

USABILITY TEST REPORT: DOLPHIN WEB BROWSER

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EXECUTIVE SUMMARY

The current usability study was conducted in Morrisville, NC between 15-17 October 2013 to test the usability of the Dolphin web browser. The main objective of the usability study was to assess the ease of use, intuitiveness and usefulness of the browser to accomplish certain tasks. The study collected quantitative as well as qualitative measures. The insights and the related research questions are reported in detail in the following table:

Research Question	Insights from the Study
Are participants able to locate functions necessary to accomplish tasks?	Participants found the functions of adding and removing an application/shortcut from the speed dial very easy to locate and useful. Participants faced particular difficulty accessing functions to create a bookmark folder, use a gesture to access a webpage and use voice input. Participants had some different expectations about finding the clear browsing history function as well.
Do participants understand the terminology used in the browser?	Participants expressed confusion specifically about the terms 'gesture' and 'sonar' and did not find them very intuitive. One participant also expressed opinion about the term speed dial <i>not</i> being sticky, understandable and associated with the menu of shortcuts/applications on the home screen.
Preference regarding paths to accomplish tasks	Participants could understand that they could access menu by tapping the left button on the smartphone as well as by keeping the dolphin icon on the screen tapped. Most of the times participants accessed the menu by clicking on the dolphin icon may be because it was easier to access and offered access to other functions as well. Participants reported some issues accessing the menu by tapping the dolphin icon as one had to keep the icon tapped so that all the functions were accessible.
What do participants think about the sonar functionality?	Participants thought that the sonar functionality was very useful and reported that they were likely to use it but most of them faced issues while accessing it.
What do the participants think about the gesture functionality?	Participants could create a gesture as a shortcut but faced some issues in using a gesture to open a webpage. Participants liked the speed dial and sonar functionality more and found them more useful than gesture.
How easy did the participants find clearing the cache?	All the participants were successful in clearing the browsing history and cache. However, they expected to find the function of clearing the history under different sub menu item of the browser settings. There are too many steps involved in clearing the cache and browsing history.

How easy did the participants find adding and removing applications from the speed dial?	All the participants found it very easy to add and remove a shortcut/application to and from the speed dial respectively and found this feature very useful.
To what extent the participants found the functions useful and likely to be used by them?	Participants liked the functionality of speed dial and sonar and found those useful and more likely to be used as compared to the functionality of gesture.

METHOD

PURPOSE OF THE STUDY

The main objective of the current study was to assess the usability of Dolphin browser through several tasks to investigate the effectiveness and ease of use. For this purpose both quantitative and qualitative data were collected regarding following factors:

- Task success and failure rate
- Time on tasks
- Errors, alternative paths and impediments in accomplishing the tasks
- Comparison with the experience of desktop browser and the participant's current Smartphone browser
- Impressions about the user interface
- Overall experience of using the Dolphin browser to accomplish the tasks in the session

PARTICIPANT CHARACTERISTICS

For the current study, the main criterion for participation was experience of using a smartphone. The study tested the browser on android OS, however one of the participants had no experience of using an android. The demographic characteristics and web browsing habits of the participants are presented in Table 1 below:

Table 1. Participant Characteristics

Characteristic	Number of Participants
Gender	
Male	2
Female	2
Age	
26-35 years	2
36-45 years	2
Ethnic Background	
Asian	4
Educational qualification	
Masters Degree	4
Field of Education	
Engineering	3
Finance	1
Type of Smartphone	
Android	3
iPhone	1
Experience of using Dolphin	
Yes	3
No	1
Time spent browsing web on Smartphone	
Less than 1 hour	1
Between 2-4 hours	3

From Table 1, it is clear that the current sample was predominantly Asian, highly educated (Masters degree) and Android phone users. Both the genders were well represented. Participants represented two age groups and three participants had experience of using the Dolphin browser. Three participants reported of web-browsing using smartphone between 2-4 hours. As there were only four participants, reporting in terms of percentages was deemed to be misleading and thus was not reported.

TEST ENVIRONMENT

LOCATION

The study sessions were conducted at the researcher's home located in Morrisville, NC. The researcher ensured to create ideal testing conditions by keeping the noise and disturbance to the minimum.

SET-UP

The study was set-up in the home-office of the researcher. Participants performed all the tasks on Samsung Galaxy S III android phone with the 10.1.0 version of the Dolphin Browser installed on it. The researcher used a Dell PC Monitor (connected to the MacBook Pro) to display the test scenarios to the participants using Microsoft PowerPoint program. The audio for each study session was recorded using Audacity software installed on the MacBook Pro. The researcher used the Microsoft Excel program installed on the MacBook Pro to record notes of each session and the stopwatch function in Alarm clock application of the MacBook Pro was used to time the tasks. The participant sat on the swiveling chair while and the moderator sat on the non-swiveling chair besides the participant to observe the screen of the smartphone closely and constantly. The set-up can be seen in Figures 1-3.

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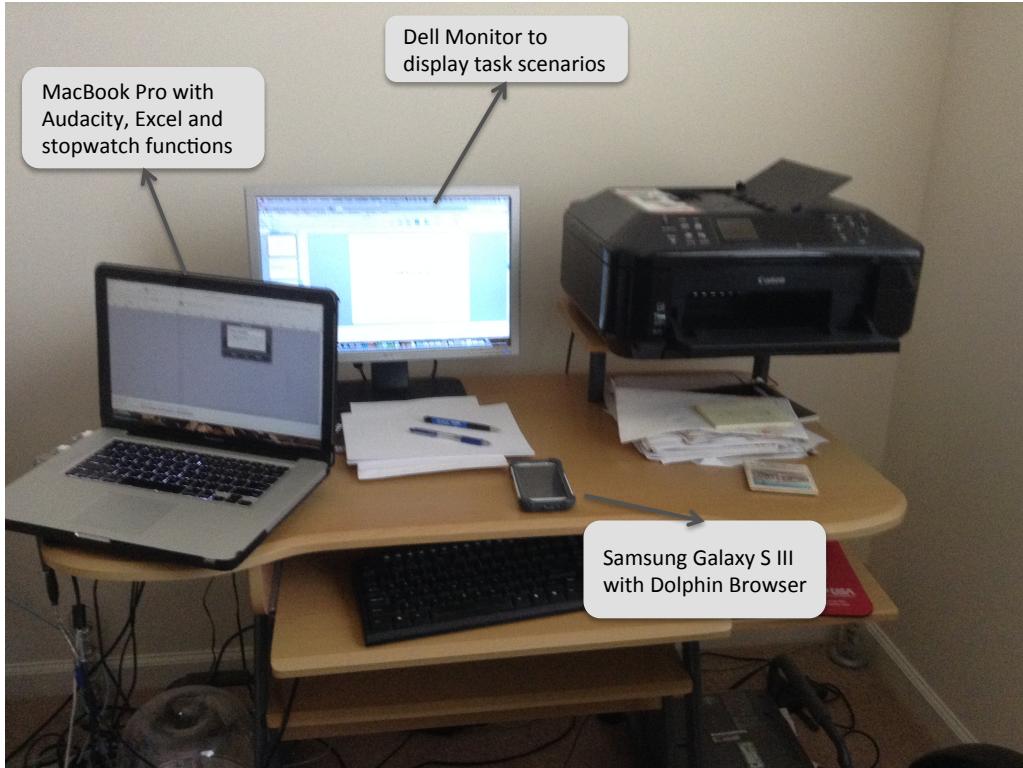


