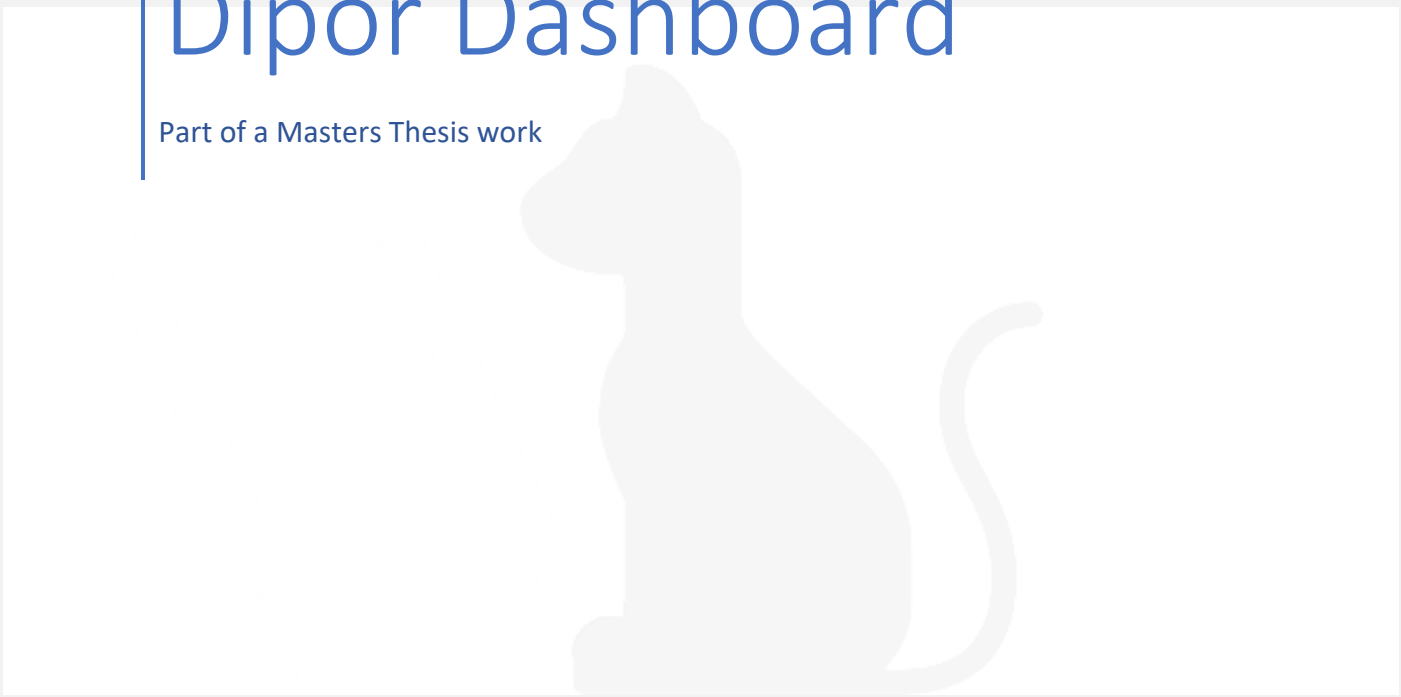
Tamper University of Technology

Usability Evaluation of Dipor Dashboard

Part of a Masters Thesis work



Nazia Hasan – UI / UX Designer

*"As my thesis work, I developed concept of a **Dashboard** that would show progress statuses of various **Digital Service Implementation projects** under Finnish public-sector organizations. My thesis was part of a **proof of concept** project of Sampo Software Oy, who oversaw the implementation of **Dipor Dashboard**. The **department of Basic and Early Childhood Education** under the **Ministry of Education & Culture** in **Finland** originally commissioned the project. I also conducted a **usability evaluation** of the implemented Dashboard Service. This document demonstrates the overall procedure and results obtained from **heuristic evaluation** and **usability tests.** Enjoy!*

The Usability evaluation of Dipor Dashboard was executed to understand how efficient and effective the dashboard view of the portal was to visualize progress information of different digital service implementations with its overall look-and-feel and functionalities. It aimed to find out how satisfying it is for the intended users to use this service to achieve their work goals regarding to digital service development monitoring. The usability evaluation process was the 2nd phase in the overall empirical work in the Masters thesis. This consisted of both Heuristic Evaluation and usability Testings.

The following table contains at a glance information on methods used in this usability evaluation of Dipor Dashboard.

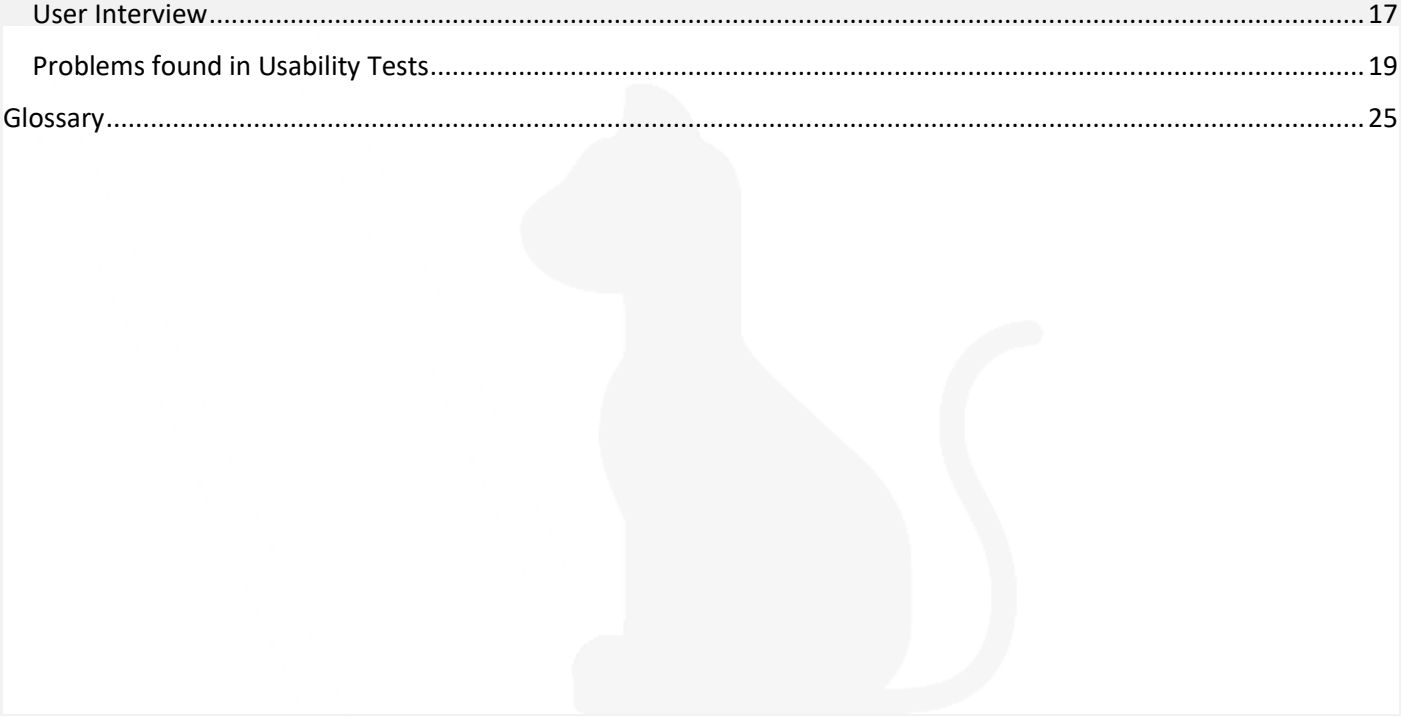
***Table 1** Heuristic Evaluation Overview*

Heuristic Evaluation	
Timeline	**1st May, 2016 – 8th May, 2016**
Number of sessions	**2** (**independently** conducted by **me** and a **researcher** working in Human Centre Design department at Tampere University of Technology)
Number of Heuristics:	**10** Chosen from: An heuristic set for evaluation in information visualization
Number of Severity Levels	**5** Chosen from: Severity Ratings for Usability Problems
Chosen Platform	• **Windows 8** in **Lenovo Ideapad** (**chrome** web browser) • **iOS** in **MacBook Air** (**Safari** web browser)
Issues Identified	**14** (the total number is a combination of outcomes found out by both evaluators.)

