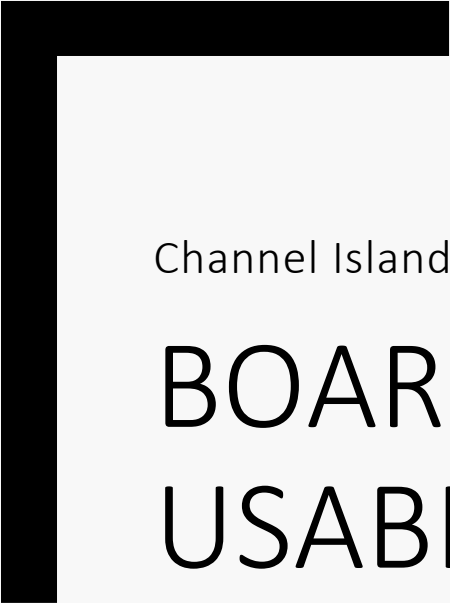




Channel Island Surfboards'

BOARD SELECTOR USABILITY REPORT

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EXECUTIVE SUMMARY

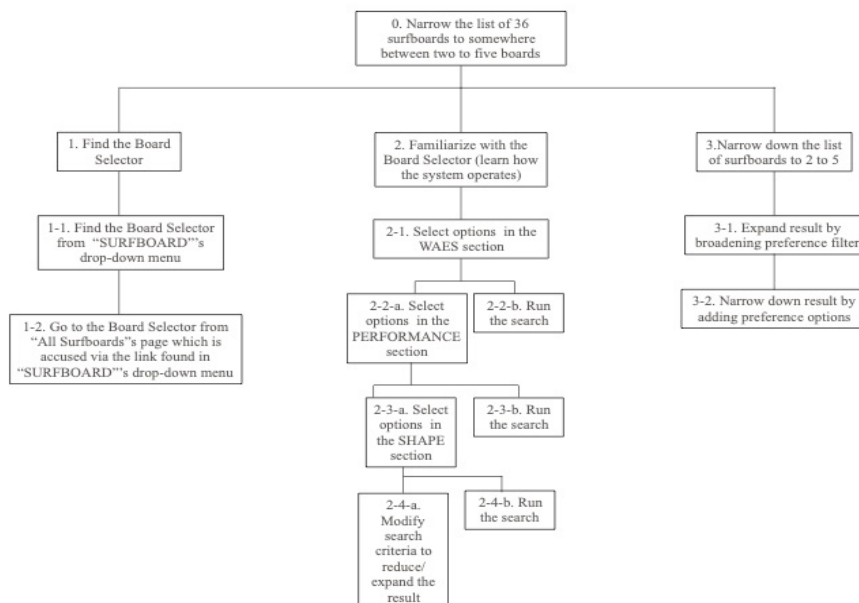
Objective & Overview	Channel Island Surfboards' Board Selector was evaluated on its mental workload imposed on users, over-all user satisfaction, and users' performance analysis. The participants' feedbacks were gathered upon completion of each study session.	
Task Analysis	A Hierarchical Task Analysis was developed to map out the tasks involved. Three major tasks were identified: 1. Find the <i>Board Selector</i> 2. Familiarization with the <i>Board Selector</i> 3. Manipulate the search result	
Process Report	The observer recorded and timestamped the participants' noteworthy behaviors.	
NASA TLX	Each participant was asked to rate the mental workload of the task performed using NASA TLX upon completion	
WAMMI	Each Participant was asked fill-out the Website Analysis and Measurement Inventory (WAMMI) to rate CIS's website	
Timeline Performance Analysis	Participants' performance was analyzed in terms of time required to complete the overall task as well as the two sub-tasks	
Conclusion & Discussion	Almost all participated users assumed they were ought to be as specific as possible in order to effectively filter out unfit surfboards. Therefore, it required the users some extent of time and effort to figure out "No Match" was due to too many	

TASK ANALYSIS

In order to effectively filter out the unfit surfboards via Board Selector, there were three fundamental tasks that a user must perform.

1. Find the *Board Selector*: The *Board Selector* is not accessible from the CIS website's home page. The user must either
 - a. activate by clicking 'BOARD SELECTOR' found on 'SURFBOARDS' drop-down menu, or
 - b. activate from by clicking 'BOARD SELECTOR' found on 'ALL SURFBOARDS' page which can also be accessed via 'SURFBOARDS' drop-down menu.
2. Familiarization with the *Board Selector*: participants intuitively assumed all specification must be selected to generate the search. Almost all of the participants resorted to the random selection of the preference choices when they did not understand what was being asked. Their searches with number of preference criteria specified repeatedly resulted in "No Match". The *Board Selector* did not require all criteria to be specified in order to effectively filter out the unsuited surfboards. However, likely due to the lack of description, the users only learned such nature of the system after several trial & errors. Despite the alteration, but not deactivation, of selected preferences in attempts to obtain positive results, the users' search repeatedly came back to "No Match". Consequently, the users became frustrated with the system.
3. Manipulate the search result: once the users understood not all options were ought to be specified, they reduced the number of activated preference options in order to broaden their search results or vice versa to narrow down.

