

The Mind Map: A Tool for Exploring Children’s and Teacher Trainees’ Conceptions of School, Friendship, and Play

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Abstract

Mind Mapping can be used in any discipline as a tool for learning and organizing information. Mind Maps can be created as a group as a means of supporting brainstorming or individually to generate ideas. The aim of the present study was to explore preschool children’s and teacher trainees’ conceptions of school, friendship, and play through Mind Maps. A phenomenological approach was employed. The participants were 18 preschoolers ($M = 65.33$ months; 11 girls and 7 boys) and 12 preschool teacher trainees ($M = 21.31$ years; 10 females and 2 males). The children and the teacher trainees constructed three Mind Maps as a group and each group’s Mind Maps were evaluated with a rubric. The results revealed that the children can be as successful as adults in Mind Mapping. The children used drawings more often compared to the teacher trainees. The children and the teacher trainees had similar scores on the Mind Maps for school and friendship. With respect to school, it is evident that teachers and physical environment were quite important to children. For friendship, it seems that the children tend to talk about play and the common activities they do with friends whereas the teacher trainees referred to more abstract and emotional aspects of friendship as expected. Lastly, the children and the teacher trainees’ conceptions of play seemed to differ significantly, and the children did not include digital play in their Mind Maps unlike the teacher trainees who referred to digital play with many associations.

Keywords: Mind Mapping, Preschoolers, Teacher Trainees, School, Friendship, Play

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INTRODUCTION

The Mind Map has been developed by Tony Buzan (Buzan, 2018) in 1960s as an innovative form of notetaking which was inspired by the ancient Greeks who made use of sophisticated systems that helped them to recall and improve their memories. The modern Mind Maps are similar to those of the ancient Greeks in that colors are used to link the interrelated concepts and ideas. The colors are important because they turn the monochromatic, monotone, monotonous, and straightforward notetaking into an active, simple, and effective process (Buzan & Buzan, 2006). A Mind Map revolves around a central concept or a key idea, which is connected to key themes related to this central concept by thick branches radiating out. Each of these thick branches is represented by a different color and subsidiary branches or twigs can be added to represent the second and third-level branches. A single word (in capital letters) is written to label the branches. It is also possible to use drawings instead of words. After the main branches and sub-branches are completed, arrows can be added to emphasize the connections between them. Mind Maps makes recalling information easier and more fun while it helps to make associations in a more imaginative, analytical, and multidimensional fashion compared to traditional notetaking (Buzan, 2018).

Mind Mapping can be used in any discipline, such as medicine and healthcare (Mollberg et al., 2011; Zipp & Maher, 2013), mathematics (Brinkmann, 2003), and business (Anderson, 1993; Mento et al., 1999; Buzan & Griffiths, 2014) as a tool for learning and organizing information. Mind Maps can be created as a group as a means of supporting brainstorming or individually to generate ideas (Buzan, 2018). Mind Mapping can also be used with different age groups, including children (Polat & Aydın, 2020; Van der Veen et al., 2018; Buzan, 2004), adolescents (Merchie & Van Keer, 2016; Fidan et al., 2021) and adults (Keleş, 2012; Evrekli et al., 2009). Because Mind Maps help to break down a topic into its components in a logical way, they are useful to understand a complex subject, prioritize its components, and plan what to do about it with clarity and creativity regardless of the subject (Buzan, 2018). Therefore, it is possible to make use of Mind Maps to explore individuals' knowledge and opinions of a subject as well as using them as a tool to support memory and notetaking skills.