Table 2 *Usability Test Overview*

Usability Testing	
Timeline	**11th May, 2016 – 31st May, 2016**
Number of Participants	**5** (Each session was organized independently with one participant performing given tasks.)
Number of Tasks	**11**
Number of Severity Levels	**5** chosen from: Severity Ratings for Usability Problems
Chosen Platform	**Windows 8** in **Lenovo Ideapad** (participants chose their preferred browsers from **IE9**, **Mozilla** or **Chrome**)
Issues Discovered	**16** (the total number is a combination of outcomes found out by the evaluator.)

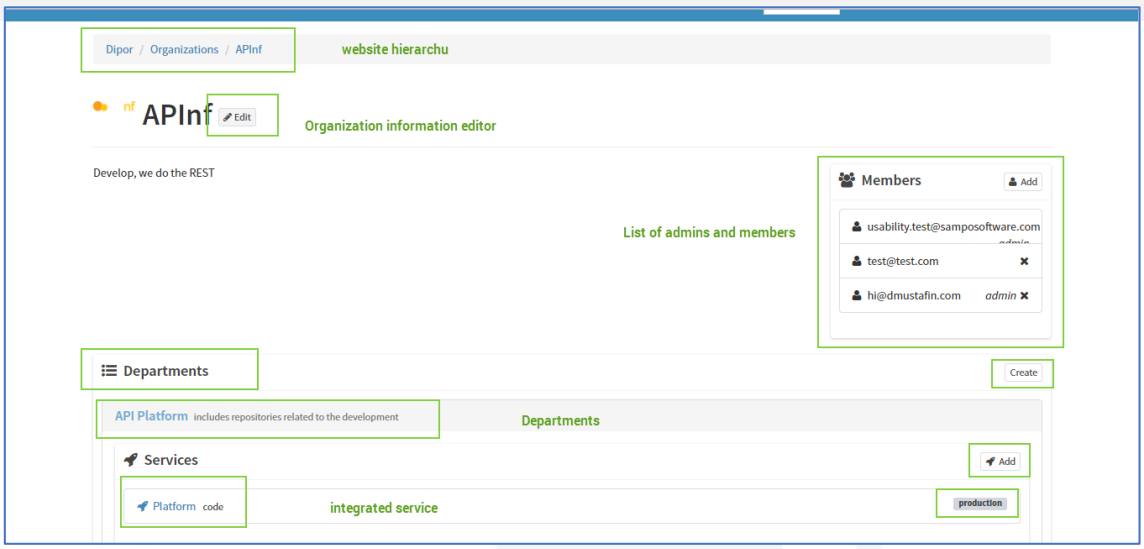
Contents



Dipor Dashboard at a Glance

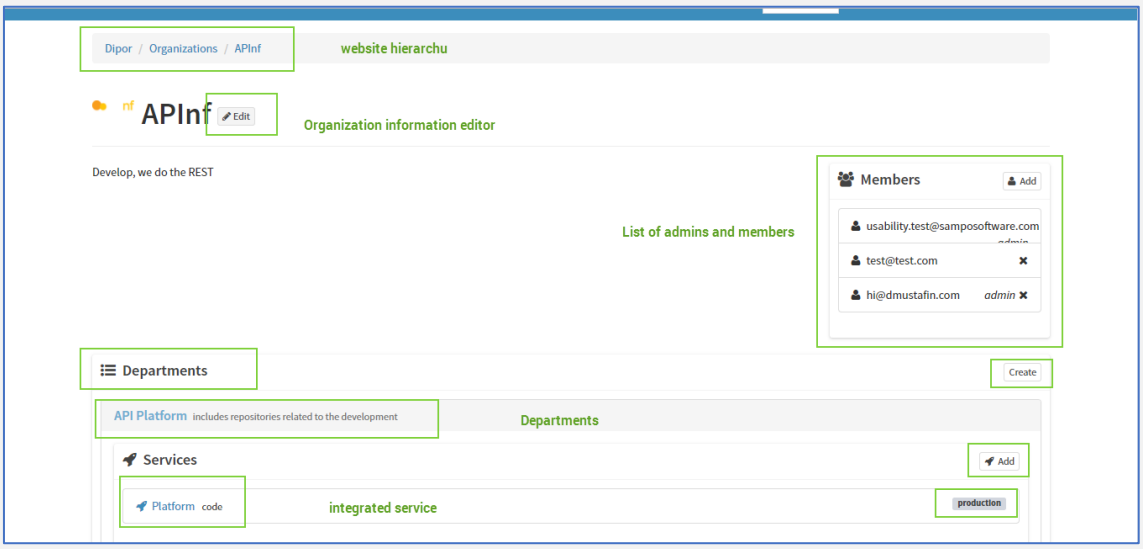
Before going through the findings of the usability evaluation, it is helpful to get an overview of the service/system that is to be examined. The concept for Dipor Dashboard was to project implementation progress of digital services which have a **3-month long development period**. As a web service, Dipor Dashboard has a homepage that contains entities called **organizations**. The organization refers to both public and private sector institutes that are undertaking different digital service implementations. Organizations appear as **card** containing **information** that has **public visibility** (i.e. name, department, owner, etc.) To see the entire information, a user needs to **register** in Dipor Dashboard and **get access as a member** of the organization.

Figure 1 *Homepage of Dipor Dashboard*



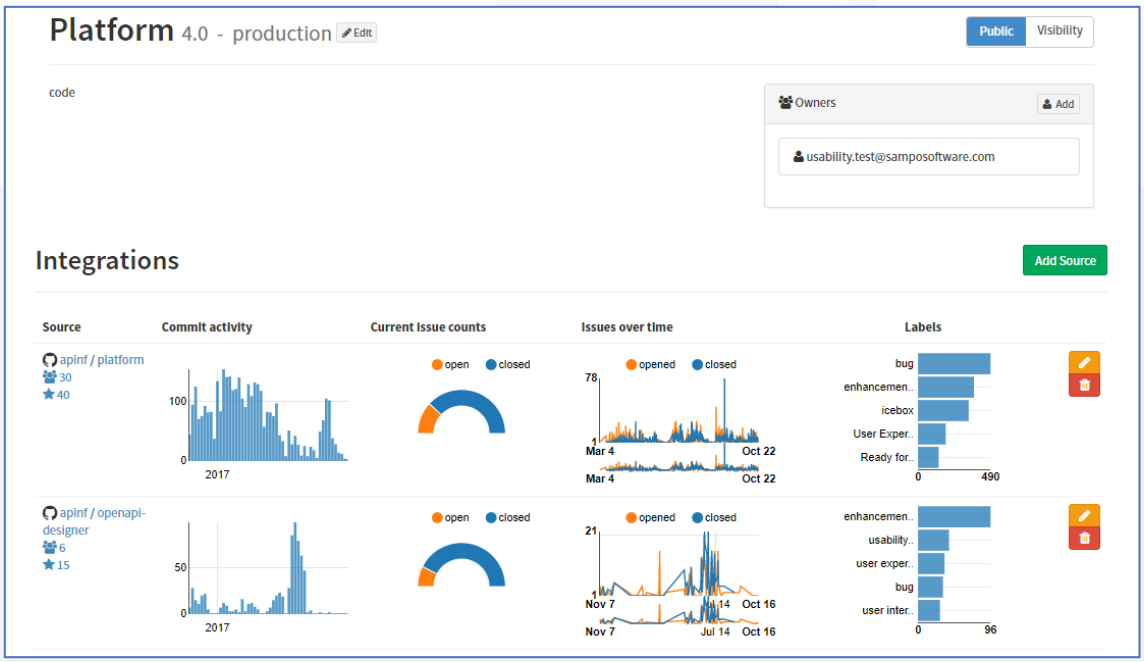
Each **organization profile** describes its **purpose**, shows the **member-list** (including owner and admin) and displays the **number of departments** under it. Under an organization exists one or more **departments** which usually divide the overall works of an organization (e.g. If Ministry of Education and Culture is an organization, and then under this can exist the Department of General Education and Early Childhood Education). In real life, the digital services (e.g. either on-going or complete and in production) under a ministry are managed by different departments under it. So, the similar hierarchy has been maintained in the structure of Dipor Dashboard.

