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Children's perception of their city centre: a qualitative GIS methodological investigation in a Dutch city

Haifa Alarasi[†], Javier Martinez*[‡]  and Sherif Amer

Faculty of Geo-Information Science and Earth Observation, University of Twente, Hengelosestraat 99, 7500 AA Enschede, The Netherlands

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Children represent a population group that is much neglected in the city planning process. Their perceptions, which are different from those of adults, are usually not incorporated in the design of cities. The aim of this paper is to present a qualitative GIS approach to capture children's perceptions of the urban environment. It gives a detailed insight into why certain perceptions occur and what the associated physical and social qualities are. The approach considers children as active participants and combines quantitative and qualitative methods. Twenty-eight children aged 10–17 were involved in examining the city-centre area of Enschede, the Netherlands. The results show both similarity and heterogeneity in perception (e.g. based on gender and age group) and the emergence of new location-specific qualities (e.g. natural elements, smart technologies, economic functions). It concludes with a discussion on the potential of incorporating this approach in urban planning processes.

Keywords: children's perception; qualitative GIS; physical qualities; social qualities; city centre; child-friendly cities

Introduction

The importance of children's input in creating settings that promote a healthy living environment has been recognized internationally by the Convention on the Right of the Child (UNICEF 1989), the Child-Friendly City initiative (UNICEF 1996), and Chapter 25 of Agenda 21 (United Nations 2009). Nevertheless, urban planners have infrequently addressed these needs (James 1990; Simpson 1997), resulting in cities where children may feel alienated and excluded (Gleeson and Sipe 2006). Alienation can manifest itself by limited independent mobility (Broberg and Fagerholm 2011), reduced walkability and declining physical activity (De Vries et al. 2010; Wridt 2010), and exclusion from public spaces (Laughlin and Johnson 2011).

Recently, there has been growing scientific interest in understanding the relationship between children and the built environment (Lynch 1977; Hart and UNICEF International Child Development Centre 1992; Simpson 1997; Shier 2001; Chawla 2002). Some of these studies used participatory research methods to gain insight into the perceptions that children have of their living environment.

*Corresponding author. Email: j.martinez@utwente.nl

[†]Current address: Department of Geography and Planning, University of Toronto, Toronto, ON, Canada. haifa.alarasi@mail.utoronto.ca

These studies indicate that children have excellent knowledge of their living environment and are not only able to identify issues that matter to them, but are also capable of suggesting solutions that best address these issues (Lynch 1977; Veitch, Salmon, and Ball 2007; Travlou et al. 2008; Walker et al. 2009; Laughlin and Johnson 2011; Ramezani and Said 2012).

At the same time, there is limited knowledge of how children perceive their living environment. Children are made 'invisible' as a result of limited community participation in urban planning, the conceptualization that children are not yet capable of full participation, and specific laws which influence how children can use urban space (Simpson 1997). Knowles-Yáñez (2005) mentions the planner's interest in politics and power and the focus on adults, usually parents or guardians, to speak on behalf of the child. Even when children's voices are included, participation is not always meaningful and is often misdirected (Hart and UNICEF International Child Development Centre 1992). Children, in short, are generally not effectively involved in the urban planning process.

The aim of this paper is to present a participatory qualitative GIS (QGIS) approach to capture children's perception of their local living environment. We demonstrate this approach with a case in the city of Enschede, the Netherlands. The case study is the result of close collaboration between researchers and teachers of the local international school. The international school was selected to ensure ease of communication since the research needed to be conducted in English. In particular, we focused on how children perceive the city centre of Enschede. Our motivation to choose the city centre was twofold. First, it is a location familiar to all the children participating in the research. Second, the city centre has an important role as public space where children can experience the social and cultural diversity of the city (Freeman and Tranter 2011).

This paper commences with an overview of the physical and social qualities as a starting point to conceptualize what we mean by local living environment (Chawla 2002). The following section focuses on the research methods and on the QGIS approach developed to collect and analyse the data. The last two sections discuss findings and reflect on the benefit of the developed approach and on the possible incorporation of children's perceptions in the planning process.

Components of the local living environment according to children

One of the first studies that involved children and adolescents in evaluating their local living environment was done by Lynch (1977) in the 'Growing Up In Cities' (GUIC) project. This project was revived in 1996 by the Convention on the Rights of the Child and its reaffirmation in Agenda 21. The latter project focused on documenting improvements or deterioration of the living environment compared to the situation in the 1970s. This resulted in the formulation of indicators of social and physical qualities of the local environment (a term that encompasses spaces that the children live in, play in, or regularly visit) based on the evaluation of the children themselves (Figure 1).

Qualities can be social or physical, positive or negative (Chawla 2002). Together, this results in four quadrants representing the living environment of the children.

These qualities were the result of the evaluation and experience of 10–15 year olds in low- or mixed-income urban centres in different cities in both developed and developing countries. A summary of the qualities and definitions is listed in Table 1.

