

# KINDERGARTEN TEACHERS AND CHILDREN'S PERCEPTION ABOUT SPATIAL CHANGES IN TIME OF COVID-19

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## Abstract

The SARS-COV-2 pandemic situation forced the society to adapt, changing many aspects of the daily life. In early childhood education, both the environment and daily routine had to be reorganized, according to the health authorities' regulations, towards containing the new coronavirus transmission. This led to enforcing physical distance among all actors, regardless of the impact on the learning and the development of children, as well as ensuring their well-being and right to play. It is well known that the interactions and relationships that children establish with adults, other children and the surrounding physical spaces are the basis for their learning and development. In this context, this study describes the impact on the interactions and in the learning experiences that resulted from the compulsory spatial changes in kindergarten during the pandemic situation. This research also aims to understand the feelings, constraints and opportunities that these changes were experienced by a group of kindergarten teachers' and their children, as well as the strategies and actions they developed in order to provide opportunities to create enabling environments for children's well-being and learning. This is a research conducted with kindergarten teachers and children after the first lockdown in Portugal. Methodologically, the study takes a qualitative approach. For data collection, two phases were considered. The first phase was developed through zoom interviews with kindergarten teachers. In the second phase, forty-two interviews were conducted with children between three to five years of age, creating contextual conditions for their application. The children were also asked to draw up a drawing illustrating how they saw space before and after the pandemic situation. A previous meeting was held with the kindergarten teachers, clarifying the main objectives of the children participation in the study. The procedures were defined, and the intervention strategies were drawn collaboratively. Children were asked if they wanted to participate, and only the children that chose to participate freely in the study were involved. Moreover, the parents' consent was requested. Regarding this, all ethical procedures were considered in study, ensuring the anonymity, confidentiality and informed consent of children, educators and families or institution. Kindergarten teachers and children's interviews were recorded and, subsequently, transcribed and submitted to content analysis, whose heuristic function increases the propensity of the discovery of the reality experienced by the actors. From the content analysis, categories emerged that allowed the analysis of the discourses. The text produced was analysed and described in an articulated way, trying to apprehend the specific conditions in which it was conceived, revealing a certain order of reality, from which the narrative was made. The data analysis shows that child-materials, child-to-child, and also child-adult interactions become less significant. The spaces limitation by groups and the reductions of materials (number and kind) does not seem to allow the diversity of pedagogical experiences. However, the educational environment, both indoors and outdoors, continued to be appealing and promote learning, but with the particularity of the working in "bubble".

## 1 INTRODUCTION

Throughout our development process, there are several factors that help in motor growth and development, spaces participate in this role. Regarding this, spaces must be well thought out and structured according to the needs and interests of the child, and that play in natural environments should be considered.

The child is an active agent in the search for opportunities to explore, act and learn in the contexts that surround him [1]. The way in which he perceives and interacts with these opportunities for action (Affordances) seems not only to depend on his individual characteristics, but also on the attributes that characterize that same context [2].

The spaces, in what refers essentially to early childhood, can influence the child's behaviour and have a promoting effect on the child's motor and intellectual development. The availability theory studied by environmental psychology focuses on the opportunities that spaces, including the outdoors, provide [3].

The kindergarten is a proximal context of the child's life [4], whose physical involvement has an impact on learning and the development of his cognitive, motor and socio-emotional competencies [5]-[9]. The kindergarten must therefore offer multiple opportunities for games and activities inside and outside, that promote exploration, social interactions, and a wide range of experiences and learning [10]-[12].

Several studies highlight the importance of playing for children's development [3], [13], [14]. OPAL, refers the spaces develop not only creativity and imagination, but also cooperation, resistance, resilience and trust [14]. All of this leads to lower levels of stress and higher levels of happiness. One of the most effective strategies for developing learning is to learn by experimenting and doing.