Figure 2 *Organization Profile in Dipor Dashboard service*



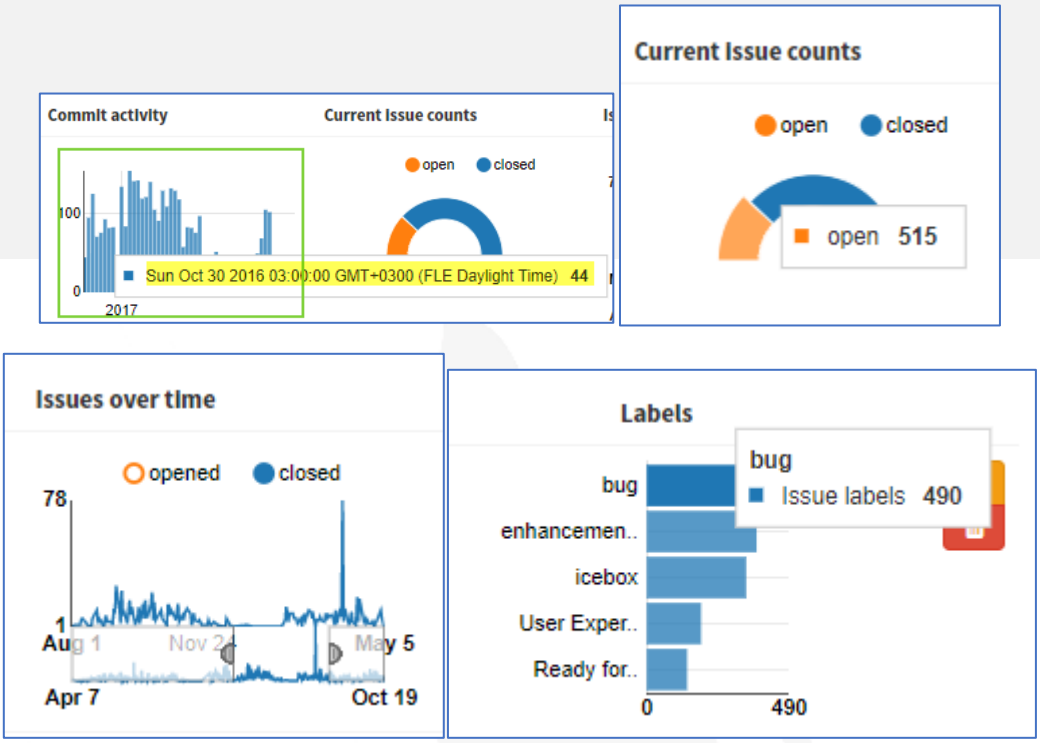
The primary feature of Dipor Dashboard is its **services** and the **integration view** under it. Services indicate digital development works being evaluated by an organization and can have different **life cycle phases** (**idea**, **design**, **deciding**, **development**, **proofOfConcept**, **alpha**, **beta**, **production**, **sunset**, **retired**). In real life, an idea or solution can be implemented by two development companies. Organization considers the development companies as competitors and wish to see who can produce a better testable solution for a digital service idea. Service integration view aim to analyse work progress performed by both competitors with the help of different charts and visualizations.

Figure 3 *Integration view of a Service in Dipor Dashboard*



The service integration fetches information from a **GitHub repository** relative to a service development work and projects the information using **charts** and **metrics**. The information that are being emphasized in this view are: **Contributor** (people making pull request and commits to that repository), **Star rate** (number of people giving positive feedback to the repository), **number of commits**, **open and closed issues** in the repository and **issue labels**. The above metrics are shown using column, donut, line and bar charts respectively. All charts are interactive and can be filtered.

Figure 4 *Charts in Integration view. (cw) Commit activity, Current Issue counts, Labels and Issues over time*



Heuristic Evaluation

The heuristics were chosen from the work of **(Forsell & Johansson, 2010)** where **63** pre-existing heuristics were refined into **10** which are specifically suitable to perform expert evaluation of **information visualization systems** provided that adequate details are given with the description and evaluators have sufficient domain knowledge. In both evaluation sessions, whenever an issue was detected with the UI or functionality, a **description of the issue** and **why it is a problem** were written down. One or more appropriate **heuristics** being violated by the detected issue were chosen to associate with the problem. **A number** (**from 0 to 4**) was also used to describe individual evaluation of the severity level of the identified issue. **N/A label** was used beside an issue if none of the heuristics was capable to describe the problem.

Identified Usability Problems from the Heuristic Evaluation

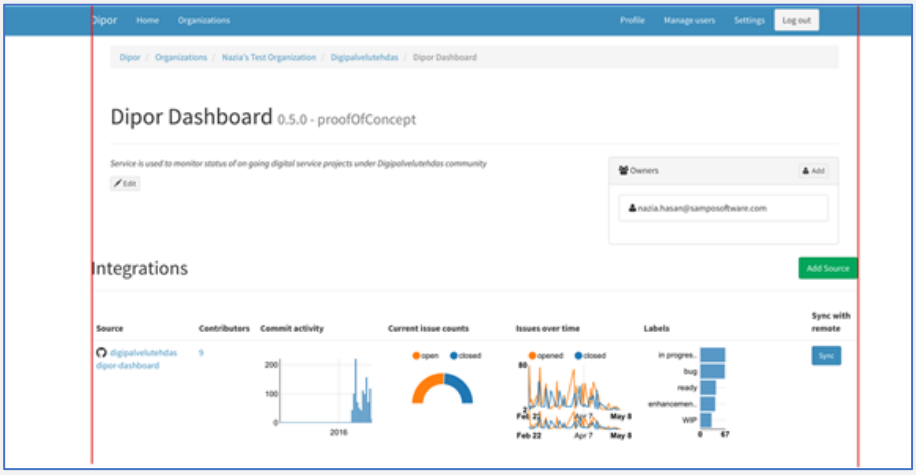
The following table shows identified issues during the heuristic evaluation sessions:

Table 3 *Issues discovered during Heuristic Evaluation sessions*

**for an issue having more than 2 heuristics violated, associated severity ratings appear in consecutive order*

1. Unfamiliar relationship between system used and real-life terms	
Violated Heuristic(s)	**1. Information Coding, 6. Consistency**
Severity Rate	**[2], [2]**
In service page, the term "Integration" does not indicate its associativity with GitHub repositories. It should be renamed with appropriate terms or help text can be included under info tip, but that reduces minimal action	
2. Alignment issues in the Integration view	
Violated Heuristic(s)	**5. Spatial Organization**
Severity Rate	**[1]**
Alignment should be maintained among GUI elements so that their borders (e.g. elements located at extreme left or extreme right of a page) have their borders in the same (imaginary) vertical line.	

Figure 4 *Misalignment in Integration view*

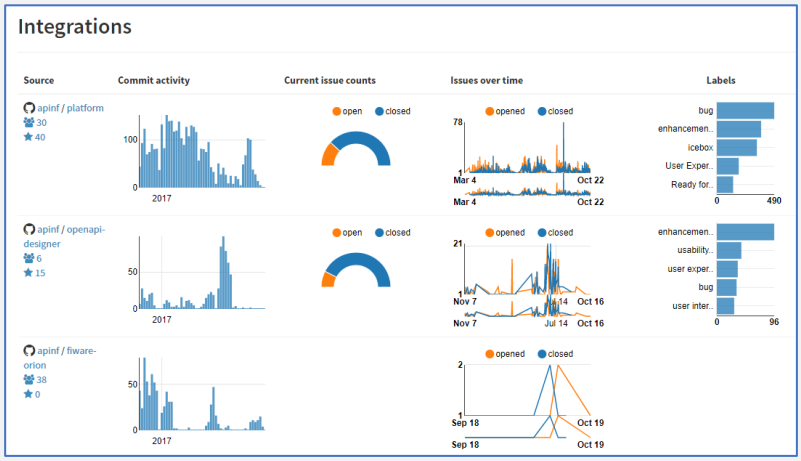


3. No choice is given for users to visit the actual GitHub repositories/version management systems	
Violated Heuristic(s)	**3. Flexibility**
Severity Rate	**[2]**
On clicking the GitHub icon or repository name, user can't get redirected to the original repository. This could become inconvenient as users would have to manually search for the repository in the internet.	
4. No numbers associated with charts to represent actual or summed up amount	
Violated Heuristic(s)	**7. Recognition rather than recall, 2. Minimal Action**
Severity Rate	**[3], [2]**
No Numeric figures and units (e.g. a total amount of issues) are provided along with the visualizations. This may create confusion in users to understand the exact value represented by the visualizations. Also, users may have to go back and forth in the charts to understand the value represented by them.	
5. No option to filter charts for a specific time range.	
Violated Heuristic(s)	**6. Consistency, 10. Data Set Reduction**
Severity Rate	**[3], [3]**
Commit activity chart shows data for consecutive week whereas issues over time may focus data for variable time range. It creates confusion among people when they are seeing data filtered by two different time range. Giving an option to select specific time (e.g. last 24 hours, last 7 days, last 30 days) makes the data visualization simpler and more understandable to people.	