Although the framework presented in Figure 1 was developed with a focus on residential neighbourhoods, one can argue that such qualities can also be present in different urban settings, hence including city centres. In fact, the consensus among the children who participated in the GUIC project as to what constitutes good or bad places suggests that many of these qualities might even be universal. Examples of such qualities include the value of green areas (Percy-Smith 2002; Wilhjem 2002; Gidlöf-Gunnarsson and Öhrström 2007), freedom of movement

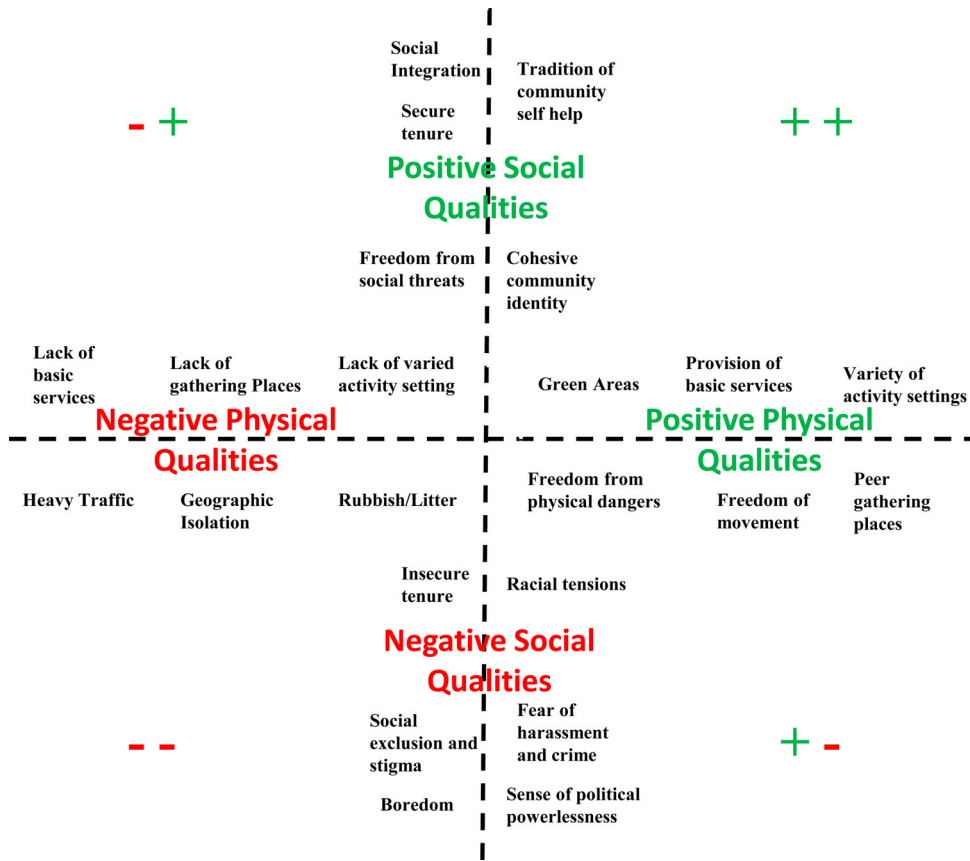


Figure 1. Qualities of the living environment. Adapted from Chawla (2002).

and freedom from danger (Kyttä 2004; Leonard 2007; Broberg and Fagerholm 2011), sensitivity to rubbish and litter (O'Brien 2003), and social exclusion and racial tension (Klasen 1998).

Case study area

The city of Enschede

Enschede is located in the eastern part of the Netherlands close to the German border. It is a medium-sized city with around 158,000 inhabitants (Kennispunt Twente 2014). From the 1980s, efforts have been made to revitalize Enschede, transforming it into a modern city with a focus on knowledge-intensive industry and institutions of higher education (Enschede-Stad 2014).

In the mid-1990s, the municipality developed a comprehensive redevelopment plan for the city centre. Motorized traffic was diverted away to create a car-free zone. A large market square was constructed, which now functions as a 'node' for the city centre (Hospers 2010) and has characteristics of themed public spaces such as 'funshopping' (Van Melik 2009). The area around the railway station was earmarked for office use and a new bus station was created. Cultural functions were concentrated in the northern part of the city centre, and offices and apartments were constructed at underutilized locations (Enschede-Stad 2014).

Table 1. Qualities of the living environment.

