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Hands on Sustainable Mobility

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Promoting Pedestrians in a Real-World Laboratory: GO Karlsruhe

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The real-world laboratory (RwL) aims to promote walking and to get residents involved. Together with the research team, pedestrians in Karlsruhe identify measures to improve walkability and develop solutions for existing problems. This is done with new digital participation instruments as well as conventional participatory processes. These ideas are implemented in real-world experiments and subsequently analysed to determine whether the desired improvements have been achieved, and which aspects (still) have to be considered. GO Karlsruhe was launched in November 2015 and is due to run until June 2019. The research project is funded by the Federal State of Baden-Württemberg.

Problem statement: Why walkability?

Walking is considered as an important part of sustainable urban development. Therefore the promotion of walking takes a key role in the transformation of cities towards sustainable mobility and social inclusion (Southworth, 2005). However, walking is still the most underestimated mode of transport. One reason for this is that surveys often do not register shorter trips. In 2012 Karlsruhe had a walking *share in the modal split* of 24% in the entire metropolitan area and 28% in the inner city (Omniphon, 2012). These are just the figures when walking is considered as main means of transport. The walking parts of trips made primarily by public transport are not taken into account. Yet pedestrians are neglected not only in terms of numbers, they are often faced with hostile conditions in the cities due to a historic development. Cars dominated urban spaces for decades, but over the past years municipalities in Germany such as Karlsruhe started to promote biking and public transport in order to reduce the car traffic and increase the quality of life in the cities. The Karlsruhe model, in which a seamless transition from an inner-city tram-trip to a regional train journey is key was developed in the 1990s and successfully applied to other cities. The situation for bicycle traffic was also significantly improved by a systematic approach to bike traffic with the improvement of traffic safety, the development of bicycle routes, the development of bicycle racks, public relation activities for biking etc. as described in the program of the city of Karlsruhe from the year 2005. In its SUMP from the year 2013 the city of Karlsruhe is now also promoting walking as an attractive und environmentally sensitive traffic mode (Stadt Karlsruhe, 2013). In Germany today's situation in general is best described by the term *renaissance of walking* (Gehl/Svarre, 2013). The promotion of walking and the improvement of the environment for pedestrians goes along with the reduction of exhaust gases and thus air pollution, less traffic noise, and more space for trees, green spaces and benches. Moreover, there is clear evidence that walking has substantial benefits for health. Regular walking has been shown to reduce blood pressure, diabetes and obesity, as well as mental stress (Dittrich-Wesbuer/Erl, 2004; ITF, 2012). A comparison between Europe and the USA showed that

pedestrian-friendly infrastructure reduces the overall level of traffic danger (Southworth, 2005). In addition, there are benefits for the local economy. Pedestrian areas and the intermingling of people bring vitality to cities and economic benefits to retailers (ITF, 2012). However, providing more space for pedestrians is nowhere near enough.

Research approach

So far preferences of pedestrians have not been comprehensively investigated due to the lack of data bases or survey instruments. Through participatory research socially robust knowledge will be generated in the RwL (Wagner/Grunwald, 2015). There is a growing attention on participatory research. "Participatory research methods are geared towards planning and conducting the research process *with* those people whose life-world and meaningful actions are under study." (Bergold/Thomas, 2012). Participatory research engagement can support the development of more social robust research findings and can support the scaling-up of innovative solutions. The participatory research ultimately guides and supports the implementation of research by taking account of local problems and needs. In addition, the participatory research fosters a sense of ownership over the innovative solutions by the stakeholders resulting in an improved implementation of results and reduced delays and inefficiencies in the implementation (Butterworth et al., 2009). The Real-world Laboratory developed as the German answer to international approaches in other settings of real-world experimentation: in urban transition labs, sustainability (living) labs and transformation labs. As part of the research, real-world experiments are conducted in order to verify the common developed solutions. In real-world experiments citizens' wishes are taken up and provisionally implemented. This is particularly useful if, during an urban redevelopment process, residents and the municipality have the opportunity to temporarily test constructional measures in the public space in the form of real-world experiments. Possible negative effects or difficulties can be identified in the forefront of the ultimate reconstruction and therefore can be avoided. The idea of real-world experiments can be understood as a new mode in the transdisciplinary sustainable research. They integrate different scientific disciplines and stakeholder in a transdisciplinary process and thus contribute to the generation of socially robust knowledge (Schneidewind/Singer-Brodowski, 2015).