Task HTA



PROCESS REPORT

All participants but one had no prior experience with the *Board Selector* or surfing. Participant 3 had some knowledge of the system and regularly surfed.

PARTICIPANT 1 (NO EXPERIENCE IN SURFING AND BOARD SELECTOR)

Task briefing	Upon arrival, participant was given the following instruction: - Assume you are looking to purchase a surfboard for yourself - Narrow down the list comprised of 36 surfboards to a number between two and five using the <i>Board Selector</i> on Channel Island Surfboard's (CIS) website - Observer is not allowed to answer any question related to surfing or content of the website	
Task commencement	The Internet browser was connected to the CIS's website prior to the participant's arrival. The participant began searching exploring the website as soon as the initial task briefing was concluded.	
Initiate the <i>Board Selector</i>	The participant clicked on the <i>SURFBOARDS</i> icon then first selected <i>ALL SURFBOARDS</i> from the drop-down menu. Then, selected <i>Board Selector</i> found at the top right corner. * <i>Board Selector</i> link was also available immediately below the <i>ALL SURFBOARDS</i> link, however, participant did not recognize at first.	00:20
Utilize the <i>Board Selector</i>	The participant began randomly selecting the options under each category; Waves, Performance, Shape, & Board Model.	
<i>APPLY FILTERS</i>	After entering information to all the criteria, clicked <i>Apply Filters</i> . The initial search resulted in negative match.	
Preference modification by addition	Unable to see search results, the participant began modifying his preferences by adding more preference options in an attempt to produce a positive search result. The search remained resulting in no matches found. The participant's search resulted in "No Match" several time after he modified search criteria by adding and/or switching between options.	1 st 01:47 N th 07:55
Preference modification by reduction	After several "No match"s, the participant began broadening the search by deactivating the selected preference options. At first, the participants deactivated significant number of preferences which resulted in too many boards to choose from (i.e., more than five). After a few trial and errors, the participant successfully narrowed down the result to five surfboards to choose from. The study was concluded at this time.	08:15 to 10:22

PARTICIPANT 2 (NO EXPERIENCE IN SURFING AND BOARD SELECTOR)

Task briefing	Upon arrival, participant was given the following instruction: • Assume you are looking to purchase a surfboard for yourself • Narrow down the list comprised of 36 surfboards to a number between two and five using the <i>Board Selector</i> on Channel Island Surfboard's (CIS) website • Observer is not allowed to answer any question related to surfing or content of the website	
Task commencement	The Internet browser was connected to the CIS's website prior to the participant's arrival. The participant began searching exploring the website as soon as the initial task briefing was concluded.	
Initiate the <i>Board Selector</i>	The participant first clicked on the <i>SURFBOARDS</i> icon where the Board Selector link can be found but failed recognize and moved on to clicked <i>BUILD A CUSTOM</i>. The participant proceeded with the <i>BUILD A CUSTOM</i> function in an attempt to find the <i>Board Selector</i>. Observer advised that the user must use <i>Board Selector</i>. The participant recommenced his search and went back to the <i>SURFBOARDS</i>'s drop-down menu. After a brief scan, the participant found the <i>Board Selector</i> link. *although the cursor was on the <i>Board Selector</i> link when the participant first scanned through <i>SURFBOARDS</i>'s drop-down menu, it was not recognized.	01:56
Utilize the <i>Board Selector</i>	The participant selected one option in all three items under <i>Waves</i> but ignored <i>Performance</i> , <i>Shape</i> , and <i>Models</i> .	
<i>APPLY FILTERS</i>	After entering information to all the criteria, clicked <i>Apply Filters</i> . The initial search resulted in too many; greater than five.	1 st 02:23
Preference modification by addition	The participant went back to the <i>Board Selector</i> to provide preference under <i>Performance</i> and selected one item in each sub-component. The second search resulted in "No Match".	2 nd 04:05
Preference modification by reduction	The participant modified the preference options and ran the search for the third time which came back to only one surfboard; unsatisfactory. The participant, again, modified his options and ran a search for the fourth time which successfully narrowed down the 36 boards to two. The study was concluded at this time.	3 rd 05:38 4 th 08:26