Qualities of the living environment	Summary
Physical qualities	<ol style="list-style-type: none"> 1. Green areas: safe green spaces that are accessible. 2. Provision of basic services: basic services such as food, water, electricity, medical care, and sanitation are provided for the children. 3. Variety of activity settings: there is a variety of places for children, including places where they can meet friends, talk, or play informal games. 4. Freedom of movement: children feel that they can count on adult protection and range safely within their local area. 5. Peer gathering places: there are safe and accessible places where children can meet. 6. Heavy traffic: streets and other public places are taken over by cars. 7. Rubbish/litter: children read trash and litter in their environment as signs of neglect for where they live. 8. Geographic isolation: the local area is isolated by from other communities by a way of a mountain, river, or valley.
Social qualities	<ol style="list-style-type: none"> 1. Social integration: children feel welcome throughout the community, and interact with other age groups. 2. Tradition of community self-help: residents are building their community through mutual aid organizations. 3. Cohesive community identity: children are aware of their community's history and take pride in its accomplishments. 4. Secure tenure: family members have legal rights over the properties they inhabit. 5. Racial tension: children experience stigmatization based on their race or ethnic origin. 6. Social exclusion: children feel unwanted and left out in their local area. 7. Fear of harassment and crime: children avoid specific areas or whole sections of the community due to fear of harassment and violence. Boredom: children express high levels of boredom and alienation because places set aside for them are featureless. 8. Sense of political powerlessness: children and their families feel powerless to improve conditions.

Additional services are integrated in the city-centre fabric such as an underground car and bicycle parking giving city residents (including children) easy access to and from the centre. Just outside the car-free zone, there is a hospital, a hotel, and other small-scale commercial activities. The city centre itself offers a variety of functions with modern shopping centres, restaurants, bars, cannabis shops, theatres, and a casino. It hosts many activities, including an open market and recreational activities such as festivities and live concerts, making it an ideal space for families in their free time. The centre does not offer natural green areas, but there are some spaces with greenery and water fountains.

Children's participation in local planning processes in the Netherlands

With growing interest in understanding the relationship between children and their environment, youth participation has received increased attention in the Netherlands. In fact, the Dutch National Youth Council was established in 2001 with the task to improve youth participation at the national and local level (Netherlands Youth Institute 2007). In addition, the 'opportunities for all children'

framework states that youngsters from 13 to 25 years should be able to participate in local civil society and have a say in issues that concern them (Netherlands Youth Institute 2007). Some instances of children's participation in local planning in the Netherlands do exist. The city of Rotterdam, for example, is mentioned as a case of child-friendly urban planning initiatives (Hoogendoorn, Hilverdink, and Darwish 2012).

In Enschede children participated in the redevelopment process of their neighbourhood (*Roombeek*). Their participation was of particular relevance since a fireworks explosion devastated the neighbourhood in the year 2000. The municipality collaborated with local artists and the primary schools located in the area to involve the children in sharing their visions about their future neighbourhood (Denters and Klok 2010).

In the case of Amsterdam, Karsten (2005) observed that children in general make decreased use of public space to play and socialize. In the central parts of Amsterdam, however, Karsten (2002) observed the emergence of new cultural and commercial activities aimed at children (e.g. children's theatres, children's bookshops) pointing at a new children's consumer culture (Chin 1993).

These examples, however, represent rather exceptional cases as children's participation is not commonly embedded in local planning practice in the Netherlands. This is in spite of significant efforts of the Ministry for Youth and Families (now the Ministry of Health, Welfare, and Sports) to set up agreements with local municipalities. In fact, it was proposed that by 2011 all municipalities should have some means of consulting young people with a focus on creating child-friendly environments (Netherlands Youth Institute 2007).

Methodology

This research was conducted in the city centre of Enschede, the Netherlands in close collaboration with its international school (which is located outside the city centre). The research involved the school's principal and the geography teacher and was incorporated into the geography/humanity sessions of the educational program. The study was conducted between September and December 2012 and it involved 28 children aged 10–17 (19 boys and 9 girls).

Most children resided in middle-class neighbourhoods and were from different ethnic backgrounds. Nearly all children had been living in Enschede for a number of years and were well acquainted with the city-centre area.

Following Hill (2005), ethical considerations were carefully incorporated in the different stages of the research process. First, we obtained informed consent from the legal guardians and from the children. Second, contact sessions were conducted in an open, non-formal learning space with free seating arrangement. This set-up allowed for very little power distance between the children, the teachers and the involved researchers.

Third, we made clear that children could opt out of any session that is of no interest to him or her. Fourth, we designed the research process in such a way that the one-on-one interviews occur later on in the research process to enable the children to familiarize themselves with the researchers. Finally, we communicated the preliminary findings and results to the children, parents, teachers and school officials.

QGIS mixed-method approach

In order to measure the children's perception of socio-physical qualities, we developed a QGIS approach. This mixed-method approach combined conventional geographic information systems (quantitative) methods with qualitative methods (Cope and Elwood 2009). As shown in Figure 2, this combination of methods enabled a connection to be formed between the macro-scale urban phenomenon and the micro-scale of the perception of the individual child. This approach made it possible to capture perceptions associated with different locations.