The state of emergency enacted in Portugal on March 18, 2019 closed the kindergarten, having only reopened in May of the same year, with contingency measures determined by the General Health Direction (GHD) that challenged them to reorganize their physical involvement. The SARS-COV-2 pandemic situation forced the society to adapt, changing many aspects of the daily life.

The specific recommendations and conditions relating to this aspect in particular focused mainly on reducing the number of children in the indoor and outdoor space, increasing the distance between them; and rethinking the materials available in the room, prioritizing the presence of those considered essential to the pedagogical activity and easy to disinfect. The Government stressed that these recommendations should be applied according to the reality of each kindergarten, without ever losing sight of the importance of guaranteeing the well-being of the child [15], something essential after a long period of confinement, which appears to have had a strong impact on children's emotional and physical well-being [16], [17].

This research also aims to understand the feelings, constraints and opportunities that these changes were experienced by a group of kindergarten teachers' and their children, as well as the strategies and actions they developed in order to provide opportunities to create enabling environments for children's well-being and learning.

## 2 METHODOLOGY

This research aims to analyze preschool children's perceptions about the changes made in kindergarten spaces, taking into account the restrictions indicated by the DGS

In a qualitative research, such as the one presented in this study, the participants are selected, a set of individuals from a group is selected, with the objective of analyzing their conceptions about the subject under study [18].

The educators' perceptions were collected through written reflections on the advantages and disadvantages of changes in the organization of spaces, routines and interactions, as well as on the strategies found to comply with official guidelines. The data collection was carried out with a group of fourteen early childhood educators who attended a training workshop on the quality of Spaces in Early Childhood Education. From this group, collaborators were selected for data collection about the children.

In a first stage, we selected the educators and children who were available to collaborate in the research, and five kindergartens were selected, involving eight groups of children and their respective kindergarten educators. The choice of institutions for the study followed some previously defined criteria, which considered the geographic location, ease of access and acceptance to carry out the study.

Initially, all children were active participants, expressing their ideas about the changes observed in the space. In a second moment, between five and seven children were selected, per room, taking into account the purposes that the research was intended to achieve, their ease of expression through drawing and dialogue.

The participants in the second part of the study were forty-four children, fifteen three-year-olds, four females and eleven males, ten four-year-old's, six females and four males, thirteen five-year-olds, eight females and five males, and six-year-olds, three males and three females, as indicated in

Children	3 years old	4 years old	5 years old	6 years old	Total
Female	4	6	8	3	21
Male	11	4	5	3	23
Total	15	10	13	6	44

In this research work, a semi-structured interview was used, guided by scripts organized according to a set of themes, objectives, and questions that were validated by two experts, with the purpose of obtaining data and information that would meet its objectives.

In addition to the semi-structured interview, free drawing was also used with respect to children, since, according to Lopes and Park [19], drawing is considered a unique way of expressing personal and social contents. It is useful to collect data on the child's social representation due to its potential to reveal indications both of the information they have about the social object they represent, and their position in front of it.

Thus, as far as the research is concerned, after the interviews, they were asked to draw a free drawing representing the space as it is now and what they would like it to have.

The data obtained through the interviews with the children were interpreted qualitatively and structured through the creation of categories and subcategories, the division of the material in accordance with the categories and subcategories and, finally, the interpretation of their subjectivities. For it to be possible to perform the content analysis, a pre-analysis was performed in an initial phase, that is, a floating reading of the interviews. In a second phase, the material was explored, the registration unit was coded, where all the elements, with similar characteristics, were grouped, thus enabling their categorization. The coding of the categories is alphanumeric (the letter indicates the categories and the numbers the subcategories within each category, i.e. A1, A2; B1, B2), as well as the kindergartens that were identified with the letter K (Kindergarten) and a number (1 to 5) that individualizes them. Similarly, the coding of the reports of the kindergarten teachers is indicated by the letter E and a number that individualizes (i.e. E1; E2...)

