian Educator).

Numeracy and Literacy (Scotland):
In momentum nursery they have set up a designated IoToys area where toys remain. This separates activities from the rest of the playroom and play is not integrated with other materials. Children use the resources within the confines of the pre-designed activities afforded by the technologies. Practitioners have a specific focus on Numeracy and Literacy related to the Scottish Attainment Challenge and practitioners have commented on the ease of justifying toys related to those curricular areas (researcher reflection).
Dash building tunnels (Norway)

“When you put an aim to the activity, for example with the Dash, when children controlled Dash with the iPad, they see that the iPad has another function that they are used to, it comes positive learning” (Annika, kindergarten teacher)

Children collaborating in Osmo Monster

Language becomes a motivation factor for the bilingual child that supports peer-interactions
Finding 2: Interactions facilitating children’s cognitive and social learning
Collaborating and critical thinking

T: Let’s all just think about how we are going to get Botley to go up and down on the ramp. [Moving over to block cupboard] We’ve got a lot more of these. [Bringing over semi-circle blocks] Or, could he go through these? What else could he do? Do you think he could go through those?

Jo: What if we put him through a tunnel?

Eddie: You could make a tunnel!

T: Oh yea! You could definitely make a tunnel. What else could we do?

Jo: Let’s make a tunnel for him to go through. And then a little home that the tunnel leads to.

T: A little home at the end of the tunnel, that sounds nice. Where and how are you going to do that? Which blacks are you going to use?

Jo: We are all going to have to work together.

T: [To Meena and Ari] Do you girls want to help us? We could see if both Botleys will go in the tunnel.

J: Maybe inside the tunnel is their meeting place?

[Botley moves through tunnel, students all move in the peak in]

Eddie: He came off track!

T: Oh, did he? Oh, why did he come off track?

Eddie: Because it's too small! Ah! He’s gone through!

Jo: It's stopped! We have to put another code. We have to make him go straight!
Robot city created for all Robots/lootoys to live together happily
Traditional instruction and scaffolding

- “It’s above their level and things. She said she’s left them to try and figure out on their own and it’s just not happening. She said maybe it will when they get used to it and things but for now it needs to be adult led…”
Conclusions

- Within the interactions across multimodal platforms (Yelland, 2018) with IoToys, children construct shared knowledge that fosters discovery learning (Hakkarainen & Sintonen, 2002), to enhance children’s creativity, critical thinking and problem solving dispositions.

- This is only made possible by practitioners’ framing of the toys and fluid integration within the environment. If IoToys are used devoid of context, their educational potential is limited to the confines of the toy’s affordances and pre-set activities.
Next Phases

- Parent and children’s consultations across participating countries
- Teacher workshops and online reflective discussions developing Professional Learning Communities
- Track children’s learning and development (since the project is running for over one year already)
Thank you! Questions?

- Sarika Kewalramani email: sarika.kewalramani@monash.edu
  @sararamani77
- Lorna Arnott email: lorna.arnott@strath.ac.uk @lornaarnott
- Maria Dardanou email: maria.dardanou@uit.no
- Ioanna Palaiologou email: i.palaiologou@ucl.ac.uk

This paper is part of the EECERA Digital Childhoods, Multimodality and STEM Special Interest Group @EECERA_DC