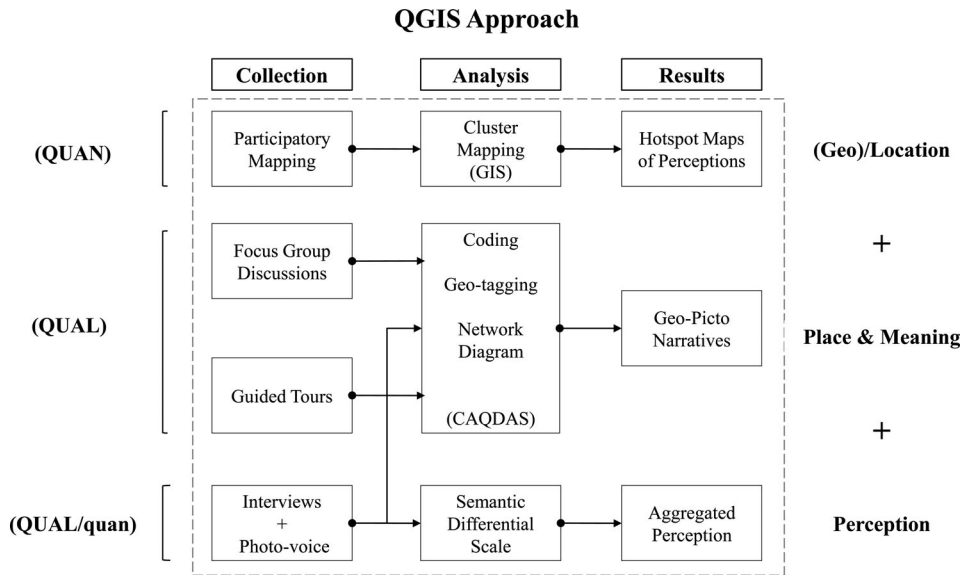


Figure 2. QGIS methodology.

Dennis (2006) suggests that youth participation using a qualitative GIS approach holds a lot of promise, but given the considerable variety of available tools and methods, it is important to select those that are effective in capturing children's knowledge about their local environment. The different methods used in this study for data collection and analysis (see Figure 2) are discussed in the following sections.

Data collection

Different data collection methods were used, including participatory mapping, focus group discussions, guided tours, and interviews supported by photo-voice. First, a participatory mapping exercise was conducted in a 60-minute session in small groups of 4–5 children. The objective of the exercise was that each child identifies particular locations in the city centre that he or she (dis-)liked. Google Earth® images of the city centre of Enschede were printed on A3 paper, labelled with street names and main features, and overlaid with transparent sheets. The children made use of the school computers to access Google® maps and its StreetView® function. They were given green and red circular stickers and were asked to use these to geocode locations in the city centre that they liked (green) or disliked (red). The children were then asked to associate qualities to the identified locations. The children were assisted where needed and supervised by the researchers and their teacher to ensure reliable mapping.

Following Wridt (2010), at the end of the session, all transparency sheets were superimposed to give the children an immediate insight on how their collective map would look like after being entered into the GIS. This also enabled them to see an overview of the locations of interest for the group as a whole.

The second data collection step was a focus group discussion to obtain better insight into the social and physical qualities of the identified locations. There were two focus group discussions; one for the younger children (aged 10–12) and one for the older children (aged 13–16). This was done to later examine the potential differences in perception between the two age groups. Each

session lasted for 60 minutes and was voice- and video-recorded, with the consent of the children, to allow for transcription and further analysis.

The guided tour, adapted from Cele (2006), came as a third step to obtain a deeper insight into how the children experience the city centre, and how they interact with the objects and/or people they encounter. The route was predetermined based on the previously mapped locations. To allow for flexibility, children were allowed to somewhat deviate from the predetermined route. The children were divided into six groups of four to five children; one of the researchers or teachers accompanied each group. Each group was carrying a handheld GPS device to track and trace the walk, a camera, and a printed map. Within the different groups, each child was asked to take pictures of the positive and negative locations and situations they observed in the city centre.

The last method of data collection consisted of interviews supported by photo-voice (Wang and Burrell 1997). By that time, the children were more familiar with the researchers enabling open communication. Conducting the interviews as a final step allowed the children to reflect back and to add and/or remove locations from their maps. The interviews were held on a one-on-one basis, and were recorded for later transcription and analysis. In the last part of the interview, each child showed the photographs they took during the guided tour and explained why he or she took them. To adequately capture the perceptions of the children, a semantic differential scale (Lewis-Beck, Bryman, and Liao 2003) was used during the interviews.

Additionally, semi-structured interviews were conducted with two city planners after analysing the data collected by the children. This was done to ascertain whether planning professionals see possibilities for incorporating the developed approach and its outcomes into future urban planning processes.

Data preparation and analysis

The maps produced during the participatory mapping exercise were incorporated into a GIS database to allow for spatial analysis. Each child was given a unique mapping ID linked to personal characteristics such as age and gender. Identified city-centre locations were digitized and a database was created, which included attributes such as point ID, child mapping ID, and place name. The qualities associated with each mapped location were entered into a separate database accompanied by the point ID and child mapping ID to allow linking of both tables and further analysis of the spatial distribution of the identified qualities. The use of a spatial database enabled the creation of a variety of mapping outputs.

