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Quantitative variations of schoolyard sizes

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Abstract

How are changes in urban principles reflected in the design, size and placement of schools and schoolyards in Stockholm municipality? The aim of this study is to analyse schoolyards and how they vary in size and location in relation to the historical urban morphology development. Lately, schoolyards and specifically the size of schoolyards has become a highly debated topic in Sweden, with reports on the size of school premises shrinking from year to year, or schools even being built without outdoor yards. The reasons for smaller school premises may be ad hoc solutions to a growing population and/or densification of the city. The study includes 143 public compulsory schools in the municipality of Stockholm, primarily with examples from the urban expansion in early 1900 and forward. The size of the schoolyard and the size of the yard in relation to the size of the school building are analysed. In addition, it is highlighted when the school was built and what building character were present at the time. Together with planning regulations and the major urban principles (Stone City, Garden City, Neighbourhood Units, Million Homes Program and the walkable city), the study gives examples of variation over time. This study results in an overview of when public compulsory schools are built in Stockholm, their yard sizes (today) and a brief history of planning regulations. These findings can inform contemporary school design and shed light on the debate about shrinking school premises.

Keyword: *Schoolyard size, urban principles, architecture, planning regulations*

Introduction

Lately, schoolyards and specifically the size of schoolyards have become a highly debated topic in Sweden, with reports on the size of school premises shrinking from year to year (SCB, 2018), or schools even being built without outdoor yards, not reaching national recommendations (ibid). At the same time, there are vast amounts of research concerning the importance of outdoor environments of children, in relation to health, wellbeing, motoric skills and cognition. There are increasing gaps in terms of social polarization in Stockholm (Stockholm Stad, 2015) and schools are described as having both educational and physical differences (Isling Poromaa, 2016). The former proud concept “one school for all” in the sense of independent of where you live and what school you attend you may have the same compulsory education, may be questioned.

Most of the research done on schoolyards and preschool yards are done by other professionals than architects or urban planners, hence there is not much focus on the built environment and its performance. The first aim of this study is to clarify the current situation of the schoolyards. If and how the size of the schoolyards is relating to other aspects in the built environment, like building year, curriculum and planning regulations. The second aim of the study is to contribute to the ongoing discussion about schoolyards and to add to the complexity of the question. If we know more about the present schoolyards this can inform the planning of new ones.

Background

A comparison of schoolyards, of compulsory schools, in the time span 2014-2017 in Sweden, shows that the size of schoolyards dropped (SCB, 2018a). If looking only at Stockholm, the size of public schoolyards decreased 5% between 2014 and 2017 (SCB, 2018b). There are differences between city and rural towns (SCB, 2018a), implicating a connection between schoolyard size and density. This study will look at a more nuanced level – how the schoolyard size relates to building character, building year and location in the city.

Why are schoolyards important?

Schoolyards play a role both for children during school days, for children after school hours and the local society (Larsson et al, 2017). During school days the yard is used as a space for play and rest in-between lessons, for sports and outdoor education. For children after school hours and during weekends the schoolyard is a space for play, sports, homework and a social space. For the local society, the open space of the schoolyard is used for cultural activities, sports, recreation, local democracy (political elections), fairs and association meetings. Some schoolyards contain greenery like trees, shrubs and some grass, which is of benefit for ecosystem services such as biodiversity, local water management and temperature regulation. Well-designed and located yards plays an important role in the social life of the community (Klinenberg, 2018) serving as a natural meeting space for both adults, adolescents and children. As this meeting space, the schoolyard is a physical ground for starting friendships and forming social relations (Peponis, 2017). The schoolyard, as well as the school, can also be a part of creating a social arena that contributes to integration (Legeby, 2013).

The children benefit from schoolyards in health, concentration and physical activity as shown by Jansson et al (2021), Mårtensson et al (2009), Söderström et al (2013) and Boldemann (2014). Schoolyards may also have positive effects from an environmental perspective, especially those designed with greenery and permeable surfaces. Giusti et al (2014) have found that children who on a regular basis visit and spend time in green areas are more empathetic and concerned for non-human life forms. A study by Björklid (2005) shows how the physical environment also influences learning outcomes. Concluding that both these studies strengthen the importance of the built environment for cognitive skills in children.

