

Kartlegging av barns bruk av plass. Erfaringer fra Fredrikstad, Norge

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Vitenskapelig bedømt (refereed) artikkel

Renata Aradi: Mapping of children's use of space. Experiences from Fredrikstad, Norway

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«Barnetråkk» (children's tracks) is a participative planning tool with a long, successful history that aims at involving children in spatial planning processes. This method was adapted in a research project that studies the influence of the landscape context on the physical activity of adolescents. The experiences with «digital barnetråkk» aroused curiosity about the method.

«Barnetråkk» is introduced through the historical background. Afterwards, the adaptation to the research project and experiences are described; the working process and main results.

«Digital barnetråkk» raised other questions than the manual version. The discussion concentrates on the feasibility and possible improvements of the method both for practice and research.

«Digital barnetråkk» is a promising method that can be used for different purposes. However, with some improvements, it would be more efficient and easier to apply

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Introduction

This article was inspired by experiences gained in a research project which had the overall aim to study the influence of the landscape context on the physical activity of adolescents. Within the project, «barnetråkk»¹ was primarily used for data collection. «Barnetråkk» was developed as a participative planning tool to involve children in physical planning. The difficulties that emerged while working, aroused curiosity to learn more about the operation and history behind the development of «barnetråkk».

The main aim of the research project in which the digital version of «barnetråkk» was used is to increase our understanding of the environmental influences on the adolescents' use of the outdoor environment and the gender differences in it. The research design is based on case study methodology at landscape/neighbourhood level. Since the re-

search project focuses on how the landscape influences physical activity, the case areas were selected in different landscapes. Two schools and their neighbourhoods were chosen from the city of Fredrikstad. The city is located in southern Norway, divided into western and eastern parts by the Glomma river. Altogether, it has approximately 72 000 inhabitants. The settlement structure is dispersed, as it consists of several neighbourhoods. The selected schools are located in two different neighbourhood areas in the eastern part. One of them is in a hilly landscape; the other in a more open, flat area. From the schools, the 9th–10th grade classes (14 years old pupils) were invited to participate in the project, 121 children altogether. The participants' homes were not registered in the project, but most of them live in neighbourhoods close to the schools, only some of them live in other parts of the city.

1. In English: Children's tracks. In this article I use the Norwegian name.

In our case, the digital version of «barnetråkk»² was adapted and used as a data collection method, and hence we gained experiences about the operation of the tool, but not about the use in planning. Therefore, this article focuses on performing «digital barnetråkk» in a research project instead of analysing it for planning purposes. The aim of this paper is:

- to communicate the experiences with «digital barnetråkk» as a tool for increasing the understanding of adolescents' use of public space
- to outline how «digital barnetråkk» could be improved based on the experiences from our research project and similar projects in Sweden and Finland

«Barnetråkk» was the paper based predecessor of «digital barnetråkk». It was a pioneering project, initiated by Eva Almhjell and developed with her guidance from the late 1970's (Almhjell & Ridderstrøm 2003). The method is based on cooperation, and use children's own knowledge as a source to map the areas that have value from their point of view. Now it has more than three decades of tradition in the spatial planning system of several municipalities in Norway (Kommunenes Sentraforbund Vestfold, Statens Utdanningskontor Vestfold & Vestfold fylkeskommune 2000). The first digital version came out in 2006, when the technical development had become sufficient to allow for its introduction.

«Digital barnetråkk» is a powerful tool for involving children in spatial planning, but its existence in itself is not enough; the implementation process determines the expediency. Besides the early technical difficulties, some of the most sensitive elements of the digital method are very similar to the paper version (Haukelien & Holsen 2004); i.e. the organization of the workflow and cooperation between the participants are crucial in the procedure.

Through the historical review in this article, we give insights into the background, development and expansion of «barnetråkk».

The case description positions the tool within the research project, introduces how «digital barnetråkk» was customized to the research project and how it contributed to the development of «children's habitat maps», and presents the process and outcomes. In the last part, the results and experiences from the use of the tool will be discussed from a research point of view in the light of international examples.

Mapping children's use of space. The Norwegian context

The sociologist Eva Almhjell was the first to initiate the concept of «barnetråkk», and under her leadership a group of skilled professionals developed a method for mapping the children's neighbourhood area use. «Barnetråkk» was elaborated during the 1980s and 1990s in Vestfold county, Norway (Almhjell & Ridderstrøm 2003). The method addressed primarily the age group from 10–12 years (Vestfold County Council 2002). It was developed through action research and approved by the Norwegian Data Inspectorate³. The basic idea of «barnetråkk» was drawn from work on animal tracks (Haukelien & Holsen 2004). At that time tracking animals' movements had already been a well known concept for the assessment of natural values and biodiversity. When «barnetråkk» was introduced, nature protection had a strong influence on planning, while children's interest did not appear (Almhjell 2010a).

The four main principles of «barnetråkk» were: democracy, culture, health and contribution to sustainability (Almhjell 2009). The forerunner of the development was the extensive research on the children's urban environment that in Norway started in the early 1970's (Hammarqvist & Stenbråten 2009). In parallel with the urbanisation process, the number of cars also increased; traffic took over public spaces. There were little space left for playgrounds and the quality of these in general was quite poor. In the urban renewal processes, several researchers took part from different fields, aimed at improving the urban environment. Both the build-

2. Afterwards «barnetråkk» refers to the manual method and «digital barnetråkk» to the digital version.

3. Datatilsynet

ing and traffic safety policy concentrated on children's residential and neighbourhood environment. In the late 70s it became clear that the accumulated knowledge was not enough to change the policy and planning practice, therefore the focus of researchers moved to the children's role in physical planning processes.