6. Cluttered view in case a page contains many service integration	
Violated Heuristic(s)	**1. Information Coding, 5. Spatial Organization**
Severity Rate	**[4], [4]**

Four types of visualizations indicating different set of data are cluttered together in the same row. Here information becomes difficult to comprehend due to excessive data appearance, small size of visualizations and not having enough textual data (or having them in smaller texts)

Figure 5 *Cluttered view caused by too many charts*



7. Option for choosing specific information set to visualize is not present. (1, more or all at a time)	
Violated Heuristic(s)	**3. Flexibility**
Severity Rate	**[1]**

If user is interested to see only specific attribute visualizations at a time, should be an option to allow him/her to select his/her preferred one(s).

8. Visibility of Contributor Information	
Violated Heuristic(s)	**5. Spatial Organization**
Severity Rate	**[1]**

Contributors of a service don't appear directly to user views. User needs to click on the number to see the people associated to it. A separate layout of visualization could be used to display contributor information. This information might include, name, no. of assigned issues, no. of pull request made and related contributor graph from GitHub.

9. Visibility of textual information on charts	
Violated Heuristic(s)	**2. Minimal Action**
Severity Rate	**[2]**

User needs to hover on visualizations to know additional data about the information represented. They don't appear automatically.

10. Appearance of Data in Issues over time chart.	
Violated Heuristic(s)	**5. Spatial Organization**
Severity Rate	**[3]**

The visualization is not represented using bigger space. So, the data becomes cluttered and often difficult to comprehend.

11. Option for browsing time data using focus pointer is not visible in the map.	
Violated Heuristic(s)	**2. Minimal Action, 7. Recognition than Recall**
Severity Rate	**[4], [4]**

User may not know the existence of this option. User needs to click on map to activate the option and often with 1 click the option doesn't get visible.

12. Overview on monthly statistics is missing	
Violated Heuristic(s)	**8. Prompting**
Severity Rate	**[2]**
Since the services monitored in the dashboard are developed in a three-month timeframe, it would have been convenient to overview statistics for each month (or each 30-day period, depending on the starting day of the project). The same set of information but filtered within 30-day period can be presented apart from the regular information. This view can be static and can help people to understand how development work has progressed every month.	

13. No Information on start and completion date for a service is given.	
Violated Heuristic(s)	**4. Orientation and Help**
Severity Rate	**[2]**
There is no option to manually add the start and due dates of a service or to configure them automatically while integrating the GitHub repository. It is possible to get insights about how the service development is progressing when information like closed issues, commit numbers, etc. are compared against these dates.	

14. Chart axes are too small and incomprehensible (specifically with dynamic charts like issues over time	
Violated Heuristic(s)	**1. Information Coding**
Severity Rate	**[3]**
Because of the small size of the charts, no information is given on the axes about what is being measured with which unit. Only some numeric values appear with no indication about the used scale. When interacted with "Issues over time" chart, the change in axes information was too rapid to understand.	

Usability Testing

5 usability tests were conducted to detect problems within user interface and associated functionalities of a system when end users interact with the system to achieve some work goal. The conducted tests covered the main functionalities of Dipor Dashboard – primarily getting an idea about development progress from the information that was collected from GitHub Repositories and visualized in a dashboard. All the participants were given a set of tasks to perform using the dashboard view. All usability test sessions included collecting data from user background and satisfaction questionnaire and interviewing briefly the participants with their thoughts about the process.

A **pilot test** was conducted before the actual sessions took place. This helped to refine the tasks, set approximate completion time for each task and take necessary preparations to conduct the sessions.

Participants of Usability Tests:

People taking part in the usability testing included both **interviewees** from the **1st phase of thesis empirical works** and **others not familiar** with the concept of **Dipor Dashboard**. **2 usability tests** were performed with **participants working** in the **Ministry of Education and Culture in Finland**. **2 sessions** were conducted **remotely** using skype and screen recording software. **Participants of these 2 sessions previously knew about the implementation work** and gave feedback on low fidelity prototype about the intended system were taken during the 1st empirical phase. **Last session** was conducted at **University of Tampere** and the participant was **familiar with the Dipor Dashboard project**.

Table 4 *General information about the Participants of Usability Tests*

	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5
Age	28	30	41	34	35
Education	College / University Degree	College / University Degree	other	College / University Degree	College / University Degree
Occupation	Employer	Service Holder	Employer	Service Holder	Student / Idea Innovator
Computer Skills	Good; Frequent & fluent usage	Good; Frequent & fluent usage	Excellent; Knows functionalities	Excellent; Knows functionalities	Excellent; Knows functionalities
Field Expertise	Administrative Science	Business Administration & Economics	User Interface & Information Architecture	Software Engineer	Well being technology for elderly people
Familiarity with Digital Service Development	Yes; Product Owner in some projects; negotiates requirements	n/a	Yes; Product owner in some projects; Negotiates requirements; makes further continuation of projects based on development progress	Yes; Product owner in some projects; Negotiates requirements; makes further continuation of projects based on development progress	Yes; Product owner in some projects; Negotiates requirements; makes further continuation of projects based on development progress
Familiarity with software development and monitoring platform	Trello	n/a	GitHub, Jira, Trello, Google Analytics	GitHub, Jira, Trello, Waffle, Google Analytics	GitHub, Trello
Usage frequency of any platforms above	Few times a month	n/a	Daily or nearly daily; Few times a week; Few times a month	Daily or nearly daily	Few times a week
Familiarity with Dipor Dashboard Service	No	No	Yes; is part of the Dipor Dashboard project under the Ministry of Education & Culture	No	No

Procedure of the Usability Tests

After initial introduction, all participants were briefly informed about the **purpose of the tests** and **what is Dipor Dashboard**. After explaining the testing procedure, **consents** were collected from the participants

with the promise of their **identities to be kept anonymous**. Participants were instructed to **Think Aloud** while they were performing each given task. After the participant had filled up a **background questionnaire**, the Think Aloud method was demonstrated to him/her by asking her to perform a pilot test task. In all sessions, I worked as both the facilitator and observer of the usability tests.

After performing the **pilot task**, each participant was given in total **11 tasks**, **one at a time** to be performed at their own pace. If the participant was struggling to complete a task and taking more time than the pre-calculated approximate completion time, s/he was prompted to leave the task and start performing the next one. I separately made notes during the usability testing about success/failure of the tasks.

All participants filled up a **satisfaction questionnaire** after the testing sessions (with **remote participants** filling up the same in **google form**). A **semi structured interview** was conducted to learn their feelings about the usability test and how the overall UI and functionality can be improved. Each session concluded by thanking the participant and giving a small token of gratitude for his/her contribution.

The recordings of each usability test were observed the same day the test session took place. Possible **usability issues** discovered during a test session were **rated** based on the **severities they possessed**. Same ratings set from the heuristic evaluation was used for this purpose. Feedback about UI and functionality and improvement suggestion given by the participants were also logged separately.

Tasks in the Usability Tests:

The following table contains description of the tasks performed by the participants in the usability test sessions. Each Task contains its purpose and the condition for successful completion.

Table 5 *Tasks performed in the Usability Test sessions*

1. Open a browser and go to Dipor Dashboard's page and login with the given credentials: https://dashboard.digipalvelutehdas.fi	
Task Purpose	To determine if participant can find out Dipor Dashboard and login into the system
Task Conclusion	When the participant was able to login successfully and was being navigated to the "Organization" view
2. You are really interested on works done by the Ministry of Education and Culture. You want to know more details about it. Find this organization and go to its page.	
Task Purpose	To determine if the participant can navigate closer to the service development dashboard view. The hierarchy of the website is: **Organization → Department → Services → Integration (the dashboard view)**
Task Conclusion	When the participant was able to successfully navigate to the profile page of the mentioned organization.
3. There are several departments under this ministry and each department hosts several services. Find out the list of services under Department for General Education and Early Childhood Education.	
Task Purpose	Like task 2
Task Conclusion	When the participant was able to successfully expand the department view and locate the list of added services.
4. You wish to know about one of the services and associated information about its development. Go to the service page and find out its status, version and how it is visible to everyone.	