The interviews were transcribed and entered into Computer-Assisted Qualitative Data Analysis (CAQDAS) software. The interviews were coded, labelled, and sorted according to the themes derived from the main conceptual framework (see Figure 1). Google Earth® images of the study area were embedded into CAQDAS to allow for geo-tagging of the codes and linking these to relevant textual statements.

The photographs were also geo-tagged and grouped into different categories based on the qualities derived from the narratives provided. These narratives were then coded together with the textual information, using the qualities of the conceptual framework as a main guide.

Results

The findings are presented in three sections to illustrate the benefit of the approach developed to capture the children's perceptions. The first section discusses the general perception of the study area and observed similarities and differences between age group and gender. The second section introduces the spatial distribution of the perceptions captured. The last section discusses the qualities that emerged in this study. The contextual information collected by the researchers and the

children together with the maps form what we call: *Geo-Picto Narratives*. These give detailed insight in the (dis-)liked locations and their associated qualities.

The general perception of the city centre

The overall perception of the city centre of Enschede was positive (see Figure 3). The children described it as a safe place where they can enjoy multiple activities, and hang out with their friends and family.

In the instance of the pairs ‘Quiet–Noisy’ and ‘Crowded–Uncrowded’, most of the children associated a temporal dimension to the two qualities. This is because an open market takes place twice a week and attracts many people. Additionally, in the pair ‘Safe–Dangerous’, most of the children were very clear in identifying areas where they did not feel safe. In some instances, children also associated this feeling with time.

After 6:00 pm it is dangerous, before 6:00 pm in winter it is also dangerous, but in summer it is always ok because if you have light it is ok. (Boy, 12)

When looking at the variations based on gender, both boys and girls overall were quite similar in their evaluation. The most apparent differences appeared in the adjectives: ‘Pretty’ and ‘Friendly’. In both instances, boys scored more positively than girls did. Girls perceived the city centre less friendly as they reported feeling uncomfortable when walking through some areas because of unwanted attention.

When looking at the differences between age groups, the older children scored slightly higher on all qualities except for ‘Interesting’. This higher score could be expected as older children have

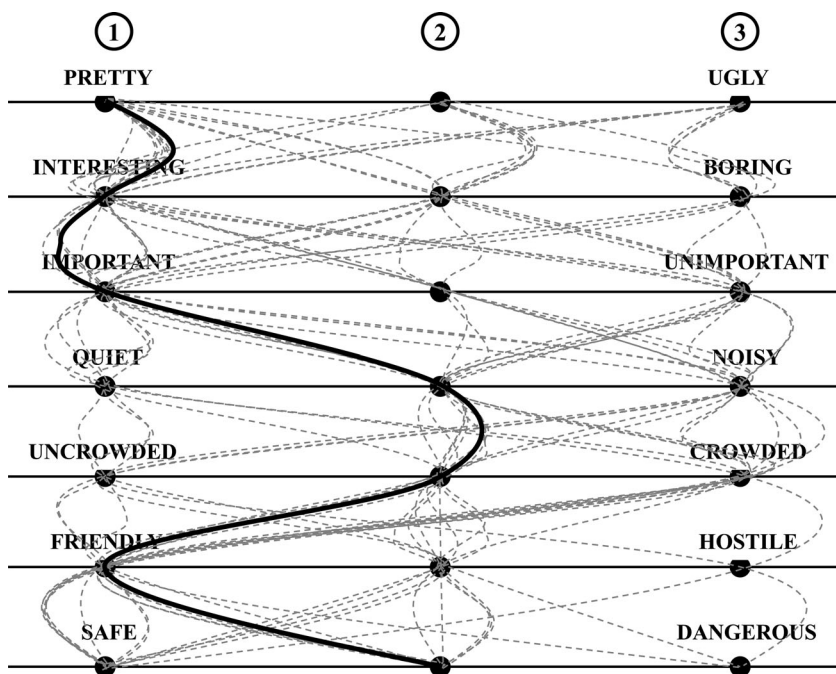


Figure 3. General children’s perception on city centre. Semantic differential, frequency of responses (N = 28).

better negotiation ability of the different spaces and better know what spaces to avoid. In the instance of 'Quiet', the difference is larger as the younger children appear more sensitive to noise, especially on market days and during festivals that take place in the open square. The younger children, however, scored higher in the 'Interesting' quality as many of them enjoyed the city centre, in particular video game shops, candy stores, ice cream shops, and fast food restaurants.

The spatial perception

The spatial representation of perceptions made it possible to identify positive and negative areas and the convergence or divergence of perceptions between the children. Together, the children recorded 235 observations in the city-centre area distributed over 75 locations (Figure 4). These locations were categorized as positive, negative, or with a mixed perception (both positive and negative).