Digital participation tools

Conventional face-to-face participation usually addresses people living in a specified district where an infrastructure measure is planned. However, in the city center and other heavily-attended places user of the traffic infrastructure are rarely residents. User are tourists, employees, and customers who live outside the city center or even outside the city. Conventional citizens' participation methodology therefore has inadequacies. With the help of digital participation instruments such as interactive posters and applications for smartphones pedestrians are involved during the problem analysis, the development of measures, the decision on implementation and the assessment of the measures.

Figure 1 Android application: GO Karlsruhe

By using the Android app GO Karlsruhe pedestrians have the comfortable opportunity to give spontaneous feedback on the way or from home. The app enables user to report what they perceive as good or bad on their everyday paths. In doing so, they actively improve the walkability in their city. To ensure the distribution of the app across the city, the app was advertised via the radio station *die neue welle*.
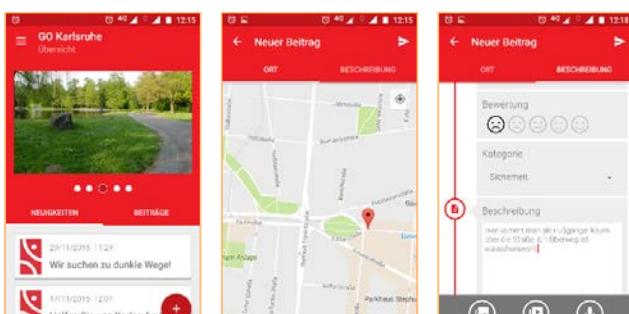
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Interactive posters were developed for on-site participation without smartphones. On them, a given statement is printed, which can be evaluated by pressing buttons (see Figure 2). The passing pedestrians have the possibility to express their agreement to the statement by different smileys (see Figure 5 for details).

The hope is that digital participation as a whole will also involve people who would normally not participate. Economically powerful groups and the educated middle class are often overrepresented in stakeholder engagement processes whereas parents of small children, poorer groups, migrants etc. are usually missing.

Figure 2 Pedestrian feedback by pressing a button

Stakeholder Analysis: who is in and why?

A stakeholder analysis serves to get an overview of who is involved in the face-to-face participation process and what are the motives of those involved (Moura et al., 2017). The stakeholder analysis is based on numerous sources such as protocols of all kinds of events, media reports, observations and interviews of stakeholders were taken into account. It summarizes the main interests and concerns of the identified key stakeholders and provides lessons learned from previous engagement processes. Stakeholders were identified, grouped into categories (key stakeholders, veto-player e.g.), and a profile was created for each stakeholder. In addition, a stakeholder map was drawn up for each district, which provides an overview on the relation between the stakeholders and helps to recognize conflicts at an early stage. The stakeholder analysis helps to understand who is participating in the RwL and reveals the fact that only certain citizens are engaging. Economically powerful groups and the educated middle class are often overrepresented in stakeholder engagement processes (Aichholzer et al., 2016). Young people, parents of small children, poorer groups, migrants etc. are usually missing (Baek et al., 2012). This is a well-known problem and also true for the face-to-face participation in GO Karlsruhe. There is the danger that the results of the engagement will be flawed because of that (like scientific survey with improper sampling so that sampling is biased). If not all relevant stakeholders are represented the research would lose legitimacy. In addition, valuable information from the diverse set of stakeholders would be missing. To facilitate the inclusion of marginalized groups it is important to use appropriate language, take into consideration cultural norms and habits, or the provision of suitable meeting arrangements and places. Moreover, the RwL tries to reach those groups that are usually underrepresented in conventional participation processes by digital participation. The approach is to be transparent about the participation bias so that this could be taken into account when interpreting the results.

Theoretically a broad participation due to digital tools is possible. However, the number of digital participants does not overtop the number of face-to-face participants. Independent from the way of participation people still need to make an effort. Although the point when the digital tools such as the app is used is freely selectable, time and thoughts must be invested in the end. This means, people only participate when they have sufficiently interest in the topic itself.

