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### **Abstract**

Increased use of technology in early childhood classrooms comes with new concerns about how technology may impact the development of social skills in young children. This mixed methods study examines how the use of a multi-touch table influences social skills and interactions of preschoolers in a head start setting. Eight children age's three to five were video recorded while using a multi-touch table during free choice time in groups of three for ten minute increments. Tracking sheets were used to track how often social interactions occurred for each child. Results indicated students played cooperatively 12% of their time and parallel to each other 3% of the time. The qualitative data indicated verbal interactions among peers included asking for help, encouragement, and sharing their likes and dislikes. Findings from the study highlight the importance and value of social interaction during group technology usage in the classroom and its implications for social development.

Key Words: Technology, Preschool, Social Skills

### **Technology in the Classroom**

Technology tools are pieces of interactive media such as TVs, tablets, computers, and multi-touch tables. Interactive media allows children to use their imagination to create stories or play on the technology. It may also provide social opportunities through children asking peers for help, assisting peers, asking peers to engage, discussing what they are playing, and discussing what they like or do not like about a game or story as children use digital technology (NAEYC, 2012).

The use of technological tools is becoming more prevalent in modern society, even among young children. Research cited in 2014 by Child Trends reports 38% of children under the age of two have used tablets or smart phones; this has increased since 10% since 2011

(Garcia, 2014). Data from a study by Common Sense Media completed in 2013 found 43% of preschool children in America use a tablet or smart phone to play educational games on and 35% of preschool children in America play educational games on a computer.

Children are using technology tools at home with their parents/guardians to watch TV, read, and play games. Schools are now purchasing technology equipment, such as tablets, computers, or multi-touch tables, for teachers to use in their classroom. Teachers are expected to use the new technology to help the children learn and incorporate the tools in their teaching practices.

Once technology is brought into a classroom does the interaction between children change? Computers are usually for one person and multi-touch tables allow multiple children to play at once. Social skills are promoted when children are interacting with each other. Since an important part of the preschool curriculum is the development of social skills, how might the use of these tools, which often have children working along, influence social development?

Parents and teachers are both concerned that socialization is decreased when children utilize technology (Arnott, 2013). They worry that children are isolated while playing on a computer or a multi-touch table. A child may be so focused on the game they are using that they are not socializing with their peers, asking for help, or seeking suggestions for different solutions to a problems which may occur during games. Some teachers also believe children's language skills start to decrease when they are engaging with different technology tools throughout the school day (Chen & Geist, 2012). However, Bandura's (2009) social cognitive theory discusses how children learn through observations and social interactions. Incorporating technology tools, such as a multi-touch table into the classroom may have both positive and negative influences on children's social interactions, observations, and skills in modeling teachers and peers.

If teachers facilitate positive interactions through modeling and engaging with the children while on the multi-touch table, children will learn how to interact with each other during their play. Since children learn best through observation (Bandura 2009), providing rich teaching moments through modeling will help children learn to play socially, ask questions, and provide support to their peers. Social cognitive theory discusses how important it is for children to observe teachers and peers throughout the school day for young children's learning (Bandura, 2009).

Technology can be a useful learning tool for children if teachers are using it intentionally throughout the school day. Teacher's beliefs regarding technology in the classroom play an important role guiding how children use the technology (Mei-Ju, 2012). Children can learn from the devices if a teacher explains how to use the tool, why the game is important, and what the child will be learning by playing it. The games being provided for the children need to be developmentally appropriate and there needs to be a time limit set for using the technology each day (NAEYC, 2012). Teachers who do not believe in having technology in their class will not support children in their learning through technology and use intentional teaching with the new technology.

Few studies have examined how the use of technology tools in the preschool classroom influence social skills development as children play and interact with each other. Hence, the research question posed in this study is how does the use of a technological tool in the classroom, a Hatch Multi-Touch Table influence children's social play behaviors?

### **Literature Review**

This literature review will help inform a study of children's social play behaviors while using a multi-touch table. Topics to be covered include an examination of teacher's view on

technology, and how technology devices influence social interactions among the children while engaged in play. The goal of this review is to examine studies on social interaction with technology in the classroom and how teachers feel about technology being integrated into their classrooms. The review will examine if children are playing alone or engaging with each other while using technology in their classroom. It will also examine how children are engaging with other through verbal or non-verbal interactions, supporting each other, and problem solving as a group.

### **Teachers Views**

Chou (2013) studied factors important to successfully integrating interactive technology into early childhood classrooms. She sent surveys to preschool administration, parents, and the preschool teachers to learn how the teachers in her study encourage the use of technology in their classroom. Her research took place in 10 different preschool settings. Findings from the surveys found teachers allowed the children to use the computers during free choice time and were there to provide support when the children need it. The results discussed how children, parents, and teachers felt the interactive technology should be used as a reward for good behaviors or completing tasks. Technology should not be used by parents or teachers to drill certain skills or academic knowledge, according to results from Chou's survey. Teachers reported children of different ages working together while using technology showed older children were willing to help younger children when they struggled but did not like younger children helping them when they were struggling.