Task Purpose	To determine if the participant can navigate to the dashboard view of a preferred service from the list.
Task Conclusion	When the participant was able to successfully navigate to the Integration page of the chosen service. This also indicated that participant is now in the dashboard view of Dipor Dashboard.

5. You are interested to know which people are working under this service. Find out some of their names.

Task Purpose	To determine if the participant can find out names of the people associated with that repository of GitHub.
Task Conclusion	When the participant clicked on  icon and opened the list of contributors in the repository.

6. You want to know how much active this service has been over time. Find out the number of commits from two consecutive entries and tell how the dates in these entries relate to each other.

Task Purpose	To determine if the participant is able locate the number of commits for two consecutive periods of time. It was observed to see if the participant can understand that the numbers are calculated on weekly basis.
Task Conclusion	When the participant was able to see the information from tooltip which appeared on hovering the mouse over “Commit activity” chart

7. You are interested to see how many issues have been reported for this service. Find out the number of open issues and the number or closed issues.

Task Purpose	To determine if the participant can filter the “Current issue counts” chart and visualize the open and closed issues separately.
Task Conclusion	When the participant was able to successfully filter the number of open issues or closed in that repository using the given chart.

8. You want more detailed information about open issues over a certain period of time. Find out about how many open issues were there between the times August 31, 2015 to December 23, 2015.

Task Purpose	To determine if the participant can reveal the functionality of focusing the “Issues over time” chart within the given time limits and determine the number of open issues in the focused view.
Task Conclusion	When the participant was able to use the view finder in the related chart and tell the number of open issues in the given time limit.

9. It is easier for you to track issues if they are somehow categorized. Find out what are the different labels used for issues.

Task Purpose	To determine if the participant can find out different issue labels used in that repository
Task Conclusion	When the participant was able to locate the chart showing different labels from the given visualization

10. You are interested about bugs that are produced when a service is developed. Find out the number of bugs under this service.

Task Purpose	To determine if the participant can identify how many issues with a specific label existed in the repository
Task Conclusion	When the participant was able to identify the number of issues under “bug” label from the given visualization

11. You suddenly remember about a service that has similar development work. Add the given data source to get different information about that service development:
User: nrel
Repository: api-umbrella

Task Purpose	To determine how easy it is to add a new repository from GitHub to see the projected visualization

Task Conclusion	When the participant was able to successfully add the given repository in the system.

Results from Usability Testings

The following table shows the **task completion time**, **number of problems found** and **success criteria** for each task for individual participants. Task outcomes are labelled with the following codes:

A – Successful
***A** – Partially Successful (with reason)
B – Moderator help was required in performing the task
C – Failed
D – Suspended
E – Not Tested (e.g. there was no more time to execute the task)
d – Dependent on previous task.
n – Procedure not expected

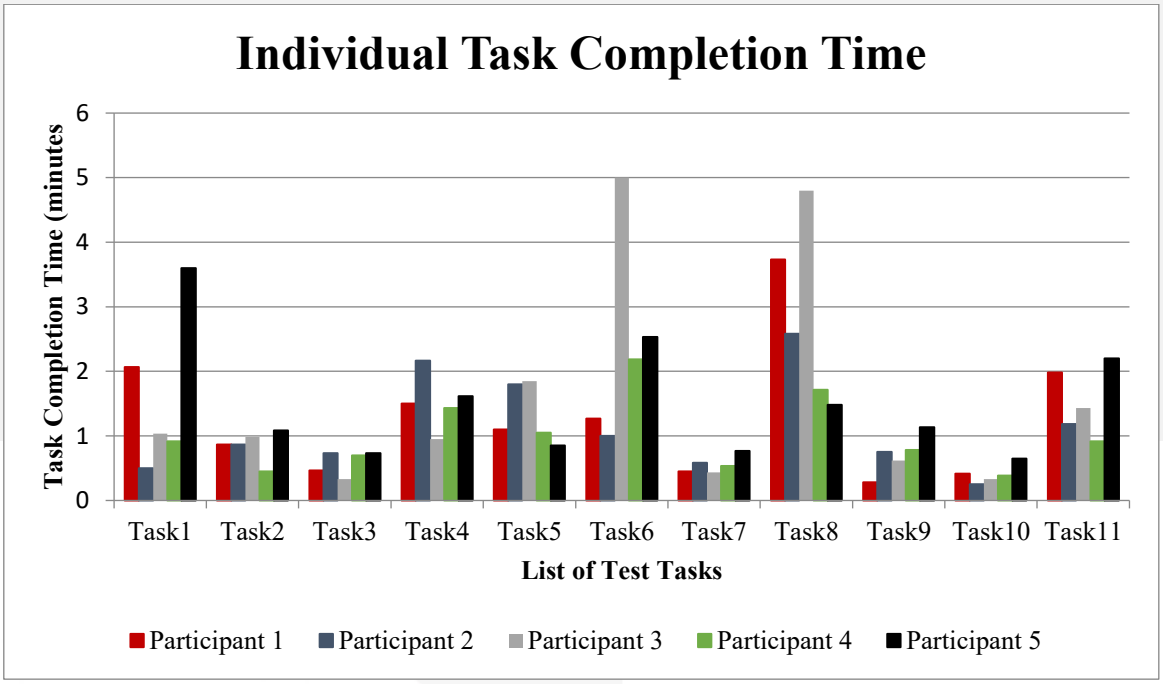
Table 6 *Task completion time, number of problems found and task outcome for all participants*

Test Tasks	Participant 1			Participant 2			Participant 3			Participant 4			Participant 5		
	Task Time	Number of problems	Task Outcome	Task Time	Number of problems	Task Outcome	Task Time	Number of problems	Task Outcome	Task Time	Number of problems	Task Outcome	Task Time	Number of problems	Task Outcome
Task1	2:04	1	A	0:30		A	1:02		A	0:55		A	3:36	1	AB
Task2	0:52		A	0:52	1	AB	0:59	1	A	0:27		A	1:05	1	A
Task3	0:28		A	0:44		A	0:20	1	A	0:42		A	0:44		A
Task4	1:30	2	AB	2:10	3	*A[2]B	0:57	1	A	1:26	1	A	1:37	1	C
Task5	1:06	2	AB	1:48	2	C	1:51	3	A	1:03	3	A	0:51	2	A
Task6	1:16		AB	1:00	1	C	5:00	5	*A[1]B	2:11	2	*A[3]B	2:32	4	BC
Task7	0:27		A	0:35		A	0:26		A	0:32		A	0:46		A
Task8	3:44	5	C	2:35	5	C	4:48	5	C	1:43	2	C	1:29	1	C
Task9	0:17		A	0:45	2	A	0:37		A	0:47	2	A	1:08	2	A
Task10	0:25		A	0:15		A	0:20		A	0:23		A	0:39		A
Task11	1:29	1	AB	1:11		AB	1:26		A	0:55	1	*A[4]	2:12	2	A

*A[1] – could not find the how two entries are related and the time was up
*A[2] – wrong information (open close issue/issue over time) is perceived as status
*A[3]- Charts didn't load in the first attempt. Had to reload the page in order to make all charts appear
*A[4]- The repository was added successfully but the charts didn't appear after the add dialog was closed

