

Fostering real-world interaction in autistic pupils with digital technology: Design considerations from practitioners in special education

Margaret Laurie, Andrew Manches, Sue Fletcher-Watson
Patrick Wild Centre & Centre for Digital Education, University of Edinburgh, Scotland. UK

Thank you!

To all of the teachers, educators, and
services that contributed to this research

Email: m.h.laurie@sms.ed.ac.uk

Twitter: @_mlaurie, @SueReviews

Background

- A handful of studies have suggested that technology could inspire or support autistic children to engage, interact and play with others [1-3]
- On the other hand, practitioners and parents have expressed concern that technology could impede social development, and prohibit “real-world interaction” in autistic children [4].
- This study aimed to draw on practitioner experience to explore how social interactions may be influenced by technology, and presents design considerations for fostering interaction

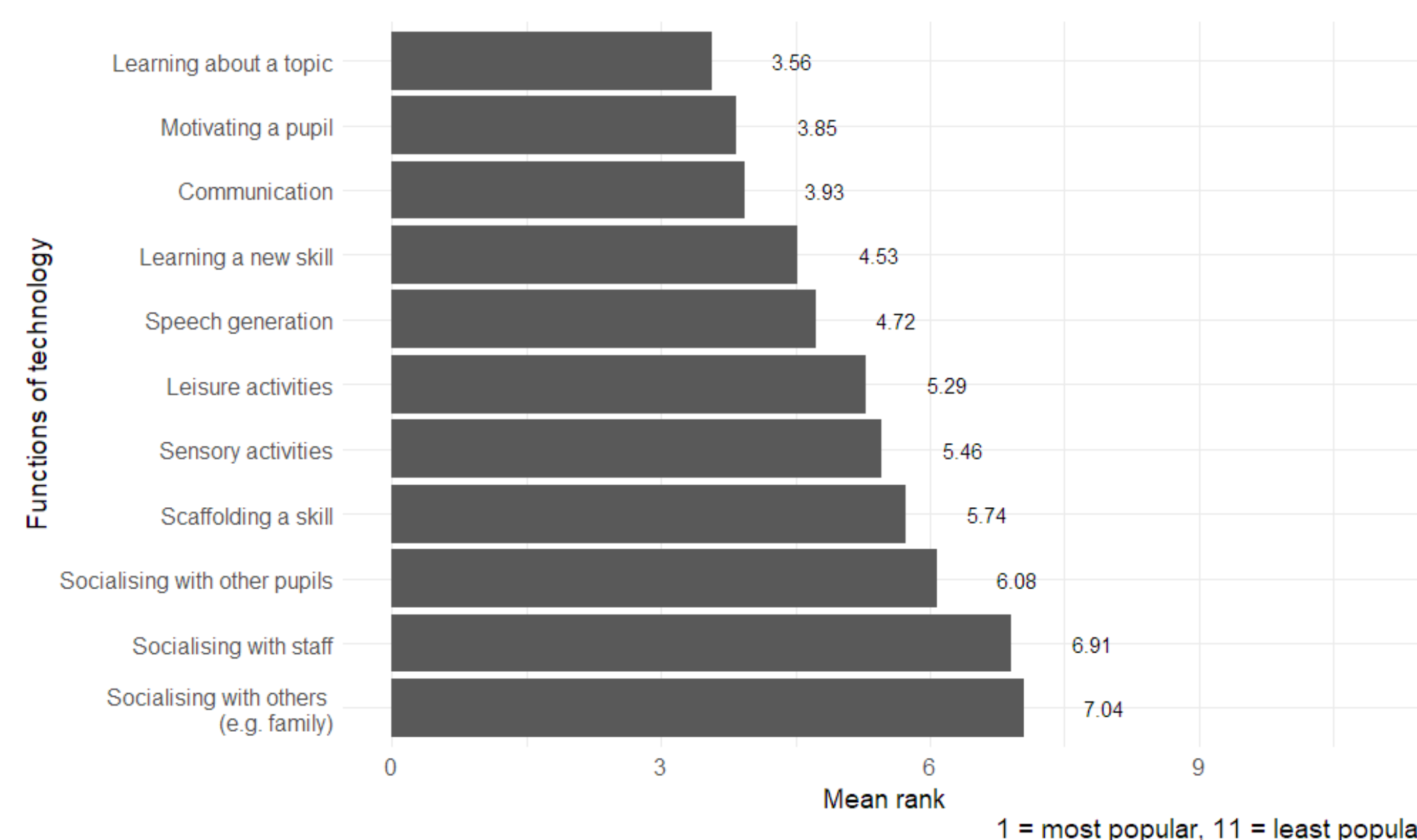


Method

- 186 educational practitioners with a range of backgrounds, roles, and expertise completed a survey about the use of technology in education for autistic pupils.
- Focus groups with teachers in different special education services (total $n = 11$) discussed the influence of technology on social interactions in autistic pupils.
- An inductive thematic analysis approach was used to create themes from the focus group data.

Uses of technology

When asked what they used technology for, educators frequently said *learning*, *motivating pupils*, and *communication*. Educators rarely reported that they used technology to support children to socialize with others.



For more details see www.dart.ed.ac.uk/research/autism-tech-play

ML is supported by a Chancellor's Studentship from the University of Edinburgh. They costed the research and sponsored ML's travel to INSAR 2018.

Key findings

Teachers did not overtly use technology to encourage interactions but when asked to think and talk about it, they noted lots of examples of technology mediated interactions.

*"In my classroom, technology acts as like a **common ground**. For example, all three of my children play Minecraft and they'll come and they'll talk to each other about what they've done"*

Technology can inspire peer relationships, by bringing children together through a shared interest. Children were reported to converse and form bonds with peers from both within and beyond their classroom through a common interest in technology.

Larger technologies, such as sensory rooms, brought different groups of children together which elicited novel social interactions. Staff viewed these technologies as an opportunity for building relationships and social tolerance, as noted below:

*"I've got a handful of children in individual rooms and main classes and **they come together** in the Magic Carpet to share a space"*

Common Ground

Space

Involvement