Chou states how important it is for teachers to encourage the use of technology if it is in a classroom because it shows children their teachers are comfortable using it. Chou believes if teachers are not encouraging and supportive of the technology provided in the classroom, the

children will not use it as often and will not have meaningful learning experiences because they will sense their teacher's dislike towards the technology. Bandura (2009) discusses how children who are exposed to negative learning experiences in the classroom do not excel and want to participate with the technology as often as children who experience positive learning experiences with technology. Not providing support when children need help, not interacting with children during play with technology, and making negative comments about the technology are examples of negative experiences teachers may expose children in their class to.

Chen and Geist (2012) examined how some teachers believe children become isolated during games on the computer or tablet. They think the child becomes so focused on what they are playing that they forget what is going on around them and are not interacting with their peers or teachers. Some teachers also believe children's language skills decrease because of the use of technology in the classroom. These teachers believe children are not talking with their peers as often and are not asking questions while they are engaged on the technology tool.

McManis and Gunnewig (2012) discuss how teachers feel when they receive new technology for their classrooms but are not being given the tools or training to understand and use the new pieces of technology in the correct way. Some teachers are able to play around with technology tools and figure out how to incorporate it into their classroom and/or curriculum. Other teachers need guidance and training so they can understand their new technology tools and may not receive training. The teachers who are not receiving the training or support they need may feel disconnected from their technology and not use it or promote it effectively.

Jones (2010) examined the negative beliefs of parents and teachers regarding how technology influences socialization. At the beginning of the study teachers were asked how they felt about technology use in the classroom and many feel technology causes isolation and solitary

play. Children can sense if a teacher is uncomfortable with something or does not like something. Jones had teachers work with children during her study with computers and cameras. Observations reported teachers who were comfortable using the technology were social with their children and teachers who were not comfortable socialized less often during their time with the technology. Jones' conclusion found technology does promote socialization among the children and technology is important for learning.

McEwen and Dubé (2015) conducted a study to help teachers understand if technology is engaging their students or distracting their students. The researchers tracked each child's gaze while they were using the technology. The children would look into each of the four corners of the screen before they would start so the tracker could measure their gaze to each corner before the games started. The researchers found the children struggling with the games on the tablets engaged more with their peers than children who find games simple to play. Social interactions among the children occurred throughout the study with the researchers and peers.

### **Social Interactions**

Chou's (2013) study found that children interacted cooperatively when a younger child asked an older child for help during a game or if the older child stopped by to see what the other child was doing on the computer. She found the older children became more upset and did not want to be interrupted when the younger children would go over to the computer to see what the child was doing. Also, the older children very rarely asked the younger children for help if they were stuck on a game.

Chen and Geist (2012), studied the different kinds of social interactions that occurred among the children while using computers, the patterns of collaborative interactions, and how activity on the computer influenced social-emotional development. The researchers found



preschool children's social interactions were the same at the computer then at other centers in the classroom throughout free play. The researchers observed problem-solving, turn taking, and conversations which occurred at the computer were just like those occurring in the block area and the dramatic play area. The results did not state children ignoring peers or teachers because of their focus on the computer. Teachers stated the computers provided another opportunity for children to interact with their peers while promoting problem-solving and multi-tasking skills.

Teachers providing intentional teaching through technology will encourage children to participate in activities involving the technology tools in their classroom. McManis and Gunnewig (2012) suggest if teachers model how to interact with peers, they will promote social interactions among their students. The researchers found in the classrooms where teachers were modeling how to use the technology tools there was greater social interaction among peers compared to the classrooms where teachers did not model how to use the technology.

Arnott (2013) studied how children interact in clusters while using technology in their classroom. She found children picked their own role when interacting in a cluster with their peers; some children chose to be the leaders of their group, others chose to interact with the technology but not participate with the group involved, and some children played along with everyone and not wanting to be a leader.

Arnott's study investigated whether using technology in the classroom has a negative effect on social interactions. Her study found most of the children had positive social interactions throughout their play on the technology tools. Interactions observed included children talking about the game, praising each other, showing each other what to do, asking questions, and telling each other what to do next. Arnott's results showed there were three children out of twenty-four did not participate socially. Two of twenty-four children played the

game by themselves and did not focus or interact with the other children playing the game. One child out of twenty-four went to the tablet with the group but stood and watched the children in his/her group instead of playing the game. Through her observations most of the children in the study interacted with their peers and were social through out their play.

Wohlwend conducted a study in 2015 using an app that allowed multiple children to touch and create a story at the same time. The children were to work together to create a story by picking the backgrounds, characters, colors, clothing, sounds, and words. Her study examined if preschool children could work together creating a story or if one child would take over. She had three children working on a story at once and observed three groups. She studied how children took turns, who was swiping and tapping the screen, if once child took over, and how the children problem solved together. They found children played collaboratively throughout their whole story creation. The children would problem solve when issues came up and everyone was able to have a turn. Some of the children encouraged the quieter children by asking them questions so they would be able to have a part in the story making.

Tying these studies together, Bandura (2009) discussed how cognitive learning theory suggests children learn through social interactions with their peers and through observing their peers and teachers. Children can help each other learn while interacting with technology. They can teach each other how to problem solve when there may be an issue, ask a friend to play with them, praise a peer for doing great, and ask for help when they need it (Garcia, 2014). Social interactions may be one of the most important ways for a child to learn while using technology.

