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Can We Build Inclusion?

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Abstract. Inclusion of children with special needs in kindergartens and preschools may be approached from different angles. This paper raises the question of whether the physical framework of kindergartens makes any difference for daily life at the kindergarten at all, and whether it can support inclusion of some children with special needs. Hence the title – can we build inclusion? In the literature of Universal Design, accommodation and design features seldom reflect the less visible disabilities. The paper is based on a research project initiated to investigate how more or less space influences daily pedagogical practice in general. Twelve interviews were conducted with experienced teachers from twelve different kindergartens with different amounts of space, varying from a ratio of 2.1 m^2 play area per child to 5.5 m^2. The results indicated that, for a group of children with special needs in particular, the amount of space is crucial. This group consisted of children who were socially very extrovert, and who maybe were noisy, easily provoked, and quick to get involved in arguments with other children. Alternatively, children in the group were very restrained and withdrawn in social interaction. Based on the answers in the interviews, we found support for answering the question in the title in the affirmative; we can build inclusion! This is because the teachers' experience indicated that, if there was sufficient space per child, there were fewer conflicts and the children managed to stay in the same activity for a much longer period. Sufficient space made it possible to divide the children into smaller groups, and use any secluded space. Therefore, it was much easier for other children to include some children with special needs. Accordingly, we can say that, sufficient space per child and an adequate layout and furnishing of the kindergarten is an advantage for *all* children. This is a clear example of Universal Design in which architectural solutions that are good for one specific group are also beneficial for all children.

Keywords. Inclusion, Universal Design, children, kindergarten, space

1. Introduction

A society can be judged by how it cares for its weak, and this includes how it cares for people with disabilities and perhaps how it includes children with special needs in kindergartens rather than referring them to special institutions. This paper raises the question of whether the physical framework of kindergartens makes any difference for daily life at the kindergarten at all, and whether it can support inclusion of some children with special needs. Hence the title – can we build inclusion? All things being equal, more square meters will offer more possibilities than fewer. As a basic condition, this applies to architecture and likewise to kindergartens. In fact, you can hardly find any examples of somebody arguing that it would be better to place many children in fewer square meters. On the contrary, authorities have an ambition

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and an interest to offer citizens and their children the best possible conditions. However, this is a balance of the well-being and development of children on one hand, and finances on the other hand - two very different and conflicting arguments that have to meet in negotiation. This negotiation can certainly be very heated, but the notion leading to this article is that, although parents and teachers will argue that space is needed in kindergartens on the basis of their experience, and references can be made to research documenting that more space per child is important, there is a lack of knowledge about why space is important. We lack knowledge on the qualitative aspects of having more or fewer square meters. For example about the kinds of pedagogical activities and social interaction that are facilitated/limited by more or less space. In order to qualify discussions on this topic, a research project was initiated to investigate how more or less space influences daily pedagogical practice. Interviews were conducted with experienced teachers from different kindergartens, varying from a ratio of 2.1 m^2 per child to 5.5 m^2. At this stage in the process, our interest was still at a general level and our research question concerned 'children' without connotations of designing for *all* children, including children with special needs.

However, the findings resulted in more and different knowledge than anticipated at the setup of the project. The results clearly indicated that different kinds of daily activities are facilitated or limited by different amounts of space per child, layout and design of buildings, and the results demonstrate a close interaction between the building itself and the strategies that teachers develop to fulfil their pedagogical intentions. By analyzing the interviews, it became clear that, especially for a group of children with special needs, the amount of space is crucial. This group consisted of children who were socially very extrovert, and who maybe were noisy, easily provoked, and quick to get involved in arguments with other children. Alternatively, children in the group were very restrained and withdrawn in social interaction. Important here was that the qualities identified in the interviews as valuable for children in general were the same qualities as those identified as important for some children with special needs. Thus, based on the answers in the interviews, we found support for answering the question in the title; yes, we can build inclusion.

2. Method and Research Design

A basic assumption in this paper is that learning and development can be influenced by the physical environment. This assumption is not to be read as a simplistic, deterministic understanding of the relation between buildings and people's behavior and interaction, but it gives an understanding of the kindergarten as a co-organizer of daily practice in kindergartens. The relationship between buildings and users is seen as an interaction.