PARTICIPANT 3 (SOME EXPERIENCE WITH THE BOARD SELECTOR & REGULARLY SURFS)

Task briefing	Upon arrival, participant was given the following instruction: - Assume you are looking to purchase a surfboard for yourself - Narrow down the list comprised of 36 surfboards to a number between two and five using the <i>Board Selector</i> on Channel Island Surfboard's (CIS) website - Observer is not allowed to answer any question related to surfing or content of the website	
Task commencement	The Internet browser was connected to the CIS's website prior to the participant's arrival. The participant began searching exploring the website as soon as the initial task briefing was concluded.	
Initiate the <i>Board Selector</i>	The participant first clicked on the <i>SURFBOARDS</i> icon where the <i>Board Selector</i> link can be found. After a brief scan through the <i>SURFBOARDS</i> 's drop-down menu, the participant located and clicked the <i>Board Selector</i> link.	00:05
Utilize the <i>Board Selector</i>	The participant made choices in all three items under <i>Waves</i> and selected one item for <i>Approach</i> and <i>Foot Orientation</i> but left <i>Skill Level</i> undecided in the <i>Performance</i> segment. In the following segment, <i>Shape</i> , the participant specified only one characteristic (i.e., <i>Entry Rocker</i>) out of the seven listed.	
<i>APPLY FILTERS</i>	After desired preferences were entered, the participant clicked <i>Apply Filters</i> to run the search. The initial search resulted in only one board.	01:12
Preference modification by reduction	The participant went back to the <i>Board Selector</i> and unselected <i>Entry Rocker</i> preference. The second search came back with the same exact result. The participant went back to the <i>Board Selector</i> and unselected <i>Foot Orientation</i> . The third search resulted in four surfboards to choose from. The study was concluded at this time.	2 nd 01:30 3 rd 01:46

PARTICIPANT 4 (NO EXPERIENCE IN SURFING AND BOARD SELECTOR)

Task briefing	Upon arrival, participant was given the following instruction: - Assume you are looking to purchase a surfboard for yourself - Narrow down the list comprised of 36 surfboards to a number between two and five using the <i>Board Selector</i> on Channel Island Surfboard's (CIS) website - Observer is not allowed to answer any question related to surfing or content of the website	
Task commencement	The Internet browser was connected to the CIS's website prior to the participant's arrival. The participant began searching exploring the website as soon as the initial task briefing was concluded.	
Initiate the <i>Board Selector</i>	The participant first clicked on the <i>SURFBOARDS</i> icon where the Board Selector link can be found. After a brief scan, the participant found the <i>Board Selector</i> link relatively quick.	00:18
Utilize the <i>Board Selector</i>	The participant selected one option in all three items under <i>Waves</i> but ignored <i>Performance</i> , <i>Shape</i> , and <i>Models</i> .	
<i>APPLY FILTERS</i>	After entering information to all the criteria, clicked <i>Apply Filters</i> . The initial search resulted in too many; greater than five.	1 st 01:08
Preference modification by addition	The participant went back to the <i>Board Selector</i> to provide preference under <i>Performance</i> and <i>Shape</i> and selected one option in each sub-component. The second search resulted in "No Match". The participant modified the preference options and ran the search for the third time which again came back to "No Match". The participant went back to the <i>Board Selector</i> and selected one option under <i>Models</i> . The fourth search resulted in "No Match" again.	2 nd 02:35 3 rd 03:10 4 th 04:05
Preference modification by reduction	The participant modified the search by reducing the selected preference options. The 5 th and 6 th search resulted in "No Match". The next, 7 th , search successfully narrow the list down to two boards. The study was concluded at this time.	5 th 04:30 6 th 05:21 7 th 07:33

PARTICIPANT 5 (NO EXPERIENCE IN SURFING AND BOARD SELECTOR)