As the schoolyards become smaller they become less functional both from a user's and from an environmental perspective. The children move less and are more in crowded surroundings, which may cause more aggressive behaviour (Jansson et al, 2021). Smaller schoolyards are usually having less greenery as a consequence of both less space and also intense usage – greenery has a hard time surviving with the increase of wear as shown by practice (Enskede Årsta Vantör 2019 and Männik et al 2017).

The National Board of Housing, Building and Planning (NB) provides recommendations for the size of schoolyards (Boverket, 2015). However, it is not clear how they have arrived at these recommendations, there are no references to any empirical studies. Rather, the recommendations most likely derive from

practice and municipal guidelines (Kylin 2014 and Norman Bjarsell 2014). Looking at the history of state recommendations and guidelines for schoolyards, before the ones from NB in 2015, Lindholm (1995) concludes that since 1979 no new guidelines have been presented by the state. Looking at the municipal level, not all municipalities have guidelines for schoolyards (Kylin, 2015). One example of this is the municipality of Stockholm, where this study is carried out.

The field of architectural research on schools is wide, and here two examples are brought up. It is where either the built environment as such is considered, as the design and layout of the building (Bjurström et al 2006) or the school as a place in society (Bacharel et al 2017 and Legeby et al 2019). If the first is more concentrated on the building, building materials and disposition of classrooms, less interest is paid to the relation between school and city. The second is mostly interested in the relation school/city and not so much in the school as a space. This study focus upon the built environment of the school and schoolyard as well as its relation to the city. Hence it will contribute to a deepened understanding of how schools are both a place in relation to the city as well as a built space.

Methodology

According to the planning office, there are 274 compulsory schools in Stockholm municipality, about 120 of them are private and 154 are public (SBK, 2019). Because of different regulations between public and private schools, only public schools are included in this study. Due to the way the schools are mapped and errors in the data set, 143 of the 154 schools are included in the study, primarily with examples from the urban expansion in the early 1900 and forward. The data in this study is provided by municipal departments in Stockholm, see table 1.

For this study, the different data were combined into one new dataset, through the use of geographic information system (GIS) as well as the name of the schools. From this new combined database, the analyses are done in excel as well as GIS-program. Concerning the accuracy of the data from the municipality, some tests were done, especially concerning the location of the schools, to verify the quality. Ongoing research by Kylin (2021) is testing how the yard size is measured and its accuracy, this will be included further on.

Table 1, showing where the data comes from.

What	From who	Name/where	When
Size of schoolyard and building	Education office and SCB (UTBF)	Friytor2019_grundskolor	2019
School “form” (public/private) and amount of students	Planning office (SBK)	Grundskolor	2019
Building year	SISAB (property manager of schools)	Database online	2021
Building Character	Planning office (SBK)	Stockholms Byggnadsordning	2020

The building characters used in Stockholm building code (Stockholms byggnadsordning, 2020) are 12 different principles, from medieval times until the walkable city. To make comparisons possible (not many schools are built in all of the categories) they were summarized into 5 categories.

The word 'schoolyard' is used in the meaning of the playable area of the schoolyard where the pupils have free access in connection to the school building. This area does not include parking spaces, loading areas, storage and plantations. No schoolyards on rooftops are included since these spaces are not considered as yards, but rather as additional spaces (Boverket, 2015). Compulsory school in Sweden is for children aged 6-15 years. When school and schoolyard are written in this text, only public schools are included.

Results and Discussions

How big are the schoolyards?

In Stockholm, a majority (79%) of the schools have a total yard area of 3000m^2 or more. When looking at the relation between yard area and the amount of pupils attending the school, 17 (12%) schools have 30m^2/pupil or more. These 17 schools also have a total yard of 3000m^2. More than half of the schools (68%) have less than 20m^2/pupil. The recommendations on schoolyards from state level are a total area of 3000m^2 and at least 30m^2/pupil at compulsory schools (Boverket, 2015, p.42). A majority of Stockholm's compulsory schools meet the recommendation of total size (3000m^2). At the same time, a great share of the schools (88%) miss the recommendation of area/pupil. This means that even if a large share of the schools fulfil the requirements regarding schoolyard size, they are not big enough in relation to the number of pupils attending the school.