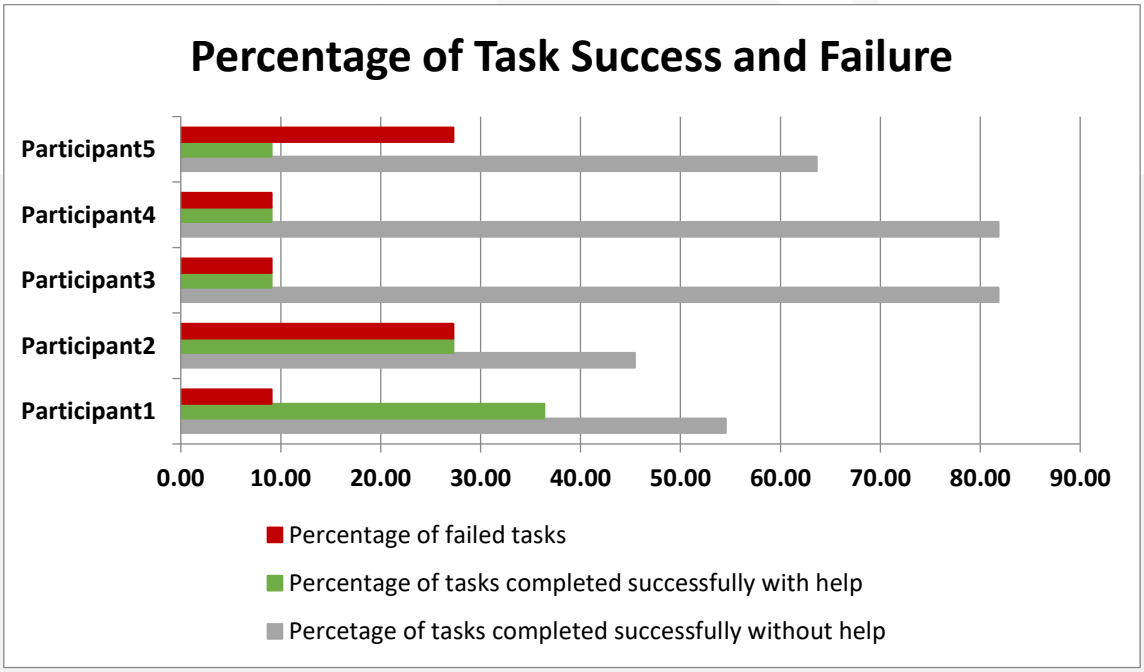
The following figure shows the task completion rate in minutes for individual participant in each task:

Figure 6 *Individual task completion time for each participant*



The following figure shows the percentage of successful and failed tasks for individual participants

Figure 7 *Success and failure rate in task completion for individual participant*



The table below contains the failed tasks and the reason the completion was unsuccessful. Information of only those tasks is provided which were failed to be completed by one or more participants.

Table 0-7 *Failed tasks, failure reasons and their occurrences*

Tasks	Reason for Failure	Occurrence
Task 4	Participant couldn't locate the information of the service status amid others; s/he tried to guess that from available graphs but failed.	1
Task 5	Participant became uncertain that if both owner and contributor referred to people working actively in the project	1
Task 6	In one usability testing session, "Commit activities" chart didn't load. Another participant couldn't figure out the commit numbers beside date information in tooltip. S/he was unsure if clicks could be made on the chart.	2
Task 8	In two sessions, "Issues over time" chart got broken on making mouse clicks. The page needed to be reloaded for making the chart to reappear. No participant could discover the view finder in the chart to select specific time range. Clicking around the chart area often activated the filtering functionality which created some confusion. For the small UI and information format (date and content) one participant felt the task really complicated.	5

Feedback from Satisfaction Questionnaire

Each participant was requested to fill up a questionnaire after the usability test was finished. The questionnaire contained nine queries about the general impression on the look-and-feel and functionality of Dipor Dashboard. Participants were asked mark down how strongly they agree with the given statements.

Please refer to next page to see the answers from all participants in the satisfaction questionnaire.

Table 8 *Feedback from the satisfaction questionnaire**

Feedbacks	Strongly Disagree	Disagree	I don't know	Agree	Strongly Agree
It was easy to learn to use the service			|	|||	|
I found the information I needed easily				||||	|
The appearance of the service was pleasant				||||	|
I am satisfied with the fluency of the use of the service			|	|||	|
The service included unfamiliar words and terms		|		||||	
It was easy to perform the given tasks				||||	|
Using the service was frustrating	||	|||			
I am going to use the service later			|	||	||
Overall Grade (Scale: 1 = Very Poor to 5 = Excellent)	1	2	3	4	5
			||	||	|

**Frequency of chosen feedback for each criterion is shown as (\|) symbol in associated cell.*

User Interview

A short interview was conducted with every participant after s/he filled up the satisfaction questionnaire. The interview contained the following themes:

- **General appearance** of the Dashboard view of the Dipor Dashboard Service
- **Different features** of the dashboard view and their **functionalities**
- Impression on **Dipor's feasibility** as a service to monitor development progress of ongoing digital service implementations

The following table contains the summary of the feedbacks that was obtained from All participants. The feedbacks are arranged as the **features participants liked** in the Dipor Dashboard service, **issues** they faced and the **improvements** they would like to see in future.

Appearance of Dipor Dashboard		
Liked Features	**Found Issues**	**Expected Improvements**
• Simple UI Layout • Minimalistic Colour Scheme • White space generating pleasant view of the Dashboard visualizations	• Chart size • Interaction with charts (specifically Issues over time chart)	• Chart size • Information on the charts about their purpose • Font style and size • Accommodating numeric figures along with the charts

		• Full labels of information being displayed

Different features and their functionality in dashboard view		
Liked Features	**Found Issues**	**Expected Improvements**
• Filtering option in the charts	• Unfamiliar terminologies associated with charts • Concerns over the change in terminology when more than one data source (e.g. Jira) is available to be integrated • Chart UI often broke down • Time period used to visualize data is incomprehensible	• Common terminology in charts irrespective to data sources • Redesigning functionality and contents of the charts (e.g. redesigning Label chart to be customizable by users) • Making hidden functionalities visible
		• Filter time periods associated with charts (e.g. Last 24 hours, Last 7 days, Last 28 days)

Dipor Dashboard's feasibility as a platform to monitor digital service implementation		
Liked Features	**Found Issues**	**Expected Improvements**
	• Uncertainty with the provided features being enough to determine progress of a service implementation work • No start and end dates of implementation work	• Inclusion of closed pull requests, commits made and closed issues • Remaining time for project completion • Quick access to dashboard rather than going through 3 level of hierarchies to reach it (Organization -> Department -> Services -> Integration) • Designing integration view as a separate feature to compare progress of 2 separate implementations of a service rather than using it as a dashboard • An ideal dashboard would include overview information of selected entities (e.g. service, department, organization) by a user and if the statuses of these entities are good • Customizable widgets to display entity information

		• A Detailed view for every service implementation to give more insights about the project work • Monthly statistics

Problems found in Usability Tests

Following are the issues that were discovered during the usability tests. A severity rating is associated with an identified problem which depends on its impact on using the Dipor Dashboard service. The ratings have been referenced for from the work of Nielsen.

Problem 1: Login page of Dipor Dashboard takes long time to load

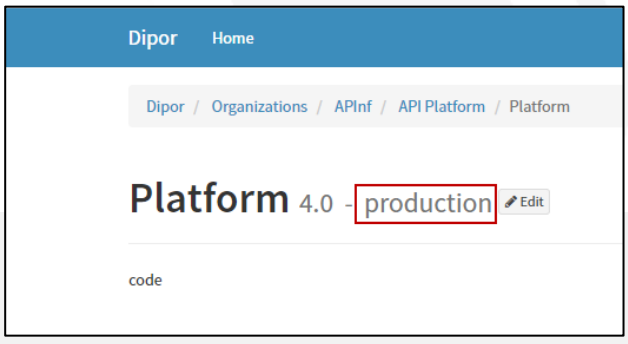
In most cases the login page of Dipor Dashboard took more than 15 seconds to load. Possible reasons behind can be loading of JavaScript code scripts in the client side which block other processes until its execution is finished. Similar case is applicable for block-rendering CSS and Fonts. Also data loaded per page, images with wrong dimension size can increase webpage loading time. Network speed can also be a crucial factor here.

Severity Rating 2

Problem 2: Terminologies used in the system are often vague (status)

Participants often got confused when they were asked to identify in what is the present phase of the service they were exploring. It seemed that they were unfamiliar with the different phases (e.g. idea, design, proof of concept, production, etc.) a service goes through in its life time.

Figure 8 *Position of lifecycle phase of a service in Integration view*

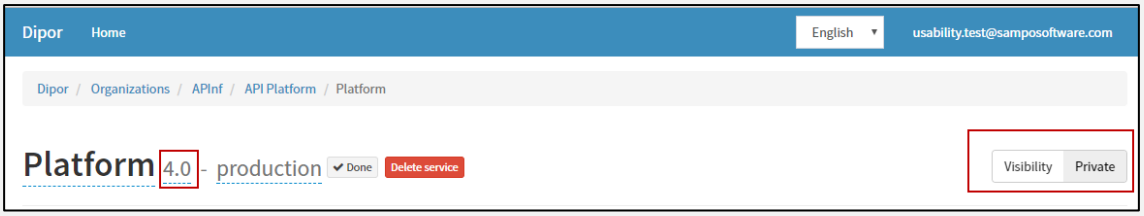


Severity Rating 0

Problem 3: Placement of information (version, status, etc.)