## **Conclusion**

Current research shows the potential for technology in early childhood education classrooms to help children learn (Chou, 2013) and provide social interaction among peers

(Wohlwend, 2015). Theory and research suggests children may have more positive experiences with technology if their teacher has a positive perspective on technology (Bandura, 2001) and uses it intentionally (Chou, 2013). With technology changing so often and becoming more prevalent in the early childhood classrooms, more research needs to be conducted on social interactions among peers in preschool classrooms. Data shows preschool children socially interact with each other often throughout their play with technology tools cooperatively, by assisting peers, and showing empathy towards peers Chen and Geist (2012). The goal of this qualitative research study is to further explore social interactions while using a multi-touch table in a preschool classroom. Social interactions in this study will focus on how often the children disagree with each other, how often they play cooperatively, and how often the children ask for help or offer help to their peer.

Eight children will be observed using qualitative methods during their play at the multi-touch table.

## **Methods**

### **Setting**

A Head Start classroom located in northern New England is the setting for this study. The classroom operates 5 days a week for 6 hours a day. The classroom has a lead teacher, an assistant teacher, a part-time aide and seventeen preschool children. The children have access to a multi-touch table and a computer everyday during their center time. During center time, which typically last from 1.5-2 hours, children can choose the area of the classroom they'd like to play in. The multi-touch table was introduced to the children in September. Before September, there was no technology in this classroom. The researcher is the lead teacher in the classroom.

### **Population and Participants**

Children in the class range in age from 3 to 5 years old. The children enrolled in the classroom must meet certain criteria; their families must be low-income, homeless, qualify for child development services, or be foster children to qualify for a spot in this head start classroom. Only eight of the seventeen children participated in this study as many of the children in the classroom were foster children and could not be recorded or have their pictures taken. The eight children who participated in the study (2 girls and 6 boys) were Caucasian and spoke English. Four of the children had delayed language development, two had diagnosed behavioral issues, and two received occupational therapy for fine motor skills.

### **Informed Consent**

Prior to participation in the study, the study was reviewed and approved by the university's Institutional Review Board (IRB). Guardians of minor participants and the classroom teachers in this study also signed informed consent forms (See Appendix A). Guardians had the opportunity to refuse participation in this study or to withdraw from participation at any time. If requested, the researcher also agreed to provide participants and their guardians with a copy of the study's findings.

### **Procedures**

Children participating in the study had the opportunity to choose the multi-touch table during center time. If the children did not want to go to the multi-touch table they did not have to. They could play for ten minutes a day at the table. The multi-touch table could have up to four children at a time interacting with it. Most of the time during the observations the children were in groups of three but sometimes only two children wanted to play at the table together. Teachers let children use the multi-touch table alone but stepped-in and helped when the children

could not hear the directions, needed help, or had questions. Hatch, Teaching Strategies, and teachers designed the software on the table; children and/or teachers did not get to pick what games are played. The educational activities on the table are comparable to math and letter activities already incorporated into the classroom curriculum.

Observations were completed using an iPad to record videos and take pictures of the children during their allotted time at the multi-touch table. The researcher (lead teacher) recorded videos and took pictures throughout the study. Recordings were taken when the children were in their groups interacting with the multi-touch table. The groups observed were chosen randomly from the children participating in the study. The researcher transcribed the recordings.

### **Instruments**

The researcher used a social skills tracking sheet (see Appendix B) which was provided by the school while watching the videos. The tracking measured how often children interacted with peers during their ten minutes on the multi-touch table. There were 16 categories related to social skills on the tracking sheet. A mark went under each category every time a child completed it throughout the video to measure the frequency. Some of the categories used included asking for help, parallel playing, responds to interactions from peers, take turns, and disagrees with peers. The researcher watched the video recordings four times. Children were observed individually and rated using the tracking sheet. The videos were then rewatched to track interactions. Once the tracking sheets were recorded the videos were watched again so interactions could be recorded. The researcher wrote interactions that were examples of each category on the tracking sheet.

**Reliability and Validity**

Data trustworthiness is ensured when the data is checked for accuracy and dependability is when the data in the study can be checked by someone and the results are similar. If a second person reviewed the recordings and found the same data as the researcher the study would be verified or if a different researcher repeated this study and receive the same outcome the data would be valid. Credibility in a study is addressed through leaving out assumptions and biasness (Creswell, 2015). The researcher recorded observations to go through and code what the children said to each other.

The social skills tracking sheet was also used to measure how often children interacted with each other. The recordings and the tracking sheet helped the researcher to capture data objectively and without bias when analyzing the data. The observations were transcribed with exact words and interactions which allowed them to be reviewed for accuracy and the tracking sheet explicitly highlighted what the researcher needed to record. The assistant teacher of the classroom also watched the videos and coded them word-for-word to establish reliability among the data. The results from the assistant teacher and the researcher agreed 100% of the time. This study could be completed by any researcher in a different preschool classroom who has access to a Hatch multi-touch table. To recreate this study in a different setting the researcher will need a video recording device, the hatch multi-touch table, the tracking sheet, and access to a preschool classroom. The researcher did not receive training for the tracking sheet. It was given as a tool with the new technology equipment at the beginning of the school year and told to use this to track social interactions. Hence, there is no information on reliability or validity for the tracking sheet.