The research question is: "How do differences in building design (play area:child ratio, and lay-out of space) influence inclusion of all children, including children with special needs?" The paper is based on a research project "Plads til trivsel og udvikling" (Space for well-being and development) conducted at the Danish Building Research Institute [1].The concept 'children with special needs' covers a wide range of different needs from physical impairment, sensory impairment, intellectual impairment or needs linked to difficulties linked to social relations and interaction within a group. In this article, the concept 'children with special needs' is children whom the teachers considered difficult to integrate because of problems linked to their functioning in the

group. This definition was indirectly given by the examples the teachers themselves gave when asked how space might influence caring for children with special needs.

The empirical foundation consists of 12 semi-structured, qualitative interviews with teachers working in kindergartens, primarily in a management function. This means they had considerable experience. Having in mind that people do not necessarily actually do what they think they do, interviews were nevertheless chosen as a method for getting first-hand knowledge of experiences and reflections among professionals on pedagogical practice and daily life in kindergartens.

Criteria for selecting the respondents were differences in kindergarten buildings, with a diversity in play area:child ratio ranging from 2.1 m^2 per child (the minimum in Denmark is 2 m^2 play area per child) to 5.5 m^2 per child. The layout varied from being divided into smaller secluded spaces to transparent open spaces. The chosen institutions cannot be taken as a mirror of the general situations in Danish child care, but were chosen in order to gain experiences from a broad range of sizes and layouts.

The age of the children in the Danish kindergartens ranges between 3 and 6 years. The interview guide was structured in three clusters of questions: introductory questions to get a general assessment of the building; a number of questions concerning the amount of space and how it influences daily life and pedagogy; and finally how the buildings supported compliance with statutory requirements for children's learning. Qualitative questioning was used, allowing the respondents to focus on subjects to which they attributed importance. Each interview lasted about one hour, was taped and transcribed afterwards.

3. Theory

3.1. Previous Research on Child:Space Ratio

Previous research deals with the question of space and layout; of the physical design and the role it plays for fulfilling of the pedagogic intentions in kindergartens.

Evidence in a mathematical sense is sparse. An exception is a number of research projects dealing with the relation between space and the possibility to predict risk for contagious diseases. Here, a clear connection is found between number of square meters per child and number of days lost through illness (sick days), concluding that more space per child gives more healthy children [2], [3], [4].

In previous research, an attempt has been made to reduce complexity and isolate single parameters in the interaction between building and people. However, the results from investigations using quasi laboratory experimental methods and results from comparisons with control groups far from always supported each other, and it was difficult to achieve the required objectivity, [5]. The reader is still left with unanswered questions of how the different parameters influence each other.

The complexity of the interaction between children and space has led researchers to look for other research approaches, and another method has often been applied in more recent studies by observing the interaction in the actual settings, a research method inspired by ethnography. However, studying more variables at the same time makes it more difficult to draw clear conclusions.

With the growing interest in environmental psychology, the concept 'behavior settings' became important in the study of the interaction between children's behavior and their physical environment [6]). However, according to Gary T. Moore, the first

studies lacked a meaningful conceptualization of the physical space. In his study "Effects of the spatial definition of behavior settings on children's behavior: a quasi-experimental field study" [7] Moore investigates the influence of spatial definition for the behavior of the children. A well-defined behavior setting according to Moore is equipped and furnished for only one activity, without being totally secluded from other activities. The recommended size is usually to hold between two and five children and a teacher, and he reckons 5-10 square meters to be a good size [idem. p 28).

To be spatially well-defined means that it is separated from other places by means of (low) partitions, book shelves, cupboards, changes in floor level etc.

Smith & Connolly [8] found that, although it is not possible generally to state a connection between spatial density and behavior, there is an upper limit for how high density can be before it affects the functioning of a group of children. Thus, the official minimum size limit in England was 25 square feet / 2.3 square meters, they state, was not without reason.

Other researchers have focused on the role of resources and studied how resources guide children in their activities. Rohe and Petterson (quoted in Kampmann [9]) found that the highest percentage of relevant participation in constructive behavior occurs at about 5 m^2 per child and a good amount of resources.

Several researchers find that it is possible to compensate for density by increasing the amount of resources and by clear subdivision of the play area. However, this is up to a certain limit – if there is less than 25 square feet per child it is no longer possible to compensate by means of introducing more resources. [8].