The aim of the current study is to explore what preschoolers and teacher trainees think about school, friendship, and play by using Mind Maps as a qualitative data collection tool. These themes seem to be the core of early childhood education because they are part of children's everyday life supporting children's learning, well-being, and overall development. Children's perceptions of school have been associated with school engagement (Papadopoulou & Gregoridias, 2016), psychological problems (Anderman, 2002), and academic achievement (Brock et al., 2008) whereas negative perceptions of school climate and friendship have been linked to problem behaviors, such as aggression and withdrawal (Ladd & Burgess, 2002). Play, on the other hand, triggers positive feelings as a social medium and help children learn how to delay their desires to keep playing with friends as well as supporting cognitive, physical, and linguistic skills (Tamis-LeMonda et al., 2004). However, children and adults, specifically parents, teachers, or prospective teachers, might have different understandings of school (Koth et al., 2009), friendship (Calder et al., 2012), and play (McInnes et al., 2011) because of various child-level, teacher-level and school-level predictors, such as age, ethnicity, gender, and school size, and experience. For instance, although adults do have more developed cognitive skills compared to those of children simply due to maturation, children might still outperform adults in creating Mind Maps just because it is possible for them to have more experiences with and special interests in the subject of the Mind Map. The investigation of such differences is of utmost importance because a mismatch between children's and practitioners' beliefs might indicate a lack of pedagogical qualifications. In addition, taking children's perspectives of school, friendship, and play as the starting point might help adults to better understand how children learn, what they need to love school, and guide the early childhood curriculum and practices as well. Given the importance of children's perspectives, we wanted to compare them to those of teacher trainees to see the similarities and differences between their conceptualizations of school, friendship, and play through Mind Mapping, which is a child-friendly tool as it allows children to express what they think with drawings and colors.

METHOD

Design

The aim of the current study is to explore what preschoolers and teacher trainees think about school, friendship, and play by using Mind Maps as a qualitative data collection tool. A phenomenological approach was employed to explore the participating children's and teacher trainees' perceptions of school, friendship, and play. Phenomenological research studies participants' reactions to or perceptions of a particular phenomenon where the researcher tries to portray and detail each participant's reaction to and perception of their experience assuming that there is some commonality between people's perceptions and interpretations of similar experiences (Fraenkel et al., 2018). Phenomenological research aims to construct meaning of a shared event from the perspective of those who have experienced it focusing on "what" and "how" of the experience (Teherani et al., 2015). That might be the reason why children seem quite familiar with the subjects of the mind maps. They could express what they think about those subjects and what they mean to them, and reflect on their experiences, feelings, and the effects of these experiences on their lives.

Phenomenological methods, such as interviews, conversations, observations, and text analysis, can be employed in single subject studies as well as selected samples with multiple participants (Moustakas, 1994). Mind Mapping has been employed as a phenomenological tool in the current study to explore preschoolers' and teacher trainees' perspectives of school, play, and friendship as a shared experience in detail.

Participants

Participants were 18 preschoolers ($M = 65.33$ months; 11 girls and 7 boys) and 12 preschool teacher trainees ($M = 21.31$ years; 10 females and 2 males). Purposive sampling was used to select the participants and two criteria were identified for preschoolers, which were (1) having a previous experience with Mind Mapping and (2) being in the 60-72-month-old preschool group. For teacher trainees, only the first criterion was applied and the teacher trainees who have done at least 5 Mind Maps before were included in the sample. The preschool education in Turkey is divided into three age groups, which are for 36-48-month-olds, 48-60-month-olds, and 60-72-month-olds. Based on the authors' previous knowledge of preschoolers' experience with Mind Mapping, only 60-72-month-old children were included in the sample to suit the specific purpose of the current study. Because the sample size used in qualitative research is often limited compared to quantitative research in order to gain a deeper understanding of a phenomenon with no concern for generalizing the results to larger populations, the preschooler participants were recruited from a private preschool in Kadikoy, Istanbul. The teacher trainees who had taken "Special Teaching Methods" course where they had learned about Mind Mapping voluntarily participated in the study and parental consent was required for preschoolers.

Procedure

Preschoolers

After getting the ethics approval, the researchers went to the private preschool, introduced themselves to the children and spent about an hour with them participating in their games. Then, the researchers said that they would be making a big Mind Map about "school". The children were given some time to think about school and were asked to share what they thought. After that, the floor was covered with 4 sheets of Kraft paper taped to each other and it had "school" written in the middle with a branch drawn by the researchers. Next, the children were asked to think about what this branch should be and add some sub-branches. After determining the first level branch with its sub-branches and guiding the children how to express what they think, the children were placed in the driver's seat. The researchers took notes for what the children intended to draw under branches while talking about the Mind Map. The construction of the Mind Map continued until all children agreed that there was

nothing left to add. The children completed the Mind Map in about 45 minutes. Then, the researchers thanked them for their participation and reminded that they would come together next week to create a new Mind Map. During the next 2 weeks, the children created Mind Maps for “friendship” and “play” following the same procedure. At the end of each session, the children were presented with a Mind Mapping badge (a badge with a picture of a mind map) for their active participation.