Figure 1: Test Set-up with the devices used for testing and recording

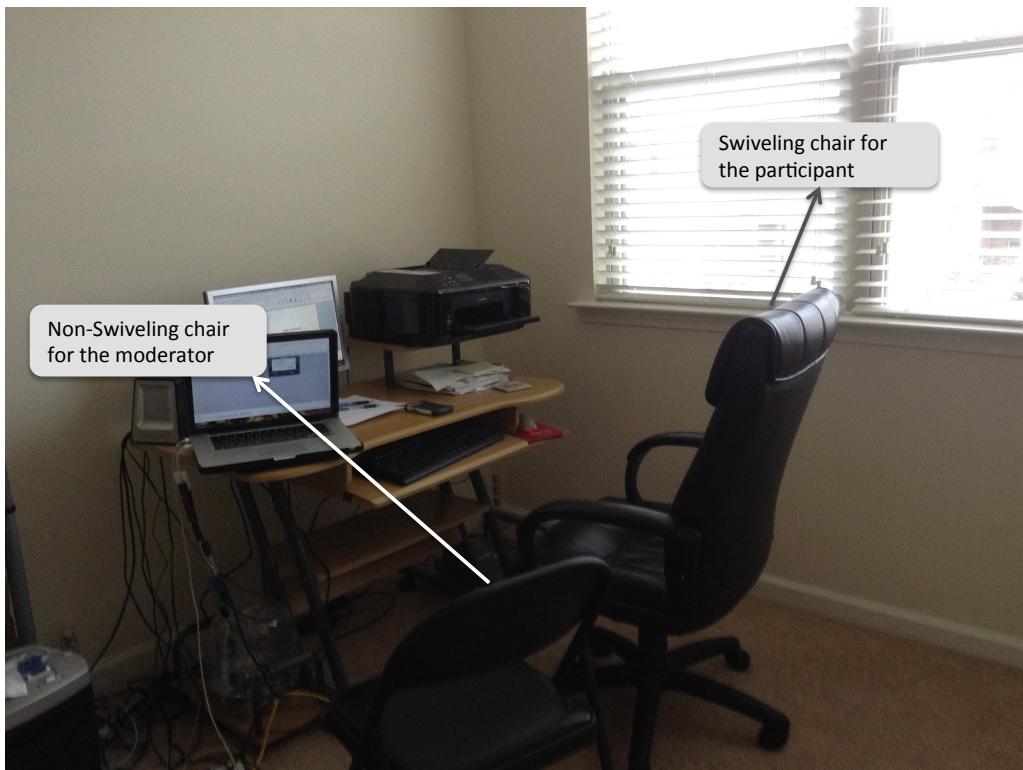


Figure 2: Test Set-up with the seating arrangement

Usability Test Report: Dolphin Web Browser

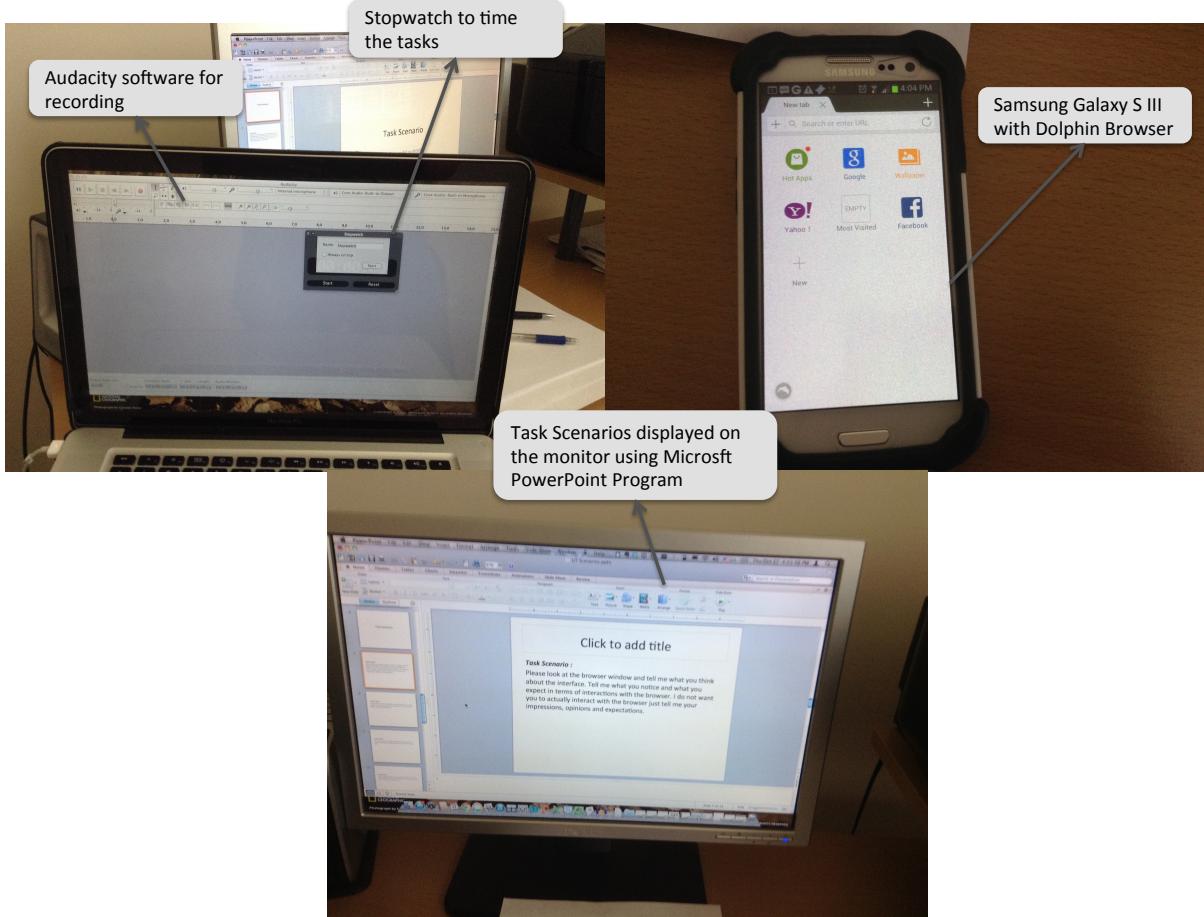


Figure 3: Devices and software used to conduct and record the test session

TEST DESIGN

The current study used a within-subjects design by default, since only one browser was tested and all the participants attempted all seven tasks. To counter the possible learning effects, the sequence of the tasks was varied across the participants. All the participants attempted the first task (impressions of the user interface) in the beginning of the session, since it did not make sense to ask about the impressions any time later in the session. The task order for the four participants is presented in Table 2.

Table 2: Task order per participant

<i>Task Assignments</i>	
Participant 1	1,2,3,4,5,6,7
Participant 2	1,4,3,5,7,2,6
Participant 3	1,5,4,3,2,6,7
Participant 4	1,7,3,2,4,6,5

On an average, each session took around 1 hour. The duration of each session ranged between 45 minutes-90 minutes. At first, the participants filled the pre-test questionnaires (see Appendix B) reporting their web-browsing habits and demographic details. After the pre-test questionnaire, the participants attempted the seven tasks using the Dolphin browser. Each task scenario was displayed on PC Monitor as shown in Figure 3. The participants used think-out loud protocol as they attempted each task so that the moderator can fully understand and record their interaction with the browser. After attempting each task, participants rated their experience in terms of difficulty level of the task, difficulty level of locating functions, usefulness and likelihood of using the function (see Appendix C). After completing all the tasks, participants rated their agreement on ten statements regarding the Dolphin browser (see Appendix D) to get their overall impression regarding the browser. The researcher also debriefed the participants and asked few open-ended questions (See Appendix E) to the participants to elicit qualitative data and impressions regarding the Dolphin browser.

TASK SCENARIOS

The tasks attempted in the current study are presented in Table 3. Each of the tasks was presented in a context (see Appendix A). During designing the study, the researcher estimated time limit for each of the task based on her own experience of attempting each task and considering the think-out loud time. Additionally, change was made to the time estimate based on feedback from the course instructor.

Table 3: User Tasks and estimated task times

Task No.	Task	Time estimate
1	Initial impressions of the user interface of browser	3-5 minutes
2	Create a Bookmark folder and add a website as a bookmark to that folder	4 minutes*
3	Add an application to the speed dial on the home screen	2.5 minutes
4	Remove an application from the speed dial	3 minutes
5	Clear cache and browsing history of a browsing session	4 minutes
6	Create a gesture for a particular website	5 minutes
7	Use voice input to open a webpage	2 minutes

*Note: * indicates that the time limit was increased after feedback from the instructor*

DATA COLLECTION

The current study collected both qualitative as well as quantitative data to address the research questions mentioned earlier in the report.

QUANTITATIVE MEASURES

- Number of participants who accomplished the tasks successfully
 - Create a Bookmark folder and add a website as a bookmark to that bookmark folder
 - Add an application to the speed dial on the home screen
 - Remove an application from the speed dial
 - Clear cache and browsing history
 - Create a gesture for a particular website
 - Use voice input to open a webpage

User performances were recorded in terms of (a) Success within time limit, (b) Success outside the time limit, (c) Success with some hint, (d) No Success

- Time taken for each successfully completed task
- Post task ratings
- Post-test questionnaire agreement ratings

QUALITATIVE MEASURES

- Qualitative data was elicited from the participants through post-test interview and the think-aloud protocol and were analyzed in terms of:
 - Initial impressions about the browser
 - Expectations regarding the behavior of the browser and the functions
 - Points of confusion
 - Understanding of the terminology
 - User attitudes
 - Errors committed/ detours taken while attempting the aforementioned tasks
 - Number of times a specific path was used to accomplish a task

RESULTS

USER TIMING AND TASK COMPLETION RATES

Overall, the participants were most successful in adding and removing the application to and from the speed dial respectively and clearing the cache and browsing history. All the participants completed creation of gesture but faced issues while doing it and using the gesture to open the website. One participant could not use voice input to open the webpage, another two participants faced a lot of issues in locating the sonar functionality. Three out of four participants could not create a bookmark folder and add a bookmark to that folder. The details of the task completion rates are presented in Table 4.