In one of their research projects on kindergarten buildings, the Dutch researchers Ine van Liempd and Ed Hoekstra, , evaluated 30 day care institutions (POE) and they found that at least 4 m^2 per child is required to make activities possible, [10], [11].

The Swedish researcher Billy Ehn [12], on the other hand, argues that because the very well-prepared activity places invite to specific sorts of activities, they can become predestined for certain activities, meaning that initiative is taken from the children, instead of stimulating their own fantasy and initiative. According to Ehn the experts then have to 'plan the unplanned' [12, p. 78].

3.2. The Concept of Universal Design

Universal Design (UD) originates from the Barrier-free Movement that since the middle of the last century has worked for an accessible built environment in the USA [13]. UD is a way of designing a building or facility, at little or no extra cost, so it is both attractive and functional for all people, whether disabled or not [4]. Instead of designing a specific access solution for a specific group of users with disabilities, the intention was to design solutions usable for everyone at any age, thus preventing stigmatization of people with disabilities. Mace emphasizes that all people will experience some kind of disability to some extent going through life; for example being pregnant, becoming old.

UD was defined as "applicable or common to all purposes, conditions, and situations" [15 p. 2] and UD was described as an approach to design [15]. Mace is regarded as the father of the UD concept as it appears today:

Universal Design is the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design [16].

That a building or a product should be universally designed has been problematized by asking: would it be possible to design something that everyone can use? [17]. Mace explained that "*The term universal is not ideal because nothing can be truly universal; there will always be people who cannot use an item, no matter how thoughtfully it is designed. However, we can almost always improve on the things we design to make them more universally usable."* [18, page 23].

The definition of UD by the Center for Universal Design is the underlying basis of the definition of UD in the UN Convention on the Rights of Persons with Disabilities, where the focus is much broader than products and environments.

'*Universal design' means the design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design. ''Universal design'' shall not exclude assistive devices for particular groups of persons with disabilities where this is needed*" [19].

In order to make the concept manageable and offer designers guidance, seven principles for UD have been formulated at the Center for Universal Design at NC State University: Equitable use, Flexibility in use, Simple and Intuitive Use, Perceptible Information, Tolerance for Error, Physical Effort, and Size and Space for Approach and Use [20].

3.2.1. Great Focus on the Physically Disabled and Old People

It is not stated in the seven Principles of Universal Design that they primarily concern the physical environment. However, photographs on the poster presenting the seven principles mostly illustrate the interaction between the physical environment and a person with physical disability [21]. Principle seven about 'size and space for approach and use' seems relevant in relation to the topic of this paper, opening up for a broader understanding of the concept of UD. However, in this case too, the interpretation and communication of the principle primarily focuses on physical disabilities and assistive technologies. As an example, we could mention a presentation from the Centre for Excellence in Universal Design in Ireland [22]. At the Center for Inclusive Design and Environmental Access (IDeA), University of Buffalo, they have designed pictograms to illustrate the principles [23]. The pictogram about principle seven is illustrated with two people of different sizes; it could be an adult and a child. In 1985, Mace pointed out that children would be helpless and handicapped in an environment designed for adults [14]. Children were used as an example of the challenges related to lifespan.

Despite this stance, and the children being an important group of users in UD, they are almost absent in the literature on UD. However, they are not the only group of neglected users; invisible disabilities also play no role in the literature. The literature in the field of UD is primarily about people with physical disabilities and the elderly (regarding mental health, most of the literature is about dementia, for example: [24], [25], [26] and the tendency is also present in relation to education, for example: [27], [28]).

3.2.2. A New Focus on Social Inclusion

Steinfeld advocates a new version of UD based on expanding the focus. By emphasizing social inclusion, health and wellness, and prevention of disability, the intention is to make UD relevant to the entire population and then increase the adoption of UD. He opens for a new group of users by pointing out that diseases like asthma and depression could become important issues in UD. Furthermore Steinfeld points out that

UD should be conceptualized as a process. *"A process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation*" [29. Page 56]

Eight goals of UD have been developed in order to address anthropometry, biomechanics, perception, cognition, social participation and human performance in relation to a development of UD: Body Fit, Comfort, Awareness, Understanding, Wellness, Social Integration, Personalization and Cultural Appropriateness. These goals can be combined in a crossover with the Principles of Universal Design [30].
In this paper, UD is used as a combined term for design for all [31], inclusive design [26] and universal design [15].