Two categories emerged from the categorical analysis of the children's oral and pictographic productions: (A) The space before the COVID 19 pandemic; (B) The Current Space. In category A three subcategories emerged: (A1) Organization of space and available materials; (A2) Collaborative work; and (A3) Pedagogical documentation. In Category B seven categories emerged: (B1) Reasons for change; (B2) Care needed; (B3) Perceived changes; (B4) Positive aspects of the reorganization of the Space; (B5) Negative aspects in the current space; (B6) Realities they miss; (B7) Other possibilities.

From the analysis of the data that emerged from the educators' written reports, three categories emerged: (A) Advantages of changing spaces/groups/interactions; (B) Disadvantages of changing spaces/groups/interactions; (C) Strategies found to minimize the impact on children. In category A, the following subcategories emerged: hand hygiene (A1); use of outdoor spaces (A2); being a one-place kindergarten (A3); use of other indoor spaces (A4); recreation of other ways of playing and playing (A5). In category B, the subcategories: Use of Mask (B1); Impossibility of interaction between groups (B2); Reduction of room areas and materials (B3); Impossibility of physical interaction with parents (B4); Interaction with other family members (B5); Interactions and affections with children (B6) are highlighted. No subcategory emerged from category C.

### **3 RESULTS**

This section will present the data that emerged from the interviews with the educators and the results that emerged in the children's oral and written productions. The data will be presented based on the categorical system enunciated in the previous section, through an interpretative line that seeks to give meaning to the speeches and productions collected.

#### **3.1 Analysis of the data emerging from the educators' interviews**

This section presents and analyzes the data related to the written reflections produced by the kindergarten teachers and that highlight the: (A) Advantages of changing spaces/groups/interactions; (B) Disadvantages of changing spaces/groups/interactions; (C) Strategies found to minimize the impact on children.

##### *3.1.1 Advantages of changing spaces/groups/interactions*

The reflections of the early childhood educators highlight as advantages the change of spaces, the opportunity for children to learn to sanitize hands (A1) "more carefully and frequently" (E1, E6).

A positive aspect of the regulations issued by the Portuguese State is the greater and better use of outdoor spaces (A2) "to develop more activities related to nature, as well as the reuse of materials for

the development of other types of activities and free play, thus allowing for creativity" (E1; E2; E4). E1 considers that this was "a need already felt, but which now becomes even more relevant".

The promotion of outdoor spaces, integrated into kindergartens, also emerged "as a great opportunity due to the loss of freedom to walk around outside or the prohibition to visit public parks" (I9). It was revealed that "time was subtracted from structured activities in large groups, more time was given to individual and small group work, the outdoor space was used more both in free activities and in programmed activities" (I3).

The fact that there is "only one room [in the kindergarten] and a small group of children" (E9) is also indicated as an advantage, and, because of this, it is possible to "have a single entrance to the kindergarten, with conditions for changing shoes and independent circulation" (E9).

The use of other interior spaces (A4) was also considered positive, highlighting that "the use of differentiated spaces" allowed "airing and sanitizing, and also the existence of a space for storage of clean toys" (E9; E6; E2; E3). It is also noted that the reduction of materials allowed the recreation of other ways of playing and playing (A5), mentioning that: "the removal of most of the toys was also a driver for new games, for more play investment by the children. I noticed that they play longer with the same toy, exploring new possibilities" (E9) and that "when we remove materials and toys from the room, it is a fantastic way for children to realize that sometimes you don't need much to play and be happy. It is the fastest way for them to understand that we have to value what we have" (E6).

Despite the advantages listed the educators also highlight a number of disadvantages, as noted in 3.2.1.

### *3.1.2 Disadvantages of changing spaces/groups/interactions*

The use of the mask is indicated as a disadvantage, not only for the "discomfort of having to wear it all day" (E1) but mainly for the limitation it brings to interactions with children who "don't see our [educators'] smile, our expression" (E8; E10). However, there are educators who consider that this is a lesser evil, because "fortunately children look more at the smile in our eyes than at the smile on our lips" (E1, E6).

