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# Testing the Usability of OpenStreetMap's iD Tool

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*The objective of this study is to investigate the usability of the iD editor of OpenStreetMap (OSM). To this end a usability test with 18 participants has been conducted. The participants were given mapping tasks to complete using iD and observed with the thinking aloud method as well as screen recording and mouse/keyboard logging. Additionally, the test persons were interviewed after each test. The data gathered were analysed with regard to key usability criteria such as learnability, efficiency, error tolerance, and subjective user satisfaction. The outcome of this study is the identification of usability issues from which possible improvements of the tool have been derived. The study shows that iD is an overall usable tool for novice users, but still shows opportunities for improvement especially in terms of learnability and error handling.*

Keywords: OpenStreetMap, VGI, usability, iD editor

## INTRODUCTION

Volunteered Geographic Information (VGI) has been in the focus of research since Goodchild first coined the term in 2007, referring to it as “the widespread engagement of large numbers of private citizens, often with little in the way of formal qualifications, in the creation of geographic information” (Goodchild, 2007, p. 2). The phenomenon has emerged from the Web 2.0 paradigm that web-based content production is not only done by experts anymore, but also by amateurs – i.e. the ones who were previously only meant to consume content. Simultaneously, the lack of free and open sources of geographic information has led to the development of VGI platforms which increasingly provide an alternative to (costly) authoritative and commercial geodata. The relevance of VGI has been proved by, among other things, the great success and growth of collaborative geodata projects such as OpenStreetMap (OSM).

OSM (URL 1) is the best-known and biggest collaborative geodata project today, numbering more than 1.7 million registered contributors (URL 2). OSM's goal is to collect geographic data for the whole world, and this goal is pursued with the help of a crowd of volunteers. In this context, the term ‘crowdsourcing’ is widely used, referring to any community-based activity aiming at content generation including, for example, Wikipedia (URL 3).

In OSM, as in Wikipedia, any person (provided they have registered an account) can edit and improve the map with their local knowledge. Raw OSM data are freely accessible, meaning that everyone is free to take it and use it for individual purposes, such as creating a custom map or setting up a location-based service. OSM has become one of the most popular resources for map production, enabling laypeople to put geographic information to their

personal use. It is being increasingly adopted by the media and commercial suppliers of location-based services, e.g. Nestoria (URL 4) or Flickr (URL 5), who have made the switch to using OSM on their websites, or the navigation system Skobbler (URL 6), which solely relies on OSM data.

With the popularity of OSM rising constantly, an increasing number of studies investigate the phenomenon with respect to user characteristics, users' motivation to contribute, and data quality (Budhathoki, 2010; Nedović-Budić and Budhathoki, 2010; Lin, 2011; Haklay, 2010). Several studies of OSM have highlighted the need for better usability of OSM tools in order to lower the barriers to contributing, especially for new users. Jones and Weber (2012) pointed out that a “chasm” exists in the transition of OSM contribution rates from a small number of pioneer users to mass adoption. This is an indication that (among other things) flaws in the editing tools might prevent the project from gaining a greater amount of dedicated and actively contributing members.

Therefore, investigations into the tools that contributors work with in order to make their edits are vital. If these tools are appealing and, most importantly, usable enough, a bigger fraction of potential users will adopt the system. Within the scope of this study a usability test of one of OSM's editing tools, iD, has been conducted.

iD is a recently developed online editor for OSM, integrated directly into the main OSM website. It has been designed primarily for beginners and casual contributors, but may also serve as an alternative for more advanced users. Programmed in JavaScript, it was intended as a replacement for the previous Adobe Flash-based online editor Potlatch 2. It was launched on the OSM main page in May 2013 (URL 7) and set as the default online editor in August 2013 (URL 8).

The iD tool has been chosen because it is currently the most used editor for OSM data (measured by changesets and distinct users; URL 9) and because so far no scientific usability study exists about it. The objective of this research is to investigate the usability of the iD editor for OSM. The outcome of this research is the identification of usability issues that are indicative of possible improvements of the tool.

## RELATED RESEARCH

### Contributing to OSM

OSM data are collected by volunteer enthusiasts using techniques such as Global Positioning System (GPS), tracing from aerial imagery, or local knowledge. In the mapping process, the gathered information is translated and integrated into the OSM raw data format. This conversion is facilitated by editor programs that provide an interface between the geographic data collected and their representation within OSM.

