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An Ethnography-Based Smartphone App for Promoting Sustainable Mobility and a Healthy Lifestyle

1. Introduction

The main goal of the *DriveGreen* project (2014–2017), which combines anthropological and engineering approaches, is to develop a culture-sensitive and environmentally responsible smartphone app for motivating people to change their mobility habits and to reduce emissions of greenhouse gases produced by traffic.[1] The ethnographic method, supplemented with quantitative measurements of daily mobility patterns, was chosen as a foundation for research and development because it made it possible to create an app with a major advantage over other similar technologies, which are usually based on the "one-size-fits-all" approach: the app would be adapted to sociocultural and other specific features of different cities and would take into account people's needs and requirements.

The development of the app was based on a multi-sited interdisciplinary study carried out in five cities: Ljubljana (Slovenia), Belgrade (Serbia), Budapest (Hungary), and Newcastle and Durham (UK).[2] The study showed that environmental awareness had the least influence on mobility habits. Lowering fuel expenses carried more weight, yet was not persuasive enough to change peoples' daily practices. Therefore, the *DriveGreen* team decided to make a "detour" and attempted to promote sustainable mobility via a health and wellbeing app called *1, 2, 3* that tracks the use of public transport and passenger cars and introduces walking, running, and cycling achievements. In addition, the app encourages competition and cooperation by engaging users in individual and collective activity, and thus makes a move from the increasingly popular "quantified self" (Lupton 2016) to the more neglected "quantified us" (Jordan & Pfarr 2014), especially in sustainable mobility (see overview in Schwanen 2015).

The name *1, 2, 3* was chosen because it highlights three main benefits (or steps) on the way to sustainable mobility and a healthy lifestyle: the first step is made for individuals and their health and wellbeing, the second for more livable cities and the satisfaction of their communities, and the third for the planet and its climate (see Figure 1). In addition, the name suggests that it is time to making a change at the individual and collective levels ("1, 2, 3 . . . action!"). Each new version of the app is adapted to the city and its traffic conditions, and takes in account specific infrastructure, geographical, and sociocultural features. Every version is also named after the city where it operates (*1, 2, 3 Ljubljana*; *1, 2, 3 Belgrade*; etc.), and tracks the daily mobility patterns of its residents while ensuring data protection and, when desired, anonymity of its users. For example, sensitive information about location is not collected; the data are instead securely used only to define types of users' movements, which are later shown on their smartphone screens.

Figure 1: *Each version of the app is named after a city and is adapted to its specific infrastructure, geographical, and sociocultural features.*

[1] Project webpage: www.drivegreen.si/en.

[2] Istanbul was to be included to the list of cities studied; however, the three-month study planned to be carried out in 2016 was canceled due to the unstable political situation in Turkey.

2. Research methodology

The *DriveGreen* project explored the foundations on which daily mobility patterns are based and tried to define factors that influence the habits of individuals and communities in traffic (age, experience, type of vehicle, weather conditions, etc.) These factors were identified through multi-sited ethnographic studies (participant observation, interviews, focus groups, etc.), which were enhanced by driving style measurements made with telematics devices for vehicle tracking and monitoring driving style. Mixed methods (i.e., a combination of qualitative and quantitative research approaches) made it possible to obtain a complete picture of how and why mobility patterns change from one city to another and which factors are crucial in their formation, endurance, and transfer. The sample included a variety of social groups (the young, the middle-aged, the old, students, the employed and unemployed, etc.) and users of various types of vehicles (cars, bicycles, public transport, etc.), and took pedestrians into account in order to gather data about different potential application users.

The ethnographic study in each city lasted from two to three months. Ljubljana was studied first and in greatest detail because all five ethnographers (four anthropologists and one ethnologist) were already professionally based in the city. The other cities (Belgrade, Budapest, Newcastle, and Durham) were studied in depth by one researcher (the author of this text), who traveled to each city and carried out his research through participant observation, paying special attention to sustainable mobility, and semi-structured interviews with traffic participants (approximately ten interviews per city). The participants in the research were recruited by a network of acquaintances, various clubs and associations (e.g., cycling and hiking), and local and national professional driving associations, and also via the *DriveGreen* online community, available on Facebook. Participant observation and interviews were supplemented by photography and video-documentation of traffic and mobility patterns, and media analysis (national and local TV and radio stations, and the press).

3. Research findings

The research provided some commonalities about the cities and approaches for promoting sustainable mobility, which were later used for defining the main functionalities of the app. For example, it was discovered that sustainability and protection of the environment are not the most relevant motivation factors for adapting mobility patterns. The participants in the research found it very important on an abstract level to follow driving rules and use public transport, but in practice these statements were often ignored: they often speeded and did not use public transport or bicycles, usually claiming that they lacked of time and that it was faster to go by car—even though it often takes more time and is usually more expensive. However, people did emphasize economic factors; for example, savings that could be achieved through more sustainable transport modes such as bicycling and walking. Most often they mentioned health benefits and improvements to their lifestyle when they had changed their daily mobility patterns and habits. We observed that driving cars was stressful for most participants in our research, especially during rush hours and in other critical situations (see Podjed & Babič 2015).