One of the disadvantages listed by almost all the kindergarten teachers participating in this study is the impossibility of interaction between the different groups of children. It is considered that: "the interactions between children of different ages are extremely important and necessary, at this moment even the children miss these moments, especially at playgrounds" (E1). In this regard one of the educators states that "In my opinion, with the pandemic, what is being lost are the positive interactions that would occur in a normal daily situation. Namely of children with children from other classrooms, since "conviviality bubbles" were created in which children only live with those of their group regardless of the physical space where they are" (E2).

Also the interactions between educators and children was one of the restrictions that had the most impact on some educators, stating that "Not being able to kiss, show a smile, use the expressiveness of the mouth for emotions and learning, not allowing interactions between children from different rooms, realizing that babies find any person from outside the room even more strange (when a substitution is needed) and that it comes from the limited contacts they have with people they don't know, even in a family context, worries me. It is, without a doubt, what I miss the most" (E4).

The closure of parks, even those that belonged to kindergartens, was considered "violence to children" (E5) and a limitation of learning and relaxation opportunities. It is stated that "the changes deprived [the children and educators] of many things, such as forbidden spaces, limited interactions with the outside, leaving the perimeters of the institution, selected materials removed from the room, toys removed from the room, no contact with other staff members, little physical proximity with parents, entrance forbidden to any person from outside the kindergarten, permanent disinfestation of toys, washing hands even more often" (E6) but the educators have a positive spirit and tried to reinvent their ways of action to minimize the impact on children, as expressed in the following account "they took away exterior and interior spaces, true, but we reinvented others. They took away our interactions with the outside, we used new ways of interacting, for example the Children's Mini-Festival of the Singing of the Kings that was different this year, it's the same thing... of course not, but we tried and in our own way we succeeded" (E6).

Another disadvantage indicated by several participants is the impossibility of physical interaction with parents, referring that "one of the major constraints was not allowing parents to enter" (E9) mentioned that this interaction "now happens mostly via digital, losing also the component of parental participation in the activities of the educational project" (E2).

Despite indicating these disadvantages, the educators try to find ways to overcome them, as explained in the next point.

### *3.1.3 Strategies found to minimize the impact on children*

One of the strategies found by the educators to minimize the impact of the situation on the children was to find "alternative spaces for the spacing between us. The spaces that were meeting points (audiovisual room, meeting point between kindergarten and nursery school children, the main entrance Wall meeting point for everyone) became cafeteria spaces where the groups don't touch, don't interact and some don't meet" (E3). Some educators opted for "the rotation of groups by the spaces highlighting that "the spaces were divided by groups, but weekly there was a rotation, because we felt the need, the children remembered games they played in the other space that was now occupied and we opted for weekly exchange (E1).

The educators tried to mitigate the limitation of contact with parents as referred by E4 "at the beginning of the new school year, it was important to smooth the integration process, we adapted one of the access doors to the institution, which is adjacent to this room, as an exclusive entrance for the parents of the babies in the playroom, who are received and delivered only by the educator or the pedagogical assistant of the room. Thus, even not entering the room, there is direct contact with one of the people responsible for the group, which facilitated communication between the school and the family in pertinent daily information and even in sharing achievements or constraints". E9 also found an alternative solution for parents to have access to the kindergarten "with the parents not being allowed to enter and there our large windows emerged as an opportunity for interaction between parents and children, at the time of picking them up".

Educators seem to have been able to reinvent their pedagogical action, finding alternatives to the emerging limitations of the pandemic situation, as a way to soften its impact on children.

## **3.2 Analysis of the data emerging from the children's productions**

Here all the data obtained from the interviews and drawings made by the children who participated in the study will be presented, discussed and analyzed.

The importance of the study of children's perceptions in relation to space is a fundamental right expressed in articles 12 and 13 of the Convention on the Rights of the Child, which assumes that the child must be heard on aspects that concern them directly. The organization of space affects micro-contextual relationships, the child's life and learning processes. Listening to their perceptions and reconstructing the spaces with them may help them to have a more realistic view of the situation they are experiencing and integrate the interests revealed by the children in the educational options [20].