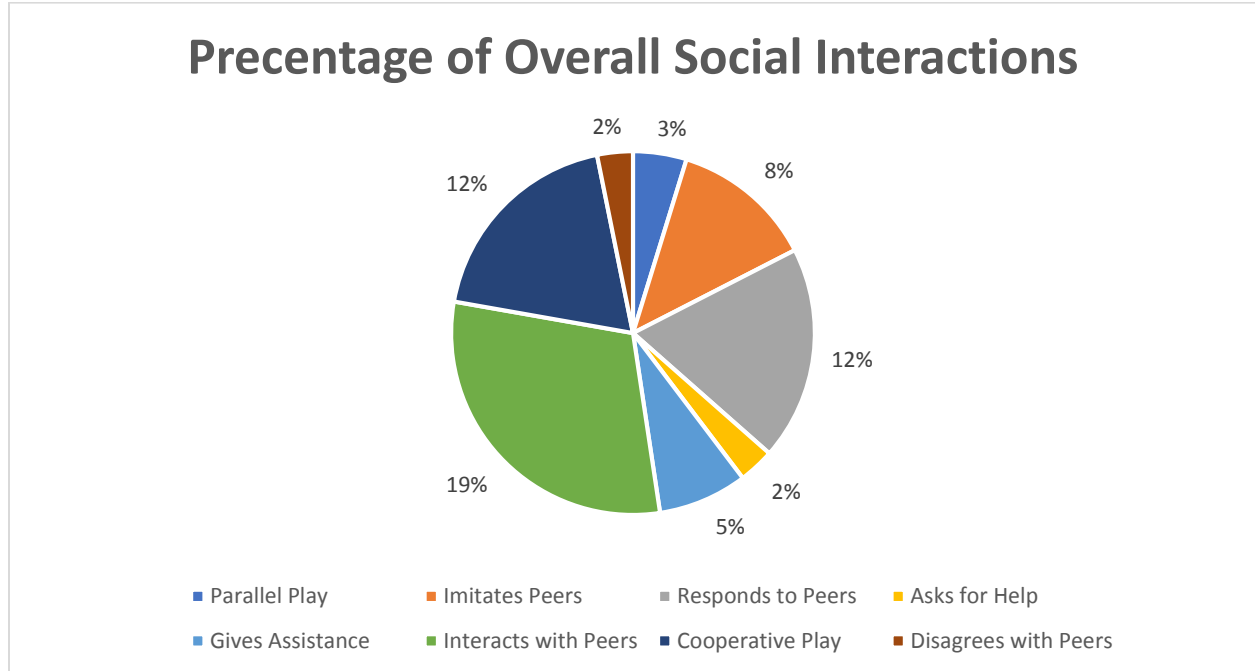
## **Results**

Results were analyzed in two different ways; transcribing word for word what the children said in the videos and using a tracking sheet to summarize social behaviors the child exhibited at the table. Transcribing the children's conversations while engaging at the multi-touch table provided the researcher with information on how the children were interacting with each other and what the children were saying to each other. The tracking sheet provided a way to examine children's individual behavior during each session at the multi-touch table and overall totals for the children as a group by totaling the frequency of behaviors. Data regarding overall social interactions at the table will be presented first, using quantitative data to show trends and then qualitative data to illustrate the quality and nature of social interactions at the table.

### **Profile of Overall Social Interactions**

The researcher counted each check mark and recorded the total next to each category observed. To calculate the percentage for each section of Figure 1, the researcher added the total from each individual tracking sheet and then divided the total by eight. The percentage formula was used to find the percentage for all eight groups shown in the graph. The percentage for overall social interactions was important to see if the trend among the students and to see which areas were strong among the class and which areas were not as strong. Figure 2 displays the total time each child performed an action in the five groups. The total time was calculated from the individual tracking sheets by adding the total from each category on the graph together and then total was then used to create Figure 2. Finding the amount of time each child performed an action was important because it would show the pattern among each child on how often they interacted with peers or played alone and compared the difference between each child.

Figure 1



The engagement at the hatch table was not teacher led. The only time a teacher stepped in was if the children asked for help with the instructions of the game they were playing. Data shown in Figure 1 reveals that 67% of time the children interacted with their peers on their own. They would ask each other questions, help each other when they say their peer was having trouble, high five and praise each other when they completed a game or did something correctly, and said hi to each other when they came to the table. Only 12% of the time the children took charge and would tell the other children at the table how to play the game or what their plan for the game was. Twenty-one percent of the time children preferred to parallel play at the table instead of interacting with their peers.

Figure 1 shows the percentage of social interactions among all eight children. Interactions with peers occurred the most often during the observations. The following is an example of interactions between children:



Child B: "Look, the people are moving."

Child F: "Closer to the house."

Child B: "Look, they moved again."

Child F: " They are almost home."

Child D: "Move when we match piece."

