Using design-based methods with autism practitioners to enable technology-mediated social play in autistic children

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Background

- Technology could provide important opportunities for autistic children to engage in peer play [1]

- With the range of technologies currently available to practitioners, educators, and parents, it is hard to know or choose technologies which provide the best opportunities for autistic children

- Four autistic children (see Child Profiles) were observed playing with different types of technology. Play and interaction were assessed using multiple methods. Practitioner-driven recommendations for technology use are presented here.

Practitioners as researchers

- We worked *with* autism practitioners and teaching staff in a specialist school to design environments which facilitated children's social play.

- We used a design-based framework [2] which allowed practitioners to provide feedback and develop ideas which were then tested in the classroom (see Session outline)

- Practitioners directed our analysis by telling us which events were most important for the child and the class context, e.g. "he did good sharing, he doesn't usually do that"

- We analysed the video recordings quantitatively and qualitatively to create a rich and informative report on children's social interactions whilst using different types of technology

Key Findings

- Technology can support a range of social interactions and types of social play in autistic children.

- Different technologies can produce different types of child interactions and play. We found that **iPads** produced the most social play with peers, and **Osmo** produced the most play with adults.

- Children initiated interactions in a range of contexts. The technology also played an important role in facilitating interactions, e.g. by prompting turn-taking, by providing feedback to the player.

- The feedback and ideas developed by staff positively shaped the patterns of play shown by the children (see Session outline). Important things to think about in practice are children's perceptions and experience of technologies, and the role of the environment in supporting collaboration.

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Acknowledgements and References

[1] Fletcher-Watson, S. & Durkin, K. (2014). Uses of new technologies by young people with neurodevelopmental disorders: Motivations, processes and cognition. *Neurodevelopmental disorders: Research challenges and solutions*, 243-261.

[2] Wang, F. & Hannafin, M. (2005). Design-based research and technology-enhanced learning environments. *Educational Technology Research and Development*, 53(4), 5-23.

[3] Howes, C. (1980). Peer play scale as an index of complexity of peer interaction. *Developmental Psychology*, 16(4), 371-372.

Social play observations on different technologies

iPad

4 games available (clockwise from top left): Fish School HD, Toca Boca Tea Party, Reactickles Magic, Balloon Pop