The major amount of user-generated geodata in OSM is contributed by only a small fraction of its members. Nielsen's '90-9-1 rule' that states that "in most online communities, 90% of the users are lurkers who never contribute, 9% of users contribute a little, and 1% of users account for almost all the action" (Nielsen, 2006) helps shape a rough picture of OSM contributions. Statistical analyses of OSM distributions have indeed shown that 1% of users account for approximately 80% of the data (URL 10). On the other hand, only 35% of the users who create an OSM account actually make edits to the database (Jones and Weber, 2012), which is more than the 10% suggested by Nielsen, but still a number that could be increased for OSM's benefit.

The questions why people withdraw from contributing and why certain users do not contribute at all, although they have some initial motivation for it, remain to be investigated more extensively. In research done by Schmidt *et al.* (2013) users who do not contribute anymore reveal that the time-consuming aspect of mapping and complexity in editing were some of the reasons why they withdrew from contributing. From this fact, it follows that research on the usability of editors is necessary in order to lower the barriers to contributing, especially for novices and passive users.

### Usability of VGI interfaces

Usability is a concept of human-computer interaction science widely referred to in testing, improving and validating software, websites, and web tools. According to Gould and Lewis (1985), a usable system should be "easy to learn (and remember), useful, that is, contain functions people really need in their work, and be easy and pleasant to use" (p. 300). Nielsen (1992) lists five usability criteria commonly referred to: "learnability, efficiency of use once the system has been learned, ability of infrequent users to return to the system without having to learn it all over, frequency and seriousness of user errors, and subjective user satisfaction" (p. 15). An evaluation of iD with a focus on these criteria is the main objective of this study.

Usability testing has been used to test neogeography maps and VGI applications as well, such as in a study by Jones and Weber (2012). They conducted a usability test of Potlatch 2, an OSM online editor that was integrated in the OSM website in November 2010 (URL 11), i.e. the direct predecessor of iD. Using screen recording, eye tracking, and thinking aloud, the researchers tested the user interface with 10 test persons who had no prior experience with OSM. The analysis, focused on the usability criterion of learnability, showed that there were significant problems with the tool, e.g. misplaced interface elements, inconsistent interaction, insufficient warnings etc.

Furthermore, Jones and Weber (2012) developed a set of usability heuristics based on previous work in the field of usability science and tailored to the specifics of VGI interfaces. These measures are, in addition to Nielsen's criteria, used in the analysis of the results of this study. This study differs from Jones & Weber's work in a way that it not only works with novices, but also with experienced OSM mappers (not ones experienced with iD), and that a broader spectrum of usability criteria is taken into account (not only learnability).

## METHODOLOGY

### Observation methods

In order to produce useful qualitative information on iD's usability, observation techniques are used that elicit unbiased data about the participant's interaction with the study object, i.e. thinking aloud, screen recording, and mouse and keyboard logging. Additionally, interviews are used to gain a clearer picture of the participants' subjective interpretations of the tests. Although thinking aloud is a time-consuming effort in terms of both execution and analysis, it is the chosen method for this research, because it may be expected to produce the most valuable results; since testing with real users has shown to produce better results than heuristic methods (Gould and Lewis, 1985).

The test persons' utterances from the thinking aloud were recorded with a headset microphone, which was attached to the computer also running the iD application. After the tests, the thinking aloud data were analyzed and relevant portions of them were tagged with certain codes and finally transcribed by the word, including descriptions of what the participant did.

Through screen recording the computer's screen was captured and saved to a video file. With this method, the interface the user is confronted with is recorded as well as cursor movements. In combination with thinking aloud it facilitates a very detailed analysis of the user's interactions, enabling the detection of misled behaviour resulting from possible usability issues of the system.

Screen recording, however, is not fully capable of taking a record of mouse clicks or keyboard strokes: although one can spot occurrences of mouse clicks and keyboard strokes whenever there is a visible feedback to them, one cannot identify them when there is no visual feedback, e.g. a click on an area of the screen that is not a button or does not react otherwise. To take a record of all mouse and keyboard interaction, the "key-mon" tool (URL 12) was used, which

displays a small panel on the screen showing the buttons pressed on the mouse or keyboard in real time. As the panel is displayed on the screen, it is embedded within the screen recording videos.