«Barnetråkk» was also inspired by the UN International Year of the Child in 1979. This event intended to draw attention to the problems children face all around the world. Most of the results of the work performed during that year were included in the UNICEF Convention on the Rights of the Child (United Nations 1989).

The Norwegian legal system was ahead of the international process, with children's right taken into account already in the early 80's (Hammarqvist & Stenbråten 2009). The innovative technique of «barnetråkk» contributed in the Norwegian «National Policy Guidelines for the Interests of Children and Young People in Planning»⁴ that was put into force in 1989.

In the legal system, the Planning and Building Act (*Plan- og bygningslov* 1985) provides the legal basis for children's participation in spatial planning; in which the children's right is significantly present in accordance with the UN Convention. In the previous version of the Planning and Building Act, a *children's representative* function was established at municipality level. Amongst other tasks, his/her responsibility was to communicate children's interest in planning and make sure that consequence analyses of children in connection with development plans was made by the responsible planners. In the new law, the children's representative is not named, but the municipalities have to find a solution in order to represent children's interest in planning.

So as to help planners in the implementation, the *Children and Planning* guideline was elaborated (Miljøverndepartement 2008). This guideline has no formal status; therefore the solution of children's participation in planning process at local level is the responsibility of the planning authorities.

By 2010, planning with children's active participation became a daily planning routine in the land use planning of several municipalities in Vestfold county and Norway (Almhjell 1998; Almhjell 2010a); it was used by Statens vegvesen⁵ (Statens vegvesen Vestfold 1999; Statens vegvesen Vestfold 2000), become a part of the impact assessment process (Statens Vegvesen 2006) and has been adapted as a planning tool in the entire Nordic region (Almhjell 2010a).

It has become a working tool also in the European policy to make children's voice heard and in the EU «*the Vestfold method*» is used as a good example of involving children in the democratic decision making process (Almhjell 2010a). Also the WHO informs about the Children's track on its website (World Health Organization 2004) and the method is known in Canada (Almhjell 2009).

Mapping children's use of space.

The method

The main motivation behind «barnetråkk» was to transform the object oriented perspective on children in planning into an active participation, where children's knowledge are valued and their interests are drawn into the planning process (Almhjell 2010a). This approach is parallel with the changes of view on the children's representation in society, that started in the 70s (Christensen & Prout 2005). However, in the publications there was no explicit theory associated with «barnetråkk».

The method was elaborated through action research with children's active participation, where the awareness of their own value, knowledge and role in the community was raised. The development was a strategic work on the implementation of children's knowledge in the local, regional and national planning processes. The work included training of the children's representatives, planners, relevant teachers in the primary schools, adults in kindergartens localised within the planning areas and municipality management organizations. The training also contained teaching the special planning

4. Rikspolitiske retningslinjer for å ivareta barn og unges interesser i planleggingen

5. Norwegian Public Roads Administration

jargon to the children and participating teachers in the primary schools and kindergartens, as well as giving the planners an overview and understanding of how to work with children. During the development of «barnetråkk» there was a systematic cooperation with the municipalities and through them with schools and kindergartens (Almhjell 2010a).

The main outputs of «barnetråkk» registration are paper maps with associated descriptive information. The children register the area that they use in their free time on 1:5000 scale maps (this can be customized to meet the demand) or ortophotos. The participants use transparent markers and predefined legend to draw the areas. A distinction between summer, winter and all year around use of the areas is made. Additionally, the children also sketch the routes they use, differentiating them into secure and unsecure parts, and on a form describe the characteristics of the registered places: who uses them (gender, age groups, many/some/few), when (daytime/evening), how often (often/rarely), how they go there and the activities they take part in. The guideline (Almhjell & Ridderstrøm 2003) contains questions intended to remind the children about possible activities.

The registration can be included in the regular education, i.e. cartography, history, social or nature sciences. The main steps of the registration are described in a guideline (Almhjell & Ridderstrøm 2003). The process starts with preparation; the working groups are established at the municipality and in the school(s) and the workflow is planned.

The data collection has three main phases: 1) information about the task for all participants, 2) teachers/pre-school teachers register the areas used during school/kindergarten time, 3) children register the same areas (in schools). The teachers' and children's registration are similar. They mark the areas and routes they use on the maps with transparent markers, and fill out forms for each registered area. The children work in groups of max. 8. The groups are set up according to the residential areas. Every group has 2 adult assistants, 1 local teacher and 1 external expert. First, the pupils draw a circle around their homes, afterwards they mark

the play areas and routes. Each child should be given the opportunity to mark at least 1 play area. The play areas are consecutively numbered. The group leader (one of the adult assistant) makes sure that a form is filled in for each numbered area in collaboration with the children. (These forms are less detailed than the ones the teachers fill in individually.) The registrations are done at the same time by all the children. The whole mapping exercise takes about two school hours including a short break.

In the next phase, the paper maps are digitalized. This is done by the end-user (e.g. municipalities, Statens vegvesen). To help the municipalities, there is a standard for digitalization (Ridderstrøm 2010). To provide quality assurance of the registration, the digital data have to be controlled by the schools and can be checked by the (student) representative of the student council. For privacy and anonymity reasons, the children's homes that are marked on the paper maps are not put in the digital database. The aim of marking their homes at the beginning of the paper registration is to help them to orientate on the map.

After putting the data in digital form, the gathered information is presented and a printed map is given for the participants. The digital information can be used in several areas of spatial planning (Norsk Form 2010a). As a last step, a report has to be written about the work with «barnetråkk». This is important feedback on the method and input for its development.

This paper based version was first used in spatial planning in 1993 (Almhjell & Ridderstrøm 2003; Norsk Form 2010a) and tested in several schools and also kindergartens in Vestfold between 1998 and 2003 (Haukelien & Holsen 2004).

