

Cooperation and Collaboration Among Preschoolers Using an Interactive Multi-Touch Table

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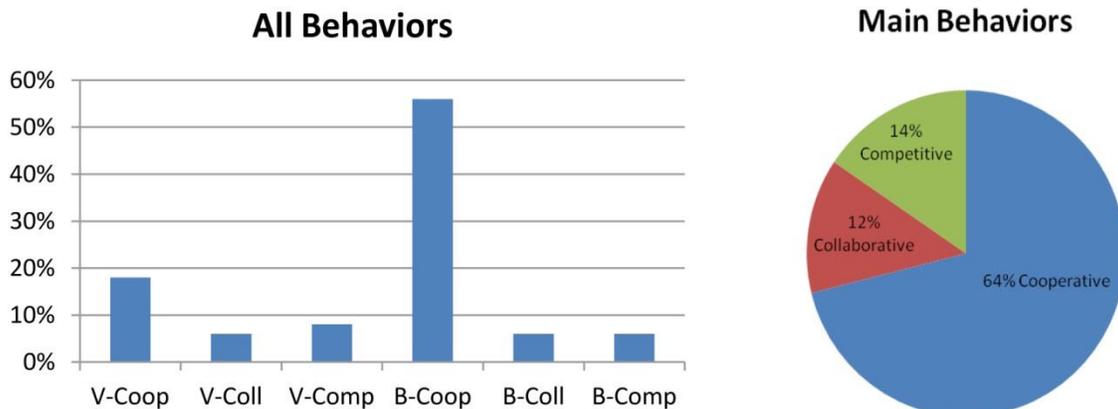
Developmentally appropriate technology supports young children’s social-emotional development by providing rich opportunities for cooperation and collaboration. As the presence of shared educational technology opportunities becomes more prevalent in early childhood settings, it is vital that professionals have an understanding of their benefits and limitations in supporting positive outcomes. The current study explores and finds that preschoolers can successfully use interactive multi-touch tables and exhibit observable and distinct cooperative and collaborative behaviors when doing so.

Background. It is well established that positive behaviors, particularly those related to social competence are key for children’s early and continued school success (Ravner & Knitzer 2002; Peth-Pierce 2000). One concern about using technology is this might lead to children having fewer interactions with others and becoming socially isolated. However, most experts share consensus that it is the type of technology experiences available to young children, not the technology per se, that determines whether development is hampered or supported. The development and display of positive feelings when young children use technology is well documented. Children exhibit positive emotions and develop positive attitudes toward learning with computers, demonstrate greater positive affect and interest when they use technology together, and often show a preference for working with peers rather than independently. (See McCarrick & Xiaoming 2007; Clements & Sarama 2003; Heft & Swaminathan 2002). A new technology is making this even more possible in the form of the multi-touch table. A number of children can interact together in a group and all touch the surface at the same time. The research on multi-touch tables is in its infancy. A recent review of the literature reports this is especially true with regard to formal studies on the collaborative capabilities of multi-touch tables in learning environments but what does exist shows there is a potential to positively impact learning outcomes (Higgins, Mercier, Burd & Hatch 2011).

Purpose of Current Study. The purpose of the research described here was to determine whether preschoolers could and would exhibit cooperation and collaboration when playing in small groups on a multi-touch table with interactive games designed specifically to elicit these behaviors.

Sample and Methods. Small groups of 3 to 4 preschool age children (10 games, 8 children) were videotaped as they played several different types of games on the table in their childcare center. Children were given a brief introduction to how to use the table including how to login, how to move objects, to listen for instructions from the table, and that they would be playing together with their friends. Videos were coded for interactions (verbal and body behaviors in the areas of cooperative, collaborative, and competitive) as well as usability.

Results. Interactions. The majority of the behaviors were cooperative, followed by a similar amount of collaborative and competitive behaviors.



The majority of children were extremely excited at their first interaction with the table and games, evidenced by jumping, clapping, saying “Wow”. Overall there was a high level of cooperation among all the children within groups. Children were tolerant of each other reaching around and across the table. This included overlapping arms, coming very close to ‘personal space’, moving toward the same object but physically following an implicit ‘first there it’s yours’ rule. Older children exhibited these behaviors more spontaneously. The easiest for the children was in the game type where they all move an object together. All quickly understood and participated. The game where all have to touch an object at the same time was a bit more challenging but appeared mainly related to having to be in synch when touching the surface; children exhibited good collaboration in order complete the task. **Cooperation** (following rules, not trying to take over, sharing resources, taking turns): The children were engaged and interested. There were individual differences with some children more verbally and others more physically enthused while others were more reserved. **Collaboration** (taking actions where all members must participate; discussion around needing to work together to meet a goal, and/or strategizing on how to do so): Several game types needed intellectual strategy for collaboration. Here there was evidence of children verbally discussing how to proceed to complete these games and also of them allowing and encouraging each other to all contribute to the task. **Competition** (dominating the space and materials by blocking, pushing, reaching into another’s space when the other does not wish them to; verbally admonishing or complaining of unfairness, and highlighting their accomplishments in relation to the lack of or lessening of those of peers): There were some instances although not common where children impulsively reached into another’s space and made the response or blocked a second child from reaching an object. The most common competitive behavior was around being first (to go, to find/accomplish, to finish). **Usability**. All children understood the basic nature of a touchscreen evidenced by using their fingers to move objects and touching around for ‘hot-spots’ (touching a certain object triggers a system response). There was variability in children’s initial success at capturing an object sufficiently to move it, with a slightly steeper learning curve for younger children. Improvement for all children was seen within just a few attempts. All children could reach the majority of the objects. Younger and/or shorter children could not reach as far and needed to move around the table.

Discussion. The majority of the play was cooperative which is in line with Parten’s Stages of Play. There is evidence the table and games promotes children being more in that stage since it is “fleeting” usually. The fact that collaborative play, which is advanced, is present represents good support that the system is promoting these behaviors. While not pervasive, competition too was present. Competition can be viewed in two ways: some is needed so children assert themselves enough to be involved and set personal goals, but this was coded as cooperative through the lens of following rules, letting others play when they wanted to etc. but when it is too much on the egocentric and comparison side this is where less than positive outcomes can come in. Additionally, this was a new experience and when something is highly valued or interesting children who tend to dominate will increase those behaviors. Other studies with older children found high competitiveness on multi-touch tables and attributed that to too few assets (objects that can be moved, interactivity, action, etc.). For this reason, many assets are available in WePlaySmart. Further, research shows (e.g., Clements) technology can bring out competitiveness with young children when the game is competitive and when children who have this trait are involved. However, when these kinds of activities are not presented to children and a teacher manages and teaches children how to be more cooperative and less competitive, this drops off and more equality of play emerges.



For more information on our social-emotional whitepaper with full discussion and references, see: hatchearlylearning.com/technology/weplaysmart