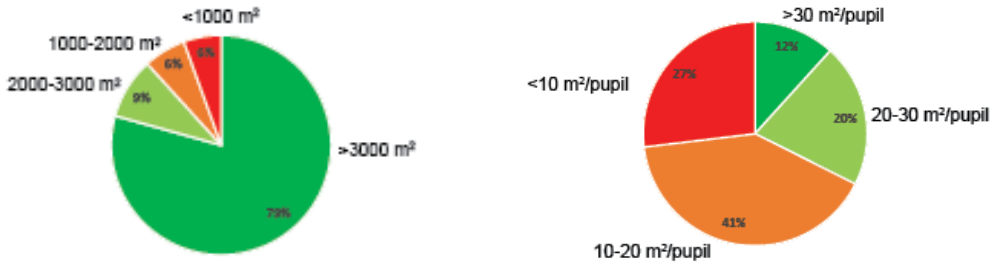

Table 2. Pie charts showing both total yard size (left) and m^2 yard/pupil (right).

When are the schools built and how does the building year relate to the area of the schoolyard today?

Most schools in Stockholm municipality were built between 1940-1980, these years may be described as the welfare state era. During this period, 79 of the 143 schools were built. Based on the size-diversity of the schoolyards four time periods can be identified, before the 1900s (1), 1900-1940 (2), 1940-1980 (3) and after the 1980s (4) (see table 3). Period 3 is different from the other periods, showing a higher diversity of schoolyard sizes. In this time period the schoolyards range between 3m^2/pupil and 120m^2/pupil. The time periods 1, 2 and 4 are more similar in terms of size of schoolyards, with at least 80% schoolyards with less than 20m^2/pupil.

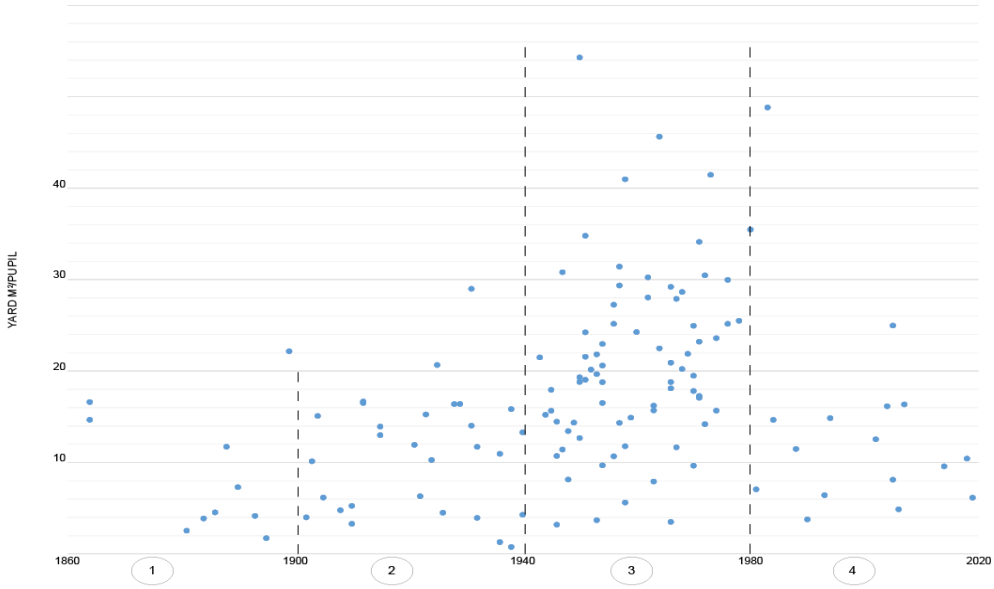

Table 3. Building year and m² yard/pupil.

When looking at the building character and m² yard/pupil the results are as follows: in the Stone City all yards have less than 20m²/pupil. In the Garden City, Neighbourhood Unit and walkable city about 1/3 of the yards have less than 20m²/pupil. In the Million Homes Program areas, about half of the yards have less than 20m²/pupil. The result show that pupils in areas described as 'stone city' have less space than pupils who attend schools located in Million Homes Program areas. Table 4 gives an overview of where the schools are located, the yard size/pupil as well as the building character of the area.