Figure 1 shows 12% of the time children responded to their peers while engaged in play at the multi-touch table. The following is an example of children responding to peers:

Child A: "Hi, want to play the forest one?"

Child C: "No, I want the school one."

Child F: "Yes, I do!"

Child A: "I'm putting my name on the forest, you too."

Child F: "Ok"

Child C: "Me put mine on the school."

Imitation of peers occurs when children copy each other either, physically and/or verbally, while engaging at the multi-touch table. Children imitated each other 8% of the time during their turn at the multi-touch table. Some examples of physically imitating peers that were observed were copying a peer's dance moves, copying when a child raises their hands in the air after completing a game, and jumping up down like their peers after completing a game.

Figure 1 shows peers gave assistance to each other 5% of the time while it was their turn at the multi-touch table. One example of giving assistance to a peer is:

Child E: "Look starfish, shell, crab." (pointing to each picture)

Child G: "We need to follow the pattern."

Child E: "I have a crab." (trying to put the crab after the starfish)

Child G: “You need a shell, it goes starfish, shell, crab. Not starfish, crab.”

Child E: “Oh.” (moves the shell next to the starfish)

During each child’s time at the table they only asked their peers for help 2% of the time.

The results found older children playing at the multi-touch table would provide help to the younger children if they were struggling with a game but did not ask for help. Disagreeing with peers while engaging at the multi-touch table only occurred 2% of the time. The children would disagree on which game each one was going to vote for and some would disagree if they did not want help but another peer was trying to help them.

Parallel play occurred 3% of the time and cooperative play occurred 19% of the time.

Parallel play is when the children were interacting with the game but not interacting with their peers. The child would be playing next to the others at the multi-touch table but not engaging with them throughout their time. Cooperative play is when children are engaging with each other during the game they are playing. The group of peers will help each other and take turns during their time at the multi-touch table.

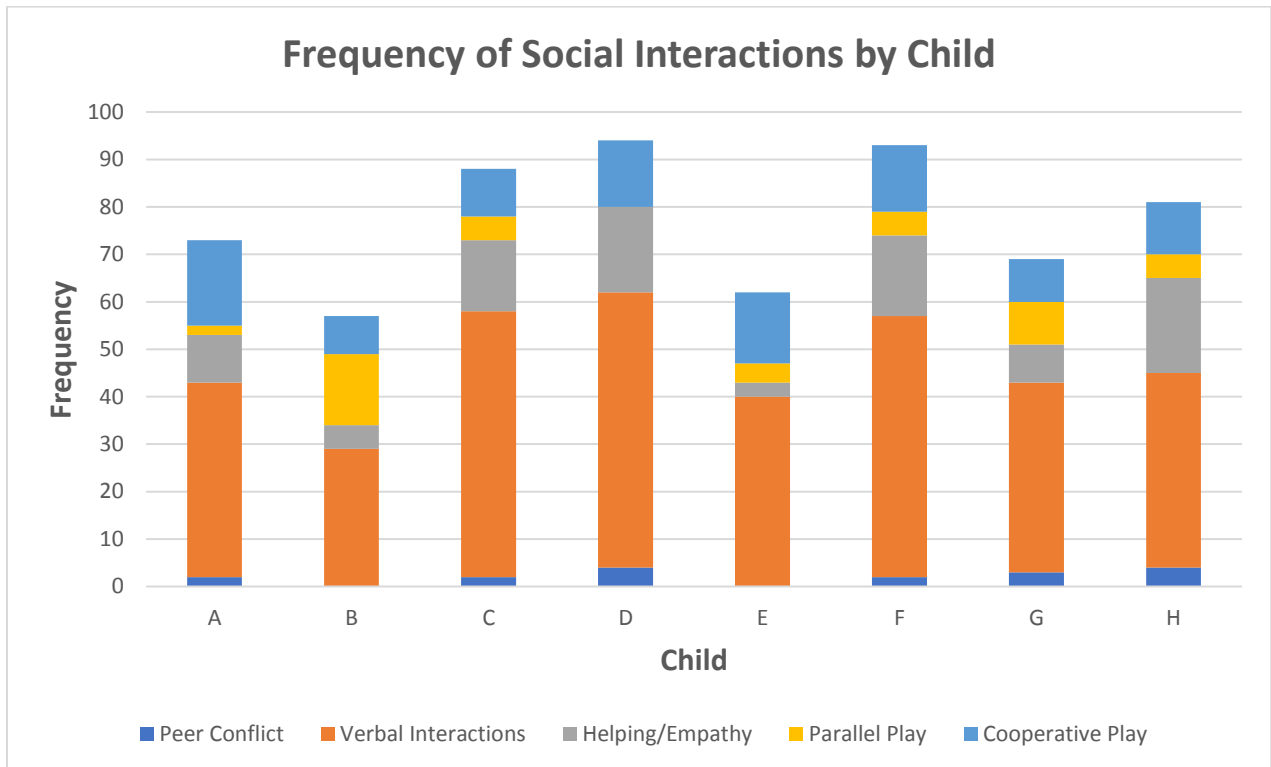
### **Frequency of Individual Social Interactions**