4. What the Interviews Told

According to the teachers, a low space:child ratio means that children get too close to each other and there is more unrest, more noise and more conflict. They called attention to their experience that more spacious kindergartens were quieter, had fewer conflicts and children were able to be occupied in the same activity over a longer period. This confirmed previous research [32], [33].

4.1. More Space Creates Possibilities for Body and Mind, Alone or Together

The teachers' answers reflected on the question of how differences in layout and space make a difference for everyday life in kindergartens. More square meters make it possible for children to be more bodily active. Children take up more space during their activities than adults. Another aspect is that more space enables children to concentrate in order to develop new knowledge or competencies. Here is an experience from a kindergarten with more than twice as much space per child than minimum:

"This may be play with building blocks – if the players come too close to each other, the noise will be too much and they will not be able to find peace to talk together, get the ideas, inspire each other with ideas, and take over each other's ideas –they will constantly be interrupted. An important reason for giving the children more room is that they will develop far better, because they get more room to become absorbed in a task."

The quotation indicates that the number of square meters per child makes a difference in more than one way. Sufficient space meant that some conflicts could be avoided. It meant that the children could partake in longer-lasting activities, thought to be good for development. Another advantage was that fewer conflicts gave staff more time to support children in their activities instead of spending time on resolving conflicts.

Clearly the teachers wanted rooms for children which could be divided into smaller areas for concentrated and undisturbed activities. This is especially important for free play, and the teachers actively took measures to spread the children, possibly taking groups outdoors in shifts. By means of furniture, the space could be divided into smaller spaces, 'activity pockets', as Moore coined them [7].
One question was "do children play better in secluded spaces?" and a teacher answered that seclusion helps the children to exchange ideas and grasp the perspective of each other:

"I think they become more involved in their activities. They become more attentive towards each other and socially able to put themselves in the background to listen to others. It is a framework for listening and grasping each other's perspectives some way or other. Instead of getting interrupted and having to start from the beginning – children are often interrupted because they don't have the space."

All in all, the teachers found it an advantage with more (smaller) areas and pockets spread in the building, and they would often furnish the spaces to create such pockets, or structure the timetable for the day so that one group was in the playground while the rest remained indoors.

4.2. Enough Space is Essential for Children with Special Needs

Danish kindergartens are obliged to draw up a pedagogical curriculum within these six themes: The comprehensive personal development of the child, Social competencies, Language, Body and motion, Nature and natural phenomena, Cultural expressions and values. In addition, the curriculum must describe how the institutions intend to support learning for children with special needs.

The teachers were asked whether activities to meet this demand could be realised within the existing building, and the overall impression was that the text of the law in fact puts into words what was already part of their practice. However, questioning the last point, how to support learning for children with special needs, gave the most revealing answers and makes up the core of this article.

It turned out that, for children with special needs in particular, the physical environment was of importance. Special needs can cover a wide range of needs; physical, mental and behavioral but, as stated above, in this article "special needs" are defined through the examples given by the teachers. In their examples, the children had various difficulties related to behavior and social functioning in the group. The difficulties covered very extrovert children as well as very introvert children, or children with a low threshold for becoming provoked. All in all, it was a group of children with difficulties in finding acceptance and inclusion in the main group of children.

These children, the teachers stated, needed an environment which they could 'cope with' and they needed some peace and quiet, which also concerned the size of the institution in terms of number of persons. However, an important aspect was the amount of space around the children, and a number of reasons for this can be listed. A teacher pointed to the fact that the children were in need of individual attention, but that it was often difficult to find both space and staff for them. Often, it was an advantage to take the children into secluded, quiet areas. For example, if a child needed some special language training, carrying this out among the other children could attract too much attention from the others. Therefore, a secluded place would be needed.

It was of particular importance for the children to have room for physical activity, moving around and playing without colliding with others, because some of them responded very strongly if they collided with others. Here, more distance between children or separation of places was of major importance.