Planning regulations and practice

The relation between practice and regulations is shown through a combination of an average yard size and planning regulations (table 5). To also put this into an understanding of how Stockholm expands during a century, population growth is added. It is possible to see that schoolyard sizes tend to be larger during the ambitions of the welfare state era. Between 1950 and 1980 there is a slight decline in both population and yard size. After 1980 the population growth rises but the average yard size decreases. In the state regulations from 1944, recommended sizes for the play area and grass field for gymnastics (Lindholm, 1995) were included. Interesting however, is that the actual increase in average yard size started earlier, in the 1930s. In 1950 it was a peak in average yard sizes, possibly an effect of the size recommendations from the state in 1944. In 1955 parking spaces for bicycles and cars were specified as a component of the schoolyard (ibid.), and after 1950 the size of the schoolyards turns smaller again. After 1980, schoolyards are clearly reduced in size. A new state regulation was launched in 1979 that was valid until 2015, when it was replaced by the new guidelines that are the current recommendations. The effects of the 2015 recommendations are most likely not readable in practice yet, with respect to the time spans planning and building schools has. Also taking into account that after 2015 only two new public schools are constructed (in 2018 and 2019) according to the data set used (SBK, 2019). In 1980 there is a break in the trend, with both a steep decline of the average schoolyard size and at the same time, very few new public schools are built (Bjurström, 2000), and during the same period the population increases.

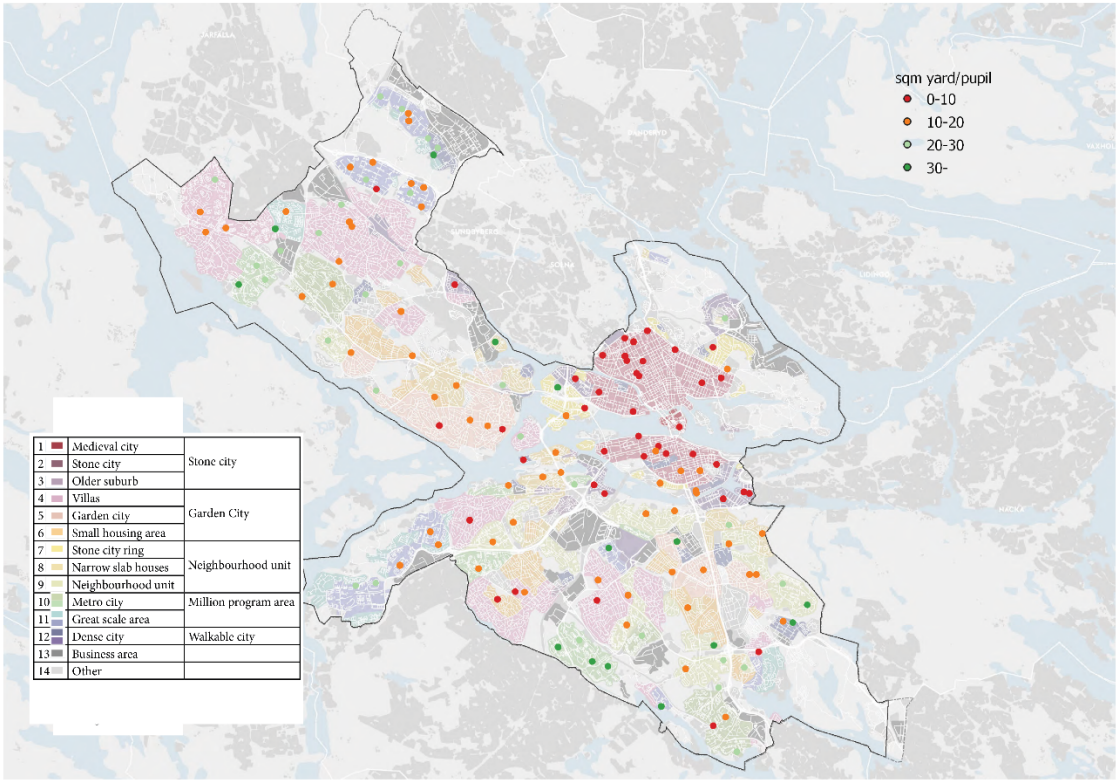

Table 4: Map of Stockholm Byggnadsordning, schools represented by points coloured according to size of yard/pupil.

