# TOYS AND TEAMWORK: CHILDREN'S COLLABORATION LEVEL TOWARD OPEN ENDED AND DIRECTED TOYS

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**Abstract-** This paper reports a study that investigated the level of collaboration and engagement during playtime with two toys: puzzles and building blocks, for multicultural children. The reactions and engagements of children were mapped using participant observation with multiple methods including field observation, visual records, photography and note taking. The results provide information on how, with whom and how long the children are interacting, and how children can affect this process. Different children showed different levels of engagement on each type of toy, yet in both types children make the small group of two for themselves. Two distinct ways of supervising emerged when we looked at how teachers tried to keep children engaged. These approaches are: (a) actively engaging as a teacher and motivating, (b) monitoring children just to make sure they are safe (not engaging in the play). To gather this information we used observation and semi structured interviewing as our methods. To conclude, puzzles can cause more collaboration among children, however teacher's influence seems to be more effective on the collaboration level than toy types.

**Keywords**- Design Studies, Participant Observation, Teamwork, Toy Design.

## I. INTRODUCTION

This project compares the behavioural response of children to different toys while they are in groups. It is almost universally accepted within the world of early years that children learn through play. Through this study, we want to assess the level of children's engagement in two distinct type of toys. It is a study to find the answer whether children are more cooperative through open-ended games or directed ones.

The study starts by observing toys as our artifacts, which are our focal point. These toys are selected from two different types, one open-ended and one directed type. Wooden blocks and puzzles are the chosen samples. The element being studied in relation to toys is the level of children's collaboration with each other. Whether the type of toy is affecting children's teamwork or it is the same, regardless of the type of toy. Being a designer and a mother gives me the opportunity to focus my attention to motherhood concerns, my honored values as a parent, and our concerns. Most of the studies done before, have studied either the children's behaviour in a team working context or activities and games effect on kid's collaboration, for example in "Early Experience of Cooperative Learning in Preschool Classroom" authors study the definition of teamwork in classrooms, or Charlotte Fisher in "Team Building Challenge Games" studies what can help individuals succeed in team situations. Therefore, focusing on toys and observing reactions around it will give us interesting information. As our context is a multicultural daycare it will be helpful to understand what are the responses to teamwork of children from different cultures in the same situation. The ultimate aim of this work is to find out the influence of toys on collaboration so it can be used as background information that will aid in the design of a toy for encouraging teamwork among multicultural kids.

## II. BACKGROUND

A. Sluss and Stremmel [1] in "a sociocultural investigation of the effects of peer interaction on the play" observe 100 four-year-old in naturalistic settings while playing with blocks. They studied children's collaboration and communication regarding their gender and found a significant interaction between treatment (play level) and gender [1]. B. Elsbach and Flynn [2] in "Creative Collaboration and the Self-concept: A Study of Toy Designers" explored how collaborative behaviors were related to the self-concepts of creative workers results suggest that promoting collaboration among creative workers may require attention to not only idea-giving behaviors and social identities, but also to idea-taking behaviors and personal identities. Sluss and Stremmel [1] have studied the children's behaviour in play and they put forward the hypothesis that peers adjust the level of complexity of play according to the level of complexity of their peers; however, an important criteria missing in this hypothesis is the context and whether the kind of play, type of toys or the place affects these behavior or not. Sluss and Stremmel did interviews afterward with the children about their play which is good in a way that the information is gathered from the perspective of participants. Each of these articles fit one part of the research; the one about the toy design helps to know more in depth about studying toys and the other is related to children's play and their collaboration with each other.

## III. APPROACH

As a designer in the scholarly field of design studies our approach is through user-centered design. The user-centered design approach, which began in the 1970's and became widespread by the 1990's, proved to be most useful in the design and development of consumer products [3]. User-centered design can be characterized as a multi-stage problem-solving process that not only requires designers to analyze and envision the way users are likely to consume a product, but also to validate their assumptions with regard to the user behavior in real world tests [4]. The reason we are embarking on this research is as part of the user-centered design process, prior to designing a toy. We want children to play with their friends, laugh together, and learn together. In order to receive this objective first, we have to gather information on how children react to different toys, how they behave while they are with their friend and while they are alone. The qualitative data helps to compare different behavioral responses in various contexts so that I have a clear idea of in which situations children are more encouraged toward teamwork. Later it will help us to design the appropriate type of toy for the stated purpose.