Teacher Trainees

The researchers made an appointment with the participating teacher trainees and after spending about 1 hour with them doing drama activities and playing games for warm-up, the participants were asked to create a Mind Map for “school” on a large sheet of paper. The participants were given 5 minutes to think about school and 10 minutes to share what they think and feel about school. As in the preschoolers’ group, the floor was covered with 4 sheets of Kraft paper taped to each other and it had “school” written in the middle with a branch drawn by the researchers. After deciding what the major branch would be, they were asked to think, draw, and write a few sub-branches. After some encouragement and guidance, the participants took control of the process. The construction of the Mind Map lasted for about 30 minutes until all teacher candidates agreed that there was nothing left to add to the Mind Map. After a break, the participants made their own Mind Maps for “friendship” and “play” following the same procedure.

Data Analysis

Mind Maps are inherently authentic and original by nature. However, it can be quite difficult to evaluate them. In the current study, the Mind Map Evaluation Rubric, which was developed by Evrekli et al., (2009) and adapted to preschoolers who cannot read or write yet by Polat et al., (2017) was used. The branches at the 1st, 2nd, 3rd, and 4th level are scored 2, 4, 6, and 8 points, respectively. A crosslink indicating the relationships between main branches is scored 10 whereas a relationship is scored 2 points. Each example or visual (drawing) also gets 1 point. The things that are written by adults at children’s request are not scored in this rubric. Figure 1 shows how the mind map is scoring.

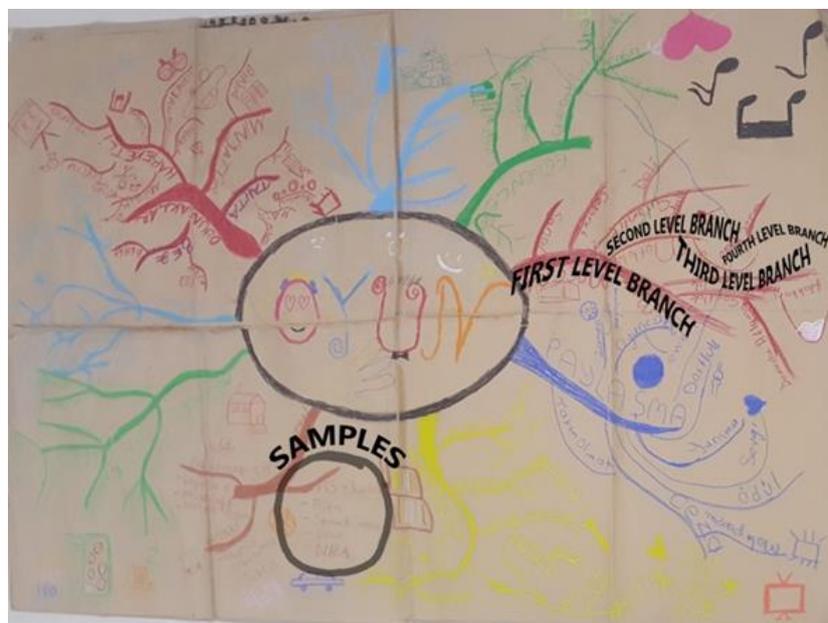


Figure 1. An example of the branching levels and samples of the play themed mind map

Descriptive statistics were used to analyze the Mind Maps. The expressions used for “school”, “friendship” and “play” in all branches were scored separately for each level by two independent encoders. The reliability between the two encoders were ensured using Miles and Huberman’s intercoder reliability coefficient [reliability coefficient = number of agreements / (number of agreements + disagreements)]. A total of 6 Mind Maps were coded by each researcher independently

and the agreement between the coders was 97.57%, 97.20%, and 94.50% for school, friendship, and play, respectively. Miles and Huberman (1994) suggest that an interrater reliability of 80% agreement between coders on 95% of the codes is sufficient for multiple coders. Therefore, the interrater reliability was quite high. Next, the frequencies and the total scores of the Mind Maps were calculated. The frequencies for preschoolers' and teacher trainees' associations related to school, friendship and play were tabulated.