Osmo

Tangible device (digital toy with physical interface). 4 games available (2 shown: Tangram and Numbers)
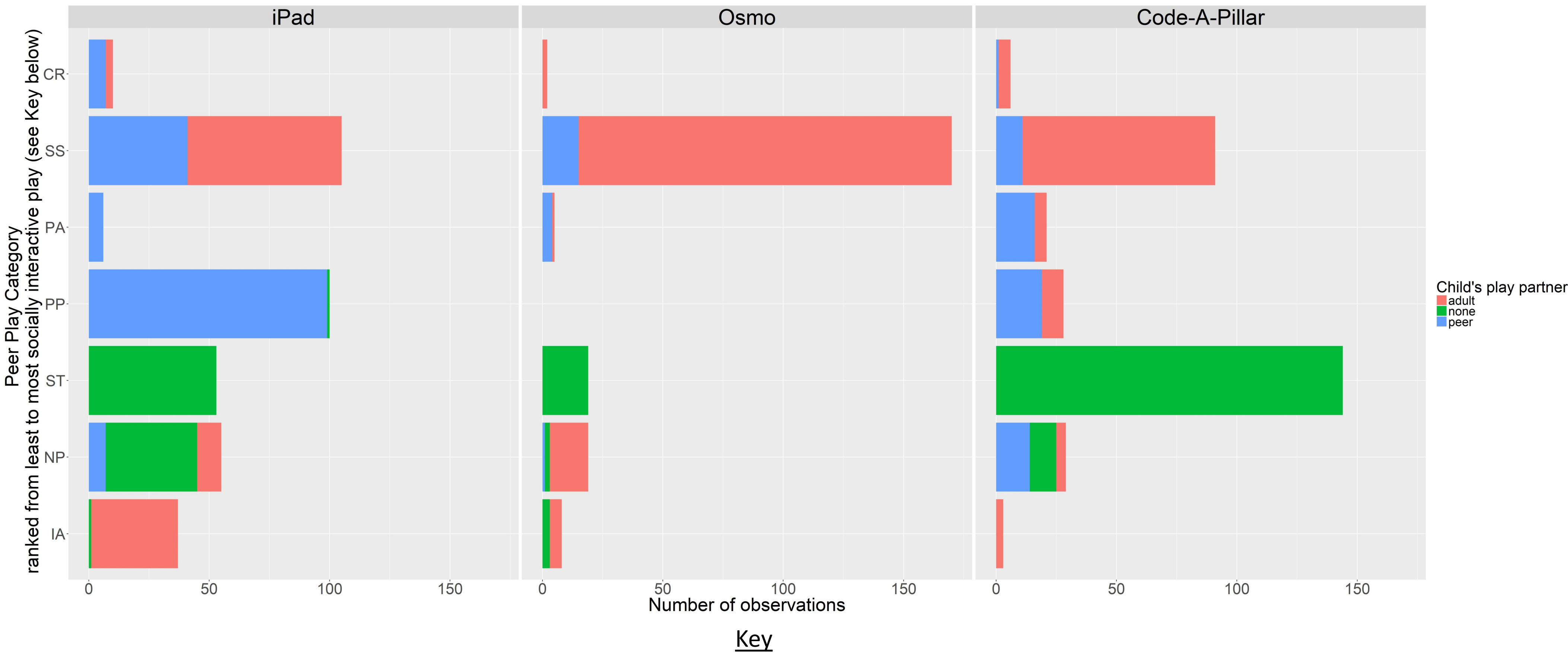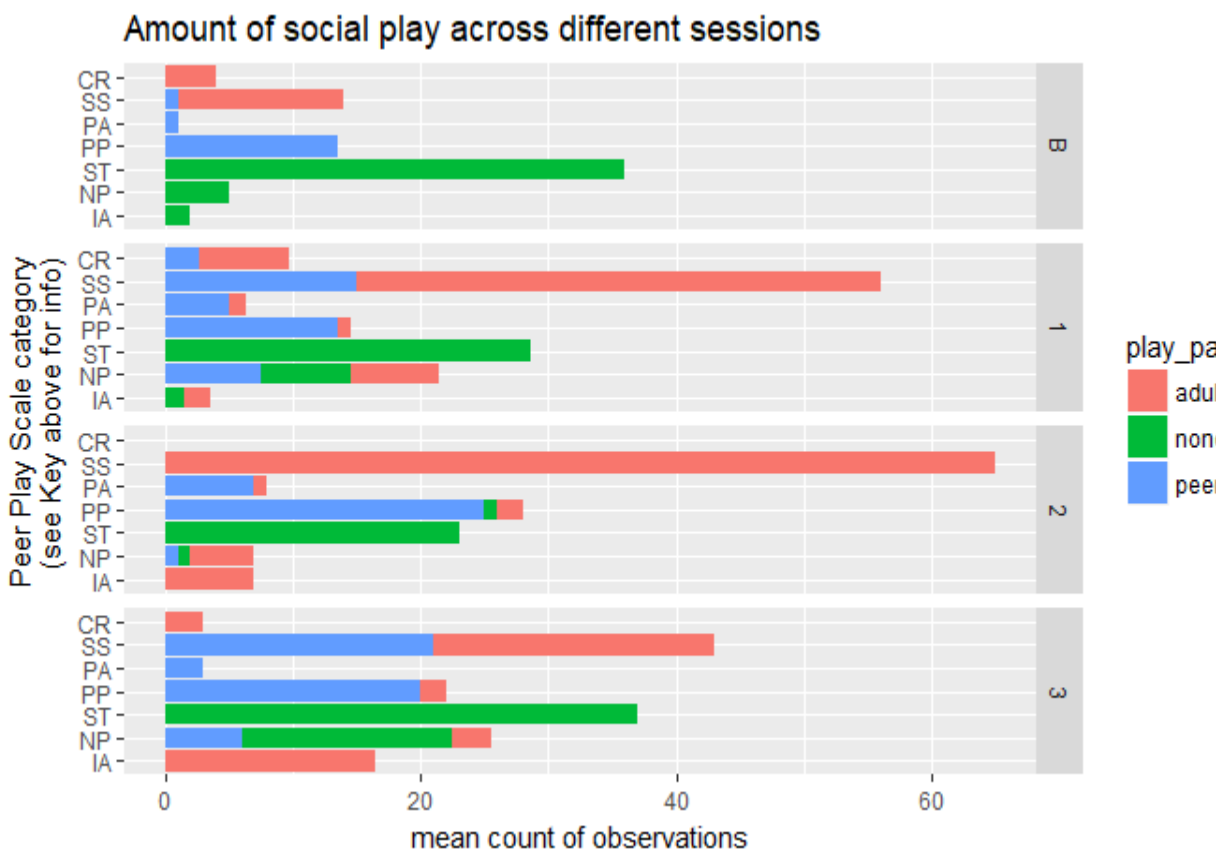
Code-A-Pillar