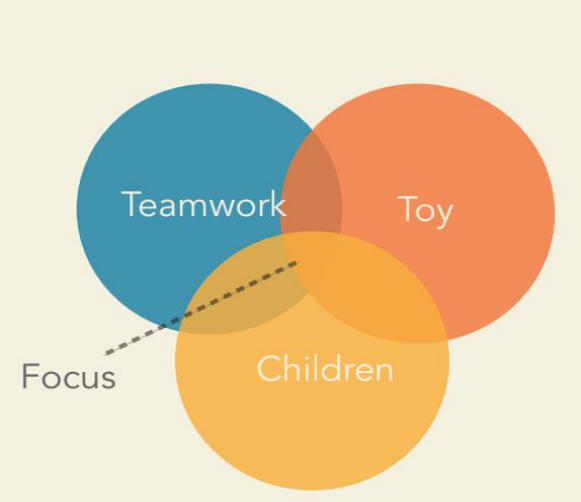



**Fig. 1: This diagram shows the intersection of the subjects related to the research and it points to the part which is the main focus of this research**

## IV. STATEMENT OF PROBLEM

Children living in Canada come from cultures all around the world, and this means that they may have a different definition of various values. They may have the same values and concepts but the way that they express them is varied. In addition to this, every child has a distinct characteristic which can cause short or fast paced engagements and different types of interaction. The challenge is that providing a condition in which most of the children have almost the same level opportunity to be engaged in the game and work with their friends to pursue a common goal.

This research is constructed to answer the question "How do toys mediate teamwork for multicultural children ages 4-6?" Also, there are some sub questions that this research will answer, such as, "Does the engagement level of children change during the play?", "What are other elements distracting children?", "Do children create any mini groups within the larger one?"

The main objective of this research is to distinguish effects of toy type on collaboration level, and find the different responses to collaboration level in multicultural kids.

## V. ASSUMPTIONS

It is clear that the level of engagement of children with different activities and toys is related to kid's personal character. However, other external elements can affect this criterion negatively or positively. According to Vygotsky's theories [5], learning environments affect how children observe others and try for themselves. For example, if children spend their time in a place where teamwork is appreciated and adults encourage children to do so, as well as showing collaboration in their own tasks, they will gradually learn that teamwork is considered as a value. In addition, we should keep in mind that children learn through the play, therefore trying to teach hem these values indirectly and through the toys would be more joyful and accepted by children.

Bias1: Not all of the children will be engaged with the toy being studied

Bias 2: Children will concentrate on the group's purpose rather than personal purpose

Bias 3: Children won't want adults to direct their play

Bias 4: Open-ended activities will encourage more teamwork than directed ones

These biases and assumptions are connected to this research since they are my assumptions related to the research, and they are related to different step of the observation required for gathering data.

## VI. RESEARCH DESIGN

Research is being done in the city of Edmonton, Canada in a daycare in center of the city. The focus of this work is on the toys that the children play with. Two specific toys are provided and children are observed with these toys. In this daycare there are children from different nationalities and they are from families with different income levels. Children participating in this research are from various backgrounds, however they all use English language for communicating among each other. The children are aged between 4 to 6 years old, and mentally and physically are considered as healthy kids. Within the daycare there are 10 adults who act as teachers or

caregivers. In the rooms which we are observing children, there are two teachers. Their roles are to supervise children and plan and implement the program for childcare. This research is designed based on the already existing methods such as one-to-one interview, character profiles, and observation, meaning this is a multiple method approach to doing research.

## VII. METHODS

There would be a combination of different methods through research process of this project. Observation, and character profiling through interview is two main methods in this research. The goal of these methods is to not only get a closer look at the material studied, but also to gain a more intimate understanding of the influence it plays on the teamwork level of participants.

### A. Observation

We observe kids playing with two types of toys, one open-ended and one directed one. Observation is chosen as one of the methods because we compare children's behaviour with two types of toys, so it can give us the opportunity to compare the behaviours. It is what Rathje [6] emphasis on, he says that "behavioural trace studies yield enormous amounts of data that can be standardized". An observation sheet is designed for toy observation specifically so that we gather the same types of information out of both kinds of toys. The outcome of these two methods will be information about studied toys and how children interact with those toys.

### B. Interview

There is a one-to-one interview with the teacher. This is done because the teacher likely knows the children well since they spend quite a bit of time with them. The interview will take place in person in the office of the teacher. This interview will be done after observation, so that the teacher's perspective is not influencing my observation and data gathering direction.