The presentation of the results will be structured according to the categories and subcategories stated above.

### *3.2.1 The space before the pandemic COVID19*

The children are aware that the space had a different layout and that there were more materials in the room before the pandemic caused by COVID19 (A1). They recognize that there were changes in the space referring that "before we were in the upper room and now, we had to come down here" (K3), that "Before, in our room, the table was in another place" (K1) and that there were "books, wigs, many clothes, witches' slippers, pillows, more toys, roads and wooden tunnels, for the wooden cars and a fluffy carpet" (K1).

They also reveal that work was more collaborative (A2) and that they could share materials stating that "we had pencils and pens for everyone, and we could sit in all the chairs" (K1) and we could use [the materials] all at the same time" (K5).

They also had the perception that the pedagogical documentation was more visible (A3), referring that they had "more works on the walls" (K1).

### *3.2.2 The Current Space*

In the category "current space" children express their opinions highlighting the reasons why it was necessary to change the space (B1). They are aware that it was "because of COVID19 that was bad for our body" (K3), but they also recognize the risk of propagation stating that "because otherwise we would put Corona to others. We would also cough for others. We would put our hands on someone and pass

the Corona Virus" (K3). There are, however, some alternative conceptions that children have and that are influenced either by the adults' explanations or by the inadequate deconstruction of the news that are broadcast by the media, as for example observed in the following speech "Because the Corona Virus had little bugs (K3) biting us. A bug comes in our belly neck and bones" (K3); "Our room is different because of the corona virus" (K4); "We are always in our room" (K4).

In the face of the pandemic situation the children know that extra care is needed (B2), so they recognize the importance of having "disinfectants in many places" (K1) and "always wash your hands" (K1). The type of materials used had to be changed from cloth mats to "plastic mats for easier cleaning" (K1) and "Legos and plastic things" (K1); "there are fewer dishes in the cupboard, you change them every day. The windows are open to let the air in" (K4)

They also consider that they have more rules [such as] putting things in the stall for washing, each one has their own chair with their name"... (K1) walking "in croquettes and at the end of the day (...) disinfecting (K1), only being able to "go two by two to the bathroom to wash their hands" (K2); in the cafeteria only having "one colleague at the table and the tables are no longer together" (K2); not being able to "touch the things that others touch (...) because they can get the bug" (K2).

In the subcategory Perceived changes (B3) the children explain their understanding about what changed in the space. They consider that there was restriction in the number of children per area, as well as in the delimitation of the play areas and in this sense, it was necessary to create a strategy that would help children in this delimitation, as observed in the following comment "we use plastic lids to know where we are playing" (K1) and they know that this restriction is justified "because we can't be together" (K5). These changes are indicated by some children with expressions such as "I see everything different in the room because of Covid" (K4); "our room is sadder" (K4); "our room is empty".



Figure 1- The space with fewer materials and areas on the K5

To prevent the spread of the virus, it was also necessary to reduce or individualize the materials, which led the children to mention what had to be done: "We take the books, clothes and shoes out of the little house (K1); "Everyone has their own things - pencils, pens, plasticine, glue, scissors... (K1); "Everyone has to have their own pencils and materials" (K5); "We keep the books, only the teacher shows them, we can't touch them... sometimes we see on the computer" (K1); "We don't have the costumes and jewelry from the make-believe area" (K2) "Because we can't wear clothes that others wear" (K2); "The dolls don't have clothes either, because we always had to wash them"(K2); "We also don't have the stuffed toy shelf anymore"(K2) "In the train we have to have distance between classmates" (K1) "We can't go to the park anymore because there is COVID 19 and the children can't play in the street" (K2); "So we can't share" (K5); "We have to be further apart in the room and in the cafeteria", (K5); "We also can't play with friends from other classrooms", (K5) "We don't see our teachers' faces" (K5).