In 2006, the conditions were matured for further development and «digital barnetråkk» was evolved by the collaborative work of Norsk Form and Statens kartverk (Norge digitalt ; Norsk Form 2010a; Norsk Form 2010b). At the time, digital tools were widely used also in the planning practise, thus most of the municipalities already had the necessary technical background and experts. Another prerequisite of the digital ver-

sion was the well organized and accessible digital map database, the Norge digitalt (Norge digitalt 2010).

Now «digital barnetråkk» is freely accessible online (KartISkolen 2010) after a username and password from Statens kartverk has been provided in order to complete the registration. The workflow in the digital version (Norsk Form 2010a) is very similar to the manual registration, but there are some differences that influence the output. The preparation phase is organised in a more flexible way, so it is easier to customize to the school schedule. It could be made by walking tours with paper mapping in the neighbourhood area, photo taking and making collages, the pupils can prepare exhibitions, it is also suggested to discuss the theme before the registration in the school or in the groups.

One important difference is that the children themselves register the areas and routes on a computer that has internet access. They also write their comments in a database at the same time. In the digital version, it is suggested to avoid that the children mark their homes, in order to maintain anonymity. Another difference is that the participants work individually or in pairs. In case of need, the adult supervisors help to navigate on the map, choose the proper tools and symbols. The pupils themselves decide whether to use a topographical map or an orthophoto. It is also possible to overlay other thematic layers from the map database. The scale of the map can be dynamically changed. The registration takes about 15–30 minutes for each child. Many children can register at the same time, thus, depending on the available computers and internet bandwidth, in a class with 30 pupils, the registration can be completed within a few hours.

Now, the digital and paper versions of the «barnetråkk» are both used in Norway. The two versions are basically the same, but the slight differences in the process may have influence on the output. An interesting point is that in Vestfold, only the paper version is used (Brekke 2010). One reason is that the digital version is criticized as a democratic tool⁶, because the individualisation of the

process (Almhjell 2010b). This is an important question considering «digital barnetråkk» as a participative planning tool, but this is outside the scope of this article and will not be discussed further.

The «digital barnetråkk» in the «How the environment affords physical activity in adolescents?» research project

Children's habitat maps: adaptation of «digital barnetråkk»

The workflow we followed in the research project with «digital barnetråkk» was quite similar to the official version, but our intention with this method in the research project was different from the objectives of the original one, and these differences influenced the implementation and the outputs (Figure 1).

The GPS & heart rate registration together with «digital barnetråkk» and essays provide information on the use of the neighbourhood area, and the data collection method and information sources construct the «children's habitat maps».

As a first step, the adolescent's movements were tracked by GPS, and simultaneously, the heart rate was monitored for measuring the level of physical activity. Through this method it was possible to get objective information about the physical activity level and the used areas. In this article under «children's habitat maps» only the adapted «digital barnetråkk» and essays will be discussed. Our experiences with the GPS & heart rate monitoring and the data analysis are published in a separate article (Fjørtoft, Löfman & Halvorsen-Thorén 2010).

The time schedule of «children's habitat maps» (Figure 2) and the cooperation with the teachers were strongly influenced by the fact that the pupils were in their 10th school year, they had a lot of compulsory exercises and had to prepare for their final exams.

In those phases that connected directly to «digital barnetråkk» (paper mapping, photo taking, digital mapping) the participation was voluntary and required parental permission. Hence the number of the participants varied.

6. democracy was one of the main principles for «barnetråkk»

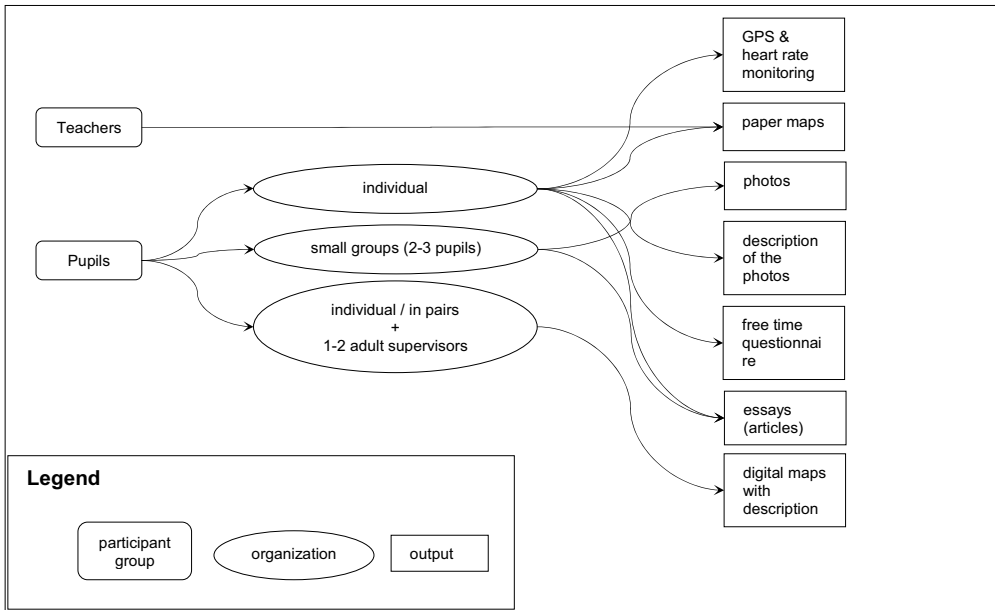


Figure 1 Data collection with «children’s habitat maps»