Participants had to look around for a while when they were asked to identify what is the current version of the service they are exploring. Also it took a while for them to figure out if the service can be accessed by general audience or only members within the organization where the service belongs to. This meta-information could be grouped together and place on a different level than service name for better visibility and identification.

Figure 9 *Version number and Visibility option of a service*

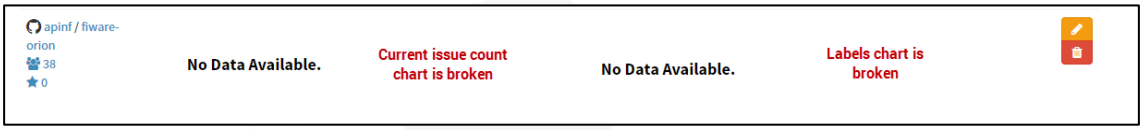


Severity Rating	1

Problem 4: Charts UI often breakdowns on clicking

When random clicks were made on the area close to the charts, they often disappeared or didn't show any contents on them. This occurred with the donut chart showing "Current issue count" and "Issues over time" line chart.

Figure 10 *Broken charts in the service integration view*

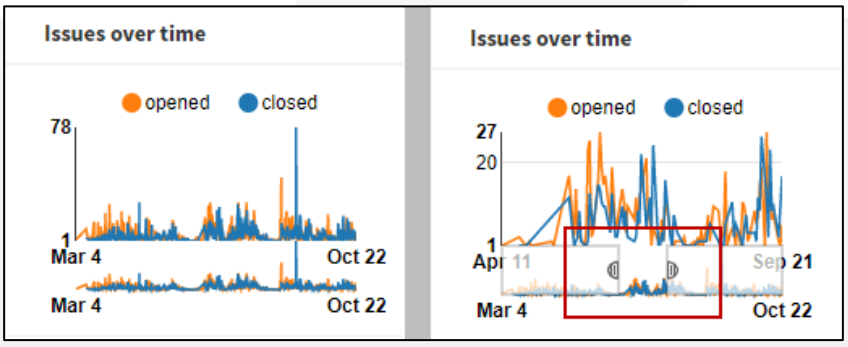


Severity Rating	4

Problem 5: View finder (if contained) within a chart is almost impossible to discover

The "Issues over time" line chart had a view finder to select time range in the chart. This could be activated by clicking on the small overview chart appearing under the main one. This didn't become visible automatically when the page was loaded. So the action was hidden in participants' view in all tests. This made the associated test task unsuccessful in all five usability tests.

Figure 11 *View finder on Issue over time chart*



Severity Rating	4

Problem 6: View finder (if contained) within a chart is slow to respond.

One participant was capable to locate the view finder. But it was too slow to respond. So it was difficult to set the view finder to focus the given time period on the test task. This made the associated test task unsuccessful to execute.

Severity Rating	3

Problem 7: Some charts don't load in the first attempt when Service Integration page is loaded.

This scenario occurred when Integration page for a service was loaded for the first time with already existing repository visualizations. This also happened when a new source (i.e. GitHub repository) was added in the Integration view. The issue was verified by navigating to the original GitHub repository and obtaining the number of commits and issues in that repository.

Disclaimer: The added repository had no issues but 8,798 commits

Figure 12 *Charts not appearing with first time page load.*

Figure 13 *Actual number of commits in the original GitHub repository*

Severity Rating	4

Problem 8: Incomprehensive presentation of information.

In most cases the login page of Dipor Dashboard took more than 15 seconds to load. Possible reasons behind can be loading of JavaScript code scripts in the client side which blocks other processes until its execution is finished. Similar case is applicable for block-rendering CSS and Fonts. Also, data loaded per page, images with wrong dimension size can increase webpage loading time. Network speed can also be a crucial factor here

Figure 14 *Unclear relationship between consecutive bars in Commit activity chart*

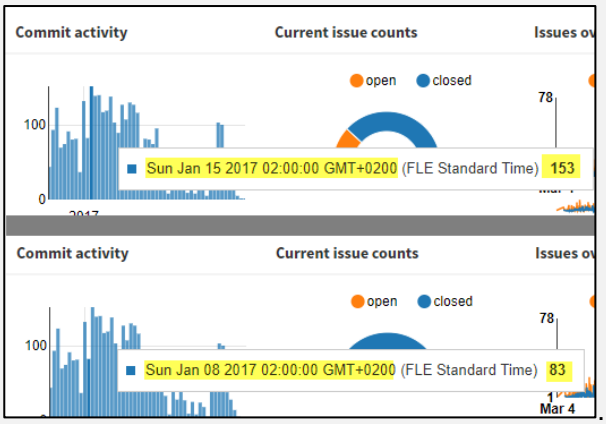
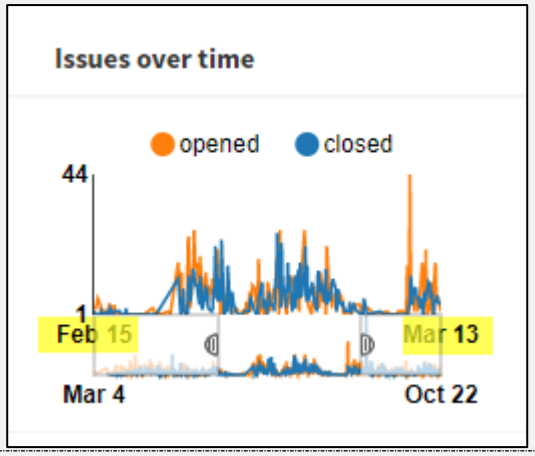


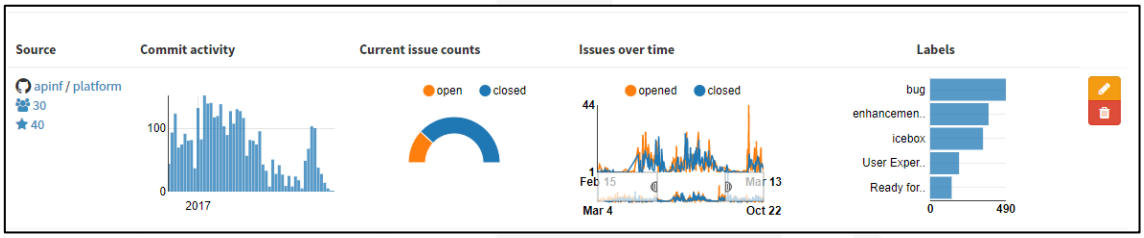
Figure 15 *Unclear date format in Issues over time chart*



Severity Rating	3

Problem 9: Chart sizes are too small to interact efficiently.

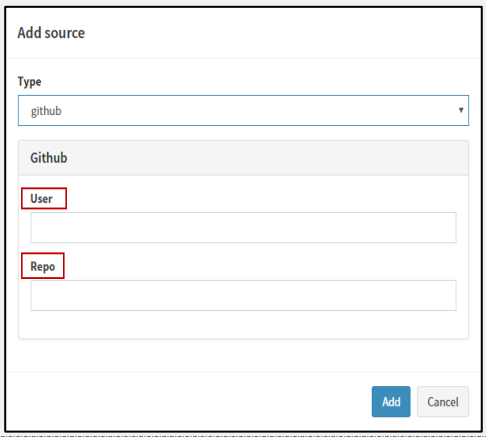
Because of the small size and restricted response area, it was often difficult for the participants to effectively interact with the given charts. Often clicking in an area in between two charts or a visual element (e.g. contributors) resulted with undesired (charts getting broken) and unexpected actions (activating chart filtering).



Severity Rating	3

Problem 10: Incorrect labels are used for data source repositories

In GitHub, a repository is under an organization. However, on Add / Edit source dialog, organization was incorrectly labelled as user. Also, full name of the terminology was not used. This could create confusion to a user habituated in using GitHub as s/he might not relate the association.



Severity Rating	1

Problem 11: Quick action items are not informative enough (Add Source)

For some participant it was unclear what the purpose of the Add Source button is. This was apparent when they are asked to execute the test task for adding a new repository in the Integration page.