RESULTS

The current study aimed to explore preschool children and teacher trainees' perspectives of school, friendship, and play using Mind Maps. Descriptive data have been tabulated to interpret and compare what comes to children's and teacher trainees' minds when they think about school, friendship, and play.

Table 1 shows the frequencies and the total score of the associations, relationships, examples, crosslinks and drawings in the Mind Maps created by the children and the teacher trainees for school, friendship, and play. Drawings (f=57) were the most frequently used way of expression followed by the 2nd level associations (f=25), which is quite similar to what the teacher trainees did for the "school" Mind Map where the drawings (f=32) and 2nd level branches (f=27) were the items with greater frequency. The comparison of the total scores shows that the children ($\Sigma=183$) were as good as the teacher trainees ($\Sigma=184$) at Mind Mapping.

Table 1 Children and Teacher Trainees Scores on Mind Maps for School, Friendship, and Play

| | | 1 st Level | | 2 nd Level | | 3 rd Level | | 4 th Level | | Relationships | | Example | | Cross link | | Drawings | | Total score |
|------------|------------------|-----------------------|----------|-----------------------|----------|-----------------------|----------|-----------------------|----------|---------------|----------|---------|----------|------------|----------|----------|----------|-------------|
| | | (f) | Σ | (f) | Σ | (f) | Σ | (f) | Σ | (f) | Σ | (f) | Σ | (f) | Σ | (f) | Σ | |
| School | Children | 7 | 14 | 25 | 100 | 2 | 12 | - | - | - | - | - | - | - | - | 57 | 57 | 183 |
| | Teacher Trainees | 10 | 20 | 27 | 108 | 4 | 24 | - | - | - | - | - | - | - | - | 32 | 32 | 184 |
| Friendship | Children | 6 | 12 | 19 | 80 | - | - | - | - | - | - | - | - | - | - | 124 | 124 | 215 |
| | Teacher Trainees | 10 | 20 | 44 | 176 | - | - | - | - | - | - | - | - | - | - | 46 | 46 | 242 |
| Play | Children | 5 | 10 | 16 | 64 | - | - | - | - | - | - | - | - | - | - | 61 | 61 | 135 |
| | Teacher Trainees | 9 | 18 | 40 | 160 | 57 | 342 | 11 | 88 | 1 | 2 | 12 | 12 | 1 | 10 | 48 | 48 | 680 |

When "friendship" was at the center of the Mind Map, most children used drawings (f=124) followed by the 2nd level associations (f=20), which is quite similar to the Mind Map for "friendship" created by the preschooler teacher trainees as the number of drawings (f=46) and 2nd level branches (f=44) were greater than the others. There was also a minor difference between the total scores of the preschoolers ($\Sigma=216$) and the teacher trainees ($\Sigma=242$).

For "play", drawings (f=61) were again the most common items followed by 2nd level associations (f=16) in the Mind Map created by the preschoolers. However, it was not the case with the teacher trainees, whose Mind Map was dominated by 3rd level associations (f=57) followed by drawings (f=48). "Play" was the only theme that the teacher trainees used crosslinks, relations, and examples. The difference between the total scores of the two groups ($\Sigma=135$ and $\Sigma=680$) was also remarkable.

Figure 2 and Figure 3 show the Mind Maps that the children and the teacher trainees created for "school".