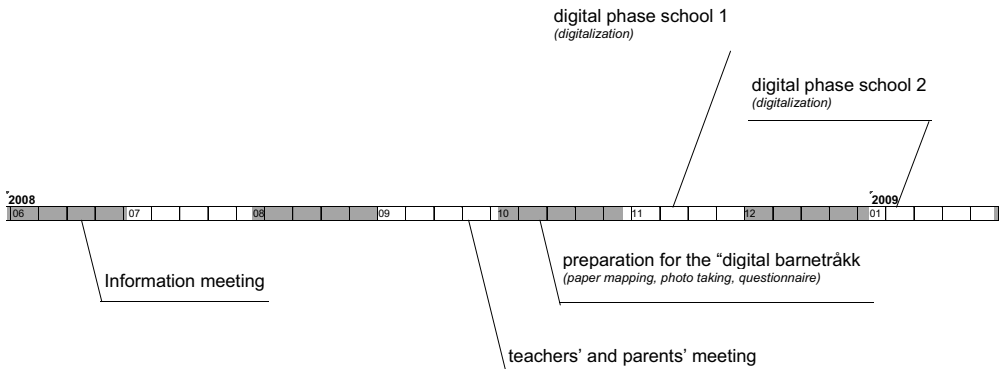


Figure 2 «Children’s habitat maps». Data collection time schedule

In the same way as for both «barnetråkk» and «digital barnetråkk», the first step in «children’s habitat maps» was the preparation for the registration. The teachers, parents and pupils were informed about the «children’s habitat maps» method and the goals of the data collection. They already knew about the research project, because the GPS tracking phase had been finished earlier.

The information was given in a process of multiple stages. Our aim was to integrate

the whole process in the curriculum as much as possible, as it is suggested in the guidelines (Almhjell & Ridderstrøm 2003; Statens kartverk 2010), therefore the discussion with the teachers started before the summer holiday, in June 2008.

For both «barnetråkk» and «digital barnetråkk» the teachers’ registration preceded the children’s one. During the information procedure, at one of the teachers’ meetings, the teachers were asked to register how they

use the schoolyard and neighbourhood areas during school days. They used an A3 format orthophoto based map to register the use of the schoolyard and close neighbourhood.

At the beginning of the semester, before we began the data collection from the pupils, the parents were also informed about the project in written form, and they were asked to give permission for their child to participate. In one of the schools, we managed to present the project on a PTA meeting (September 2008) too, but it was not possible to organize this for the other school. In the second school, the detailed information meeting was done only for the teachers.

The data collection from the pupils with «children's habitat maps» started in October 2008. The children did paper mapping as preparation for the digital mapping. In «barnetråkk» this phase contains the registration on paper maps and the work is done in the schools, during school time. In «digital barnetråkk» it is an optional part in the preparation phase. In «children's habitat maps» the paper maps were used as a preparation for the digitalization. The pupils went out in small groups (2–3 children) and walked around the neighbourhood area. In one of the schools, this phase was successfully included in the physical education class, in the other school they did it as part of the homework.

The children took paper maps in a plastic A4 folder with them. They marked the routes, areas and places with predefined legend. They got 2-sided A3 format maps with an overview of the area, a more detailed map of the closer school neighbourhood and in the school located in the north, they received another map of the city centre. An important aspect of the paper mapping phase was that we asked them to mark their gender on the maps.

This mapping tour was combined with photo taking + description and a small questionnaire about the free time use and convenient walking/biking distance.

The photo taking is not part of «barnetråkk», but it was used as a data collection tool in a related research project (Almhjell 2002), and it is an optional preparation for

«digital barnetråkk». In «children's habitat maps» it was a complementary data source which gave the opportunity to see and understand the children's point of view and in addition got their own, more detailed description on the neighbourhood area.

For the photo taking, the instruction was to take photos on those outdoor places that were important to them and describe on a sheet why they took the photo and what was on it. Afterwards, the cameras were collected and digital photos were developed. Each group used one camera, but each pupil prepared the maps and descriptive sheets individually. The pupils got back the photos in digital and paper formats so they could use them for the essays in the next stage.

To get a more complete view on the pupils' outdoor time use, it was important to get information on how much free time they had, and how much scheduled indoor activities they had in their free time. Therefore we included a small questionnaire at the end of the photo sheet.

The questionnaire covered the use of free time, including indoor and outdoor activities, the means of transportation and social factors. We also asked them about their favourite places and the furthest and longest walking and biking distance.

So as to get in-depth descriptive information on the neighbourhood area use, the pupils were asked to write articles. This exercise was also an extra task compared to «barnetråkk» and «digital barnetråkk».

It was executed as a part of the Norwegian education. The teachers customized this task to their teaching goals⁷ (Utdanningsdirektoratet 2009); therefore the articles varied in form and topic.

In one school, the pupils wrote articles in groups and the exercise was not evaluated. The topic in most cases was the neighbourhood, but some of the articles were about their experience with the research project. In the other school the pupils individually wrote essays about their neighbourhood.

The digital mapping was the last phase of the «children's habitat maps» data collection. During this exercise we used the official dig-

7. «Competence aims after Year 10. Written texts: The aims for the education are that the pupil shall be able to read and write texts in various genres ... such as articles, discussion input, formal letters, short stories, narratives, poems, drama texts and informal talks...»

ital mapping tool of «digital barnetråkk». The digital database contains generalized information; it is not possible to distinguish the individual registrations.

In one of the schools, we managed to finish this phase in November 2008, but in the other school it was feasible only in January 2009. The digital phase is also possible to include in teaching, but in the research project we didn't succeed with this. The schools provided the computers for the registration, but we had to «borrow» the pupils from the official classes until they digitalized their registration. The online registration was guided only by experts from the research project. The digitalization was done individually or in pairs. It took in total 2 days in each school.

Results from Fredrikstad

The focus of this article is the process of the «children's habitat maps». Thus, in this section, besides the paper maps, photos, essays and digital maps, the experiences with the completion are also considered as results.