#### User groups

The test was conducted with two user groups:

- 9 users who have not edited OSM before, except maybe one or two times (the 'novice' group),
- and 9 users who have some more experience with OSM, but have not, or rarely, used the iD editor before (the 'mapper' group).

The distinction between these two user groups is important because those who have edited OSM before are certainly more familiar with the basic concepts of OSM editing – such as the tagging system, the ways how map objects should be drawn, or how aerial imagery can be interpreted. As users of the novice group usually lack this knowledge, they were expected to perform differently on the editing tasks and thus to reveal different usability issues with the editor. However, with respect to the iD editor all test persons were (almost) novice users.

The conclusions that can be drawn for any improvement of iD will certainly depend on the developers' and the OSM community's opinion which user group the program is to be targeted at (who, as indicated in Section 1, are mainly novices to OSM). The usefulness of the test results will, for that matter, be increased by the possibility to differentiate between the groups of users that have produced them.

#### Test plan

The test persons were selected with the aid of an online survey (see Survey Response). In the survey, the candidates were asked questions used to assign them to the novice and mapper groups, as well as to collect some background information about their contributing characteristics and their experience with related technologies such as IT, GIS, and social media in order to better interpret the test results afterwards. All test persons were required to complete the survey prior to the actual test.

The actual test has been designed to simulate a real use case as authentically as possible. Solving the tasks required different activities typical of a beginner level OSM mapping session, with a more advanced extra task for the mapper group.

The first task was intended to make the test person familiar with the OSM website and the iD tool. The test person is asked to navigate to a target map area by using the search function. Afterwards he/she is supposed to go through the iD walkthrough, which is a built-in introduction to the basic functionality of the editor. The reason why this is done is that the walkthrough is an integral part of the editor and therefore deserves to be tested with respect to its usability as well. If it proves to be a useful tutorial for novice users, it certainly contributes to the ease of learning to use iD. Besides, it is a rather easy task and therefore very suitable as a starter (also for test persons to practise thinking aloud).

In the second task, the test person is asked to add features to the map that are annotated on a printed "Field Paper". Field Papers (URL 13) are automatically generated

printouts of a chosen map area in OSM that can be taken out into the field, filled with notes, and afterwards scanned and loaded into the editor program. Although the scanning is optional, they are a useful (and popular) way of taking notes during a mapping survey. The Field Paper provided for this task contains annotations of typical map objects, such as a restaurant, a car park, or a foot path (Figure 1). In this task the test persons are required to make use of the functionality they have become acquainted with during the walkthrough.

In the third task, the test person is asked to use the aerial imagery, which is displayed as a background layer in the editor, to make additional edits. In this task the test person is supposed to add two objects of his/her choice and to improve the geometries of two existing building outlines. This task may be more demanding, because editing of geometries is not covered in the walkthrough (but still a very common thing to do when editing OSM).

A fourth task is given to the participants of the 'mapper' group only. They are asked to add a piece of information derived from fictitious local knowledge (a speed limit imposed on a particular section of a road) to the map. This task requires the test persons to make use of a function of iD not needed in any of the previous tasks (splitting a line). The reason why this task is not given to the novice participants is because this mapping technique is not very commonly used by first-time mappers and also because the first three tasks are likely to be time-consuming enough for participants of that group.

While working on the tasks, the test persons were allowed to use two external help sources, the OSM wiki (URL 14) and the iD introduction on the "LearnOSM" website (URL 15), in case they needed information on mapping recommendations or additional help with using the editor.

Immediately after the test, the participants were asked for their opinions on their performance in the tests. The questions were targeted at the test persons' pleasure and satisfaction in using the tool, and were intended to elicit retrospective comments on, e.g., situations in which they struggled or got lost.

## RESULTS

#### Survey response

An online survey was sent out to the OSM community, mainly to attract test persons of the mapper group. In order to attract participants for the novice group – as far as they could not be found through the OSM community – we also reached out to acquainted persons. The goal was to find test persons with diverse characteristics and backgrounds for each group. The survey was announced on the OSM community's regional mailing list for Hamburg "OSM-HH", on the German-language OSM mailing list "Talk-de", and on the general discussion list "OSM-talk".