Severity Rating	1

Problem 12: No Search functionality is included in Dipor Dashboard

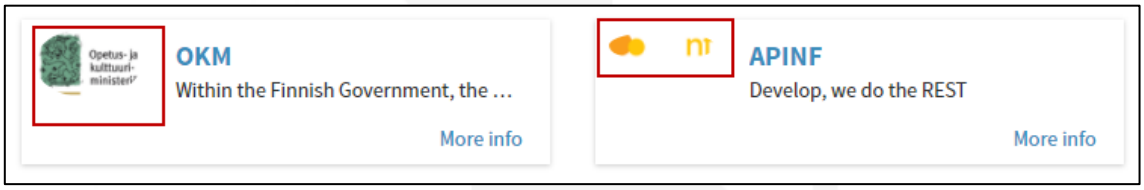
While navigating towards Integration view, participant often tried to look for quick information about departments and services. They were expecting to look for them using a search bar but found none.

Severity Rating	2

Problem 13: Logos in organization cards are too small.

In the Organization page, the card containing overview information about organization has placeholders for organization logo. The logos uploaded for an organization appears too small to understand its overall content. Also, the logo placeholder on the cards doesn't show the entire logo.

Figure 16 *Small placeholder for organization logo*

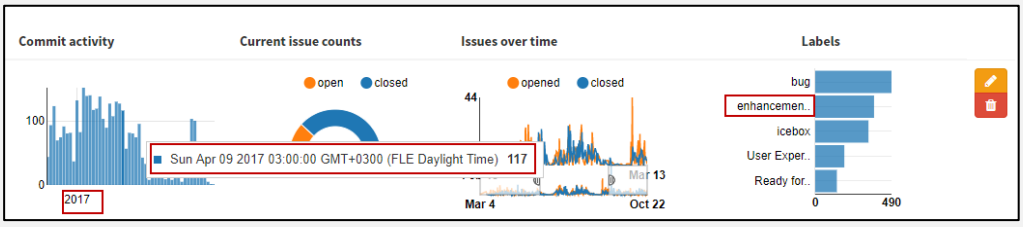


Severity Rating	1

Problem 14: Font size of texts is too small

Because of the sizes of the charts, associated text fonts (in tooltips, chart axis, etc.) appeared small. Participants often had to bring their eyes close to screen to read texts.

Figure 17 *Small font size around dashboard view*

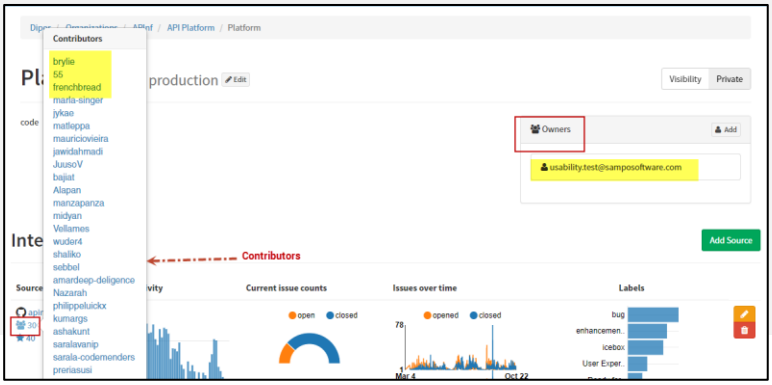


Severity Rating	2

Problem 15: Information layout is often misleading (owner vs. contributors)

Participants found arrangement and contents of owner and contributors of a specific integration to be confusing. They asked if owner is somehow associated with the contributor team. The reason might be because of the usage of the same icon to represent different information. Also, only an email address was shown to represent the owner, where contributors' information showed full names.

Figure 18 *Ambiguity in owner and contributors' information*

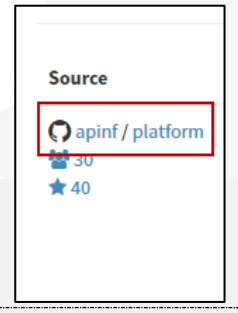


Severity Rating 2

Problem 16: Redirecting to the original repository source isn't possible.

In the integration view, an icon indicates the repository (e.g. GitHub) where the information is obtained from. Participants expected to be navigated to the original source repository on clicking the icon. But the icon was inactive, and no redirection happened on clicking.

Figure 19 *Inactive Repository Link*



Severity Rating 2

Table 9 *Heuristics to Evaluate Information Visualization Systems*

Heuristics	Description
1. Information Coding	Perception of information is directly dependent on the mapping of data elements to visual objects (graphing techniques, color, type and meaning of symbols, shading, transparency, etc.). This can be enhanced by using realistic characteristics/techniques or the use of additional symbols (legends, scales, drop lines, gridlines). Is the mapping correct? Is it appropriate for the task at hand, does it support user's perceptual capabilities? Another important aspect is the use of alternative visual attributes or objects to represent information derived from the data like groups of elements in clustered representations.
2. Minimal Action	Concerns workload with respect to the number of actions (sets of inputs) necessary to accomplish a goal or a task. The more numerous and complex the actions necessary are the more workload will increase. It is here a matter of limiting/minimizing as much as possible the steps users must go through.
3. Flexibility	Refers to the means available to the users to customize the interface in order to take into account their working strategies and/or their habits, and the task requirements. Flexibility is reflected in the number of possible ways of achieving a given goal. In other words, it is the capacity of the interface to adapt to the users' particular needs. Example: permit users to control display configuration, to define, change or remove default values etc.
4. Orientation and Help	Functions like support for the user to control levels of details, redo/undo of user actions and representing additional information (for example the path a user followed while navigating in a complex data structure) define help and user orientation features.
5. Spatial Organization	Concerns user's orientation and awareness of location in the information space, the distribution of elements in the layout, precision and legibility, efficiency in space usage and distortion of visual elements. Is related to the overall layout of a visual representation and comprises analyzing how easy it is to locate and see an information element in a display (objects location) and to be aware of the own orientation in the information space, and the overall distribution of information elements in the representation (spatial orientation). Locating and analyzing an information element can be hard if some objects are occluded by others or if the layout does not follow a logical organization. Spatial orientation which contributes for the user being aware of the distribution of information elements is dependent on the display of the reference context while showing a specific element in detail. Concerns the possibility and easiness of specifying what information should be displayed in the context area vs. the detailed area, can the user control them separately or does selection in one area affect the other.

6. Consistency	Refers to the way interface design choices (codes, naming, formats, procedures, etc.) are maintained in similar contexts, and are different when applied to different contexts. The design choices will be better recalled, located and recognized if they are stable within the system (e.g. between screens or sessions). This way the system will be more predictable, learning and generalization are facilitated and errors are reduced.
7. Recognition Rather Than Recall	Minimize the user's memory load by making objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate. Accelerators -- unseen by the novice user -- may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to use shortcuts or tailor frequent actions for their own needs. (Focused on allowing the user additional options to sidestep regular interaction techniques).
8. Prompting	Means available to guide the user towards making specific actions whether these be data entry or other tasks. Refers to all means that help to know all alternatives when several actions are possible depending on the contexts. Concerns: status information, that is, information about actual state or context of the system, information about help facilities and their accessibility.
9. Remove The Extraneous	Concerns whether any extra information can be a distraction and take the eye away from seeing the data or making comparisons. Present the largest amount of data with the least amount of ink. This involves judging whether any extraneous information is a distraction and/or slow-down. Extra ink can be a distraction and take the eyes away from seeing the data or making comparisons. But removing too much can hinder the perception instead.
10. Data Set Reduction	Concerns provided features for reducing a data set, their efficiency and ease of use. Filtering allows reduction of information shown at a certain moment, leading more rapidly to adjustment of the focus of interest, and clustering allows representing a subset of data elements by means of special symbols, while pruning simply cuts off information irrelevant for the understanding of a visual representation.

*An heuristic set for evaluation in information visualization

Table 10 *Severity Ratings of Usability Problems Identified*

Number	Severity Rating of the Finding
0	I do not agree that this is a usability problem at all.
1	Cosmetic problem only: need not be fixed unless extra time is available on project.
2	Minor usability problem: fixing this should be given low priority.
3	Major usability problem: important to fix, so should be given high Priority.
4	Usability catastrophe: imperative to fix this before product can be Released.

*Severity Ratings for Usability Problems