The outcomes of the preparation phase were paper maps and photos with descriptions. The paper maps give similar information as the digital maps, i.e. used routes, areas, places, but without descriptive information. In our case it was important that the children marked their gender on the paper maps, because one objective of the research project is to disclose gender differences in the outdoor area use. (It was not possible to get gender information in the digital phase.) Altogether we got 56 paper maps.

Regarding the technical implementation, the A3 format for the maps we used was selected from practical reasons. The pupils had to go out and use the maps while walking, therefore too big or too many maps would have been unusable. The selected scale was the largest that was possible so as to include the neighbourhood area in this frame. We supposed that instead of colour schemes a monochrome legend (Figure 3) that was possible to draw with one pencil would be more convenient during a walking tour, but the pupils in some case customized the predefined legend and used colour pencils.

These maps proved to be very important when the data analysis started, partly because of the deficiencies of the other data col-

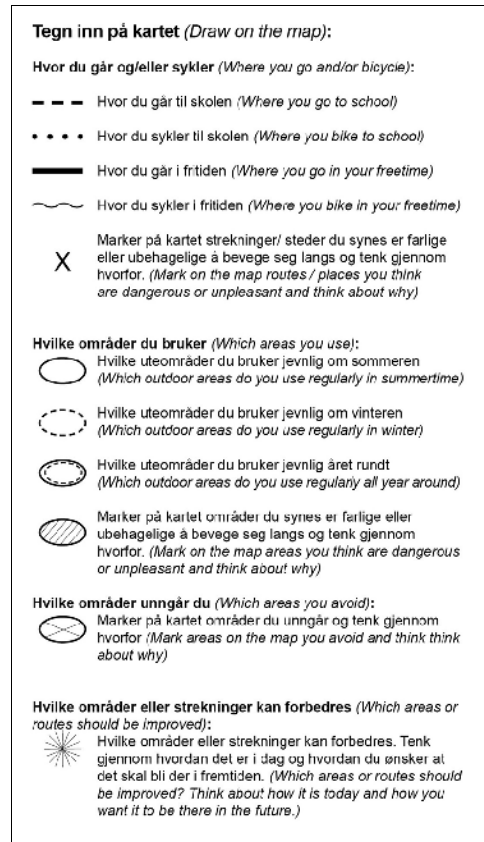


Figure 3 Preparation phase – paper maps, legend

lection parts. The children drew the routes more accurate and the gender information was also essential.

The photo taking and photo sheets with description were successful in terms of getting an insight into how the pupils see their surroundings and also more detailed descriptive information. The children also marked their gender on the sheets. Technically, the disposable cameras caused problems for some pupils, and the photos were unusable. Fortunately, the related descriptions gave enough information on the locations in most cases. We collected 502 photos from 38 groups and 49 descriptive sheets from individual pupils (Figure 4).

Concerning the process, including the preparation phase in the physical education lesson was a good idea on the one hand, because it was not an extra task, but on the other

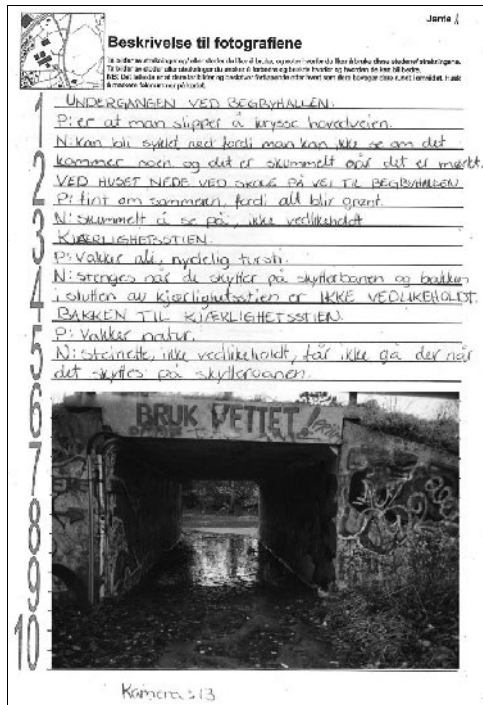


Figure 4 Preparation phase – photos & photo sheets

hand there was not enough time to go far away, and the photos were taken mainly of the school's neighbourhood. Besides, on the chosen day, the weather was rainy, which also influenced the scope of the explored area. Giving this task as homework without control resulted in the pupils considering it as extra work, and they didn't give an effort to fulfil it exhaustively.

The articles (Figure 5) which were written in the next step are great resources for qualitative analysis. It was the easiest to include this in the schools' curricular activities, but the task was defined in a very different way in the two schools, thus a comparison is difficult. The teachers adapted the exercise to their teaching objectives and schedule; therefore the essays we got from the two schools varied in topic. An influential factor was that the task was communicated in different ways in the schools. In one case the pupils' attention was directed more to environmental problems (i.e. pollution, graffiti, litter) that also might have led to deviation.

The result was affected also by the fact that in one of the schools, this exercise was evaluated, in the other one it was not. Generally, the articles give a good insight about the likes/dislikes, everyday use of and attachment to the city. We also got some reflection on how they felt about participating in the research project. Altogether 44 articles (34 individual + 10 group work) were written.