Altogether 13 valid responses (i.e. completely filled forms with valid contact information) of the novice type and 26 valid responses of the mapper type were received. Respondents were invited to the tests successively, each time only as many as needed. When any of the invited





Figure 1. The Field Paper used in task 2

candidates cancelled or did not reply at all, another round of invitations was started until a sufficient number of test persons were found. Eventually 18 test persons were found, 9 of the novice group and 9 of the mapper group. This can be considered a sufficient number as, according to Nielsen (1994), approximately 80% of the usability issues can be found with five test persons in a thinking aloud test.

**Completion of the tasks**

*Task 1.* The first task was to complete the walkthrough and was successfully completed by all test persons, as they only needed to follow the instructions given on the screen.

*Task 2.* The second task entailed entering map information that was given on a Field Paper in analogue form. Success in this task can be measured by whether the test persons achieved to add the information that the task

wanted them to add. There were nine objects to be added or modified. Figure 2 shows the amount of test persons from each group who were successful in applying the correct feature types to the map objects given on the Field Paper and Figure 3 shows the amount of test persons adding the correct attributes to the respective features.

*Task 3* asked the test persons to add two objects of their choice to the map using the aerial imagery in the editor's background layer. As the test persons were given a lot of freedom in completing this task, one can only measure if any meaningful feature types have been used at all. This is in fact true for all features that have been added except two that have been added by novice users: they added area objects using the generic feature type Area and only added a name to it.

The extra *task 4*, given only to test persons of the mapper group, asked the test persons to add attributes to segments

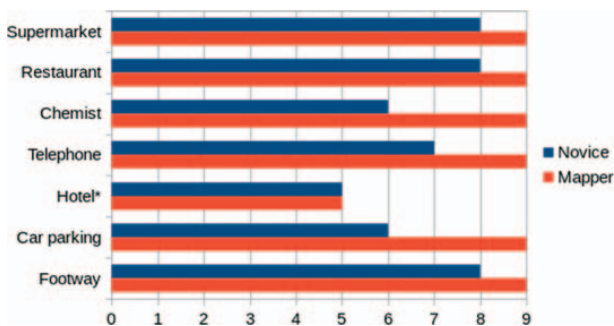


Figure 2. Success in using the correct feature types in task 2, n = 9 (\*Hotel/Novice: n = 8)

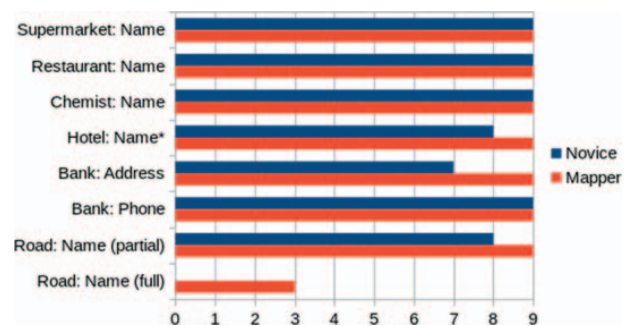


Figure 3. Success in using the correct attributes in task 2, n = 9 (\*Hotel/Novice: n = 8)

of existing lines, requiring them to use the split functionality. This task was successfully completed by all nine mapper users.

#### Analysis of the observations

In this section, some of the observations elicited from the participants' thinking aloud data are presented. Relevant sections of the recordings that exhibit issues with the editor or other interesting remarks by the participants have been identified and coded depending on the type of interaction they were related to. Some of the most interesting excerpts from the thinking aloud are quoted and discussed here, structured by the types of interaction they are related to.

#### Walkthrough

While all test persons managed to complete the walkthrough tutorial, in some instances there was some confusion about the meaning of interaction elements, or the procedure.

A common issue users got stuck with in this task was adding a name to the cafe. The walkthrough did not react when a name had been entered, so many did not know how to move forward. The situation appears not only after adding the name for the cafe, but also after changing the cafe's name and after adding the names to the playground and the residential road. However, the first instance was the most problematic case, because no indication was given by the tutorial that the feature editor needed to be closed until the user clicked somewhere outside of the name field.

Novice 1: *presses Enter; "I press enter, it doesn't react to my command. so I'm gonna try with the plus sign"; clicks '+' next to the name field; reads: "The feature editor can be closed by clicking on the close button. Close the feature editor"; clicks close button*

As with drawing areas, most users succeeded at the task of drawing a road, but several did not find the correct place to start drawing. Some clicked on existing roads until they realized that the road was supposed to be traced from the imagery.

