Assessing Experiences and Visual Perception in Train Stations with a Mobile Application and Eye Tracking

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ABSTRACT

The Customer Experience Management at the Swiss Federal Railways (SBB) experiments with new technologies and methods to capture experiences and perceptions of passengers to design safe and customer friendly environments. First, a new methodological approach based on a mobile application was developed in-house to assess experiences and emotions of rail passengers. Second, to learn more about visual perception in train stations, mobile eye tracking was used. In conclusion, the app proved to be valuable in capturing personal and subjective experiences. Mobile eye tracking helped to assess visual perception of passengers which resulted in further understanding of unique situations or objects which might subconsciously influence the experience of passengers.

Keywords: Rail, Customer experience, Mobile app, Mobile eye tracking

INTRODUCTION

The Customer Experience Management at the Swiss Federal Railways (Schweizerische Bundesbahnen, SBB) strives towards a better understanding of rail passengers and their experiences in order to create safe and customer friendly surroundings. Customer experiences happen along customer journeys, which enroll along several touchpoints (i.e. instances of specific or probable interaction between a customer and a company) (Lemon and Verhoef, 2016). Because of the personal and subjective nature, experiences are difficult to capture (Gentile, Spiller and Noci, 2007). Often used methods like surveys, focus groups or interviews give limited insights into the subjective experience. For one, they are retrospective and second, they evaluate experiences outside of the real context in which they happen. Emotions and memories change over time and hence, the reports of the experiences in the survey or interviews might differ from the actual emotions and experiences. Current studies explore the feasibility of methods that collect data about experiences not in retrospect but in real time and in context (Schneider *et al.*, 2021). Other current studies describe mobile ethnography, which means the recording of customer journeys using mobile phones (Muskat *et al.*, 2013; Bosio and Prunthaller, 2018). Furthermore, mobile eye tracking is a frequently used instrument in applied areas to assess attention and to investigate visual perception in the field. The two approaches, mobile ethnography

and mobile eye tracking, were investigated by the SBB. This paper discusses advantages and limitations of both methods that appeared during the conducted studies.

Assessing Experiences With a Mobile Application

Following a mobile ethnography approach, a mobile application was developed in-house to assess experiences and emotions of rail passengers from a subjective perspective along their customer journeys. The app allows to document an experience with a picture, a comment and an emotion (smiley scale). Therefore, the app user can take a picture of a specific situation with the phone camera, can describe the specifics of the experience in the comment and can indicate varying levels of positive or negative emotions.

The app is specifically built for test participants. They can download the app either in the app store or google play. Access is granted through a passcode sent by the SBB. The app was tested and evaluated in a pilot study (Schneider et al., in preparation a) with 39 participants (age M = 42). For the study, commuters and leisure traveler were recruited. During a two week period they documented their experiences with the SBB.

Advantages and Limitations of the SBB go App approach

Analysis of the gathered data allowed a ranking from the best to the worst experiences regarding encountered touchpoint or situation. Also, pictures and commentaries about the experiences helped to better understand the personal perspective of the test participants. As opposed to data gathered with retrospective methods, the data gathered through the app reflected experiences in real time. Therefore, the mobile application helped to generate relative data about subjective experiences in train stations.

There were also some challenging aspects and limitations to the used methodology (Table 1). The two main limitations are the following: 1) Taking a picture or adding a comment could be distracting in the critical moment.

Table 1. Overview of advantages and limitations of the methodology behind the SBB go app.

Advantages	Limitation / Challenges
Data is collected in context.	The context of interest (e.g. specific train station of interest) needs to be clearly defined in the test instructions.
Data is collected in a natural setting without distraction from test supervisor or test instruments.	Test participants need to have their own smart phone and be able to install an app through app store or play store.
Data is collected in the critical moment, meaning at the time when the experience is happening.	Taking a picture or adding a comment could be distracting in the critical moment.
The documented experiences are subjective and personal.	The documented experiences are consciously registered situations or objects. However, unconscious influences from the environment might not be documented in the app.

2) Even though the app helped to assess experiences, only experiences regarding situations or touch points which will be consciously perceived by test participants can be documented in the app. However, passengers moving through train stations encounter a variety of touchpoints or situations which might not be registered as an experience by the passengers but still potentially influence the experience of passengers.

Assessing Visual Perception in Train Stations

Mobile eye tracking is a frequently used instrument in applied areas to assess attention and to investigate visual perception (e.g. Buechner, Wiener and Hölscher, 2012; Wurtz, 2012; Knecht, Muehlethaler and Elfering, 2016; Ryffel *et al.*, 2019). In Schneider et al. (in preparation b) a signaling prototype, which was intended to coordinate crowd movements during rush-hour in a specific underground passage at a train station in Switzerland was tested. 19 participants (age M = 29) took part in the study. Test participants were wearing SMI mobile eye tracking glasses and were accompanied by a test manager through a train station passage.

Advantages and Limitations of the Mobile Eye Tracking

Mobile eye tracking proved to be a helpful tool to understand what the test participants perceived along their customer journey, e.g. signs, objects or areas they were looking at. Therefore, the test participants did not actively have to document their journey. The mobile eye tracker recorded gaze fixations automatically.

However, the data is lacking a personal evaluation given by the participant. Therefore, the data purely reflects perceived objects and situations along the journey without indication if the object or situation is causing any emotion or holding a specific importance. Another limitation regarding the eye tracking might be caused by the test situation. Gaze behavior might differ slightly from gaze behavior outside a test setting because a) the test participants were accompanied by a test manager and b) the feeling of the eye tracking glasses might be unfamiliar.

Table 2. Advantages and limitations of the methodology mobile eye tracking.

Advantages	Limitation / Challenges
Data can be collected in a natural setting.	A test supervisor has to be on site to install the mobile eye tracker and to accompany the test participant.
Relative data is collected in context.	Data recording happens during a selected time slot for 5 to 10 minutes.
Data about the specific surrounding is recorded. Unconsciously processed experiences and touchpoints are recorded.	Mobile Eye Tracking needs to be combined with e.g. interviews to understand which influences were consciously perceived and to understand the experience from a subjective perspective.
Detailed and extensive data.	Data analysis is very elaborate.

CONCLUSION

In conclusion, mobile ethnography and mobile eye tracking, can help to collect real time data. Therefore, they can both help to understand train station environments from a customer perspective and have the potential to complement a set of existing methods like questionnaire, interviews or focus groups. The app can help to assess experiences that are actively documented by the user and therefore give insights about personal experiences along customer journeys. With mobile eye tracking on the other hand, test participants are not actively documenting their surroundings. Hence, mobile eye tracking data is including all touchpoints or situations that are visually perceived along customer journeys. Therefore, mobile eye tracking has the potential to recognize influences on the experience which might not be consciously perceived by the passengers and documented in the app. The next step will be to conduct experiments with a combination of both methods to further increase our understanding of subconscious influences along the customer journey.

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