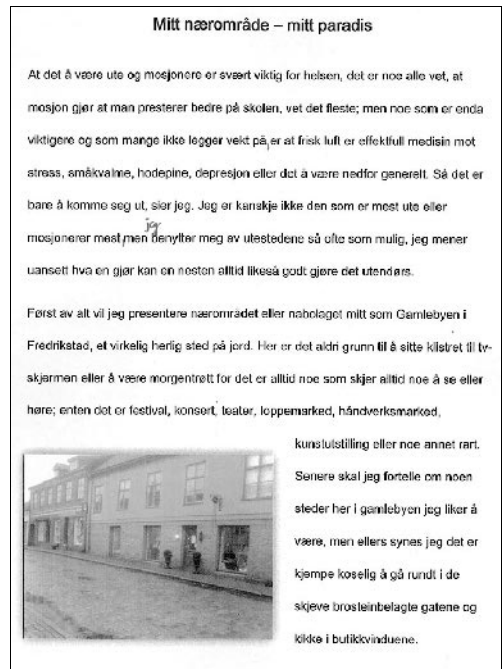


Figure 5 Articles

The digital mapping was challenging to organize. «Borrowing» the pupils from the official classes was stressful both for them and for us. The children's computer skills varied greatly, but on average they had few problems with the digitalization, however in some case it took more time than we estimated. In the schools, we used the new version of the «digital barnetråkk» online mapping tool for the first time, therefore we met some technical problems, but most of these were solved, some of them already during the registration thanks to the online support from Statens kartverk.

The drawn routes are stored in line feature layer, the areas as polygons, the places as points (Figure 6). The connected databas-

es contain the descriptive information for every single digitalized object. Regarding the areas in our case, the children registered these very generously. To avoid many overlapping objects on the same area (because the previous registrations were seen), if an area had been already registered, we asked them to add their information to the existing one. This proved to be difficult when giving the users' number of an area. It was not clear whether they had to estimate the number of users or just increase the number.

Altogether 88 pupils (48 girls and 40 boys) completed the digital mapping.

The digital registration is an individual work or, according to the guideline, it could be done in pairs. Using group work as a preparation, it was possible to include the stimulating effect of the group discussion (Almhjell 2010a; Norsk Form 2010a) that was very important to get the most exhaustive result.

As the guidelines emphasize, our experience also proves that the local expert presence would have been very important, especially when the pupils had problems with finding the places they wanted to register.

Discussion

The Norwegian «barnetråkk» was pioneering in the involvement of children into planning processes. Nowadays, similar digital methods exist in Sweden and Finland (Table 1), developed for similar purposes: to involve children's (people's) knowledge in urban planning (Berglund 2008; Berglund & Nordin 2007b; Berglund, Nordin & Eriksson 2006) and in case of the Finnish method also in research (Rantanen & Kahila 2009).

The Swedish tool, «Barnkartor i GIS»⁸ has its roots in «barnetråkk» (Berglund 2008; Berglund & Nordin 2010b). It is a digital tool that was designed exclusively for children above the age of 10 years. The Finnish method⁹, the «SoftGISchildren», is an online digital tool that was designed for children between 9–15 years.

There are some differences in these methods that are interesting to review in light of our experiences with the adaptation of «digital barnetråkk» in the research project. Even if the Swedish and Norwegian methods were not developed for research purposes, the comparison gives important input for the proposed improvements.

Here, the general remarks that are relevant both for «digital barnetråkk» and «children's habitat maps» are related to «digital barnetråkk» and the research specific ones to the «children's habitat maps».

The easiest way to reach as many children as possible is through schools. This method can be criticized, because the teachers' control influences the output, but it roots in the method: if the aim is involving the maximum number of children through the school system, this effect has to be taken into consideration. But without proper preparation «digital barnetråkk» can be considered as extra work on the teachers' as well as on the pupils' side. An important aspect is that if a task is a part of the curriculum and evaluated, the pupils put more effort into it.

So as to show that it is beneficial for the teaching, it is important to involve the teachers much more than we managed in this research project.

8. In English: Children's Maps in GIS. It was developed within a research project, but was developed for spatial planning and has never been used for research purposes. The first tests with the «Barnkartor i GIS» started in 2003 (Berglund & Nordin 2010b) and it has been used by Täby and Västerås municipalities.

9. The overall method is called SoftGIS. It was elaborated through several joint research projects (Kahila & Kyttä 2009; Kyttä ; Kyttä, Kahila & Broberg 2009) and includes different theme and age specific online mapping tools. Such as the first version, the «SoftGISquality», with which it is possible to map the perceived environmental quality, used local services, perceived health and well-being. Or the «SoftGISsafety» that aims at evaluating the perceived safety, gathers information about the sense of community and everyday infrastructure. The first prototype of the SoftGIS method was tested in 2004 and by 2007 five different type were developed (Kahila & Kyttä 2009). The «SoftGISchildren» was tested in Turku (2008–2009) with 10–15 years old children (Kyttä) and in Helsinki (2009–2010) (Broberg 2009; SoftGIS 2010).