Table 4. Task completion rates by number of users

Task No.	Task	Success within time limit	Success outside time limit	Success with some hint	No Success	Total Success within time
1	Create a Bookmark folder and add a website as a bookmark to that bookmark folder	1	0	0	3	1/4
2	Add an application to the speed dial on the home screen	2+1*	0	1*	0	3/4
3	Remove an application from the speed dial	4	0	0	0	4/4
4	Clear cache and browsing history	4	0	0	0	4/4
5	Create a gesture for a particular website	3	1	0	0	3/4
6	Use voice input to open a webpage	1	2	0	1	1/4

*Note: * The participant was confused by the terminology of shortcut used (as per feedback from the pilot session) and thus required a hint that the shortcuts are applications.*

**There was a technical glitch due to problems in Wi-Fi and loading of a webpage with the applications*

Table 5 displays the time taken by each of the participant to finish a task successfully. Time of a participant was not considered if the participant did not accomplish the task. The time estimate is mentioned as well so as to compare the performance of the participant against it. The table also mentions the range of times taken (highest and lowest times), mean time and standard deviation.

Table 5:Successful Task Times (min:sec)

	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6
Time estimate	4 min	2.5 min	3 min	4 min	5 min	2 min
Participant 1	-	2.30	1.07	2.12	3.15	1.57
Participant 2	3.02	7.44	1.35	2.11	6.30	7.00
Participant 3	-	3.25	.49	3.40	3.47	-
Participant 4	-	1.39	.15	0.58	3.32	3.00
Highest Time	-	7.44	1.35	3.40	6.30	7.00
Lowest Time	-	1.39	.15	.58	3.15	1.57
Mean Time	-	3.595	0.77	2.05	4.06	3.86
Standard Deviation	-	2.67	0.54	1.15	1.50	2.81

Only one participant successfully completed the task of creating a Bookmark folder and bookmarking a webpage in that folder. Times of other three participants were not considered as they failed to accomplish this task, though they spent more than or equivalent time to that of the time estimate on this task [*2 participants spent 6 minutes and 1 participant spent 4 minutes*]. The highest mean time was for the task of creating a gesture for a website. While the highest standard deviation was for the task of using voice input to open a webpage. Lowest mean time and standard deviation was found for the task of removing an application from the speed dial.

QUESTIONNAIRE DATA ANALYSIS AND POST TASK RATINGS

Table 6 displays the mean post-task ratings for each of the 6 tasks. The detailed task ratings can be found in Appendix F.

Table 6: Mean Post-task ratings on four scales for each task (Detailed ratings presented in Appendix F).

Tasks	Mean Post task ratings*			
	Difficulty level of accomplishing the task	Difficulty level of locating the function	Usefulness of the Function	Likelihood of using the function
<i>Creating a Bookmark folder and bookmarking a website under it</i>	2.25	2.25	2.5	2.5
<i>Adding an application to the speed dial</i>	3	3.25	3.5	3.75
<i>Removing an application from the speed dial</i>	3.75	3.75	3	2.5
<i>Clearing the browsing history</i>	3	2.5	3.5	3.5
<i>Creating a gesture as a shortcut to visit a website</i>	2.75	2.75	1.75	2
<i>Using voice input to open a webpage</i>	2	2	3.25	3

Note: * 1= very negative, 2= negative, 3= positive and 4= Very positive

Table 7 displays the post-test agreement ratings of the four participants based on their overall experience of using the dolphin browser to accomplish tasks in the study session.

Table 7: Post-test agreement ratings (Total ratings for the statement mentioned in bracket for each rating category).

St. no.	Evaluation Statement	Rating categories				Total of ratings	Mean ratings
		Strongly Disagree	Disagree	Agree	Strongly Agree		
		1	2	3	4		
1	I would like to use the browser often.	0	1(2)	1(3)	2(8)	12	3
2	I found it difficult to locate the functions of the browser.*	0	2(4)	2(6)	0	10	2.5
3	Overall, I found the browser easy-to-use.	0	2(4)	2(6)	0	10	2.5
4	I would need technical assistance to use this browser.*	3(3)	0	0	1(4)	7	1.75
5	I feel confident about using this browser.	0	1(2)	2(6)	1(4)	12	3
6	I would recommend this browser to others.	0	0	3(9)	1(4)	13	3.25
7	This browser was easy-to-learn.	0	1(2)	2(6)	1(4)	12	3
8	This browser supports my web-browsing needs.	0	2(4)	1(3)	1(4)	11	2.75
9	I found using this browser easier than the current browsers that I use.	0	3(6)	1(3)	0	9	2.25
10	I would start using this browser instead of the ones that I use currently.	1(1)	1(2)	2(6)	0	9	2.25

Note: * reverse coded items

Participants were also asked open-ended questions regarding what they liked and disliked about the browser and were asked to compare their experience of using Dolphin with the browser that they use on laptop/desktop.

Participants liked the following regarding the Dolphin browser

I liked the speed dial feature.
The home screen is not cluttered.
I liked the tiny dolphin on the home screen.
There are not unnecessary things on the home screen and it is very clean.
I like the hot apps that would be helpful.
I liked the voice input functionality.
Is very easy to follow.

Participants disliked and reported possible improvements regarding the following in the Dolphin browser

The home screen has 3 'plus' buttons, that is confusing.

Would like to save tabs and revisit them.

Would like to have an add-on of X marks to sync the websites that I visit on my laptop to the Dolphin browser on smartphone.

Would like auto-completion feature in the browser.

Bookmarks functionality is a disaster!

Reopening closed tabs may be a useful functionality to add.

Gesture can be called 'draw' and Sonar can be called 'voice input', to make it more understandable.

Was confused by the two options of 'add speed dial' & 'add shortcut' under 'add a bookmark' light box being grayed out.

Gestures can be used to access only handful of websites since it is difficult to remember all the gestures you created.

'Shake to activate' in sonar settings did not make any sense!

Voice input is good but did not understand how to access it!

Process of creating a bookmark folder is too long and I see no value in it!

The items should stay on after I click on the dolphin logo at the bottom. It shows me that one can access some stuff but since it disappears immediately, I am unable to interact with it.

FINDINGS & RECOMMENDATIONS

SUMMARY OF USABILITY ISSUES

The severity and frequency ratings are explained in the two tables below. In Table 8, the usability issues and their respective severity and frequency ratings are listed and described.

Severity Ranking		Frequency Ranking*	
1	The issue is an irritant but does not usually impede the user/participant from completing his task.	1	1 participant faced the issue
2	The user/participant will have to exert moderate effort to use the program, but will eventually complete his task.	2	2 participants faced the issue
3	The issue will severely limit the user's /participant's attempt to use the program. The user will have great difficulty in task completion.	3	3 participants faced the issue
4	The user/participant will not be able to use or will not want to use the program because of the issue.	4	All the participants faced the issue

*Note: *The frequency rankings should be expressed in terms of percentages for a study with larger sample size.*

Table 8: Summary of usability issues

Issue	Severity	Frequency	Source(s) of Error
Participants were unable to locate the 'create new folder' in bookmarks menu	3	3	<ul style="list-style-type: none"> Function is hidden in the bookmarks menu 'Add new folder' icon not intuitive and is unnoticeable Participants expect to be able to create a new folder while bookmarking the page
Some terms used in the program are ambiguous and not understandable	2	2	Some terms made it difficult to understand the task (e.g. <i>gesture</i>)
Participants found it difficult to understand and use one of the ways of accessing the menu	3	2	Participants expected that once they tap the 'dolphin' icon on the screen, the menu would appear and be accessible. But to keep the menu accessible, the participants had to keep the icon tapped.

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Accessing the sonar functionality was difficult	3	2	<ul style="list-style-type: none"> Participants found it difficult to access the sonar functionality Participants did not see that they need to drag the circle to the 'microphone' icon to activate it Participant expected that it behaves like a toggle function
Using the gesture to open a webpage after assigning the gesture was difficult	3	2	<ul style="list-style-type: none"> Participants assigned a gesture but did not understand how to use a gesture to open a webpage Did not understand that they need to go to 'draw a gesture' screen particularly
Problems in locating the clear history function	2	3	Participants expected to locate the function to clear history under 'Web Content' in the settings

DISCUSSION OF FINDINGS AND RECOMMENDATIONS

1. Participants could not locate the function of creating a bookmark folder

Issue	Severity	Frequency	Total of ratings
Participants were unable to locate the 'create new folder' in bookmarks menu	3	3	6

Three of four participants could not create a bookmark folder named 'search' and bookmark 'Google' website in the 'search' folder. All the participants easily located the function of adding a bookmark, but three were unable to create a new bookmark folder. Currently, to create a bookmark folder a user needs to access the 'bookmarks' item in the menu, that opens a list of bookmarks in the left panel. In this panel, the user needs to click on the 'settings' icon and that toggles the view so that the user can delete the existing bookmarks and in this view they can tap on the icon at the top to add a new bookmark folder. A user needs to take 5 steps to create a new folder currently. This workflow is depicted in Figure 4.

