
IMA
Intermodal Mobility Assistance



Deliverable 8.1 (a)
Integration, Testing and Validation – Field Tests



REAL USER TEST

GENERAL CONCEPT

A user test of the IMA project will be, naturally, oriented towards the user of the system and his experiences with the functions and the interface of IMA. To do this, the user has to do two things: he has to use the system, and he has to convey his experiences towards the developers of the system. Consequently, the real user test consists of (at least) two stages: a field test and an interview.

In the field test, the user will use the system as it is intended for a normal user: preferences get defined, perhaps favourite addresses get entered, routes will be planned and possibly put into the calendar, and the user will use the route assistant as a guide. IMA can work both on desktop computers and on mobile devices. This means the user should be able to test the desktop version first, to plan his route, and then use his mobile device for the route assistant or to adjust his route on-the-go.

Afterwards, the impressions of the user need to be recorded, for example by the means of an interview. In this interview, a wide spectrum of aspects about IMA will be discussed. The content of this interview will be detailed further in this document. Preferably, an oral interview will be held, because a user can express himself better given the wide range of possible remarks that can be made about the system. Oral interviews take more time to have and to process: this needs to be taken into account.

Additionally, a pre-interview or pre-survey can be held about what users expect of an intermodal route planning system. These expectations can then be compared with their experiences with IMA, to check if the system suits their needs and/or if they have adjusted their expectations. In my opinion, it can be interesting to have a comparison with the early expectations of users, but if test users of DAI-Labor are used, they might be biased because they already know to some extent what IMA is about.

FINDING TEST USERS

Ideally, test users are diverse and representative for the population. This means there should at least be certain distributions of age, gender, home location, and study/professional level that correspond to the 'real world'. The extent to which this can be done is however dependent on the time and resources that can be invested into finding test persons. If it is a first test and the system is far from ready, it might be interesting to stay within familiar environments like DAI-Labor. On the other hand, this means that people might be biased in their expectations of an intermodal route planner.

The number of test persons also depends on how functional we feel the system is by now. If the system is still far from complete, a small number of test persons may already suffice (for example 10 persons). If the system is rather complete however, and we want to test it on a bigger scale, then a higher number of test persons is desirable.

It is desirable that at least some of the participants know or regularly use one of the sharing systems that are used in IMA (CallABike, Car2Go, ...), to test if they find IMA's suggestions about these services logical.

In general, the users should have diverse modes of transport for commuting. In Berlin, the modal split of 2012 was as follows (Wikipedia):

- Walking 29%
- Cycling 15%
- Public Transport 26%
- Private vehicle 30%

This modal split should preferably be somewhat reflected in the test user base. The reason why this distribution should be at least a bit reflected is that people with different transport experiences could react differently to the route planner system.

FIELD USER TEST

In a field test, the users are able to use the system freely and to their taste, as they would do if they were normal users. Additionally, they should be able to use the system on a mobile device for route navigation. This means the field test actually consists of two parts:

1. A route preparation before leaving (on a desktop or mobile)
2. Route assistance during navigation (on a mobile device)

Although the user should be able to use the system freely, there are some guidelines that should be respected to that it can be evaluated without problems. Using IMA actually consists of different stages that the users should go through:

1. Accessing the IMA system
2. Setting preferences for vehicles/sharing services and weights for route alternative ranking
3. Potentially setting up favourite addresses (home, work, friends, ...)
4. Defining a route, using favourites or by manually inserting a start and end location. This should be a route that the user can actually perform in real life, in the region of Berlin. For example, everyone can get the same assignment to go to a certain location (i.e. Brandenburger Tor), an assignment to go to a certain location that can be different for everybody (i.e. home location), or the users can be left free to choose. In the first case, comparisons can be made but the specific route might introduce a bias in the evaluation. In the second case, there should be less bias but it might be more difficult to control. In the third case, there is no control over the routes. Additionally, the origin can differ, or the same origin can be used for everyone (i.e. Ernst-Reuter-Platz). The latter option makes it easier to test the routes (starting at DAI-Labor), but can introduce a bias about the start location.
5. Defining the number of different modes that should be included in the search. To test an intermodal route planner, it is preferable to have all modes enabled. Additionally, it is possible to set a time of departure or arrival, and even a certain date.
6. Rendering of route alternatives and their ranking according to the user's preferences
7. Choosing the best route alternative. One possibility is to let the user choose which alternative he thinks is best, using information from the ranking system but not blindly following it; or oblige him to choose the alternative that gets the highest ranking. In the first case, we get information about the confidence people give to the ranking system, and their own ability to choose one of alternatives presented. In the second case, we can get more information about the performance of the alternatives that IMA ranks highest.
8. Sending the route to the route assistant
9. Using the route assistant to complete the route 'in the field'

A number of the abovementioned possibilities might not be as hard to choose from if the user will be able to make more trips than one. For example, the user can be asked to return to work using another mode, or to go somewhere else and take the highest ranked alternative. Another possibility is to give a certain group different instructions than another group, as to compare them to each other (a group that chooses their own alternative versus a group that has to choose the highest ranked one).

During the field test, a lot of data should be gathered by both the test person and the researchers. This includes the following:

- Registration of the user's preferences, his origin and destination, the transportation modes that are enabled for searching routes, and other details concerning the user's input
- The route alternatives and their ranking that get presented to the user
- The chosen route alternative and its characteristics (start time, estimated travel time, computed distance, suggested route, modes used, ...)
- The route itself with all its characteristics (start time, real travel time, possible wait times, real distance, real route, modes used, ...)

Concretely, when starting the test, the users should first be introduced to the system, how it works, and they should receive guidelines about how to perform the test. To introduce them, a short explanation should be given about IMA and how it works. Then, the user should get a quick introduction about how the different components of the system work (setting preferences and favourites, searching for route alternatives, the calendar, and the route assistant). Finally, he can get guidelines about what to do for his test (where he has to go, etc).

INTERVIEW

Given the dynamic nature and the complexity of the IMA system, surveying test users via a written questionnaire would probably not give a complete overview of the user's experiences as certain nuances would be lost. Therefore, an interview with the test user would deliver a far more complete registration of his experiences. The interview would be held with one or two members of the IMA project team who are responsible for the general evaluation of the system. It is supposed to elicit the user's opinion about the different aspects of IMA, its functioning and the user's perception of its usability. The user should be able to be open and critical, in order to improve the system as much as possible.

Another possibility, or an extra measure, might be a group discussion about the system. Instead of interviewing each participant individually, this would mean that all participants will be interviewed at the same time, so to register their collective experiences with the system. The benefit of this option is that the users can strengthen each other's opinions or start a discussion about certain aspects of the system. Additionally, having all participants at the same time would take less time and energy to process the interview. On the other hand, group interviews can lead to having a certain individual or group predominating the interview, which can lead to a bias in the results. Also, some people might not feel comfortable enough to express their opinion in group.

As described earlier, the range of subjects that need to be discussed in these interviews covers a lot of different categories. Next, a possible list of questions will be proposed to use for the interview. This list should not be limitative: if needed, the user and the researchers can expand on certain themes or

discuss even more aspects about the system. The interview thus gives more of a qualitative evaluation, where the simulation environment should give a more quantitative evaluation.

INTRODUCTION:

- Short introduction about the project, the evaluation and what should be expected from this interview
- Confirmation of the user's personal preferences and routes, to check if they match up with what was recorded
- Values for time, costs, CO2 exhaust
- Favourite addresses
- His origin and destination for every trip
- The route alternative he chose for every trip
- The route characteristics like travel time, distance and modes

VALIDITY:

- Was the route, as suggested by IMA, physically possible to follow? Did you follow the route as suggested by IMA?
- Was the route travel time, as suggested by IMA, realistic? What was the real travel time and why do you think this deviates from the suggested travel time (if it does)? (For example, was there a lot of congestion, or was there not enough time to change from one mode to another?)
- Why did you choose your route alternative? (if users are free to pick their alternative)
- Did you find the route you chose and followed logical, as suggested by IMA? Would there have been a better route to follow, according to you? In general, was it easy to follow your route?