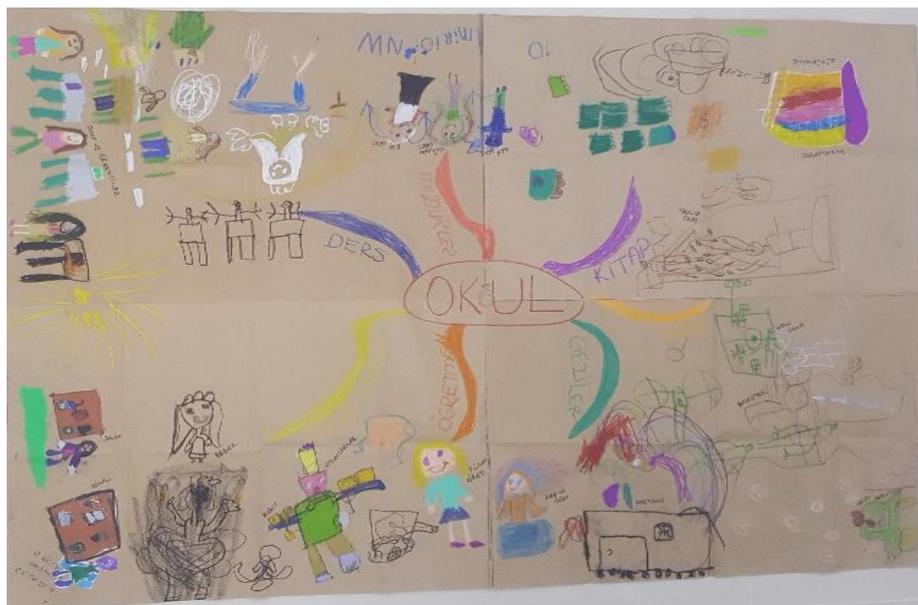


Figure 2. The “School” Mind Map by the preschoolers

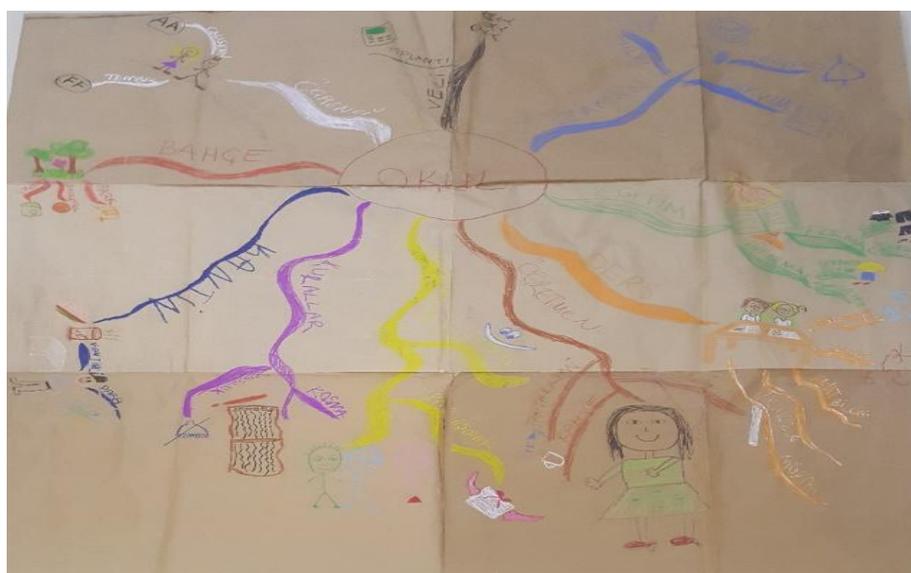


Figure 3. The “School” Mind Map by the teacher trainees

The associations related to “school” for all levels are shown in Table 2.

Table 2. Children’s and teacher trainees’ associations related to “school”

| | Children’s Associations | f | Teacher Trainees’ Associations | f |
|-----------------------|--|----|---|----|
| 1 st Level | Teachers, school trips, books, sports, headmasters, classes, play time | 7 | School yard, students, parents, time, education, classes, teachers, friendship, rules, canteen | 10 |
| 2 nd Level | Teacher F., Teacher D., patisserie, railway station, school service, football pitch, basketball, gymnastics, textbooks, library, encyclopedias, audio books, Teacher A., Teacher G., Teacher E., classroom*2, students, desks, school, chairs, robots, toys, dolls, laughing | 25 | Park, basketball, pavilion, hardworking, lazy, meeting, parents, holidays, calendar, break time, formal, informal, mathematics, Turkish, social studies, English, music, board marker, chalk, coffee, laughing, sharing, silence, running, studying, canteen staff, money | 27 |
| 3 rd Level | Swinging, jumping | 2 | Uniform, classroom, casual wear, holistic environment | 4 |

Table 2 shows that neither the children nor the teacher trainees went beyond the 3rd level associations related to “school”. The 2nd level associations were greater in number for both groups (children $f = 25$; teacher trainees $f = 27$). The 1st level branches of children’s Mind Map included the activities that they usually do at school whereas the teacher trainees’ 1st level associations were related to the profession of teaching and the physical aspects of school.