As shown in Figure 4, the highest rated positive clusters include locations such as open squares, consumer electronics stores, restaurants, and department stores. This is a clear indication that the city centre provides consumer services that children use and appreciate. As pointed out by Chin (1993) and (Karsten 2002), these locations are not only spaces where children can socialize with their peers, but also spaces where children can behave and feel treated as adults. Some of the locations were more popular than others because of positive physical qualities (e.g. open plazas with attractive physical features, historical buildings, modern buildings, and locations offering variety of activities) and/or positive social qualities (e.g. absence of social threat).

The negative clusters shown in Figure 4 include a backstreet with several 'coffee shops' selling cannabis, the dentist, the hospital, the casino, and the bus station. The prime reasons

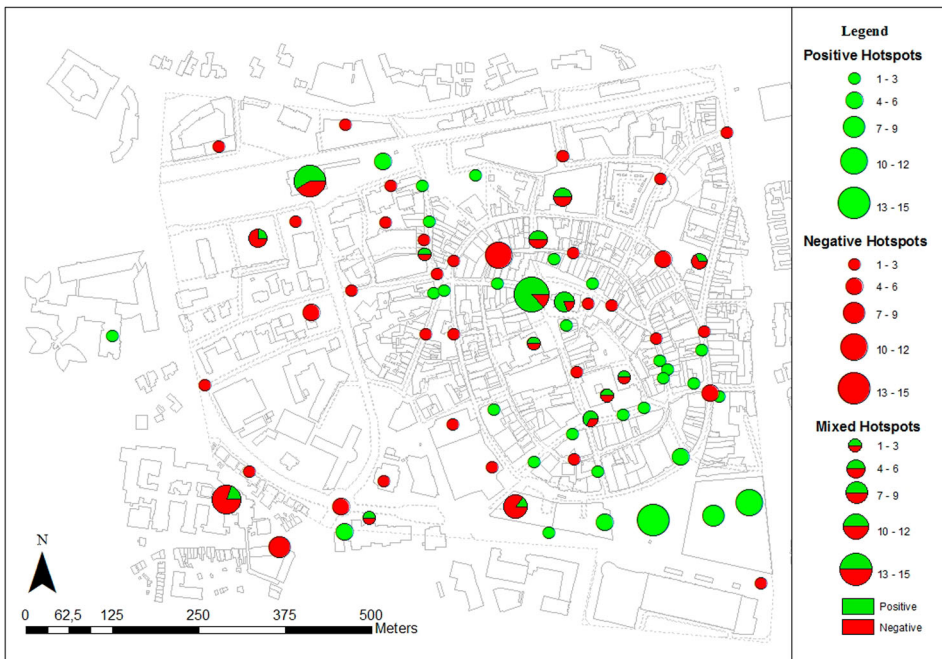


Figure 4. Spatial perception.

for perceiving a location negatively were ‘Dangerous’ and ‘Dirty’. Dangerous refers to various forms of perceived threat such as fear of harassment and crime, and heavy traffic. Dirty was associated with features such as litter and trash, ‘bad graffiti’, and the presence of animals (dogs and birds). The map in Figure 4 also shows locations where the children have mixed perceptions. In part, these related to negative physical qualities, in part to negative social qualities depending on the experience of the individual child. For example, although the main square that was generally perceived positively, some children perceived it negatively after witnessing a robbery there. The categorization of three types of spaces is in line with the framework developed by Chawla (2002) as illustrated in Figure 1. Cluster locations that are perceived as fully positive or fully negative can easily be incorporated in this framework but locations with mixed perceptions cannot.

Nevertheless, the children unanimously agreed on what makes a quality a positive or a negative one. Indeed, several of the qualities included in the original framework reappeared with new qualities emerging because of the specific context of the city centre of Enschede. The following section provides further insight into this.

Perception, place, and meaning

Textual analysis of the interviews made it possible to update the original framework presented in Figure 1. Several new social and physical qualities emerged while some qualities that were observed in previous studies did not emerge in the socio-physical context of this study (Figure 5).

This also means that the identified qualities are sensitive to the specific context of the city centre and do not automatically apply to the city of Enschede as a whole. The new qualities that emerged are:

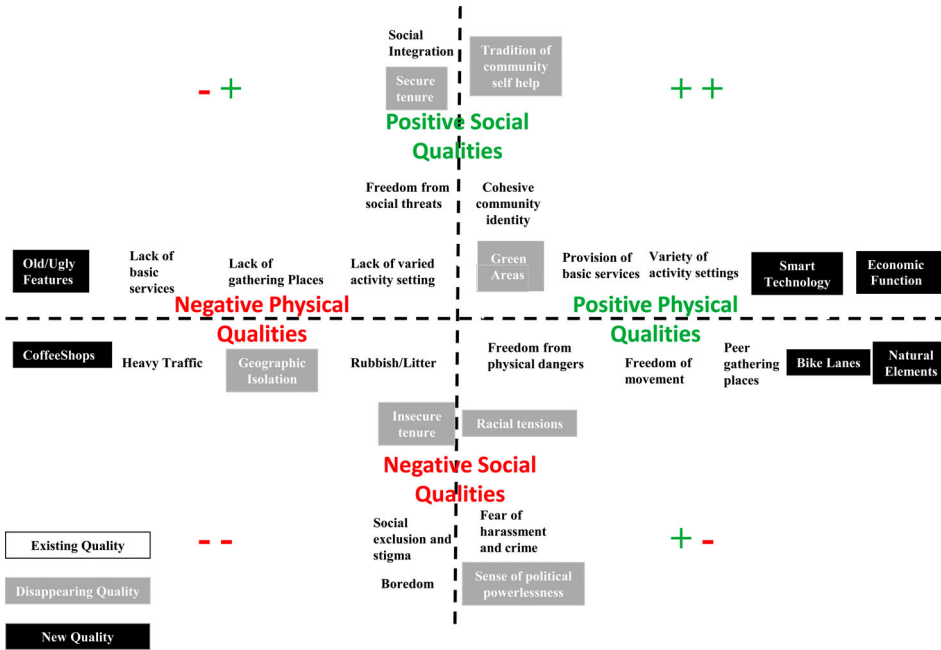


Figure 5. Emergent qualities.

- *Natural elements*: a quality similar to 'green areas' but adapted to include other natural features, including water, flowers, sunlight, and shade. In their maps, children stated the presence of natural elements as a primary reason for mapping those locations positively. In fact, adding more trees was one of the top improvements mentioned by the children when asked what they would like to change in the city centre. The importance of natural elements (Kyttä 2004) was also observed during the guided tour when the children spent a considerable amount of time exploring the various natural elements. Figure 6 gives more insight into the perception the children hold of this quality.
- *Bike lanes*: the children rated this quality positively especially when they compared the city centre of Enschede to the cities they lived in before. This quality gives children more freedom of movement because the safety of bike lanes results in decreased dependency on adults to drive them to their various destinations. More than half of the children participating in the study biked to and from school on a daily basis.
- *Smart technologies*: the children explicitly acknowledge technology as a positive quality. For younger boys, smart technologies are associated with playing video and internet games. This was the main reason why a consumer electronics store scored very positively in their maps. The older group of children looked upon smart technologies as a solution to some of the problematic areas they pointed out on the maps.

I do not like the bus station, there are too many buses and this is bad for the environment. Too much CO₂. They should try to look into electric buses, it is 2012 after all! (Boy, 14)

Additionally, most of the children very positively rated locations that offer free Wi-Fi services.

- *Economic functions*: this quality frequently occurs in the positively mapped locations. It mainly refers to (fast food) restaurants and shops (candy, video games, consumer electronics). Many of the children pass by the city centre on a daily basis and spend considerable time there. The city centre therefore is not only a place to socialize but also a place where they can spend their money, creating a culture of children's consumption. This finding is similar to that obtained in Amsterdam by Karsten (2002). This finding is especially relevant considering that retail and consumption functions played a key role in the city-centre redevelopment of Enschede.
- *Coffee shops*: a physical quality related to the specific context of the Netherlands where cannabis is legally sold. The presence of coffee shops is the one quality that all children evaluated negatively. In fact, the street with a concentration of coffee shops was the top negative location, the most frequently photographed item, and the top priority for children when asked about improvements to the city centre. When children described this quality, they tended to use the words: ugly, dirty, and dangerous. Some of the children (especially the younger age group) also perceived the people in these areas as dangerous. The network diagram in Figure 7 shows how this specific quality relates to other physical and social qualities, including fear of harassment and crime, physical danger, and freedom of movement.
- *Old/Ugly features*: children were very sensitive to old features that are not well maintained or features that are dull or 'grey'. Regardless of their age or gender, the children were very sensitive to their surroundings as they quickly noticed features such as litter, dirty walls, bad smells, poorly maintained buildings, and crowded spaces. This is also reported in previous research (Vliet 1981; Woolley et al. 1999; O'Brien 2003) suggesting that children can observe their environment in considerable detail. Ward (1978) attributes this to the smaller height of children. On the other hand, children reported positively on artistic features. Many pictures were taken of colourful street art, details of buildings and the various statues in the city-centre area.



Figure 6. Natural elements – Geo-Picto Narrative.