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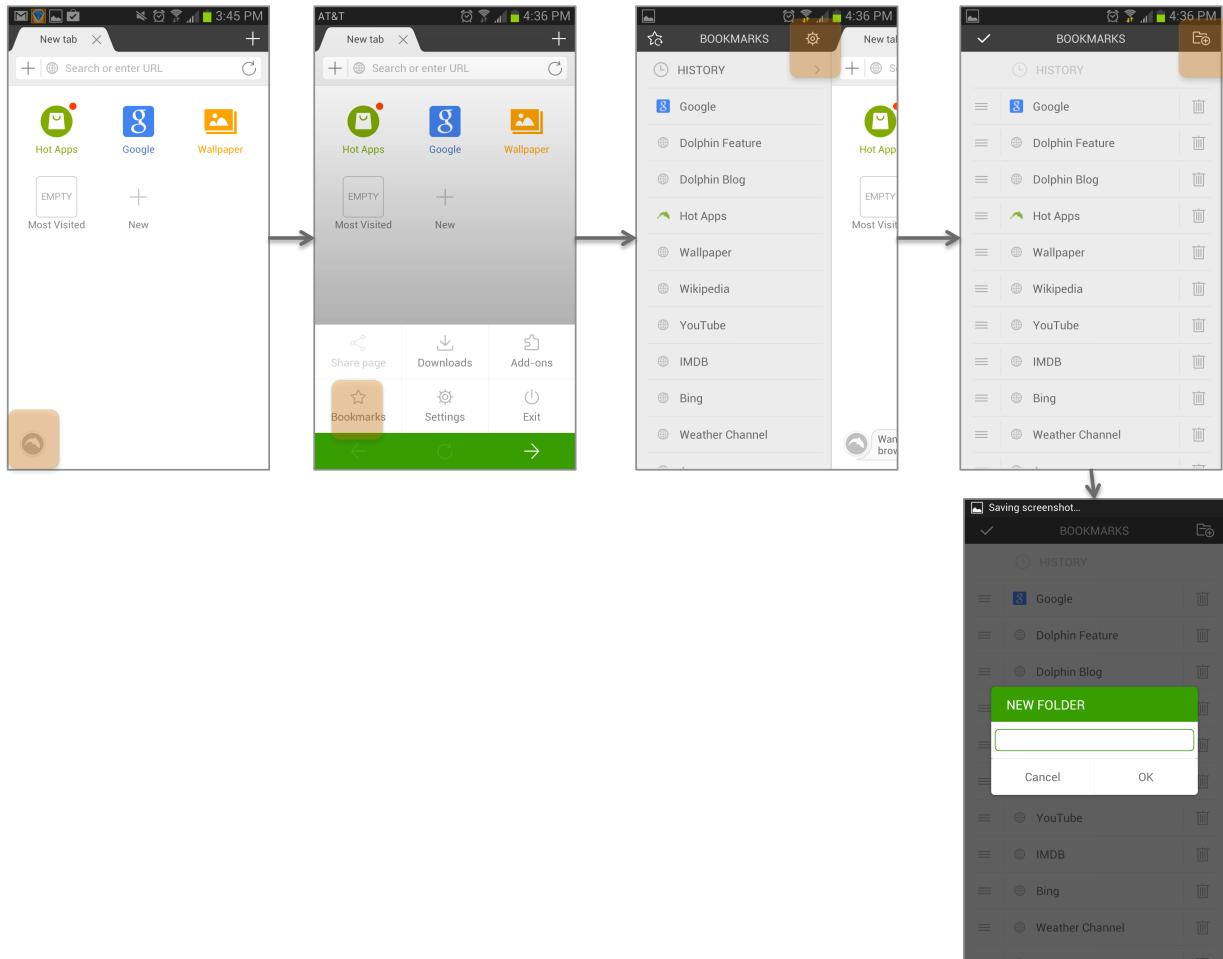


Figure 4: Current workflow to create a new bookmark folder. [Orange boxes indicate the icon that needs to be tapped]

Participant 2, who succeeded in doing this task, could do this task as she had explored the browser enough in the earlier tasks and had located this function. While participants 3 and 4 reported that they expected to have the functionality of creating a new folder when one bookmarks a webpage in the menu as shown in Figure 5. Participants 1 and 3, who did not complete the task of adding a bookmark to a folder, spent 6 minutes while participant 4 spent 4 minutes and then gave up. Another interesting finding regarding usefulness and likelihood of using this feature was that both female participants reported that this function was very useful and they were very likely to use it while both male participants reported that they did not find it useful and were not likely to use it. A study with larger sample may shed light on the gender differences in using bookmarks functionality.

It seemed that the way this function is set up is not intuitive and is hidden. The three participants did not expect to find this function located beneath 2-3 levels of menu. Moreover, the icon for adding a new bookmarks folder is too small and can be easily missed.

Additionally, one participant who failed to do this task deemed it to be useful and reported that she was likely to use it. So it seems worthwhile to improve the usability of this function wherein people are more likely to use it.

Participants' suggestion of adding the functionality of adding the bookmarks folder in the pop-up menu that appears when one adds a bookmark makes sense and brings the function to the forefront rather than burying it in levels of menu (See figure 5).

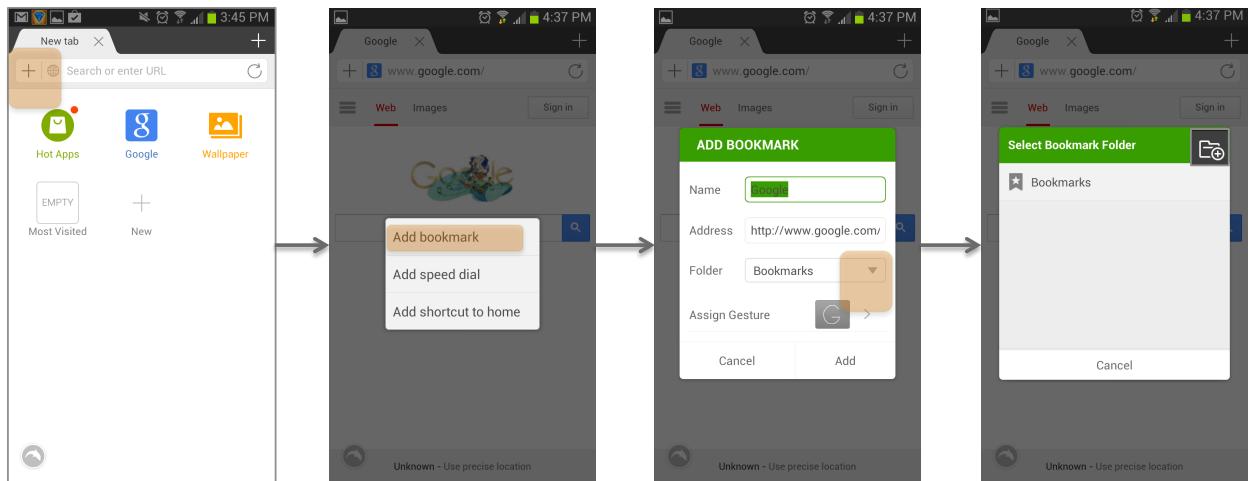


Figure 5: Recommended workflow to create a new bookmark folder. [Orange boxes indicate the icon that needs to be tapped and the 'create new folder' is added in the last image as the black box on the green ribbon to the top right]

2. Difficulty in locating a way to use a gesture to open a webpage

Issue	Severity	Frequency	Total of ratings
Using the gesture to open a webpage after assigning the gesture was difficult	3	2	5

All the participants were able to assign a gesture but three participants faced some problems in using the gesture to open the webpage. Participant 4 failed to test whether he was successful in assigning the gesture correctly as he could not figure out how he can access the webpage (twitter.com) to which he assigned a gesture ('t'). He tried for 3.32 minutes and then was asked if he thought he had completed the task to which he replied yes since he was able to assign the gesture but did not test the gesture. Participant 2 misunderstood the term gesture and thought that she needed to create the gesture of 't' by moving the cell phone physically. However, she could test the gesture but spent 6.30 minutes on this task, which was 2.30 minutes more than the estimated time. Participant 3 assigned the gesture and after trying for few moments could test it using the 'draw a

'gesture' screen. Participant 3 reported that she expected to draw the gesture on the home screen and expected to see a pop-up asking if she wanted to assign the gesture she drew to anything rather than going through the lengthy process of assigning a gesture which took seven steps as shown in Figure 6. Participant 1 had used the gesture functionality earlier, so found it easy to create and use the gesture to open the webpage.

The moderator observed that assigning a gesture took seven steps and after assigning the gesture, the screen said 'try out your new gesture' on the top which did nothing when one tapped on it, so the participant had to tap on 'no thanks' at the bottom of the screen to exit from that screen and then figure out how to use the gesture that they had assigned.