RELIABILITY:

- While using IMA, did you encounter any bugs, errors or other inadequacies?
- In general, did you feel that the system works fluently and without problems?

PERFORMANCE:

- How do you feel about the speed of IMA and the time it took to display your route alternatives?
- In how many seconds would you like the system to display all alternatives?

FIELD PERFORMANCE:

- Did the system find your location while using the route assistant?
- Did your location get updated while you moved?
- How did the route assistant react to your moving position?

REAL-TIME ADJUSTMENTS:

- Have you deviated from the route that was advised to you? If so, was this deliberately or undeliberately?
- If you deviated from your route, how did the route assistant react?
- Did you understand the new route suggestions that IMA gave you if you deviated from your route?

INTERMODALITY:

- Did you use an intermodal route (at least two different modes of transport for a single journey)? If not, did you consider taking one of the intermodal route alternatives? If not, why?
- Why did you (not) choose for an intermodal trip?
- If you chose an intermodal trip, do you think that the route was logical? Do you think the intermodal trip had better characteristics than the other route alternatives?
- Do you think the ranking of the intermodal trips was appropriate, compared to the other alternatives?
- If the system would give better intermodal alternatives, would you consider taking those instead of unimodal alternatives?
- If you took an intermodal trip, do you think it had less impact on traffic in the city than a unimodal trip?

SHARING SERVICES:

- Did you use a sharing service (bike or car)? If not, did you consider taking one of the sharing service alternatives? If not, why?
- Why did you (not) choose for a sharing service?
- If you chose a sharing service, do you think that the route was logical? Do you think the sharing service trip had better characteristics than the other route alternatives?
- Do you think the ranking of the sharing service trips was appropriate, compared to the other alternatives?
- If the system would give better sharing service alternatives, would you consider taking those instead of other alternatives?
- If you took sharing service trip, do you think it had less impact on traffic in the city than another trip?

PREFERENCES AND RANKING:

- Did you understand the preferences for route alternative rankings? Could you set it without a problem?
- Do you think the system used your preferences for its route alternative ranking in a good way?
- Did you understand why certain alternatives were ranked in their particular order, and did you find their ranking logical?
- What was the ranking of the alternative you chose, and do you think this ranking was appropriate?
- Do you think that the highest ranked alternative was actually the best alternative for you?

USABILITY:

- In general, did you like IMA's interface and did you find it easy to work with?
- How long did it take you to become familiar with the interface?
- Did you find it easy to enter your route details (origin, destination, time, modes)?
- Did you find the visualization of route alternatives clear and easy to understand?
- Did you understand the drag and drop system and do you think this system makes it easier to work with IMA?
- Do you think the interface is suited for both computers and mobile devices?

CONCLUSION:

- Do you have any suggestions about the IMA system (what is good, what could be done better, what are important things to pay attention to)?
- Would you like other, additional features for IMA?

PRE-INTERVIEW

If applied, these are possible questions for a pre-interview with the test users. In the 'real interview', in the conclusion, some questions can be added to check if their expectations and experiences correspond.

- Do you travel a lot? (to work, leisure, shopping, ...)
- What is the transport mode you use most often?
- Would you like to have more overview of the possible route and mode alternatives for your travel routes?
- Do you use route planners frequently? If so, what do(n't) you like about them? If not, why?
- What would you expect from an intermodal route planner and route assistant?

CONCLUSION:

- How did your experience with IMA relate to your expectations about an intermodal route planner?
- If freely accessible, would you use IMA instead of other route planners?
- If IMA were freely accessible, would you check more often how you could get to your destination in different ways?