The Science of Hands on Sustainable Mobility Template

As mentioned before, the stakeholder analysis helps to understand who is participating in the RwL and reveals that only certain citizens are actually participate. There is a self-selection of participants so in GO Karlsruhe face-to-face events mainly older people are found. This is a well-known problem. The stakeholder analysis shows that disproportionately older and well-educated citizens take part in the face-to-face events. In terms of age groups, the digital formats were able to achieve a change according to the data offered by google: although male user (74%) were clearly overrepresented (26%), younger user could be reached. The age group of the 25-34-year-olds is most strongly represented, whereas the age group of the 55-year-olds is the least represented. These results indicate that the combination of digital and classical forms of participation leads to a more representative distribution of the stakeholders involved. Both approaches also have in common that people in particular report deficiencies and their negative effects. At conventional meetings any request made by the participants did not remain uncommented. Participants received both verbal and nonverbal feedback. However, this is not true for the user of the app who did not receive an instant reply on their reports. Hereby different conclusion can be drawn: This form of communication allows introverted user or user with dissenting opinions to articulate their concerns without justify themselves. On the other side, user are missing the confirmation that their request is shared by others. However, it is advantageous for the dissemination of the app if user recognize a personal additional benefit in the use of the app. First response from user showed, that delivering a contribution to a scientific project and a possible change in the distant future is not a sufficient motivation to engage.

Try new solutions: Experiments

As part of the research, real-world experiments are conducted in order to assess the effectiveness of newly developed solutions. In real-world experiments, citizens' wishes are taken up and provisionally implemented. Based on the tactical urbanism approach, only provisional materials were used in the experiments, which represent a small financial burden and can be dismantled at short notice in accordance with an experiment. The first of several real-world experiments started in April 2018 in the Karlsruhe district of Knielingen. The idea for this real experiment came up at a workshop of the real world laboratory. At numerous junctions in a residential area, poor visibility due to parking vehicles and the lack of direct crossing possibilities due to asymmetrical junction shapes were criticized. Therefore, ten crossings were redesigned to be pedestrian-friendly for a period of eight weeks. By using a provisional marking with yellow dots, curb extensions (bulb outs) were created and the stationary traffic was arranged (see Figure 3).

Curb extensions have many advantages: Extending the sidewalk further into the street increases the visibility of people on the sidewalk and crossing the street. Moreover, they are reducing the distance needed to cross for pedestrians and can serve as a visual cue for people who drive that they are entering a neighbourhood street or area. This helps people at the wheel slow down and become more aware of their surroundings, especially when turning. Due to the curb extensions, pedestrians were able to cross the road more comfortably thanks to a better view into the road space. In order to create a larger effect, a number of ten intersections were redesigned. The residents of the affected roads were informed about the project in advance by flyers and an article in the local newspaper was published. The situation for pedestrians was documented both before and during the real experiment with traffic observations cameras.

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Figure 3 More space for pedestrians: curb extensions with polka dots

The feedback on the curb extensions was mixed. While many voices supported the approach achieve an urgently needed improvement for walkability, others felt patronised and disturbed by the colourful design. Although the bulb outs were intuitively used by pedestrians, the feedback showed that not everyone perceived the dotted areas as areas for pedestrians.

To investigate the effect of the experiment, a before and after comparison was made with special attention to the usage of the extensions. More than 150 hours of video recording were evaluated. The paths chosen by the pedestrians, waiting time for pedestrians and if they waited on the sidewalk or on the dots were surveyed. In addition, it was also examined whether there were conflicts between pedestrians and vehicles. However, not only the behaviour of the road users was evaluated, but also their impressions. Pedestrians were asked how they felt about the statement „I feel comfortable here as a pedestrian." and to press a button according to their view (see Figure 5).

Pedestrians were asked before the marking of the bulb outs, during the experiment and after the dots were removed (see Figure 5). Constantly half of the pedestrian felt very comfortable or comfortable, while the other half did not. However, the answers changed over time: they got more and more extreme. This reflects the general mixed attitude towards the experiment.