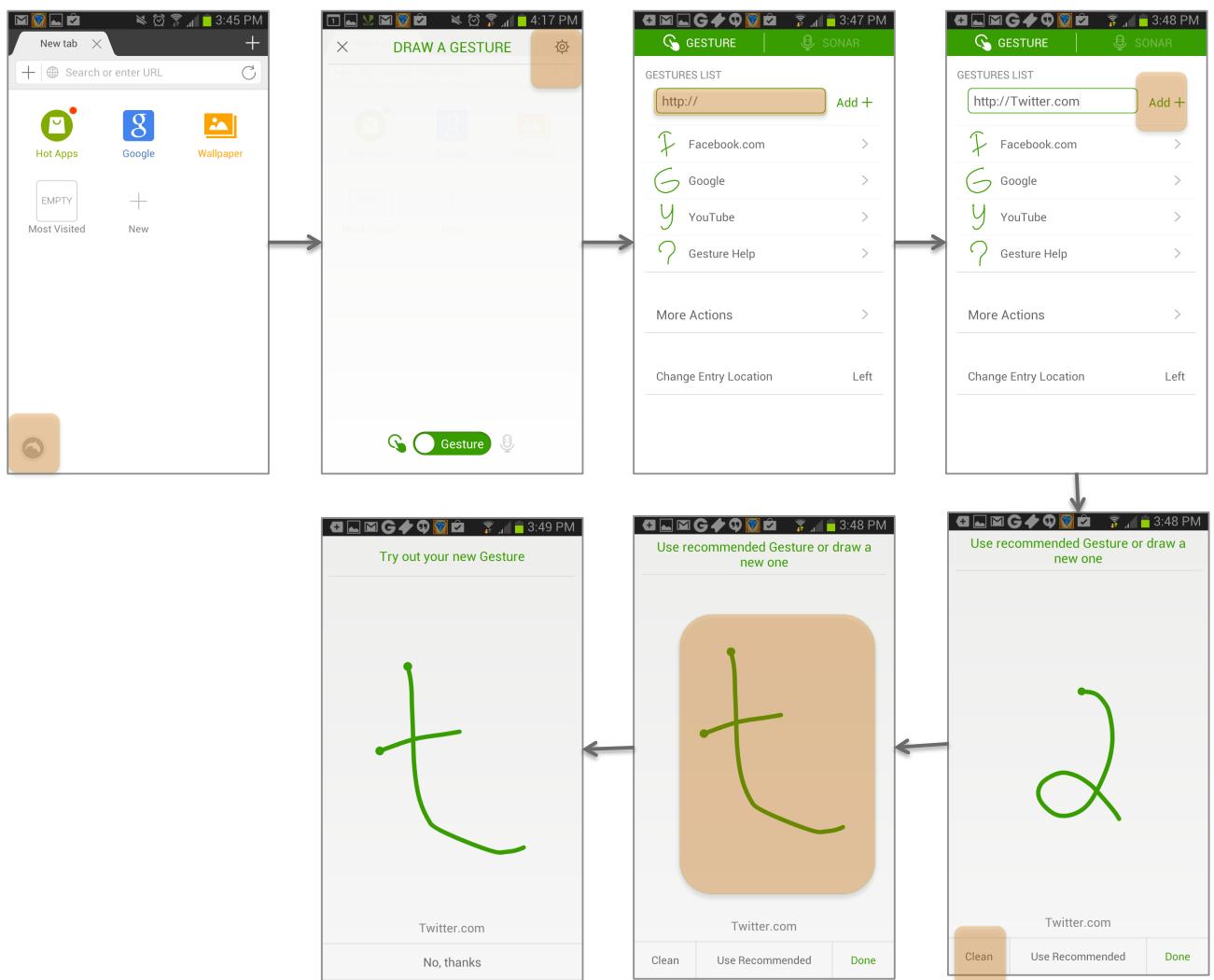


Figure 6: Current way of assigning gesture functionality

It is recommended that the assigning of gesture be promoted on the home screen as a shortcut since it is one of USPs along with sonar functionality. It seems that it would be

helpful to let the user use the gesture on the home screen rather than access the 'draw gesture' screen that is one level deep in the menu. It is crucial to improve the way gesture can be used as shortcuts to promote it as a USP of Dolphin browser. Another important feedback from the participants was that with the speed dial and voice input they did not find the gesture functionality as useful (*Mean rating=1.75: close to 'Not useful'*) and unlikely to be used (*Mean rating=2: 'Unlikely'*). This might be also since it takes too many steps to assign a gesture and then figure out how to use it.

3. Difficulty in understanding functionality and lack of affordance

Issue	Severity	Frequency	Total of ratings
Participants found it difficult to understand and use one of the ways of accessing the menu	3	2	5

Three out of four participants faced some difficulty in accessing the menu of the browser by tapping on the icon of dolphin. Two participants (participants 2 and 3) figured out that they need to keep the icon tapped to keep all the three menu options accessible and activated, while participant 4 did not use that mode to access the menu at all. This behavior of a system item was not intuitive. Participant 1 reported that since he used Dolphin, he knew how to use this function.

The participants expected that this icon would act as a button, which would display the icons when it is tapped once and did not understand immediately that one needs to keep it tapped to have the menu items accessible and visible. They figured this out only after single tapping the icon a couple of times and seeing the options appear and disappear. This behavior baffled them a bit. Participant 3 was an iPhone user and she actually kept the icon tapped with one hand and used other hand to tap the individual menu items. Such behavior of a system item (see figure 7) seems to be a characteristic of android systems rather than an iOS system.

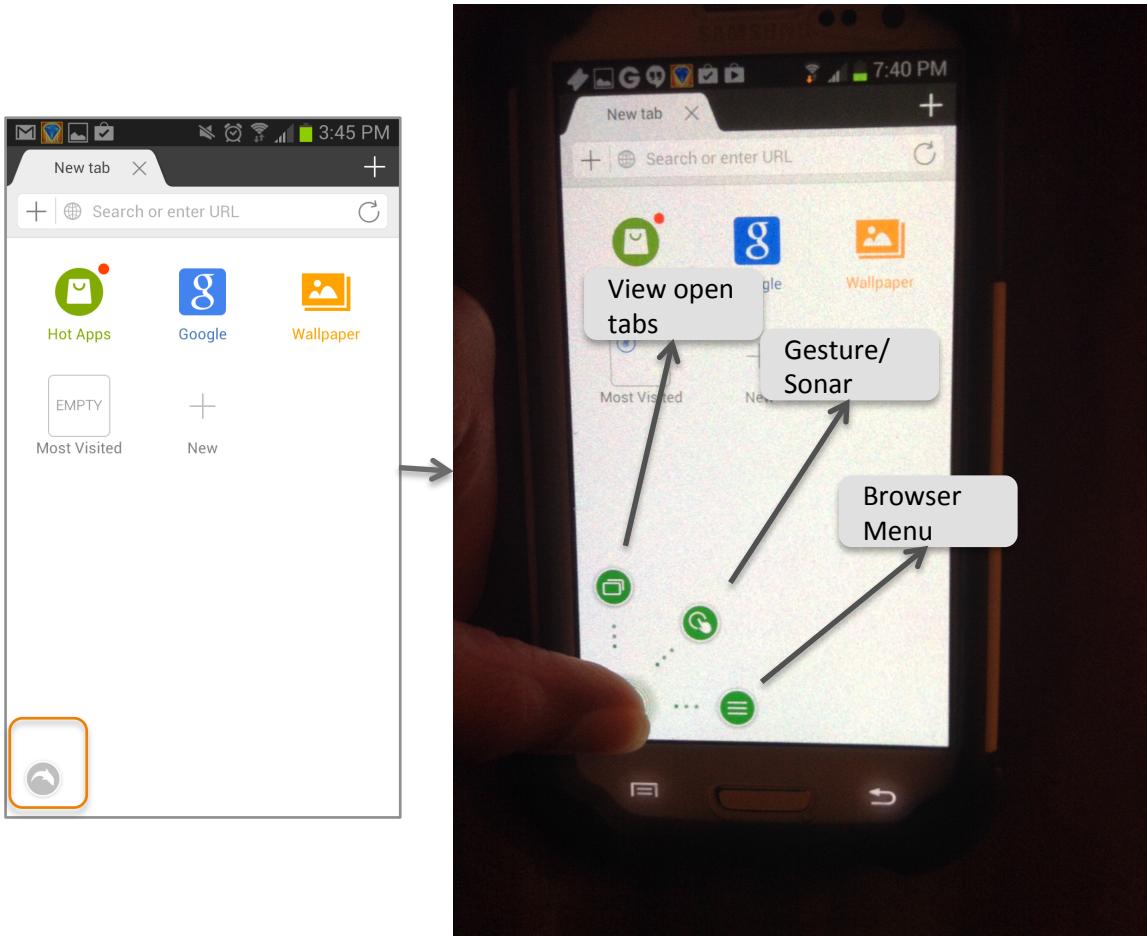


Figure 7: Behavior of the dolphin icon

It is crucial that this function is made usable as some of the menu items like the gesture/sonar can be accessed in a single tap using this function. Additionally, a user can also see a snapshot of all the tabs open currently, using this function. There are no other alternative ways of accessing these functions.