The children are also aware of the necessary reorganization of the space and the daily routine that had to be carried out and that is visible in the following speeches: "Now we always go to the room in the morning and to the playroom in the afternoon" (K2); "We can't go to the upstairs room because we would be next to the boys who live there" (K3); "We don't have a costume area, we don't have a games area, we have fewer places at the tables" (K3); "There aren't many blankets. We have a rug for house one" (K4). However, they recognize that the limitations also enhanced the creation of new areas: "that's why we created the doctor's area" (K1) or "since we can't go to the park, we made our park with sand and toys, balls, the horse, the zebra and games" (K2).



Figure 23- The doctor's area in K1

The drawing in Figure 2 is explained by the child who refers, regarding the space as it is now that: "I drew the doctor...I mean the doctor's office, to examine people and their children. The diseases like the COVID of people who didn't wash their hands and some also broke their arms. I also drew the little house the table where we work, the chairs with the names. The walls with few works". She points out that in the drawing she made about how she would like the space to be that "I would like to have your [educator's] desk against the wall, I would like to have a slide, to have many places to sit, cuddly toys and books" (K1).

However, regarding the space, the children were able to perceive positive aspects that emerged from the situation caused by the pandemic. They mention that "fruit time is also better in the classroom" (K3), "we have a park just for us" (K2), "before we didn't have a tent and now, we do" (K3).

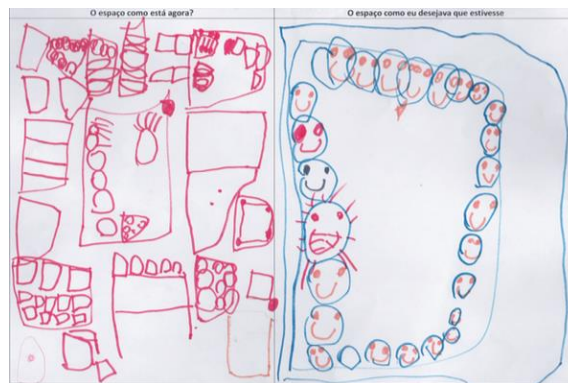


Figure 4- The tent in the K3

In K3, the introduction of a tent, where children can look at books, play with puppets and have more private moments, seems to be one of the positive aspects of the changes made, as expressed by the child who drew the picture in figure 3: "

The outdoor activities seem to be the aspects most valued by the children as can be seen in the following speeches: "we can do things in our park, because it's closed and nobody touches it" (K2) "we plant the flowers and go watering" (K2); "we make castles in the sand" (K2); they indicate that the space is better because it has more room to play (K3) and "what is better is that we spend more time in the pine forest, the park, and the soccer field" (K5).

They also highlight negative aspects associated with the deprivation of materials: "we have less materials because they have to be quarantined. We can't use them all at the same time" (K5). They also expressed their dissatisfaction with the change of space (change of location), stating that "I liked to be in the upstairs room, and I always played in the constructions and in the little house and I liked the upstairs room better, it was my favorite room. (K3); "the room was different (...) had a big game that was difficult and had more things. (K3); "I liked [the upstairs room] better, it was not so big. We had different toys" (K3); It didn't improve, because this space was for dancing and parties (K3).

Moreover, the children reveal that they miss (, not only the materials, but also the interactions and other forms of socialization. Their statements reflect these perceptions: "we liked it when we could walk in the street without Covid (K2) when we could go visit things, other schools, with other kids (K2) when "we

could go to the Eixo Park (K2) when "we could go to other people's houses without being family" (K2); "playing with kids from other classrooms and being all together (K5).



Figure 5- The need for interactions with others in K4

Figure 5 expresses one child's feelings about and misses interactions with materials and peers, stating that: "Our room is different now! It's emptier! There aren't many blankets. We have a mat for each one. We are always in our room; we are not with the other kids from the other rooms. I wish there was a tablecloth and more chairs. More games, a maze. More dolls to dress up. I wish we had a real computer in the room, and a sandbox so we could all play together. The room with more rugs would be more beautiful" (K4).