Figure 2 contains information on each individual child and the frequency of their social interactions while exploring the multi-touch table. The social interactions among the children are separated into five groups: (1) Peer Conflict, (2) Verbal Interactions, (3) Helping/Empathy, (4) Parallel Play, and (5) Cooperative Play. The five groups were composites of items observed on the tracking sheet and sections that were similar were combined into the same group. The Peer Conflict category contained data from disagreeing with peers. The Verbal Interactions categories contained data regarding how often children imitated peers, responded to interactions, returned and initiated greetings, made comments about what he/she is playing to peers, organized

play by suggesting a play plan, asked peers for help, identified likes and dislikes, and interacted with peers. Demonstrating empathy towards peers and giving assistance to peers data was grouped under the Helping/Empathy group. Data from parallel playing near peers in in the section Parallel Play and playing cooperatively with peers is under the section Cooperative Play.

The five categories shown in Figure 2 are total numbers of times each instance occurred per child. Each section on the tracking sheet was added together and then the total for the group was put in Figure 2. As can be seen in the Figure 2 verbal interactions occurred the most during the exploration between the children while they were playing together. Verbal interactions included saying hi to peers when joining in play, asking a peer for help, responds to peers, asks for help, imitates peers, and makes comments about what they are doing while playing. Peer conflict occurred least per Figure 2. Child A would talk and play with everyone at the table during his/her turn and rarely played alone or had a disagreement. Child B parallel played at the multi-touch table more than he/she cooperatively played with his/her peers. Child D had did not parallel play during his/her turn but did interact with the peers at the table. Child G alternated between parallel play and cooperative play during his/her turns at the multi-touch table. Six of the eight children played cooperatively with their peers while engaging at the multi-touch table.

Figure 2



**Discussion**

This study examined social skills and interactions while children engaged with each other during play with interactive technology in a Head Start setting. There are debates on the best way to teach and use interactive technology in the classroom throughout the study. Presented in the literature review was a debate about whether technology can be isolating for children or if it encourages interactions. Results from the study show more than half of the interactions among the preschoolers were social interactions and only a few instances of peer conflict occurred during play. Social interactions among each individual child and overall frequency throughout the study resulted in playing cooperatively more than 50% of the time and parallel playing less than 10% of the time.

### **Overall Social Interaction**

Children often problem solved together (48% of interchanges) to complete the games and were able to create solutions by working together. According to Bandura (2009), he suggested children learn how to problem by observing each other and working together. In Wohlwend's (2015) study, she discussed how the children worked together to create their own story on the iPad. Her children would problem solve together to pick the characters, the clothing, the setting, and the plot of the stories they were creating. Hence, interactive technology can be used as a tool to help children work together towards joint goals.

During play at the multi-touch table the children would imitate their peers 8% of the time. Imitating their peers included copying what the child was saying and doing. One child would jump up and down because they had completed their part of the game and another child would copy them, possibly because they were happy for that child or got caught up in the excitement. The children interacted with each other 12% of the time they were engaging in play.

Social interactions among the eight children were separated into five separate groups when being measured. The five groups were peer conflict, verbal interactions, helping/empathy, parallel play, and cooperative play. The data from the four groups show the children were engaging with each other more than 50% of the time at the multi-touch table which may help develop their social skills.

### **Cooperative versus Parallel Play**

This study found children played cooperatively and interacted with each other at the multi-touch table 58% of the time. They would ask each other for help when they were struggling. If children saw their peers struggling and not asking for help they would offer to help. For example, one child saw another child trying to complete the star fish, shell, and seahorse

pattern but kept moving the shell to put in the pattern but it would say it was wrong. The child observing told the child struggling that the shell does not go next and that he needed the seahorse. The child struggling touched the seahorse and moved it into the spot and they both were happy the pattern was completed. Children who offered help to their peers were older than the children who they were helping which supports Chou's (2013) results, which found if younger were peered with older children they would accept the help and work together.

The overall results suggested parallel play at the multi-touch table was infrequent (3% of occurrences), with children instead of engaging with their peers. These children would play the games along with the others, watch the other children interact with each other, or play the game but keep their head down and not observe what was going on with the others at the table.

Parallel playing occurred more when children were not verbally interacting with their peers as often. Parallel playing occurred an average of five times among the eight children during the study. Cooperative play occurred an average of 12 times per child during the study. The children were working together to complete the games and encourage each other while developing their social skills.

### **Verbal Interactions and Peer Conflict**

Conflict or disagreement with peers during play was infrequent, occurring only 2% of the time. The children disagreed about their opinions on a game, objected to interference with their play, and disagreed how to play a game while engaging at the multi-touch table. Conflict and disagreement possibly occurred less with the technology because there are less materials to use, the children do not get to pick the game that will be played, and the amount of children playing at the multi-touch table is small (2 to 4 children at a time). For example, the block area has many

different materials (wood cookies, different size wood blocks, cars, people, animals, and tubes) to explore with and can be used in many different ways to play with.

Peer conflict occurred the least often during the play at the multi-touch table. Two children did not engage in peer conflicts during their time at the table. Child D and Child G each had four peer conflicts occur while engaging at the table. Disagreeing with peers and arguing with peers are two examples of peer conflict that occurred among the children.