*"the other young people will be cheering on the person that's playing the game and they'll all be watching, and kind of interacting that way. So they're not playing the game together, but **they're all involved** in the game, even if they're not the one controlling it."*

Technologies designed for a single-player could still promote interactions. For multi-player technologies, such as table-top devices, having clear *player interaction* or *task instruction* (such as turn-taking) made it easier for children to engage socially. Some children were put off when the device interacted with simultaneous users, resulting in a noisy interface.

*"when they're at the whiteboard they do have **space**, and they're not usually standing next to the person, they usually are kinda back or forward or at the side, separated a little bit. But I'm wondering if it's smaller, they will have to be kinda closer"*

Interactions were reported in both physical and digital spaces. According to staff, the physical space around the technology could influence the interaction. Some children preferred technologies which invite close social proximity (e.g. tablets), whilst others preferred spaces which allowed for more distal interactions.

Some children associated using technology with solitude. Staff reasoned that some children chose technology-based activities as a way to reduce sensory or social stress in the environment, thus allowing children to have *their own space*. In this case, the children's previous experiences and expectations from digital technologies shaped how they interacted with others whilst using technology. New technologies, or new ways to use existing technologies, might inspire these children to interact with others.

Design considerations and Conclusions

- The right for children to have a **choice** in either playing a game singularly, or collaboratively, was seen as important. Games which allow both settings can be a good stepping stone for encouraging social play.
- The **physical space** surrounding technology is a mediator for interaction—for some children, bringing them closer together encourages interaction but others prefer their own personal space.
- For some children, technology can indirectly foster communication and relationships through **shared interests**. These fleeting moments of shared engagement with others can be clinically significant.
- Some interactions are entirely **unpredicted by design**, and driven by children's skills, experiences, and expectations of technology
- In conclusion, technology can inspire a range of social interactions in autistic children.
- Future work (in progress) will observe autistic children playing with different technologies (tablets, tangibles, robots) and characterize interactions using a range of methods.



References

[1] Farr, W., Yuill, N. & Raffle, H. (2010). *Autism*, 14(3), 237-252. [2] Bauminger-Zviely *et al.* (2013). *Autism*, 17(3), 317-339. [3] Holt, S. & Yuill, N. (2017). *International Journal of Child-Computer Interaction*, 11, 72-82. [4] Clark, M. L., Austin, D. W., & Craike, M. J. (2015). *Focus on Autism and Other Developmental Disabilities*, 30(3), 174-181.