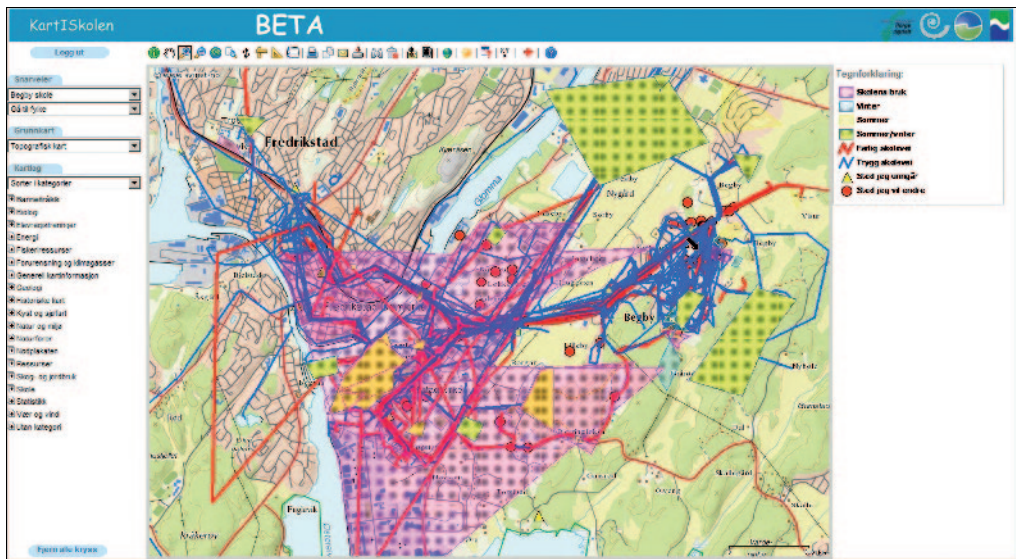


Figure 6 Digital maps

Table 1 Similar methods in the Nordic region

	«digital barnetråkk» (Norway)	«Barnkartor I GIS» (Sweden)	«SoftGISchildren» (Finland)
online accessibility	online	local PC with internet connection	online
teachers' mapping of school time area use	x	x	not known
Preparation	paper mapping / photo taking	mental mapping (optional: guided tours/group interviews, diaries)	not known
mapped themes	school way free time routes used areas places	school way free time routes used areas places	social characteristic ^a activities feelings free time
registered features	line area point	line area point	line point

a. One main difference comparing with the Norwegian and Swedish method is that the Finnish one is built around 5 different themes: social characteristic, activities, feelings, free time, and perceived health (OPUS Project) and physical activity related questions (pehmoGIS Helsinki). With registering their feelings children develop an emotional map of the city.

The conduction of «(digital) barnetråkk» supposes a good cooperation between the schools and the planning unit of the municipality/researchers. A successful implementation depends very much on personal conditions; engaged project leaders and media-

tors are crucial to encourage and involve the children.

Both the Norwegian and Swedish guidelines emphasize and contain detailed description about how to develop the cooperation with the schools (Berglund & Nordin

2010b; Statens kartverk 2010). This is very valuable for the persons who coordinate the work with this method. (No such published guideline has been founded for the «SoftGIS-children».)

Presenting the outcomes for the children in the same semester as when the work was done, is an important part of «barnetråkk» and «digital barnetråkk». Unfortunately, we didn't have the opportunity to go back to the schools with the results, which was a major weakness of the project.

Our experience shows that it is not the best choice to do the registration in the 10th grade, because preparing for the exams is stressful for the pupils as well as for the teachers. Thus it is difficult to find the time for extra exercises. This problem resulted partly from the fact that we did not succeed very much in adapting the method as an educational tool. Therefore, some tasks took time from the normal classes others were given as homework.

It is important to point out that this method is not only beneficial from a researcher's/planner's point of view. The children learn collaboration, democracy and social responsibility through the registration, and they deepen their knowledge of the environment, in addition to the practical knowledge they gain for example in cartography or in digital techniques.

Despite the described instructions for «digital barnetråkk», we found it difficult to figure out how to define the specific parts for different courses. With good examples it might be easier for the teachers to include the method in teaching and thus engage them in the process.

In the available publications, there was no preparation exercise described for «SoftGIS-children» but both the «children's habitat maps» and the «Barnkartor i GIS» had a pre-exercise before the digital mapping.

The paper mapping proved to be very important in our case. Even though it was conducted without adult supervision, the advantage of this outdoor method is that it helps to recall the memories. In order to understand the perception of the outdoor environment, the field experience seems to be important.

With the aim of stimulating the children to think about the outdoor environment, the Swedish method uses mental mapping as preparatory exercise for the GIS mapping (Berglund & Nordin 2010b). Unlike the «children's habitat maps», these mental maps are not used later as part of the method.

Depending on the aim of the registration, both methods can be useful. Although the outcomes are different, it might be important if the end user wants to use these maps. Working with cartographic maps and outdoor walking tours, the maps give an overview of the general use. The cognitive maps are self drawn, and they are prepared indoors. Thus, these show the most significant elements of the neighbourhood environment that help orientation, but there is no systematic information about the used routes and areas. With this method, it would have been possible to gather more qualitative information on how the children orient themselves and experience the landscape, but our aim with the adaptation of «digital barnetråkk» was to verify the data from the GPS registration. Since that lasted only one day, we needed more accurate data, and working with cartographic maps as preparation was more suitable for this purpose. Considering the digital maps, both methods prepare the children's thoughts for mapping, though it is a question whether, and if yes, how the two methods influence the registration.

Concerning the basis of digital mapping, in SoftGISChildren 1:4000 aerial photographs are used with street names and highlighted orientation points. In «Barnkartor i GIS» the children use digital maps of various scales (1:4000–1:10000 is recommended). Finnish experiences show that the address maps are easier to use for the participants than the aerial photographs (Kahila & Kytta 2009), but in our case the participants' preference varied between the aerial photographs and cartographic maps, therefore it seems to be a good solution to leave this choice to them. One technical problem that can occur is that the aerial photo slows down the network connection.

Another important difference in the registration is the gender information. Research results show a significant gender difference

in physical activity from very early childhood (Anderssen et al. 2008), and Finnish experiences from research projects also confirm that girls' needs towards outdoor environment differ from boys' (Horelli 1997; Kytta, Kaaja & Horelli 2004), therefore it is very important to explore the gender differences in the outdoor area use in order to provide equal opportunities for boys and girls. Both the Swedish and Finnish digital mapping tool ask for gender information, and in the old guideline of «barnetråkk» there was also suggested to register the gender differences in the area use (Almhjell & Ridderstrøm 2003), but it is missing from the new one (Norsk Form 2010a) and it was not included in the online mapping program.