Verbal interactions occurred most often during the study at an average of 45 times per child. Children who participated in verbal interactions more often had lower instances of playing parallel with his/her peers. The data on verbal interactions indicate children are engaging with each other and developing their social skills while engaging with peers. The games on the multi-touch table promoted interacting together. One of the games required the children to hold four cards with the letter F on it down at the same time. If the children were not holding the cards down at the same time it would not register the children found the cards and finish the game.

Showing empathy towards peers who are doing an excellent job during the game and providing help for children who were struggling occurred an average of 12 times per child. The older children were often willing to help the younger children while engaging with each other when they were struggling. When a younger child would complete their turn the older children at the table would give them a high-five or tell them how great they were doing.

### **Recommendations**

Some problems children have while using technology is being left alone to explore, not having the opportunity to socialize with others, not being showed how to use the technology tool the correct way, and teachers take over the play and do not allow children to lead the play. To help children develop their social skills while using technology let the children start and lead the

conversations, ask the questions, and lead the play while engaging with each other. If the children are struggling with the game, missed the directions, or need support from a teacher, then the teacher should provide the child with positive support (Arnott 2013). If the teacher provides positive support to help the child it will encourage the child to continue engaging at the multi-touch table. Positive support is when a teacher helps a child who asks or needs help, talks through problems with the child and help them problem solve on their own, and show the child how to use the technology tool the correct way.

Children can problem solve together while engaging at the multi-touch table. When stuck on a part of a game the children can try to problem solve what to do next before a teacher steps in to help. Bandura (2009) supports children learning how to problem solve from each other. If a teacher sees children still struggling after trying to problem solve on their own, the teacher should go over and see if he/she can help. Teachers can provide help by giving suggestions so the children can still problem solve on their own or problem solve with the children so they will not be struggling any longer and can continue on with the game.

Pairing younger children with older children when it is possible will encourage children to interact, learn from each other, and promote the development of social skills. Older children will help younger children when they are struggling or ask for help. Chou (2013) stated children in her study worked cooperatively during play with technology when a younger child was paired with an older child.

### **Limitations**

One limitation for this study is most of the children being in foster care and being able to get permission from the parents or guardians for children to participate in the study. Not being able to have the children in foster care in the study made for a smaller sample size in the study.



The children not participating in the study were three girls and five boys ages three to five. All the children in this study have been exposed to technology at home but none had been exposed to it at school or used a multi-touch table before.

The small group of children in the study affected the length and frequency of observations is another limitation for the research. Children could have moved out of the school which would have brought the numbers in the study even smaller or a parent could pull their child from the study at any point. Children being out sick or not wanting to participate at the multi-touch table on a day of recording was a limitation at times.

The location of the multi-touch table is a limitation. It is located next the sign-in sheet by the classroom door and the quiet area. Children were easily distracted by people coming in and out of the classroom or playing in the book area. Children who were not at the multi-hatch table would walk by to leave the room and ask what the peers at the table what they were playing.

### **Strengths**

A strength of the study was recording the play at the multi-touch table. The researcher could review the recorded materials as many times as needed and could transcribe the interactions between children word-for-word. The recordings also allowed the research to be reviewed by the assistant teacher in the classroom so results could be verified.

### **Future Direction**

The data from the study indicates technology in the preschool classroom promotes the development of social skills. Further research needs to be conducted to see if other technology tools, such as tablets, computers, and smartboards provide the same results as the multi-touch table. Research on technology in the classroom is limited because technology is always changing and research cannot keep up. There is little data on this topic and it is not current. If

more research studies are conducted will the same results be found or will it depend on the type of technology the study is including? If a researcher studies computers and social interactions in a classroom will the results show children not interacting as often compared to the multi-touch table. Computers are often looked at as a technology tool for individual children to learn at. Tablets and smartboards can be used individually or with groups. A study using either a tablet or a smartboard in a classroom to observe the interactions among children may have different results compared to the multi-touch table.

## Appendix A

## ADULT INFORMED CONSENT FORM

You are invited to participate in a research project being conducted by Kristina Tobey, a graduate student at the University of Maine at Farmington. The purpose of the research is to research how the Hatch multi-touch tables impact children during their play. I am studying if the children are interacting more with each other.

**What Will You Be Asked to Do?**

If you decide to participate, your interactions will be recorded with a camera so I can go back and review the interactions that occurred throughout the day. You will continue your daily routine of explaining the directions to the children when they need clarification and participate in the activity at the table to model appropriate verbal interactions with the children.

If you do not want to be recorded or pictures to be taken then you will not be able to participate at the Hatch multi-touch table while recording is taking place.

**Risks**

- There is the possibility that you may be uncomfortable being recorded or having your picture taken but every effort will be made to make sure you are comfortable.
- The time and inconvenience of the meeting may be risks of participating in the study.

**Benefits**

There are no direct benefits to you from participating in the study. However, as a participant you may enjoy interacting with the students and the data from the finalized study. Aside from this benefit to the participant, this research will help early childhood educators learn more about how technology in the classroom is affecting the students learning.

**Confidentiality**

Names will not be used throughout the study. Children and teachers will be referred to as child A, or child B or teacher A.