Additionally, this icon is grayed out and thus that makes it appear as if it is not clickable. However, all the participants clicked it out of curiosity to see if it does anything.

It is recommended that to enhance the affordance of the icon at the bottom of the screen, it can be of some color (*e.g. green – brand color of Dolphin*) rather than gray to indicate that it is an active element of the interface when on the home screen. Then it can be transparent on other webpages as it is currently (see figure 8). Moreover, the behavior of the element needs to be changed so that users can activate the icons with a single tap rather than keeping the icon tapped and dragging their fingers to the individual menu items.



Figure 8: Display of dolphin icon on other websites

4. Difficulty in locating the clear cache function

Issue	Severity	Frequency	Total of ratings
Problems in locating the clear history function	2	3	5

Participants 1,2 and 4 faced marginal problems in locating the ‘clear cache and history’ function. The participants correctly expected to find this function under settings (see figure 9 for the workflow). All the three participants first clicked on the ‘Web Content’ label and expected to find the clearing history and cookies function there. Participant 3 tapped on ‘Labs’ label after that. While participants 1 and 2 tapped on ‘Privacy and Personal data’ as a second alternative to find the clear history, cookies and cache. Participant 3 tapped on the label of ‘Privacy and Personal data’ as a third alternative. Participants 1 and 2 reported that they were going serially through the list of settings and the label suggested that ‘web content’ was likely to have the browsing history. Since they did not find it under that category their second alternative was ‘privacy and personal data’. Participants 1 and 2 expected to find privacy settings like password under this category.

Once they were in the ‘privacy and personal data’ category, all the three participants took some time to locate the ‘clear data’ label. Participants 1 and 2 could quickly delete the browsing history after tapping the ‘clear data’ label and arriving at the screen where certain

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alternatives were selected by default, they selected some more alternatives and then tapped on the ‘clear selected data’ button at the bottom of the screen. However, participant 3 was confused by the alternatives being pre-selected. She also reported that since these alternatives were pre-selected she expected that these functions were activated and she need not take any further action (i.e. tap the ‘clear selected data’) to actually delete the browsing history.

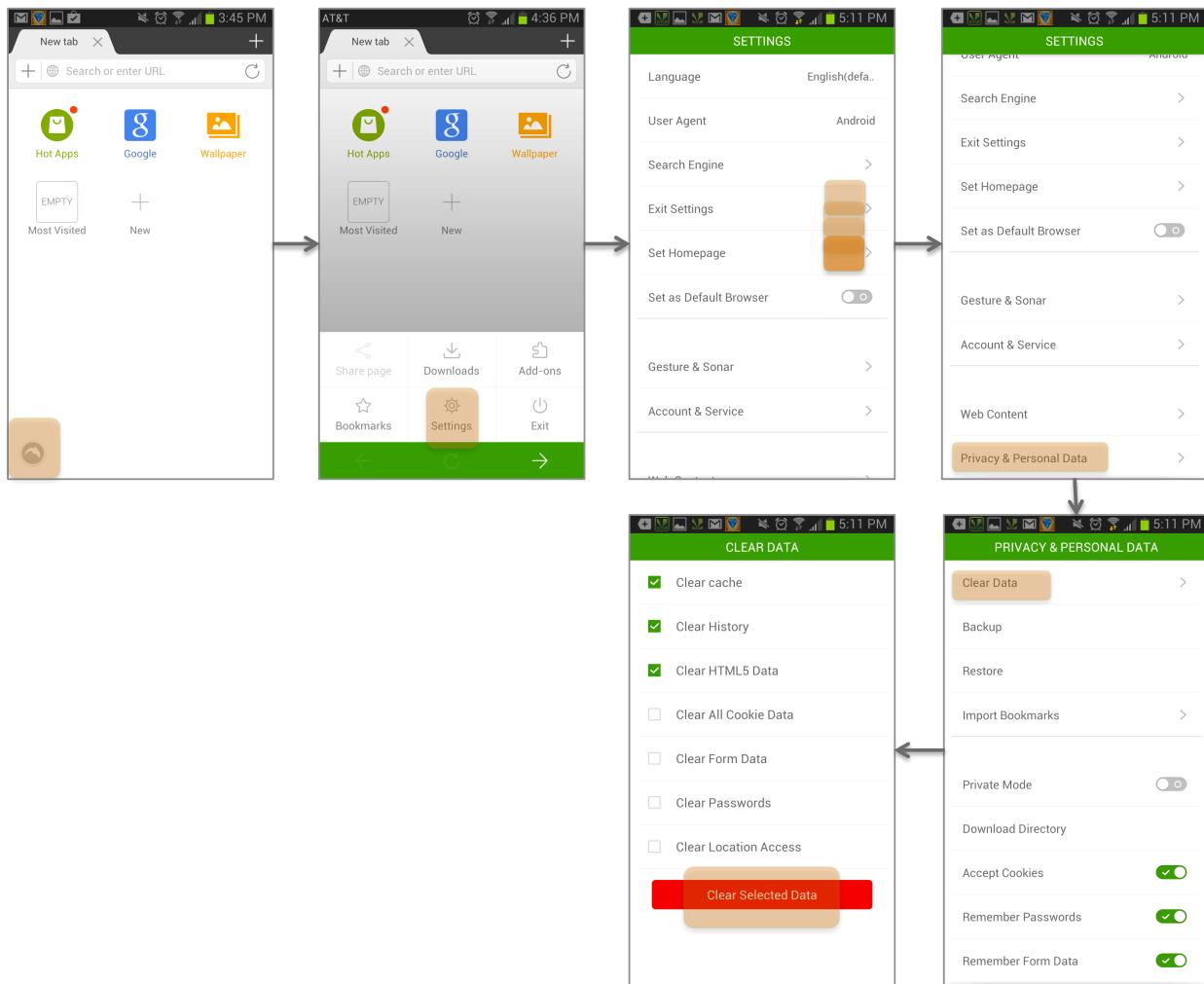


Figure 9: Current way of clearing cache and browsing history.

Participant 4 used an alternative path to delete the browsing history, wherein he cleared the cache and browsing history by exiting from the browser as shown in figure 10.

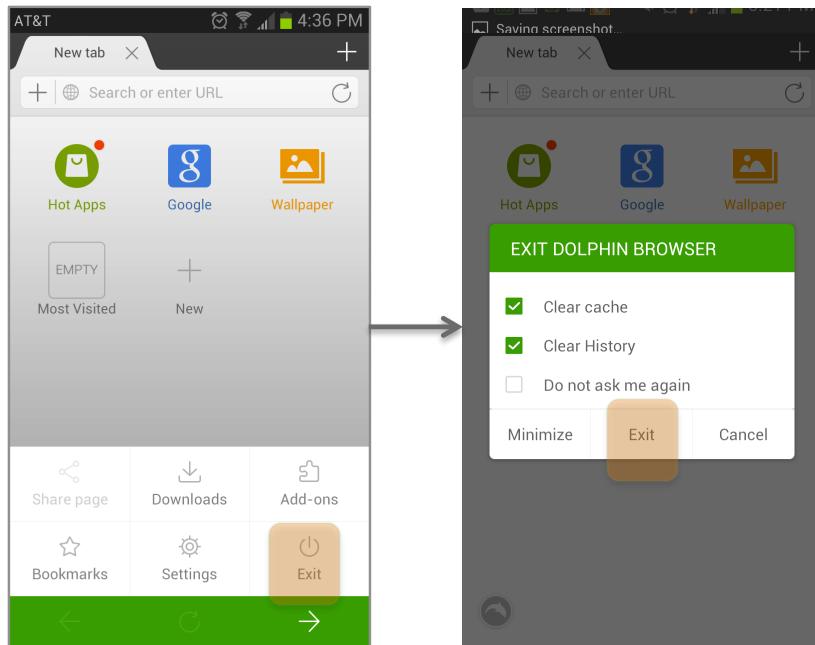


Figure 7: Alternative way of clearing cache and browsing history.

It is recommended that a card sort exercise be done to arrive at a better information architecture for the settings menu items. Additionally, the users need to scroll through the settings menu to locate the appropriate menu items (privacy and personal data here). Attempt should be made to make the menu shallower.

5. Difficulty in accessing the sonar functionality

Issue	Severity	Frequency	Total of ratings
Accessing the sonar functionality was difficult	3	2	5

Participants 2 and 3 faced some difficulty in accessing the sonar functionality after they had accessed the gesture functionality. They could see the grayed out microphone, and thought that it was a toggle function. Participant 2 figured out that she might have to drag the circle towards the microphone icon. Participant 3 could access the screen where she could have deactivated the gesture and activated voice as shown in figure 11. However, she could not understand that she would need to drag the circle to activate the voice. Participant 1 accomplished the task successfully within the time limit but reported that the way the function was presented it seemed like one could toggle between gesture and voice and need not drag the circle, as is the case. Additionally participant 2 reported that it was not intuitive at all and very wrong to assume that users would understand that they could access sonar if they go on 'draw a gesture' page. To access the sonar one has to click on the

dolphin icon and then the gesture icon to arrive at 'draw a gesture' screen (refer to figure 7). Gesture was the default menu item here and hid the sonar functionality.