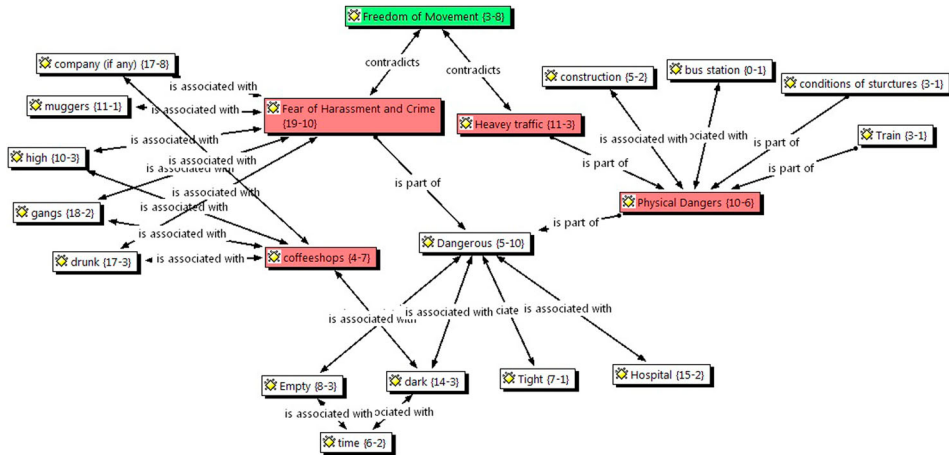


Figure 7. Relationship between the quality ‘coffee shops’ and the other physical and social qualities – network diagram.

Reflection on the QGIS approach and results

Some may argue that the use of multiple research methods could lead to repetitive information. However, the incorporation of multiple forms of data in this research resulted in a greater understanding of the perceptions and experiences of children. This was also pointed out by Cele (2006) and Jung and Elwood (2010). By geographically overlaying information and by exploring relations using querying functions of the textual analysis, we were able to obtain valuable insights in the perceptions of children. This also proved to be insightful to the city planners:

these methods are very good because by walking around, the children can exactly point what they like and dislike and by taking pictures we can see their point of view [...] and the combination between the maps and the picture is really good for us.

Among the results shared with the city planners, the maps ranked highest in importance, in particular when used in combination with the supporting contextual information:

It is important to know what are the positive areas and why and also the negative areas and why. Then you can lay them next to each other, then you can find the relationships because when we make our plans we can see and understand what we can do to turn a negative location into a positive one. That is why it is important that we know exactly why it is negative. That is very important for the policy makers. Why! Why! Why! [an area is perceived as negative] Because only then we can look if we can do something about it.

More importantly, the two planners agreed on the importance of including insights of children in urban planning processes. This is not only important to make improvements to the current situation but also to consider the insights of children in future city plans. Having said that, the planners acknowledged that children are usually forgotten in urban planning processes as these generally rely on the viewpoints of adults alone:

We speak a lot with the parents of the child. In the Netherlands when we plan for a playground, for example, the parents will often make their opinion heard while the children are not in the picture.

The planners also indicated that one of the reasons a policy-maker is more interested in a parent's point of view is because parents have voting power. When asked how this obstacle could be overcome, they pointed out to the importance of studies such as this. In fact, the collaboration with the international school during this research was seen as 'the power' of the whole study since a systematic approach can be developed so that the school can schedule this kind of activity in their yearly program, which would make future collaboration more attainable. At the same time, it must be recognized that conducting participatory sessions in a regular classroom environment may hinder true participation, as children tend to share things differently if they perceive it as an assignment rather than as a free activity.

In fact, such a process of collaboration between municipalities and schools is being introduced in different parts of Australia, New Zealand, and the UK (Gleeson and Sipe 2006) and is one of the recommendations made by Chawla (2002). Once this collaboration is established, it will become easier, as one of the planners stressed, to replicate and roll out approaches such as this to more schools. This will not only aid in institutionalizing children's participation in the existing planning practice, but it will also help to sensitize perhaps even 'educate' planners to more systematically incorporate the perspectives of children in local planning processes. Equally important is that the visual media used in this research can be used as a bridge to engage a variety of built environment professionals. Not only planners but also architects, (urban) designers, and artists could be involved at different stages.

The methodological approach presented here can be applied in different types of living environments, but might need to be adapted to accommodate the limitations and characteristics of the different settings. For example, a research done with children from low-income communities who have less access to ICT technology could require tools other than Google® maps, and perhaps even photography. A remedy would be to rely on paper maps and drawings made by children. In cases where children have difficulties in reading a map, a tour where children take the lead in guiding the researcher to points of interest could also serve as a substitute.

Conclusion

This study focused on involving children in the research process by capturing their perceptions of the city centre of Enschede. Given the specific background of the children involved in this research, the results reported do not necessarily reflect the general perception of all children regarding the city centre of Enschede. Based on the framework developed by Chawla (2002), a mixed-method (QGIS) approach was designed to obtain insight into how children perceive the social and physical qualities of the city centre. Finally, the study also illustrates the benefit of a participatory, mixed-method approach that, on the one hand, provides children the floor to express their views, and, on the other hand, results in a better understanding of these views and perceptions.

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Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Javier Martinez  <http://orcid.org/0000-0001-9634-3849>

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