The findings from the five cities were also used to prepare recommendations to develop the locally specific versions of the app; the first one was designed for Ljubljana. The researchers used specific findings from the field to design the logo of the app and plan individual and collective mobility challenges adapted to the city and its residents.

4. Development procedures

In the development of the *1, 2, 3* app, it was borne in mind that similar apps designed thus far do not have a lasting effect on people because they tend to become dull, uninteresting, and even irritating (Tulusan et al. 2011). It was sought to overcome this challenge by introducing "gamification" (Zichermann & Cunningham 2011) into the app design, which means that the app identifies the user's habits and then uses various motivational approaches to encourage the user to gradually change and improve daily mobility patterns.

The findings of the comparative ethnographic research presented the starting point in establishing the general functional application requirements, based on the principle of user-centered

design, both generally (Lowdermilk 2013) and thematically specific (Stojmenova 2014). A combined list of final functional requirements was drawn up, and the list could later be adjusted for each one of the target locations on the basis of the motivation factors identified. Based on the list of functionalities, wireframes were designed for the application's user interface.

During the development, the team tested the adequacy of the app's functionalities and user interface with groups of potential users. This made it possible to discover potential shortcomings and weaknesses of the user interface and identify performance flaws early on. Feedback was gathered with interviews in all five cities and with focus groups carried out in Ljubljana in 2015 and in Durham in 2016. The participants provided information about the performance of the application and about the user-friendly and intuitive aspects of the user interface. Feedback analysis indicated how appropriate the functions of the application are and exactly how usable the application might be. After these findings were analyzed, it was possible to suggest improvements and upgrades; for example, changes connected with user interface optimization and adding or removing functions.

As explained above, health and wellbeing were initially not part of the focus of the project, the main goal of which was to develop a smartphone application for promoting sustainable mobility. However, the qualitative study of user expectations, including the focus groups, provided an important hint for a new development focus. The research team decided to shift its focus from sustainable mobility to two additional areas: health and well-being (see Figure 2). The application developed therefore covers the intersections of the three main fields and seeks to influence these elements of everyday life.

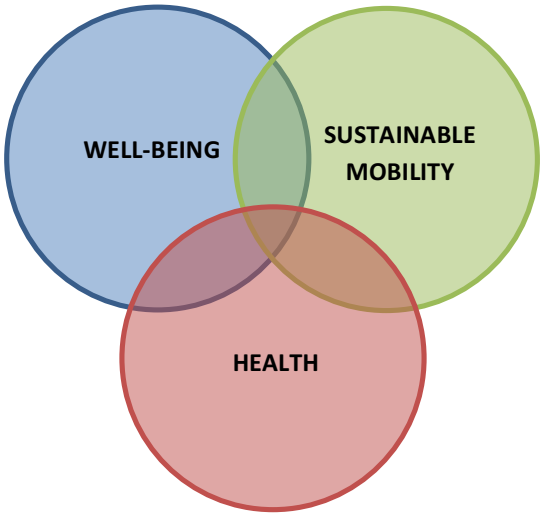

Figure 2: *The additional focus of the application covers health and well-being in addition to sustainable mobility.*

The main developmental output of the project was thus the app, which makes it possible to visualize users' daily mobility patterns. The app identifies various modes of movement or use of various means of transport and scores individuals' achievements. In addition, the app, which operates in cities, focuses on community building. It also presents short-term collective goals named *city actions*, which are linked to improved community patterns and reduced transport by cars and other vehicles that impact individuals' health the most, and reduced emissions of greenhouse gases and other pollutants in the city (see Figure 3).

Figure 3: *The app shows users how much they walked, cycled, drove a car, or used public transportation (left). It encourages movement and sustainable forms of mobility with various individual and group actions (right).*

Ethnography enabled the research team to understand the cities and people living in them and was instrumental for developing this people-friendly app, which was well accepted by its users based on usability testing in Ljubljana. The users can easily identify with its distinctive elements (the logo, names of the "actions," etc.), which are relevant for locals. The most important thing is that the app was developed from the beginning using the "bottom-up" ethnographic approach; it was thus designed *with* people instead *for* them, as has been more common in the development of IT solutions.

5. Conclusion

As presented here, it was decided to adjust the originally planned functionalities and design of the smartphone app for promoting sustainable mobility. During the ethnographic study in five cities, combined with measurements of mobility patterns, it was proven that neither environmental responsibility nor savings were the main motivating factors for changing mobility practices in urban environments. Therefore, it was decided to focus research and development on two other aspects of everyday life: health and wellbeing. When developing the *1, 2, 3* app, the team also sought to highlight the relevance of a transition from individual motivation by measuring personal performance (i.e., the "quantified self") to measuring the collective and solidarity-oriented quantification of community achievements (i.e., the "quantified us"). Such a shift may contribute to mobilization for achieving environmental objectives at both the local and global levels, and, if correctly implemented, could be useful in developing other applications in eHealth, mHealth, and telemedicine.

6. References

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