The Mind Maps that the children and teacher trainees did for “friendship” are shown in Figure 4 and Figure 5.



Figure 4. The “Friendship” Mind Map by the preschoolers



Figure 5. The “Friendship” Mind Map by the teacher trainees

The associations related to “friendship” for all levels are presented in Table 3.

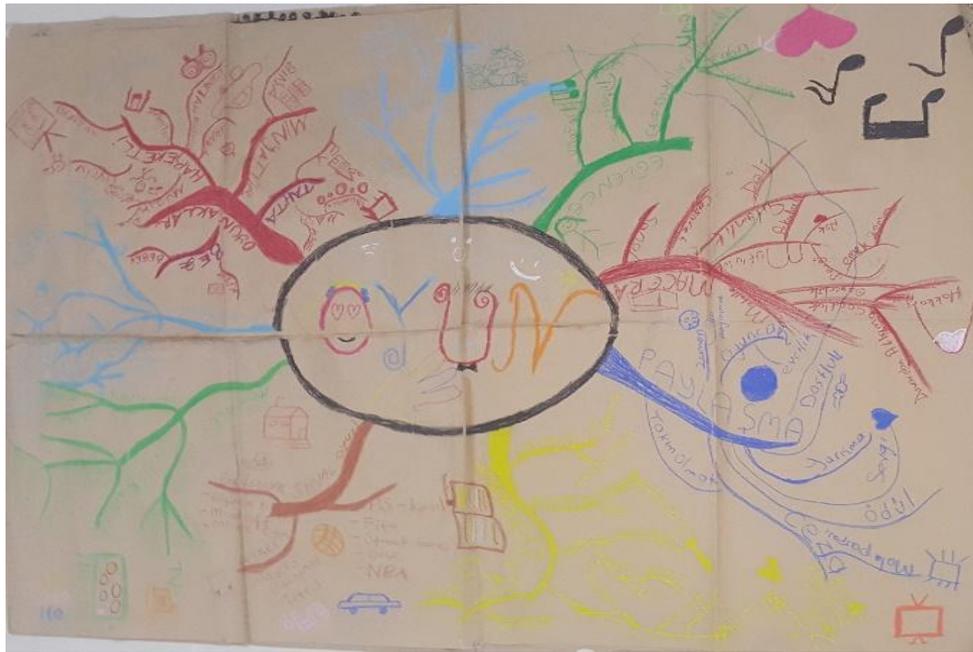


Figure 7. The “Play” Mind Map by the teacher trainees

The associations related to “play” for all the levels are shown in Table 4.

Table 4. Children’s and teacher trainees’ associations related to “play”

| | Children’s Associations | f | Teacher Trainees’ Associations | f |
|-----------------------|---|----|--|----|
| 1 st Level | Friends, outdoor play, emotions, toys, indoor play | 5 | Friendship, happiness, adventure, toys, fun, sharing, learning, video games, neighborhood | 9 |
| 2 nd Level | Tuna, Dilara, Zeynep, Hüseyin, children, park, schoolyard, happy, sad, angry, surprised, lots of toys, home, school, friends, apartment block | 16 | Help, love, fun, sharing, cloth, lively, Mustafa Kemal Ataturk, smiling, winning, playing together, sleeping, reward, amusement park, joy, group games, virtual, courage, craziness, happiness, freedom, childhood, time, toys, friendship, competition, love, reward, punishment, teamwork, readiness, school, family, curiosity, play station, arcade games, video games, evening, sunflower seeds, neighborhood | 40 |
| 3 rd Level | - | | Older sister/brother, brotherhood, family, friends, children, toys, computers, tablets, streets, equal, rights, dolls, books, music, chicks, digital, swing, remote control, car, miniature, wooden, mom, chocolate, books, park, love, affectation, jumping down the wall, Hakkari (a city), sharing the moment, playing house, break mat, permanent, Montessori, age, maturity, teacher, recreation, sister-brother, father, mother, excitement, motivation, books, console, dress-up / designing games, online games, cooking, tv, tableware, chat, cushions, fruit juice, bell, garden | 57 |
| 4 th Level | - | | Family, recorder, Teacher E., building, house, table, labor, age, maturity, garden, bookmark, grocery, chickpea powder | 11 |
| Examples | | | Uno, Monopoly, Tabu, charades, FIFA, street games, Blur, NBA, Super Mario, Packman, Tetris, Minecraft | 12 |