The ongoing debate about the sizes of schoolyards is not typical for our time, it started already with the first state recommendations in 1865 (Lindholm, 1995). The debate has continued in waves since then. In Stockholm municipality, 80% of the schoolyards follow the recommendations from the state level concerning total yard size. However, recently built schools does not always follow this. When it comes to size in relation to the number of pupils, I would argue that a higher awareness is needed. Questions necessary to answer is what importance the size has, especially when new schools are built even bigger, with more pupils, due to managerial and economic reasons.

As outlined at the beginning of this text, the size of schoolyards and building density seems to be connected when looking at the different urban characters. In general the denser stone city has smaller yards and the Million Homes Program, characterized by more space between buildings, have larger yards. Therefore, this has to be looked at closer in future research with an exact definition of density, paying attention to building footprint, plot size and population density.

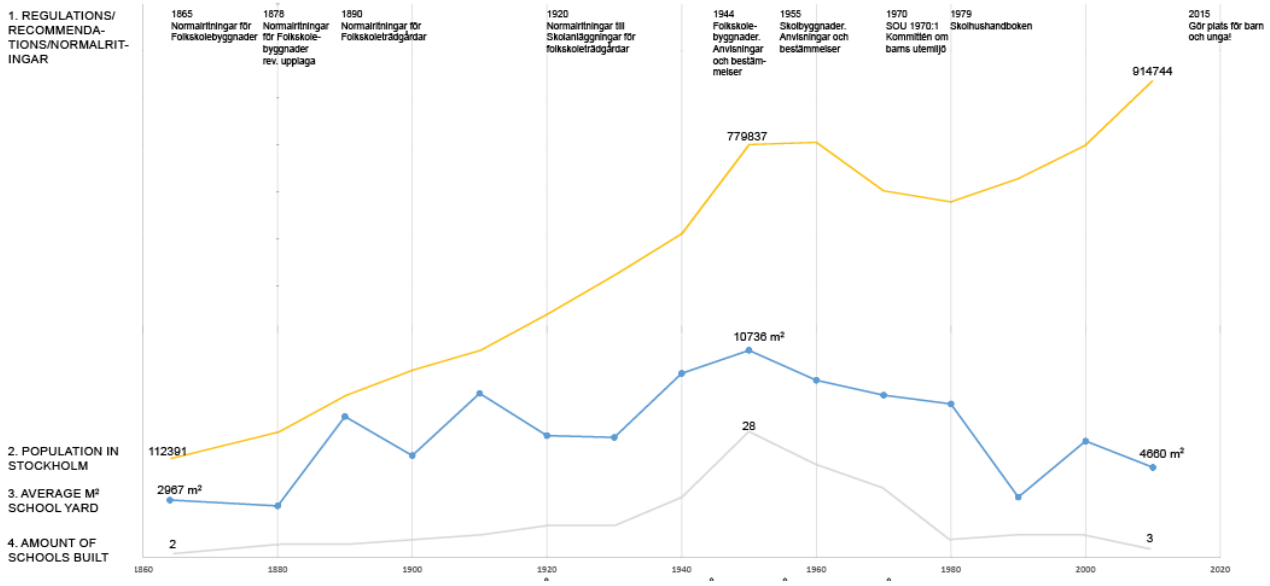

Table 5. This diagram shows the relation between practice and regulations. [1]

Conclusions

As much as 80% of the public schools in Stockholm have schoolyards that meet the state recommendation of having a yard that is 3000m^2 or larger. However, only 12% of all schools have schoolyards that meet state recommendations of space in relation to the number of pupils at the school. These findings show that most schoolyards have a size that are in line with recommendations, indicating that such regulations are important and have a strong effect on how schools are designed. This results are in line with what Nilsen and Hägerhäll (2012) found as they studied yards at preschools in Norway. A question that haven't been addressed in this paper is to what degree the size of the schoolyard has importance for the performance of the yard in relation to how children may use it. Having impact on children's health, stress reduction, environment and learning outcomes. This will be further studied in future research.

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1 The data about population is from SCB – but before 1967 there were several changes in where the border of Stockholm municipality is.

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