#### Navigation

Apart from the walkthrough task, various issues arose during the remaining tasks. Panning the map by dragging and dropping could result in accidentally moving nodes when the mouse was clicked on an existing point feature. Also, zooming the map with the mouse wheel was too slow for several test persons.

#### Search

The search function that is built into the iD editor has not been found by all users, so some closed the editor and used the main page's search function instead. If users did use the editor's search function, they often had trouble spotting the searched feature on the map, because it was not automatically centred on the map.

#### Selecting a feature type

A major issue test persons complained about was the procedure of selecting the feature type of a newly created

object, as well as changing an existing object's feature type. First, some users often did not find the correct feature types because they simply did not use the search function.

Second, they sometimes did not find the feature type they were looking for, because they did not search for the correct terms, or simply because the feature type they had in mind did not exist.

Third, several users did not understand the feature type category buttons (appearing like layers of buttons and expanding a list of subtypes when clicked) and were confused by them.

Novice 2: *"Well, what does a parking come under. place of worship."; scrolls up and down the list; "under Land Use."; clicks on Land Use; clicks again; double-clicks; clicks repeatedly; "I'd say I have selected it. but nothing happens"; clicks many more times, clicks in the map, then goes back to the feature type selection; ". or is Land Use some kind of super-category?"; scrolls down and selects Area*

Lastly, a few users were looking for a feature type for which they had the actual tags in mind. They missed a possibility to select the feature type directly by its tag.

#### Editing interactions

The line drawing functionality was picked up quickly by the majority of test persons. In a few cases, however, it was not clear to the test persons how the line could be finished, although this had been covered in the walkthrough.

Drawing areas was, like drawing lines, convenient for most users. What affected the users' workflow negatively in some cases was that when the undo button was used to revert the last node, the editor cancelled the drawing mode, making it impossible to resume drawing the area.

Besides creating new lines and areas, many test persons had issues with modifying existing ones, most notably moving and adding nodes to ways or areas. In an attempt to move a node, some users looked for a button or other type of interaction instead of simply dragging the node.

Not only moving nodes raised issues, but also adding nodes presented a challenge to several test persons. In iD there are two ways to add nodes to lines or areas: by double-clicking on an edge, and by dragging and dropping the "virtual nodes" signified by grey dots and located in the middle of two existing nodes. But these options were not always obvious; instead the circular menu (Figure 4) was often (and erroneously) believed to be useful.

#### Post-test interviews

After each test the test persons were asked a number of questions about their personal experiences while working with the iD editor. While several users reported they were very satisfied with the overall experience except minor difficulties, some users expressed more mixed feelings about it. Two novice and three mapper users said they were very pleased by the editing experience and would recommend the program to others. Five novice and five mapper users gave an overall positive feedback, but also expressed some dissatisfaction. Rather negative responses were given by two novice users and one mapper user: the novice users reported a range of issues

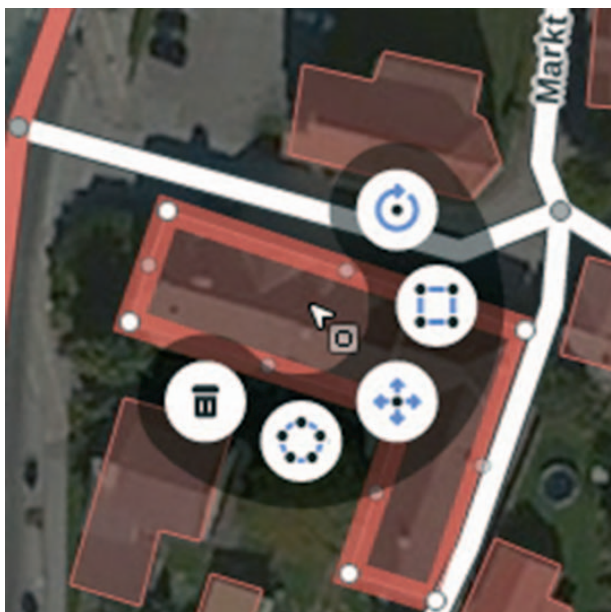


Figure 4. The circular menu offering contextual options for map features

they had with the program, preventing them from developing a satisfying workflow, whereas the mapper explained that he did not like working with predefined categories, which bothered him as an advanced user.