H.Russell Bernard [7] explains the types of interview regarding their structure and the data that researcher is looking to get out of it. Comparing the four types of interviews suggested by Bernard the most appropriate one for this research is semi structured interviewing , since we "won't get more than one chance to interview and it is based on the use of interview guide...interview guide is a written list of questions and topics that need to be covered in a particular order".

Profiles will be created for each toys depending on the information gathered from observation of toys and kids. These profiles outlines the main features of each toy and helps for comparing to types of studied toys.

## VIII. PARTICIPANTS

The selected children are from the "senior room" of day care in which children aged 4-6 stay. The majority of participants in both observations are the same children and boys, however in the second observation there are some girls added. Children are classmates and spend the day together. The interviewed teacher is working as a full time teacher in the day care.

## IX. LIMITATIONS

All research has limitations and this research is not immune to limitations. The limitations of this research is related to time, number of sample toys, repetition of observation and number of participated children.

We observe only one of each type of toys, one open-ended and one directed. The number of toys can be expanded and chosen more samples of each group. The other limitation of this research is time, and it is the main reason that we are studying only one samples of each group. Also, if we could observe children for a while prior to actual research we could have a detailed information about each child's behaviour and their general responses to teamwork. Gathering information about children personality save our time but the downside is that it is from the perspective of teacher, not the researcher. This is also because of our time limitation. Moreover this study is done only from on researcher's perspective. The number of researchers can be increased to have less biased outcomes. Finally, studying children only from one daycare is another limit. Studying children in different daycares could give us more data to compare and analyse.

## X. DATA TYPES

The data gathered results in a variety of different data types. That is, the observations result in field notes and photos and the interviews result in mp3 recordings. Notes are taken during the observation in daycare, these data contains children's reactions, responses, conversations and facial expression, also there are notes made out of observation of the toys, and it contains information about physical features of the toys and their instructions. There are photos taken while children are playing or distracted. The transcription is the outcome of semi structured interview with the teacher, who is in charge of taking care of children during the day.



**Fig 2: two participants playing with blocks and talking together.**

## XI. DATA ANALYSIS

The first step of data analysis is to manage the gathered information and categorize them in a proper way. Later, all gathered data is compared to find out similarities. (See fig 3) In this process, first we tried to assess one child's information in every kind of data. It means that the teacher's comments about child A were written and put beside the observation notes that had child A in its content, as well as any kind of other data that contained information about child A. The benefit of this method is that no information is overlooked, and any minor details can be studied. This process repeats for every single child. The second process is to compare the result to find out similar responses to a particular toy. Finding similarities helps to create a profile for toys which points out the most important features of studied toys in the research. The data from observation is used for making interaction maps that illustrate how children interacted with the toys and friends. In these maps, each child may have an arrow or more which shows either the child is playing with the toy or not, as well as if the child is communicating with any of friends. (See fig 4 and 5) Although puzzles need concentration and focus to find out the solution, children are interested to talk about their thoughts and emotions and get their peers feedback. Whereas, blocks create a context where children want to concentrate on their imagination and build what they are dreaming about. There are some conversations going on about random topics among some of the children.

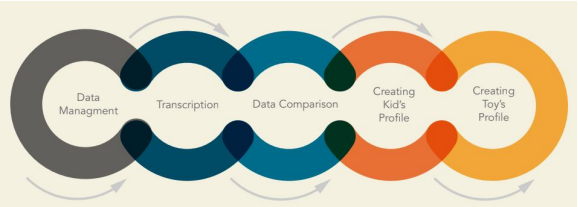



**Fig 3: A diagram showing data analysis steps in order.**

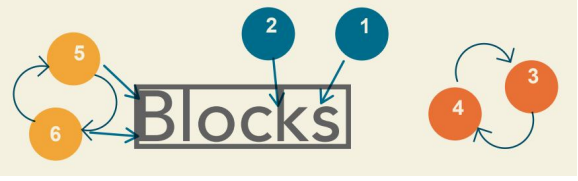



**Fig 4: This map is a map showing the interaction of children with each other and with toys. Each number is standing for a child and the rectangle with the word "Blocks" resembles the table with building blocks. As shown some children like 1 and 2, are just playing with toys and they not talking to anyone else in the room, whereas children 5 and 6 are playing with toys as well as interacting with each other. Children 3 and 4, are not engaged with the block, while they are playing with each other.**