As seen in Table 4, the number of the associations that the teacher trainees had related to “play” was much greater than the children’s associations, which is quite interesting. The teacher trainees made definitions and gave examples for all the levels of the Mind Map for “play”, which had the largest number of associations among all three themes. Most of the children’s associations ($f = 16$) were in the 2nd level branches while it was the 3rd level branches where most of the associations by the teacher trainees ($f = 57$) were clustered. It seems that the children focused on the play areas and social-emotional aspects of play in the 1st level branches. Similarly, the teacher candidates included types of play, play areas and social-emotional qualities of play. In the 2nd level branches, the children preferred to use the expression “lots of toys” as a general component of play rather than detailing the toys.

DISCUSSION

The current study aimed to explore children and teacher trainees’ perceptions of school, friendship, and play by using Mind Maps. The results showed that the children and teacher trainees received roughly the same total scores on the three Mind Maps, which might indicate that preschoolers can have a performance as good as adults in Mind Mapping although children do not have fully developed cognitive skills yet. Adult group was expected to form much more sophisticated connections and come up with more abstract and complex associations; however, the children and the teacher trainees seemed to focus on similar abstract associations (e.g., “sharing” and “happiness”) and concrete aspects of school (e.g., “teachers” and “books”), for example. This similarity might be due to the use of Mind Mapping as an appropriate and effective tool helping children recall and describe what they think. For example, Matthews (1985) investigated 6-11-year-old children’s representations of their journey to school and home by means of four different techniques, which were free-recall sketching, air photo interpretation, map interpretation, and verbal reporting. The author concluded that verbal descriptions might inhibit children to a great extent whereas all children produced better representations by any other technique. Therefore, one might infer that Mind Mapping helps children express what they know about a topic and closes the gap between children and adults with better cognitive skills who will otherwise outperform children when other techniques are used.

The results for the “School” Mind Map revealed that the children and teacher trainees almost had the same total score. However, the teacher trainees had outperformed the children in the 3rd level branches whereas it was the opposite in the drawings on behalf of children. When we look at the associations that both groups formed in detail, the children had only one association referring to the psychological aspects of school (“laughing”) and most of the associations seemed to be the social and the very physical elements of school, such as teachers, furniture and activities. The teacher trainees, on the other hand, seemed to refer to the social and emotional attributes more often like friendship, parents, canteen keeper and silence. It is also evident that the teacher trainees based their associations on their schooling years because it is very hard for children to come up with some of those associations (e.g., coffee, calendar, silence, formal, and informal) which are not observable and present in preschool settings. Although not surprising, this finding might suggest that the physical elements, teachers, and play time dominate children’s feelings for and conceptions of school. It may also indicate that the academic expectations and perspectives of adults might conflict with children’s perceptions of school during the transition from preschool to 1st grade, which has the potential to make this process more troublesome. The fact that teachers are quite visible in children’s conceptions of school further supports the findings of the existing literature suggesting that positive teacher-child relationships may serve as an agent in children’s task engagement (Alamos & Williford, 2019), school adjustment (Birch & Ladd, 1997), academic performance (Pianta & Stuhlman, 2004), expressive vocabulary (Rojas & Abenavoli, 2021), social competence (Zhang & Nurmi, 2012), and so on. Therefore, early childhood educators might consider engaging in a range of actions that will promote positive and close teacher-child relationships to foster children’s positive conceptions of school.