#### Conclusions regarding iD's usability

In terms of usability, the thinking aloud only gave an impression of what the most crucial issues were. The results have been further analyzed with respect to the specific usability measures of learnability, efficiency of use, frequency and seriousness of errors, and subjective user satisfaction (Nielsen, 1992) as well as the usability heuristics for VGI interfaces formulated by Jones and Weber (2012).

#### Learnability

Learnability is defined as the extent to which “the system [is] easy to learn so that the user can rapidly start getting some work done with the system” (Nielsen, 1993, p. 26). In the case of OSM, which depends on a large amount of active contributors who do not necessarily need to have great expertise, this is especially important. The easier the tool is to learn, the more likely it is that interested users will adopt the system and start editing.

Although iD has primarily been designed as a program for novice users, some particular interactions were significantly hard to learn for the test persons, even with the walkthrough completed. The most striking example turned out to be the procedure of editing feature attributes, such as a name, and having the changes accepted. Almost all test persons expected to find a button reading something as “OK”, “Save”, or “Confirm” and were often uncomfortable with simply closing the feature editor (of which one user said it reminded him of a “Cancel” interaction). On the other hand, this peculiarity was carefully introduced during the walkthrough. While some test persons said that once they were taught the concept, it was

acceptable for them, others remained in discomfort with it all the way through the test.

What seems relevant in terms of learnability, too, and what was observed with several test persons (especially novice users) was their failure to add nodes to existing lines or areas, or to move nodes. While the circular menu provided opportunities for all sorts of editing tasks, adding and moving nodes was not included in it. The functionality was not introduced by the walkthrough either. The confusion may have been increased by the fact that moving line and area objects as a whole was an option from the circular menu, whereas moving nodes was not.

Referring to some of the usability heuristics that Jones and Weber (2012) have developed specifically for learnability issues of VGI interfaces, another perspective on the learnability of iD can be presented as follows:

*Ensure clarity and consistency of the editing process for different map objects.* Jones & Weber have criticized major inconsistencies in Potlatch 2, e.g. that it takes different approaches to adding point, line and area features, respectively. iD's concept of adding things is much more consistent, always following the same pattern of clicking the Point/Line/Area button, drawing it, and finally editing its attributes. One thing that is inconsistent in iD, however, is the way objects are moved: while points (and nodes that are part of lines or areas, for that matter) are moved by dragging and dropping, lines and areas can only be moved by selecting the appropriate option from the circular menu.

*Have consistent and standardized map controls and clear interaction elements for both editing and viewing different windows.* iD has a dedicated map panel on the right side that is consistent with the map panel on the OSM main page. Apparently for some test users, however, the search function within the editor was hard to find: it shows up only when the main pane is not occupied by anything else, which is not always the case. Thus, it would be better to have a search button or form that is always visible.

*Minimize editing errors by preventing similar interaction actions for different VGI edits.* Jones & Weber observed that with Potlatch 2 test persons often inadvertently moved map objects when they intended to pan the map. The fact that the same mouse interaction (moving the mouse while pressing down the left mouse button) was functional for different kinds of interaction, made the test persons do things they did not want to do. Unfortunately, the developers of iD have not learned this lesson: moving points and panning the map are still done the same way. While this may make working with the tool more efficient for users who are aware of it and thus work carefully enough, to inexperienced users it poses a conceptual difficulty as well as a danger of making mistakes.

*Enable users to escape easily from editing errors.* Preventing and mitigating errors are vital to the usability of VGI editors as much as to any other kind of software. What has been observed is iD's unforgiving behaviour when the undo button is pressed while a user is drawing a line or area. It takes control away from the user and, when it happens, there is also no clear indication that he/she is not in drawing mode anymore.

To summarize, the case study revealed a number of learnability issues of iD, most notably the absence of a confirm interaction in the feature editor, difficulties with



adding and moving nodes of lines and areas, and an inconsistency in the way map objects are moved.

#### Efficiency

According to Nielsen (1993, p. 26), a “system should be efficient to use, so that once the user has learned the system, a high level of productivity is possible”. Of course, it is not always clear whether the participants in a test like this have already “learned” the system (or parts of it) at some point during the test, but nevertheless it can be observed whether a user has developed a smooth workflow with respect to a specific subtask. For example, many test persons quickly adopted the procedure of adding simple features in iD. Most test persons internalized it during task 2, in which nine map objects were to be added from information given on a Field Paper.