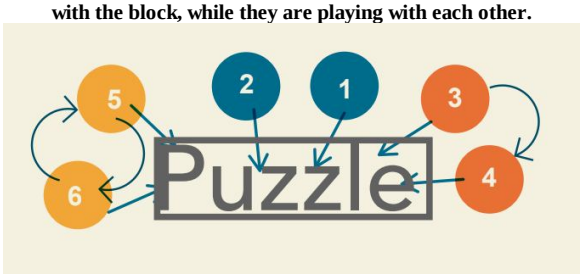



**Fig 5: This is another map showing the interaction of children with each other and with puzzles. Each number is standing for a child and the rectangle frame with the word "Puzzles" resembles the table with puzzles on it. All children are playing with the puzzles, however, some of them are interacting with their group mates.**

## XII. FINDINGS

Children are mostly distracted by other activities, such as their friends who play with toy cars. Some get back to the activity after distraction but some stop the play and join the new activity. In observation number one (see fig 2) each child makes a goal for himself and works for that. There are some conversation going on among some of the kids about general topics, for e.g. they talk about things they did the day before, their favourite cartoons and so on. In the second observation children play with puzzles, there is a puzzle for every two child. At the beginning children start by trying to put the pieces by themselves, after a while they start to talk to their groupmate. Some ask and consult about the right place of the pieces, some express themselves and their feeling. A group of children explain that they get stuck and they cannot solve the problem, and the group that is about to finish laughs and talk about their positive feelings.

Over the interview, the teacher explains each child's behaviour. All the explanations are teacher's beliefs, assumptions and observations she has made over the months spending with the children.

This study shows that children are more expressive when they are mentally engaged in a problem-solving situation, it may cause them to express themselves and they're taught or to ask for help to find a solution. On the other hand, while children are playing with the toys that are dependent on children's imagination, they do not talk about their feelings and what is going on in their mind, at least until the task is done. In these conditions, the ongoing conversations are mostly about non-related topics to the toy and activity they are playing at that moment "Children are working together more with puzzles...I hear conversations like where do you think this piece goes? Do you know where should I put this? (Teacher)

## DISCUSSION

It is really interesting how children are working together to solve a problem when there is a defined objective. When children are asked to play with puzzles, there is either direct collaboration like talking and asking or indirect one like putting the piece on the partner's side to see if one can find the right way for it. In case of blocks, things are a little different. Children are playing side by side around a table but each child is focused on his own. Some build towers and talk to their friends while rest of the group is playing with other toys like cars. An element which has effect on this situation is teacher's role. During each playtime, a different teacher supervises the children. Distinct leading approaches of teachers affect the children play direction. According to proposed principles of "Cooperative and Collaborative Learning Theory" by Mark Arthur May and Leonard William Doob students learn how to work together and support each other. Instructors should encourage brainstorming, reflection, and participation." [7]

In blocks observation the teacher is not actively leading the children, so they had the liberty to choose either to continue playing with block or leave and play with something else. However, in observing puzzles playtime the teacher is actively engaged and encourage children to continue and finish the puzzle if they are stuck in a stage. As a result when children are bored or not interested anymore, the teacher's words make them motivated again for a while, so children are engaged for a longer time in puzzles. This result interestingly goes with the Vygotsky's theory who says that environment affect the learning and social skills of a child, which is the teachers feedbacks in our case.

I've learned from this study that type of the toy can increase the interaction level of children, however the adults leading approaches can play a key role in increasing or decreasing this level.

## FUTURE RESEARCH

Even from my small sample size of two toys and limited participants, there are interesting results come ut. There is also some aspect that research can be expanded, such as studying a wider range of toys and a higher number of participants. However, there are more questions revealed for future researchers on the topic. How can teachers create a motivating environment to play with toys? Do toys affect the way children express themselves?

These kinds of studies can be constructive for toy design. If designers are designing a toy for enhancing communication level among children, it is helpful to keep in mind that problem-solving and directed toys which create a challenging situation for the kids can be more successful than open-ended games in creating a collaborative environment.

## CONCLUSION

This research is conducted in order to observe how teamwork is affected among multicultural young kids while playing with two types of open-ended and directed toys. The purpose is to observe behavioural responses of children while playing with those toys and finding out if the level of engagement changed in any way throughout the playing.

This report outlines the way the research will be done to have sufficient information regarding children's teamwork while playing with toys to have needed information of our user group, their reactions, and their behaviour so that we can design a toy according to their needs. The results show that children are more eager to talk and interact with their peers while they are playing with puzzles. Also, it's found that teachers can have an essential role in affecting the collaboration level and plays direction. Collaborating with friends and engaging with toys at the starting minutes of playtime is more related to the toy, however, after a while, the teacher's role in keeping children engaged gets bolder.

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