Robotic toy (physical interface) Body pieces connect together and chain actions (e.g. forward, left turn) - with lights and music

Play observed on iPad, Osmo and Code-A-Pillar

Social play was categorised using a standardised measure: **Peer Play Scale** by Howes [3]. The play categories increase from non-playful interaction with adults (bottom) to complementary and reciprocal play (top): **IA** = *non-playful interaction with adults*, **NP** = *non-play*, **ST** = *solitary play*, **PP** = *parallel play*, **PA** = *parallel-aware play*, **SS** = *simple social play*, **CR** = *complementary & reciprocal play.* The types of play increase according to playfulness and social complexity. Play partner is colour coded (none = solitary play, adult = teaching staff).

Contexts which inspired children's interactions

- Interactions occurred in a number of child-directed *and* practitioner-directed contexts:

- All types of interactions occurred *across all interfaces*, putting emphasis on child– and practitioner– influences on interaction.

Sharing information
Sometimes the context of the game motivated children to share additional information. For example, a picture of a pig in Osmo Words prompted a child to discuss a recent school trip to a farm park.

Providing feedback
Practitioners provided feedback or comments on the game or activity to keep the child engaged. Children also shared their own feedback in interactions, e.g. "I love this game!"

Taking turns
When instructed by an adult, some children were able to take turns on the same device (e.g. drive the code-a-pillar back and forth between two people, each child lays a cake out on Toca Tea Party)

Working together
Having a shared goal helped facilitate interaction with adults and peers. For example, children worked with their peers to pop all the balloons, or complete an Osmo puzzle.

Asking for help
When children needed assistance to use the technology or complete a goal, they usually sought out a staff member to help them

Learning opportunity
Staff used the technology content to engage the children in learning opportunities. E.g. picking up an Osmo Tangram tile and asking "what colour is this?"

Session outline

Session	Practitioner ideas	Technology
1	(B): Baseline observations	iPads
2		
3	Idea (1): New technology introduced	iPads, Osmo, Code-A-Pillar
4		
5		
6	Idea (2): Desks centred in room	iPads, Osmo, Code-A-Pillar
7		
8	Idea (3): Practitioners direct peer play	iPads, Osmo, Code-A-Pillar
9		

Amount of social play across different sessions

Child profiles

	Oliver (10 yrs)	Harry (11 yrs)	Laura (8 yrs)	Jack (8 yrs)
Verbal skills	Non-verbal	Fluent	Fluent	Non-verbal
SRS class	High	High	Medium	High
VABS class	Low	Low	Low	Medium
WSQ type	Aloof	Active-but-odd	Active-but-odd	Aloof

Results are standardised measures and bespoke reports which were completed by the children's class teacher.
SRS = *Social Responsiveness Scale 2*. **VABS** = *Vineland Adaptive Behaviour Scales 3*. High scores = more difficulties in social/adaptive skills, and low scores = fewer difficulties in social/adaptive skills. **WSQ** = *Wing's Subgroups Questionnaire* which assigns a social interaction 'style' which varies in terms of social skills, social motivation, and contexts of interaction.

All names are pseudonyms and all pictures shared with parents' and staff permission.