However, with regard to the editing of existing features (task 3), several test persons, especially novices, had significant problems: the average completion time for task 3 among the mappers was almost only half the time the novices needed – a difference more significant than in any of the other tasks (see Table 1). This may be due to the fact that in some ways, specifically in the way objects are modified, iD makes use of functionality known from other editors, giving advantage to users who are experienced editing OSM. This is, of course, essentially a good thing as long as novice users are given proper guidance to learning this functionality. Unfortunately though, the walkthrough does not cover the essentials of modifying the geometries of existing map objects.

#### Errors

Nielsen (1993, p. 26) suggests that “the system should have a low error rate, so that users make few errors during the use of the system, and so that if they do make errors they can easily recover from them”. This has basically two aspects: errors within the system and the way the system deals with user mistakes.

Software errors in the system (“bugs”) have appeared rather frequently: during the walkthrough task the system hung 13 times. This must be fixed, for “catastrophic errors must not occur” (Nielsen, 1993, p. 26). A more thorough analysis is needed with respect to the way the editor deals with the users’ mistakes, of which a few examples shall be given.

- At least eight test persons had problems selecting points on the map, i.e. either they clicked near but not exactly on the point they wanted to select or they moved the mouse while pressing the mouse button down, which resulted in panning of the map.
- While drawing lines or areas, users sometimes realized that they had made a mistake and wanted to undo the last node,

so they clicked the undo button. Then, however, the program finished the object and left the drawing mode so that it was not possible to resume the drawing. Most test persons who found themselves in this situation deleted the object they had started drawing and then started to draw the object from scratch again.

Altogether, besides the critical bug that has been observed many times during the walkthrough, iD is too sparing with feedback when users make mistakes. While too many system messages can slow down the user’s flow of work, some more feedback would probably be helpful.

#### Subjective user satisfaction

An overview of the statements the test persons have made in the debriefings after each test has already been given in Post-Test Interviews Section. Given that seven out of nine test persons from each group have given mostly positive feedback about their subjective satisfaction, iD’s user experience can be regarded as a mostly pleasant one.

However, two in three novice users mentioned at least one situation in which they got stuck and which took them rather long to resolve, e.g. while selecting a feature type, moving and adding nodes, etc. The mapper users, on the other hand, complained less about difficulties they had using the editor, but more frequently about speed issues or functionality they missed; generally the mapper users seemed to have learned the tool more easily, perhaps due to their prior experience with OSM.

## CONCLUSION

This study has highlighted a number of usability issues with iD found through a user test.

The analysis has shown that iD is an easily learnable tool, as the majority of test persons have picked up its basic functionality quickly. The walkthrough certainly contributes to that and is itself an easy thing to do as well. However, the tests have revealed a number of issues that should be mitigated in order to make the program even more attractive to novice users. Especially more feedback about the system’s status, clarity and consistency of editing options, and more help options are needed.

Based on the results presented, iD can also be regarded as an efficient tool. Although it suffers from speed issues, most of the test persons got used to the program quickly.

In terms of errors and error prevention, it was often observed that users had to spend too much effort into correcting their own mistakes, e.g. misplaced nodes or inadvertently connected objects. As this can be very frustrating for first-time users, it is important that iD deals with user errors much better.

By the time this paper is published, however, iD has certainly developed further away from the version that has been evaluated in this study. Therefore further investigations into the tool will be needed in the future.

This study has been limited by the decision to use consumer equipment for the testing – in order to allow for greater flexibility in the planning of the tests – which led to technical difficulties with the recordings. A usability test conducted with a high-end laboratory equipment would

Table 1. Average task completion times by user group

Task	Average time (novices)	Average time (mappers)
Task 1	9 min	6 min
Task 2	17 min	15 min
Task 3	15 min	8 min
Task 4	–	5 min



likely have produced better results in terms of technical quality. With better equipment one might also use eye tracking and/or video recording as additional observation methods, which could help to discover even more usability issues with the study object (see e.g. Kveladze, 2015).

Any future research on the topic that will help to overcome the shortcomings mentioned will be welcomed by the scientific and the OSM community. Usability testing of newer versions of iD is therefore strongly recommended.

Usability testing will benefit OSM and its future development as the prime alternative to commercial and authoritative geodata sources as more contributors need to be attracted to and kept engaged with OSM. Lowering the barriers for contributing needs to remain a main goal of the project, requiring successive investigations into the usability of the tools.

#### BIOGRAPHICAL NOTES



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