The documents and files from this study will all be kept in a locked filing cabinet in my office. Some data may be shared with my advisor, Donna Karno. All data from the study, including the participant key, will be kept for seven years and then destroyed.

**Please Check One:**

I do not give permission

I give permission for myself \_\_\_\_\_ to participate in the study on the use of the tablet technology in early education including the use of photos and videos

**Please Initial:**

I understand that results of this study may be shared with colleagues in professional

publications and conferences  
\_\_\_\_I understand that I can withdraw at any time from the study.

**Voluntary**

Participation is voluntary. If you choose to take part in this study, you may stop at any time.

I, \_\_\_\_\_, fully understand the purpose of this research and the procedures to be followed. I understand that my records will be kept confidential, my participation is voluntary, and that I may withdraw at any time without penalty. Results of this research will be shared in the form of one or more publications and verbal presentations. If you have any questions about this study, please contact me, Kristina Tobey at kristina.tobey@yccac.org or 207-710-2440. You may also reach the faculty advisor, Donna Karno on this study at donna.karno@maine.edu or 207-778-7561. You may also contact the Chair of the IRB Karol Maybury at karol.maybury@maine.edu or 207-778-7087.

By signing below, I assert that I fully understand the above and give my consent to serve as a subject in this research. (If you would like a summary of the results, please make the request of the researcher at the contact given above).

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(Date)

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(Signature)

## PARENTAL INFORMED CONSENT FORM

Dear Parents or Guardians,

Your child is invited to participate in a research project being conducted by Kristina Tobey. I am your child's lead teacher and I am also a graduate student at the University of Maine at Farmington. I am researching how the Hatch multi-touch table impacts children during their play. I am researching if the children are interacting more with each other during their time at the multi-touch table.

**What Will Your Child Be Asked to Do?**

If you consent for your child to participate, your child will be observed during their play time at the Hatch multi-touch table. Your child's play will be recorded with a camera so I can go back and review the interactions that occurred throughout the day. Pictures will be taken of your child interacting with the multi-touch table.

If you do not want your child recorded or pictures to be taken then your child will not be able to participate at the Hatch multi-touch table while recording is taking place.

**Risks**

There is the slight possibility that your child may become uncomfortable with me taking their picture or videoing them, but every effort will be made to make sure they are ok with this. Children will be offered to use the multi-touch table during free choice time and can opt to participate in the game or go to a different activity. Children may choose to leave this activity at any time during their play. The research will follow the standard educational practice.

**Benefits:** Your child may learn more about asking their peers for help when they are stuck on a task and how to use technology that is new to them. Additionally this study may help future students at school and in other classrooms, as I hope to learn more about how technology impacts preschool children in the classroom.

**Confidentiality:** Your child's name will not be on any of the notes or documents. In the research paper I will be using child A, or child B when referring to children. Your child's name or other identifying information will not be reported in any publications. Data will be kept in a locked filing cabinet. The videos will be transferred to a password-protected folder on Kristina Tobey's computer. At the end of the study (May 2017) the iPad will be reset to factory settings. The videos and the data will be destroyed by shredding the documents and deleting the electronics files after 7 years.

**Voluntary:** Participation is voluntary. If you choose to have your child take part in this study, s/he may stop at any time. Whether or not your child participates will not impact your child's relationship with the school, classroom teacher or any other teachers.

**Contact Information:** If you have any questions about this study, please contact me, Kristina Tobey at [kristina.tobey@yccac.org](mailto:kristina.tobey@yccac.org) or 207-710-2440. You may also reach the faculty advisor, Donna Karno on this study at [donna.karno@maine.edu](mailto:donna.karno@maine.edu) or 207-778-7561. You may also contact the Chair of the IRB Karol Maybury at [karol.maybury@maine.edu](mailto:karol.maybury@maine.edu) or 207-778-7087.

**Please Check One:**

I do not give permission

I give permission for my child\_\_\_\_\_ to participate in the study on the use of the multi-touch table technology in early education including the use of photos and videos

**Please Initial:**

I understand that results of this study may be shared with colleagues in professional publications and conferences

I understand that I can withdraw my child at any time from the study.

Sincerely,

Kristina Tobey

Your signature below indicates that you have read and understand the above information. You will receive a copy of this form.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Appendix B

Social Skills – Preschool Checklist

Name of child: \_\_\_\_\_ Date: \_\_\_\_\_

Completed by: \_\_\_\_\_

**Instructions:** For each question, check how often that particular skill occurs in each 10 minute Video.

Does the Child?	Amount	Total
1.) Parallel play near peers		
2.) Imitates peer (physical or verbal)		
3.) Take turns		
4.) Respond to interactions from peers		
5.) Return and initiate greetings with peers		
6.) Disagrees with peers		
7.) Play cooperatively with peers		
8.) Make comments about what he/she is playing to peers		
9.) Organize play by suggesting play plan		
10.) Follow another peers play ideas		
11.) Asks peers for help		
12.) Identify likes and dislikes		
13.) Demonstrate empathy toward peers		
14.) Accepts not being first at a game or activity		
15.) Give assistance to peers		
16.) Interacts with peers		

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