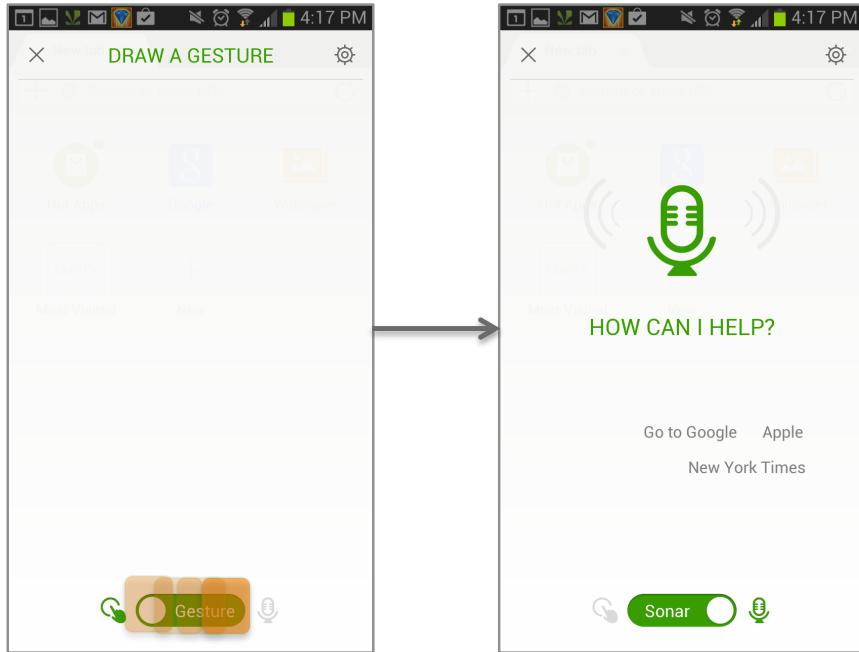


Figure 11: Current way of accessing sonar functionality [Orange boxes indicates dragging action here to activate sonar]

Participant 4 accomplished the task of using the voice input using an alternative path by clicking on the address bar, which gave an option to use voice input, and took him to the sonar functionality of the browser as shown in figure 12. But he spent 3 minutes to access this functionality, which is 1 minute above the estimated time limit.

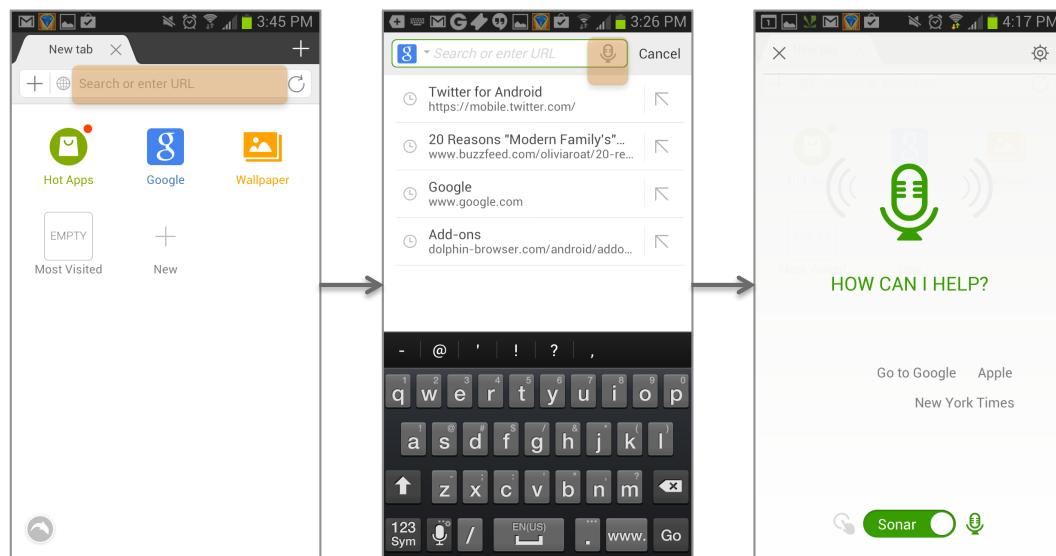


Figure 12: Alternative way of accessing sonar functionality

It is suggested that a toggle function is used to activate the sonar function rather than the drag function, as it is not intuitive at all. Moreover, it is also suggested that there should be a shortcut to voice input on the home screen to make it easy-to-access. It is important that this function is made visible and easily accessible since it is one of USPs of Dolphin and participants rated it as a useful function (*Mean rating = 3.25: above 'Useful'*) and that they are likely to use it (*Mean rating= 3: 'Likely'*) [Refer to Table 6]. Participants reported that they could see themselves using it while driving when typing is not advisable.

6. Some terms are ambiguous and difficult to understand

Issue	Severity	Frequency	Total of ratings
Some terms used in the program are ambiguous not understandable	2	2	4

The participants generally did not understand some of the terms used in the browser. Participant 1 reported that the term 'speed dial' used to indicate the applications or shortcuts on the home screen did not make sense to him and he expected to see the shortcuts arranged in a dial if that's the term used to refer to them. He also reported that he had not heard of the term 'speed dial' and it did not seem to be publicized enough. Participants 1,2 and 3 reported that the use of the term 'sonar' was far-fetched as well and they understood that it meant voice input on account of the icon of microphone associated with that term. Participant 2 reported that she had problems with understanding the term 'gesture' used for assigning a symbol shortcut to a webpage. She supposed that one needed to make a gesture by moving the cellphone to open a webpage. She reported that it was only after she saw the instruction 'draw a gesture', she understood that one was supposed to draw the gesture. Other participants did not report any issues with the use of this particular term.

The issue of use of speed dial does not specifically matter in terms of usability of the browser, however it might matter in marketing and promoting this feature. The current study suggests that all the participants found the function of speed dial especially useful (*mean rating for adding an app = 3.25: above 'Useful'*) and very likely to be used (*mean rating for adding an app = 3.75: almost 'Very Likely'*). It is recommended that some new terms may be created and tested for stickiness to aid branding.

Regarding the terms sonar and gesture, these terms matter in terms of usability as well as branding. Three out of four participants reported that they understood that sonar meant voice input due to the microphone icon. This is especially crucial since most participants reported that it is a useful function (*Mean rating = 3.25: above 'Useful'*) and they are likely

to use it (*Mean rating= 3: ‘Likely’*) [Refer to Table 6]. One participant totally misunderstood the term gesture and how it may be used.

It is recommended that sonar be replaced with simpler and more understandable term like ‘voice input’ and to test its understandability. Additionally test some alternative terms for ‘gesture’ to replace it. It is recommended that the terms be tested for stickiness, which would strengthen the brand and promote these features as unique selling points (USPs) of Dolphin.

CONCLUSIONS

Participants mainly appreciated following features of the Dolphin browser:

1. The interface is clean and not at all cluttered.
2. The interface seems very easy to use.
3. The feature of speed dial seems very useful and handy.
4. The function of voice input seems very useful

The participants in the current study were fairly successful in accomplishing most of the tasks with the Dolphin browser. The responses to post-test rating scale indicated that the participants found the browser easy-to use and learn and felt confident in using it as well as would recommend it to others (refer to Table 7). However, there are some areas wherein the design of the browser can be improved to enhance the user experience. Below is a list of changes in design that would improve the user experience:

1. Add the ‘creation of a new bookmark folder’ to the menu which users use to bookmark a website as shown in Figure 5.
2. Promote the feature of creation of gesture on the home screen.
3. Let the users use the gesture on the home screen to access a website rather than going to a separate screen to do so.
4. Change the appearance of the dolphin logo on the home screen with use of some color, to make it appear clickable.
5. Change the functionality of the logo so that a single tap makes the menu items accessible and visible rather than a requirement of keeping the logo tapped.
6. Undertake a card-sort analysis to create new information architecture for settings menu items.
7. Make the settings menu shallow to avoid scroll.
8. Reduce the number of steps to clear the browsing history.
9. Promote the sonar functionality as a shortcut on the home screen.
10. Replace the drag function with toggle function to access sonar functionality on the ‘draw a gesture’ screen.
11. Test the term of ‘speed dial’ for stickiness and promote it or replace it with a better term.
12. Test the understandability of terms ‘sonar’ and ‘gesture’. Replace them with stickier terms if necessary and promote them.

The browser can be improved in terms of usability if aforementioned design changes are made and tested to see the change in the user experience.