One of the institutions (2.1 m^2) was for a period accommodated in another - more spacious - building because their own was being renovated. It gave the teacher an opportunity to compare the different space:child ratios in relation to the same group of children, and she was very surprised to see the difference. In particular it provided

opportunities for some very extrovertly reacting children, because it turned out that the other children were better able to include these children:

"Space/room means a lot. We saw some children, who we would describe as very extravert in their reactions, functioning differently while they were here in this other, more spacious environment. It was even clearer with the vulnerable children. We were actually quite surprised. We had not expected it. And we all said to each other: Look, what's happening here! We saw it clearly. It was almost a little frightening, I think. It was obvious that the other children in some situations may have to withdraw from the children who occupy a lot of room. But the fact that these children were not so extrovert in the larger building meant that the other children could better accept/include them."

A special effort might be needed to make a child with special needs 'visible' in a positive way to help it to get a place within the group. From an institution with a high ratio of square meters per child (5.5 m^2), the teacher told how a small group of children in a separate room could play undisturbed while one child played a leading part:

"Children with special needs must have support from the adults to be made visible. We can give them some quietness here (a separate room). If the child in question has found something interesting outside, you can let a small group go to this place and examine it without interruptions from others. They are allowed to go to the workplace and then others are not allowed. In this way you create a context that is easy for a vulnerable child to deal with. In this way, space plays an important role."

More space made it possible to develop some activities further and go into more depth because it was not necessary to tidy away everything every now and then. An institution had extra resources, also in terms of square meters, because of some hearing-impaired children in the group. Once a boy came for language enhancement and observation before school start (age 6 years). He was very good at building model railroads and he used all the available toys for the construction. Other children were welcome to join in, as long as they did not ruin the game.

It turned out that the amount of space was crucial because he could pursue and unfold what he was good at. He received high-status among the group. He was much in demand as a playmate. Because of sufficient space, it was not necessary to tidy the playthings away and he could continue the construction the following day. Furthermore, the spacious rooms were quieter and he could benefit better from his hearing aids. Moreover, his language developed in a very positive way before he started school – and he left without any 'diagnosis'.

5. Analysis

The results indicate that some of the most vulnerable individuals in a kindergarten serve as a kind of indicator for the general architectural qualities in terms of spaciousness and of giving opportunities for a variety of activities - especially children's free play. The teachers working in the kindergartens considered these qualities of utmost importance for all children, but particularly important for children with special needs. Sufficient space made play and activities occur more smoothly and frictionless than in a cramped space. Playing could go on undisturbed over longer intervals and with fewer conflicts. A positive consequence was that teachers got more time to support children in their learning and development.

Notable is the fact that, for children with special needs, lack of space seems to have major impact and the consequences may be much stronger than for the rest of the group. This is because children with special needs may pay the highest price if the environment is too crowded for them, and some of them may be subject to social exclusion. Part of their 'problem' was that they might react more strongly to collisions with other children, get distracted more easily by activities close by, and they tend to disturb other activities. Another unwanted aspect was that if a child needed extra supervision, for instance language training, the activity could attract too much attention from other children if it was not possible to find a secluded space. Sufficient space in the kindergarten can become a platform for social participation that contributes to the first and crucial step towards inclusion, perhaps with consequences for future social participation.

Children with special needs might easily be pointed to as the 'problem'. However, the findings here invite us to change focus from the child to the physical environment as carrier of the problem, which would be in accordance with the view of disabilities promoted by the Convention on the Rights of Persons with Disabilities [34].

6. Conclusion

The results from this qualitative research project indicate that an improved space:child ratio in kindergartens offers better conditions for inclusion of children with special needs. The results do not enable precise recommendations for the number of square meters required per child or how an adequate layout and furnishing of the kindergarten should be designed. Therefore, more research is required. Firstly to affirm or confirm the results by conducting systematic comparisons between kindergartens with different child:space ratios and a limited number of well-defined behavioral aspects, secondly further investigations are needed to find a number of square meters which defines a minimum to be used to build inclusive kindergartens. In such a study, it would be relevant also to study different qualities of the space and the sensory aspects of the space, especially light and acoustics.

If the results of continued research support the findings presented in this article, we have an example of UD in which the physical framework plays an important role for the daily life of both children and staff.

The findings show us that differences in physical environments can make a difference on a mental-social level, improving opportunities for inclusion of children with special needs. The findings further make clear that differences in quantity and quality of space which make the environment more inclusive may be beneficial for *all* children.

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