The Mind Map for friendship also bears several similarities to the Mind Map for school with respect to the total scores, 2nd level branches, and drawings. The teacher trainees used more than twice of the number of the 2nd level associations than the children whereas the children had almost three times more drawings compared to the teacher trainees although the total scores were close to each

other. This finding might further support the idea that children are quite good at drawing their mental impressions of a phenomena referring to its emotional elements and that their drawings are not just visual observations (Di-Leo, 1996). The associations children formed for friendship seem to revolve around play and the obvious activities that friends do during play, such as “swing” and “skipping rope”, which further extends the findings of previous research on the development of young children’s notion of friendship (e.g., Selman, 1981; Newcomb & Bagwell, 1995). Bigelow (1977) who studied 480 children aged 6-14 years concluded that there are three stages of friendship which develop with age. Based on children’s descriptions, the first stage was dominated by common activities like play and propinquity for children younger than 10. Then, children move to the second stage which includes admiring friends, and the third stage where children care about more social, emotional and abstract concepts, such as acceptance, loyalty, common interests, and intimacy. Therefore, it is not surprising that the teacher trainees had more diversity both in their 1st and 2nd level associations which included discrete categories with more abstract and emotional qualities as expected like “exchange of ideas”, “money”, “mirror”, “tolerance”, and “patience”.

In addition to the associations based on common activities and play, some of the associations by children seem to emphasize the “togetherness” and “altruism” of friendship, such as “having fun together”, “exchanging gifts”, and “carrying something together”. This is in line with the previous research findings in that preschoolers tend to be quite generous with their friends by the age of 5-6 (Yu et al., 2016; Paulus, 2016). Because identifying social relations between people and choosing to help is a difficult task for young children as it requires social and cognitive skills (Warneken, 2016), our finding might also suggest that preschool children are capable of interpreting that friendship includes reciprocity and contribute to the literature on preschoolers’ understanding of friendship.

One of the interesting findings of the current study is the significant difference between the total scores of the children and the teacher trainees on the “Play” Mind Map. The children did not have any 3rd or 4th level associations although they again had more drawings than the teacher trainees. The teacher trainees’ 2nd level associations far exceeded the number of the associations formed by the children as well. When we take a closer look at the children’s associations for play, we see personal names (e.g., “Tuna” and “Dilara”), places (e.g., “House” and “School”), and some adjectives describing emotions (e.g., “Happy” and “Puzzled”), which shows that the social and physical context of play might be much more important to preschoolers (Horgan et al., 2018) compared to the teacher trainees who referred to many objects (e.g., “Cloth”, “Books”, “Chocolate”) and digital play (e.g., “Play Station”, “Console”, “Online Games”, “Computer”, etc.). It is quite unexpected that although most preschoolers have tablets or smartphones available at home nowadays (Brito et al., 2018), they did not include the digital play in their conceptions of play. This finding may further provide evidence for the idea that most children opt for playing with friends or playing outdoors whenever they can instead of sedentary activities, such as watching TV or playing video games indoors because they think that outdoors is a place to play whereas indoor spaces are for work (Singer, 1996). For example, Nedovic and Morissey (2013) who investigated 18 three- to four-year-old children’s preferences for the redesign of a childcare report that only 9% of the children wished to have non-natural elements (e.g., commercial toys) while the rest of the children preferred natural elements (e.g., mulch and teepee). Similarly, Greenfield (2004) who asked the children to take photographs of their favorite play areas reported that most children prefer to be outside when given the choice. Therefore, teachers might consider children’s conceptions of play for their practices and decision-making to better serve children’s needs and facilitate their learning by placing a high value on what they care about.

Taken together, the results of the current study, which aimed to explore preschoolers and teacher trainees’ conceptions of school, friendship, and play through Mind Maps, revealed that the children can be successful Mind Mappers like adults and tend to use drawings more often than adults. The children and the teacher trainees had similar scores on the Mind Maps for school and friendship. With respect to school, it is evident that teachers and physical environment are quite important to children. For friendship, it seems that the children tend to talk about play and the activities they do with friends. Lastly, the children and teacher trainees’ conceptions of play differed significantly, and the children did not include digital play in their Mind Maps unlike the teacher trainees.

However, the current study has its own limitations. First, the number of participants for each group is quite limited and future studies might work with larger and heterogenous groups from different backgrounds. Second, the Mind Maps in the current study were created on group-level. Although it has its own advantages for brainstorming, individual Mind Maps might be used in future research to reveal and compare participants' conceptions. Third, the results should be interpreted with caution because the aim of the phenomenological approach is just to reveal a phenomenon as it is rather than focusing on causes and generalizing the results to larger populations.

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