APPENDIX A

Task Scenarios

Task Scenario 1:

Please look at the browser window and tell me what you think about the interface. Tell me what you notice and what you expect in terms of interactions with the browser. I do not want you to actually interact with the browser just tell me your impressions, opinions and expectations.

Task Scenario 2:

You use Google website a lot and want to make it easy to access. Bookmark the Google website under a Bookmark folder named 'Search'.

Task Scenario 3:

You are News buff and want to access the CNN news quickly. Add an application/shortcut of CNN News to the speed dial that you can see on the home screen.

Task Scenario 4:

You do not want the Facebook application/shortcut on the speed dial. Remove this application/shortcut from the speed dial.

Task Scenario 5:

You like your browser to perform faster and feel that it is made sluggish by all the browsing history and cookies. Clear the cache of the current browsing session.

Task Scenario 6:

You spend a lot of time reading your Twitter feeds and want a quick way to access the mobile website of Twitter. Create a gesture 't' as a shortcut to access Twitter mobile website.

Task Scenario 7:

You are travelling in a crowded subway and are unable to type in Facebook web address in the browser. Use voice input to open Facebook webpage.

APPENDIX B

Pre-test Questionnaire

Participant # : _____ (To be pre-filled by the moderator)

Gender: M/F

Usability Test Report: Dolphin Web Browser

Check the Age group where you fit:

- 18-25 years
- 26-35 years
- 36-45 years
- 46-50 years

Check the alternative that best describes your race/ethnic background?

- American Indian or Alaskan Native
- Asian
- African American
- Hispanic
- Caucasian
- Other _____

Check the highest education level you have achieved:

- Completed high school
- Some College
- Bachelor's degree
- Master's degree

Specify the field in which you have earned the degree: _____

Do you own a Smartphone?

- Yes
- No

How long have you owned the Smartphone?

- Less than 6 months
- Between 6 months and 1 year
- More than 1 year

Type of Smartphone that you own:

- Android
- iPhone
- Windows Phone
- Other. Please Specify _____

Do you browse web using your Smartphone?

- Yes
- No

How long do you browse web using your Smartphone?

- Less than 1 hour

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- Between 1-2 hours
- Between 2-4 hours
- More than 4 hours

What web browser do you use on your Smartphone?

- Google Chrome
- Mozilla Firefox
- Opera
- Dolphin
- Other _____

Reasons for browsing web using Smartphone

Sites you visit most often using your Smartphone:

1. _____
2. _____
3. _____
4. _____
5. _____

Features you like about web browser you use in your Smartphone:

Features you dislike about web browser you use in your Smartphone:

How long do you browse web using laptop/desktop?

- About 1 hour
- Between 2-4 hours
- More than 4 hours

What web browser do you use on laptop/desktop?

- Google Chrome
- Mozilla Firefox
- Opera
- Internet Explorer
- Other _____

Reasons for browsing web using laptop/desktop

Sites you visit most often using your laptop/desktop:

1. _____
2. _____
3. _____
4. _____
5. _____

Features you like about web browser you use in laptop/desktop:

Features you dislike about web browser you use in laptop/desktop:

APPENDIX C

Post-task Questions

How easy or difficult was it to accomplish this task?

1 Very Difficult	2 Difficult	3 Easy	4 Very Easy
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How easy or difficult was it locate the function necessary to accomplish this task?

1 Very Difficult	2 Difficult	3 Easy	4 Very Easy
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How useful is the function of the browser?

1 Not at all useful	2 Not useful	3 Useful	4 Very Useful
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How likely are you to use this function while browsing the web?

1 Very Unlikely	2 Unlikely	3 Likely	4 Very Likely
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APPENDIX D

Post-test Questionnaire

Participant # : _____ (To be pre-filled by the moderator)

Please refer to the rating scale below and indicate your agreement with following statements.

1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree
---------------------------	---------------	------------	------------------------

Statement	Rating
1. I would like to use the browser often.	_____
2. I found it difficult to locate the functions of the browser.	_____
3. Overall, I found the browser easy-to-use.	_____
4. I would need technical assistance to use this browser.	_____
5. I feel confident about using this browser.	_____
6. I would recommend this browser to others.	_____
7. This browser was easy-to-learn.	_____
8. This browser supports my web-browsing needs.	_____
9. I found using this browser easier than the current browsers that I use.	_____
10. I would start using this browser instead of the ones that I use currently.	_____

APPENDIX E

Post-test Interview

1. Tell me, what you liked about the Dolphin browser?
2. How can the browser be improved?

3. How did browsing with Dolphin compare with the browser that you use on your Smartphone and laptop?
4. How did your experience in web browsing using the browsers that you use on your laptop and Smartphone support or hamper doing the tasks you did today?
5. Please tell me your thoughts about gesture browsing and sonar functionality specifically. How useful did you find it and how likely are you to use it?
6. At any point in the session, did you find some term difficult to understand?
7. Anything you would like to comment upon which was not covered by me in today's session.

APPENDIX F

Post-task ratings on four scales for each task (Total ratings for the task mentioned in bracket for each rating category).

Bookmarking a webpage in a Bookmark folder								
<i>Rating categories</i>								
<i>Rating scale</i>	<i>Very Negative</i>	<i>Negative</i>	<i>Positive</i>	<i>Very Positive</i>				
	1	2	3	4	<i>Total of ratings</i>	<i>Mean rating</i>		
<i>Difficulty level of the task</i>	1 (1)	2(4)	0	1(4)	9	2.25		
<i>Difficulty level of locating the function</i>	1 (1)	2(4)		1(4)	9	2.25		
<i>Usefulness of the function</i>	2(2)		2(8)		10	2.5		
<i>Likelihood of using the function</i>	2(2)		2(8)		10	2.5		
Adding an application to the speed dial								
<i>Rating categories</i>								
<i>Rating scale</i>	<i>Very Negative</i>	<i>Negative</i>	<i>Positive</i>	<i>Very Positive</i>				
	1	2	3	4	<i>Total of ratings</i>	<i>Mean rating</i>		
<i>Difficulty level of the</i>	1(2)	2(6)	1(4)		12	3		

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<i>task</i>											
<i>Difficulty level of locating the function</i>	3(9) 1(4) 13 3.25										
<i>Usefulness of the function</i>	2(6) 2(8) 14 3.5										
<i>Likelihood of using the function</i>	1(3) 3(12) 15 3.75										
Removing an application to the speed dial											
<i>Rating categories</i>											
<i>Rating scale</i>	<i>Very Negative</i>	<i>Negative</i>	<i>Positive</i>	<i>Very Positive</i>							
	1	2	3	4	<i>Total of ratings</i>	<i>Mean rating</i>					
<i>Difficulty level of the task</i>	1(3) 3(12) 15 3.75										
<i>Difficulty level of locating the function</i>	1(3) 3(12) 15 3.75										
<i>Usefulness of the function</i>	1(2) 2(6) 1(4) 12 3										
<i>Likelihood of using the function</i>	1(2) 1 2(8) 10 2.5										
Clear cache and browsing history											
<i>Rating categories</i>											
<i>Rating scale</i>	<i>Very Negative</i>	<i>Negative</i>	<i>Positive</i>	<i>Very Positive</i>							
	1	2	3	4	<i>Total of ratings</i>	<i>Mean rating</i>					
<i>Difficulty level of the task</i>	1(2) 2(6) 1(4) 12 3										
<i>Difficulty level of locating the function</i>	2(4) 2(6) 10 2.5										
<i>Usefulness of the function</i>	2(6) 2(8) 14 3.5										

Usability Test Report: Dolphin Web Browser

<i>Likelihood of using the function</i>						14	3.5					
Create a gesture for a website												
<i>Rating categories</i>												
<i>Rating scale</i>	<i>Very Negative</i>	<i>Negative</i>	<i>Positive</i>	<i>Very Positive</i>								
	1	2	3	4	<i>Total of ratings</i>	<i>Mean rating</i>						
<i>Difficulty level of the task</i>	0	1(2)	3(9)	0	11	2.75						
<i>Difficulty level of locating the function</i>	0	1(2)	3(9)	0	11	2.75						
<i>Usefulness of the function</i>	2(2)	1(2)	1(3)	0	7	1.75						
<i>Likelihood of using the function</i>	1 (1)	2(4)	1(3)	0	8	2						
Use a voice input to open a webpage												
<i>Rating categories</i>												
<i>Rating scale</i>	<i>Very Negative</i>	<i>Negative</i>	<i>Positive</i>	<i>Very Positive</i>								
	1	2	3	4	<i>Total of ratings</i>	<i>Mean rating</i>						
<i>Difficulty level of the task</i>	1 (1)	2(4)	1(3)		8	2						
<i>Difficulty level of locating the function</i>	1 (1)	2(4)	1(3)		8	2						
<i>Usefulness of the function</i>			3(9)	1(4)	13	3.25						
<i>Likelihood of using the function</i>		1(2)	2(6)	1(4)	12	3						