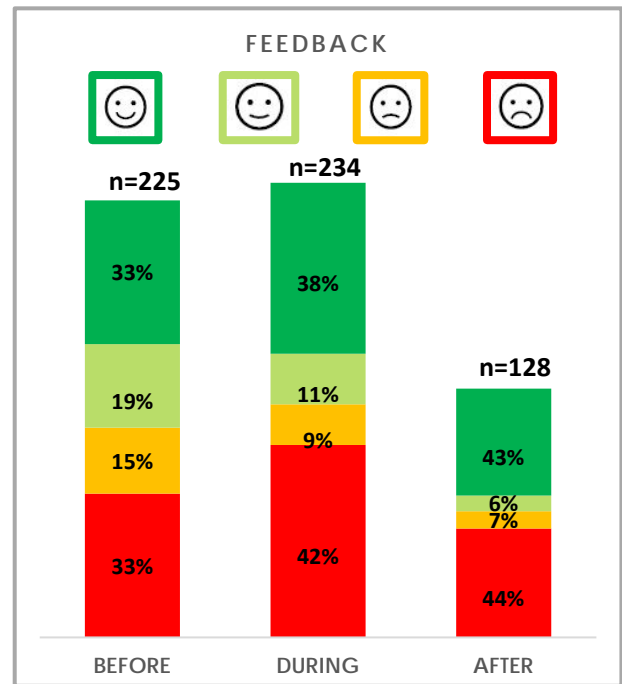*Figure 5 Statement: "I feel comfortable here as a pedestrian"*

Figure 5 Pedestrian feedback over time

The positive effects of the markings became particularly apparent at a junction with a heavily oversized basic traffic area and a centre island for crossing only on one side. The markings reduced the area for vehicle traffic and created a clear allocation of lanes. It is therefore regarded as a success that the city of Karlsruhe is endeavouring to permanently re-mark the junction in future and to provide pedestrians with a new crossing possibility with a centre island. The first results of the video evaluations also show that vehicle speeds at the redesigned crossings have fallen slightly.

The experiment is considered successful although no significant change was found in terms of

- waiting time for pedestrians
- ways pedestrian chose
- number of conflicts between pedestrians and cars

However, the vehicle speed decreased and the cars used less space. Overall, the crossing for pedestrians was made more comfortable. In addition, a discussion on fair use of street space among the road users was initiated.

Conclusion

The first evaluations show that walkability cannot be represented by striking one-dimensional factors. Thus, a high number of factors are relevant for the well-being of pedestrians. In addition, so-called soft factors play an important role. They are given greater importance in further evaluations. According to the results so far, the topics of face-to-face participation as well as the digital participation are largely identical. It can therefore be stated that similar problems are identified independent of the participation method. The results of the on- and offline participation are not contradictory, but rather mutually supportive. However, differences can be noted between the urban districts, which are mostly due to their respective urban structure. For example, pavement parking was reported via app and at meetings in particular in quarters with narrow streets and few regular parking spaces without charge.

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Activating pedestrians to participate has proven to be a difficult task. This is true for both forms of participation but with different emphasis. Although almost everyone is affected by the absence of walkability the public perception is relatively low. For the activation of pedestrians, the medium radio has shown only a low potential. The explanation for this can on the one hand be the weak or nonexistent link between the medium radio and walking ("radio is heard in the car"). On the other hand, the medium is less common than expected. In contrast, social networks and advertising on tram monitors have proved to be effective alternatives. According to the findings of the project so far, the full potential of the participation cannot be exhausted without the use of financial resources for a broad-based advertising campaign.

As expected, the digital participation via app reaches especially younger age groups. The age group of the 25-34-year-olds was clearly overrepresented. These results need a further examination. On the one hand it is plausible that younger people are more familiar with digital devices and therefore reflect in numbers. Digital participation cannot replace face-to-face participation entirely. It opens up opportunities for participation independent of time and place and enables fast and broad provision of information. However, the associated risks must be considered. Here, above all, the unequal participation due to the digital divide should be mentioned as well as the missing consensus-building power of face-to-face communication. Particularly when dealing with controversial topics, digital participation reaches its limits. Nevertheless, a mix of participation methods can make sense, if one focuses on the respective advantages. In the case of a multi-phase citizen participation, it is also possible to split the participation into an online and offline phase. In order that both formats can benefit from each other, the participation has to be planned accordingly. Meaning and functionality of the digital participation has to be brought closer to citizens and the usability of the digital tools has to be easy and self-explanatory. If the topics to be discusses are in need of explanation, meetings should be offered. Gathering ideas and feedback on suggestions can also be done digitally. Participants have the opportunity to reflect intensively on the topics and weigh up arguments against each other. Furthermore, a guided digital participation is a promising further option. In a student project as part of the RwL pupils were instructed to record their ways to school via app. The app is thus uses specifically as an instrument in a participatory project. This approaches of interlinking on- and offline participation lend themselves for the future.

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