A group of children miss the "mirror" (K3). The use of the mirror in early childhood education is well documented in the scientific literature [21], [22] which points out that when children look at themselves in the mirror they experience different sensations, perceptions and emotions, reacting in different ways, they are surprised, search, laugh, observe, show joy, sometimes sadness or strangeness, sometimes they are fascinated. Therefore, it is important that it has a place in the spaces that is accessible to all children and that is at their side so that they can and already do look at their image.

The children also talk about how there should be improvements in the spaces to create new experiences and learning opportunities, for example: "we can get more games to play in our park" (K2); "I wish there was a swing and a slide to play on" (K2) and "I like the grass floor for picnics" (K2).

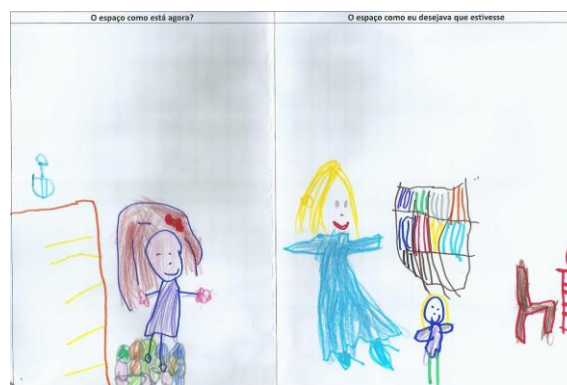
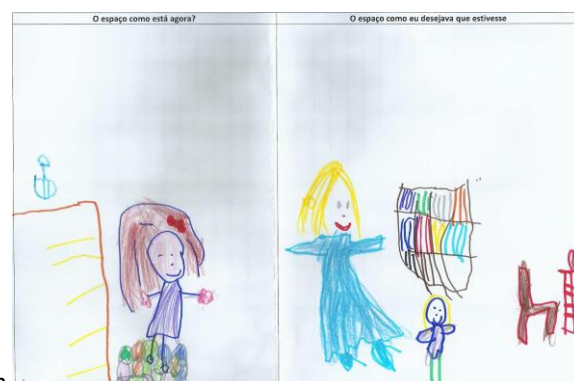


Figure 6- Interest in new areas in K1



The comment of the child who drew the picture in



Figure 6 expresses a desire to reintroduce materials that are currently forbidden, such as books and make-believe areas: "I would like to have you [the educator], here at school, to have books and a make-up table" (K1). The comment also expresses the need for closer interactions with the educator.

## 4 CONCLUSIONS

The return to kindergarten after the first general confinement due to the pandemic situation caused by SARS-COV2, had a great impact on the children's interactions and learning experiences, resulting from the spatial changes imposed by DGS. The spaces were rethought and structured according to the children's needs and interests, offering different ways of interaction and play, among the children, between them and the materials, and natural environments that ended up being privileged. The recommendations and specific conditions focused mainly on reducing the number of children in the internal and external space, increasing the distance between them at the same time that the materials available in the room had to be reduced, prioritizing the presence of those considered essential to the pedagogical activity and easy to disinfect, according to the reality of each Kindergarten.

The educators participants in this study highlighted as the main constraint the reduction of child-child, child-adult, and parent-education professional interactions. They also highlighted the limited spaces for groups and the reductions in pedagogical materials, which reduced the diversity of learning experiences and opportunities. They mention, however, that the educational environment was strengthened by working in small groups in a "bubble". There were multiple opportunities for games and activities, including outdoor play, which promoted exploration and a new and broader range of learning experiences where creativity and imagination were present, but also cooperation, resistance, resilience, and increased confidence.

The children were aware that the space had a different layout and that there were more materials in the room before COVID-19. What they emphasized the most was the need to comply and understand this new reality due to the pandemic, which requires them to constantly clean their hands and spaces, and to reduce the materials available. This pandemic affected them particularly in the lack of greater interaction and socialization with friends and adults, which is what best characterizes human beings: socialization.

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