In all the three described methods, it is possible to register routes (as line objects) and places (as points) and exclusively for the Finnish version areas (as polygons). While digitalizing the routes, the drawn lines don't follow the road network automatically (no snapping option), but this was purely a technical problem. For spatial analysis, especially for planning purposes, it is crucial to get the data in a form that doesn't require too much follow up work, otherwise the required extra work diminishes one of the most important advantages of the digital version, namely time saving. Besides, both with handmade and also with automatic justification, the reliability of the database decreases. However, cleaning up the database will be necessary in every case, because sometimes nonsense data are registered (i.e. lines across everything).

The area registration doesn't prove to be very accurate or informative in our case, therefore it is questionable whether it is important to include in the digital version or if it would be enough to register them as point objects and include in the description whether it is a single spot or an area. The problem we experienced, i.e. that it was difficult to use the tool, is not individual. It was also criticized in relation with «Barnkartor i GIS» (Östlund 2009). This strengthens the question whether to keep this tool and improve it or exclude it from the program.

In all versions, the participants give short descriptive information of the registered objects during the digitalization. The inbuilt questionnaire in the Swedish version is very similar to the Norwegian one, the Finnish is more detailed¹⁰. The comments in «digital barnetråkk» are very short and gave limited insight about the pupils' opinion. For spatial planning purposes – depending on the content – this would be enough, but for this research project it would have been far too little. Therefore, the adaptation of «digital barnetråkk» was necessary. With the article exercise and the photo descriptions, we counterbalanced this deficiency. From these data sources, we are able to derive information similar to the Finnish emotional maps, but for planning purposes the direct mapping seems to be more useful (easier to work with) than a written document.

Unlike the Swedish and Finnish version, in «digital barnetråkk», the children don't mark their homes because of ethical concerns. However, in some cases, when the focus is on the close neighborhood use, it would be important to see. This might be solved if they were able to mark not exactly their homes, but blocks or name the neighbourhood instead.

The registration has been done individually or in pairs in «children's habitat maps» and it is individual in «Barnkartor i GIS» as well as in «SoftGISchildren». In case of the Swedish version this also means that one facilitator supervise only one child at the time (Berglund & Nordin 2007a) that helps to avoid the digitalization of nonsense data. In «children's habitat maps», due to technical problems and less strict control, the digital maps are less accurate therefore the paper maps were important for confirmation.

An important question is raised by the fact that during the digital mapping, the pupils saw each other's registration. It is partly a technical problem, because the overlapping digitalized objects make it difficult to see the map underneath the previously digitalized objects after only a few registrations. Partly, it is ethically sensitive, since the pupils saw each others' registrations before the revision.

10. It is important to refer back that it was developed also for research purposes.

The descriptive data needs careful revision in all cases, because it could be ethically sensitive; i.e. in our case some of the pupils registered private houses and wrote personal information.

The Swedish and Finnish versions have different technical solutions to avoid this. The «Barnkartor i GIS» runs from a local PC, thus the data collection is independent of the type of internet connection (Berglund & Nordin 2010a). The «SoftGISchildren» seems to be easier to handle, since it doesn't require installation of software.

Conclusion

The objectives of the research project required to extend the «digital barnetråkk» in order to get more detailed qualitative data. The developed «children's habitat maps» proved to be suitable to collect information on the children's interpretation of the landscape, and it was also possible for them to express their wishes towards the neighbourhood area.

In the research project, the different data collection methods completed each other in terms of counterbalancing the weaknesses of single tools. In «children's habitat maps», both the paper and digital maps provide information about the general use of the neighbourhood. The paper maps also show gender differences, and proved to be useful to validate the digital maps. The digital maps contain spatially located short descriptive information. The photos with description give more detailed qualitative data, but only about specific spots in the close neighbourhood. The articles/essays are valuable sources for exploring the pupils' preferences and attachment to the urban landscape.

Using multiple data sources were essential in the research project, but in planning practice it would be time consuming to analyse all of these sources, especially the written ones.

Research projects claim different demands according to their objectives, and although

the aims are different in spatial planning, some of our experiences could contribute in the development of «digital barnetråkk» as well as its adaptation in research projects. To sum up: the parts of «children's habitat maps» that are the same as in the «barnetråkk», i.e. the background work and the preparation phase, work quite well. Though concrete examples on how parts should be successfully included in the teaching would have been helpful.

According to our experiences, the main possible development proposals are:

- both for practice & research
 - best practice of using «digital barnetråkk» as an educational tool should be collected
 - gender information should be included in the registration
 - the participants should not see each others' results
 - during the digitalization, the routes should automatically follow the road/track network
- mainly for research
 - «emotional mapping» for gathering more qualitative information should be included
 - in some cases it would be useful to name the neighbourhood / mark the homes as larger blocks.

It is interesting that until «barnetråkk» was a pioneering project in the Nordic region, the digital version seems to lag behind. Even if «digital barnetråkk» was tested in Bergen, Oppedgård and Stavanger, and was used during the E6 and railway development, there is no systematic evaluation of it. About 100 passwords were given out, but there are no exact data about the number of municipalities, how they used the «digital barnetråkk» and their experiences with it (Sønstegaard 2010).

However, it must be noted that the «digital barnetråkk» is a very promising method¹¹. It

11. The «digital barnetråkk» is not an independent method anymore. Its life is continued within a recently started urban development project, called «Bylab» (Norsk Form 2009). The «Bylab» focuses on meeting places in small and medium size cities. It seems to be a good solution that this already existing tool is integrated in this new project, but with the «digital barnetråkk» out of the meeting places it is possible to get more sophisticated information on the outdoor area use that could be valuable in spatial development.

can be extended and used in several different ways for unlike purposes, as it has been done in Finland and already tried in Norway (Norsk Form 2010a). The technical support of the «digital barnetråkk» is flexible; it is possible to customize the tool for the needs.

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