Task briefing	Upon arrival, participant was given the following instruction: • Assume you are looking to purchase a surfboard for yourself • Narrow down the list comprised of 36 surfboards to a number between two and five using the <i>Board Selector</i> on Channel Island Surfboard's (CIS) website • Observer is not allowed to answer any question related to surfing or content of the website	
Task commencement	The Internet browser was connected to the CIS's website prior to the participant's arrival. The participant began searching exploring the website as soon as the initial task briefing was concluded.	
Initiate the <i>Board Selector</i>	The participant first clicked on the <i>SURFBOARDS</i> tab where the <i>Board Selector</i> link can be found. After a brief scan, the participant did not recognize the <i>Board Selector</i> link and left the drop-down menu then clicked on <i>SHOP</i> tab. The participant briefly scanned the drop-down menu. The participant went back to the <i>SURFBOARDS</i> tab and scanned the drop-down menu again for <i>Board Selector</i> .	02:40
Utilize the <i>Board Selector</i>	The participant selected one option in all three items under <i>Waves</i> and <i>Performance</i> but ignored the <i>Shape</i> and <i>Model</i> .	
<i>APPLY FILTERS</i>	After entering information to all the criteria, clicked <i>Apply Filters</i> . The initial search resulted in too many; greater than five.	1 st 03:38
Preference modification by addition	The participant went back to the <i>Board Selector</i> to specify preferences under <i>Shape</i> and selected one option in each sub-component. The second search resulted in only one board. The participant went back to the and added two more preferences under <i>Shape</i> . The third search resulted in "No Match".	2 nd 04:20 3 rd 05:07
Preference modification by reduction	The participant went back to the <i>Board Selector</i> , cleared all selected preferences, filled out all three items under <i>Waves</i> , selected "Novice" under <i>Performance</i> , and ran a search again. The fourth search came back to ten surfboards which was still too many. Then, the participant went back to the Board Selector and selected "Hybrid" for nose shape of the board under <i>Shape</i> . The last search successfully narrowed the list of boards down to five.	4 th 06:02 5 th 06:15

MENTAL WORKLOAD ANALYSIS: NASA TLX

NASA Task Load Index (TLX) was administered to measure the users' perceived workload of the *Board Selector*. TLX was chosen for its simplicity in administration as well as high validity. Although the *Board Selector* was not sensitive to time or involved more than minimal physical activity, it involved considerable cognitive activity and was rather high in frustration, according to the participated users. Therefore, TLX was an adequate method to measure the workload of the *Board Selector*.

TLX RESULTS

Mean: 58.33 Standard Deviation: 17.92.

<i>Participant 1</i>	Rating	Weight	Adjusted
<i>Mental Demand</i>	60	5	300
<i>Physical Demand</i>	5	1	5
<i>Temporal Demand</i>	0	3	0
<i>Performance</i>	15	2	30
<i>Effort</i>	70	3	210
<i>Frustration</i>	55	1	55
<i>Weighted Rating</i>			40.00

<i>Participant 2</i>	Rating	Weight	Adjusted
<i>Mental Demand</i>	75	4	300
<i>Physical Demand</i>	0	0	0
<i>Temporal Demand</i>	0	1	0
<i>Performance</i>	40	5	200
<i>Effort</i>	50	2	100
<i>Frustration</i>	40	3	120
<i>Weighted Rating</i>			48.00

<i>Participant 3</i>	Rating	Weight	Adjusted
<i>Mental Demand</i>	75	4	300
<i>Physical Demand</i>	0	1	0
<i>Temporal Demand</i>	0	0	0
<i>Performance</i>	70	5	350
<i>Effort</i>	55	3	165
<i>Frustration</i>	30	2	60
<i>Weighted Rating</i>			58.33

<i>Participant 4</i>	Rating	Weight	Adjusted
<i>Mental Demand</i>	85	3	255
<i>Physical Demand</i>	5	0	0
<i>Temporal Demand</i>	60	1	60
<i>Performance</i>	70	3	210
<i>Effort</i>	85	4	340
<i>Frustration</i>	90	4	360
<i>Weighted Rating</i>			81.67

<i>Participant 5</i>	Rating	Weight	Adjusted
<i>Mental Demand</i>	80	4	320
<i>Physical Demand</i>	0	1	0
<i>Temporal Demand</i>	0	0	0
<i>Performance</i>	70	2	140
<i>Effort</i>	65	3	195
<i>Frustration</i>	60	5	300
<i>Weighted Rating</i>			63.67

<i>Mean</i>	Rating	Weight	Adjusted
<i>Mental Demand</i>	75	4	295
<i>Physical Demand</i>	2	0.6	1
<i>Temporal Demand</i>	12	1	12
<i>Performance</i>	53	3.4	186
<i>Effort</i>	65	3	202
<i>Frustration</i>	55	3	179
<i>Weighted Rating</i>			58.33

<i>Standard Deviation</i>	Rating	Weight	Adjusted
<i>Mental Demand</i>	9.35	.71	23.98
<i>Physical Demand</i>	2.74	.55	2.24
<i>Temporal Demand</i>	26.83	1.22	26.83
<i>Performance</i>	24.90	1.52	116.32
<i>Effort</i>	13.69	.71	87.93
<i>Frustration</i>	22.91	1.58	141.79
<i>Weighted Rating</i>			15.94

WEBSITE ANALYSIS & MEASUREMENT INVENTORY

WAMMI Score

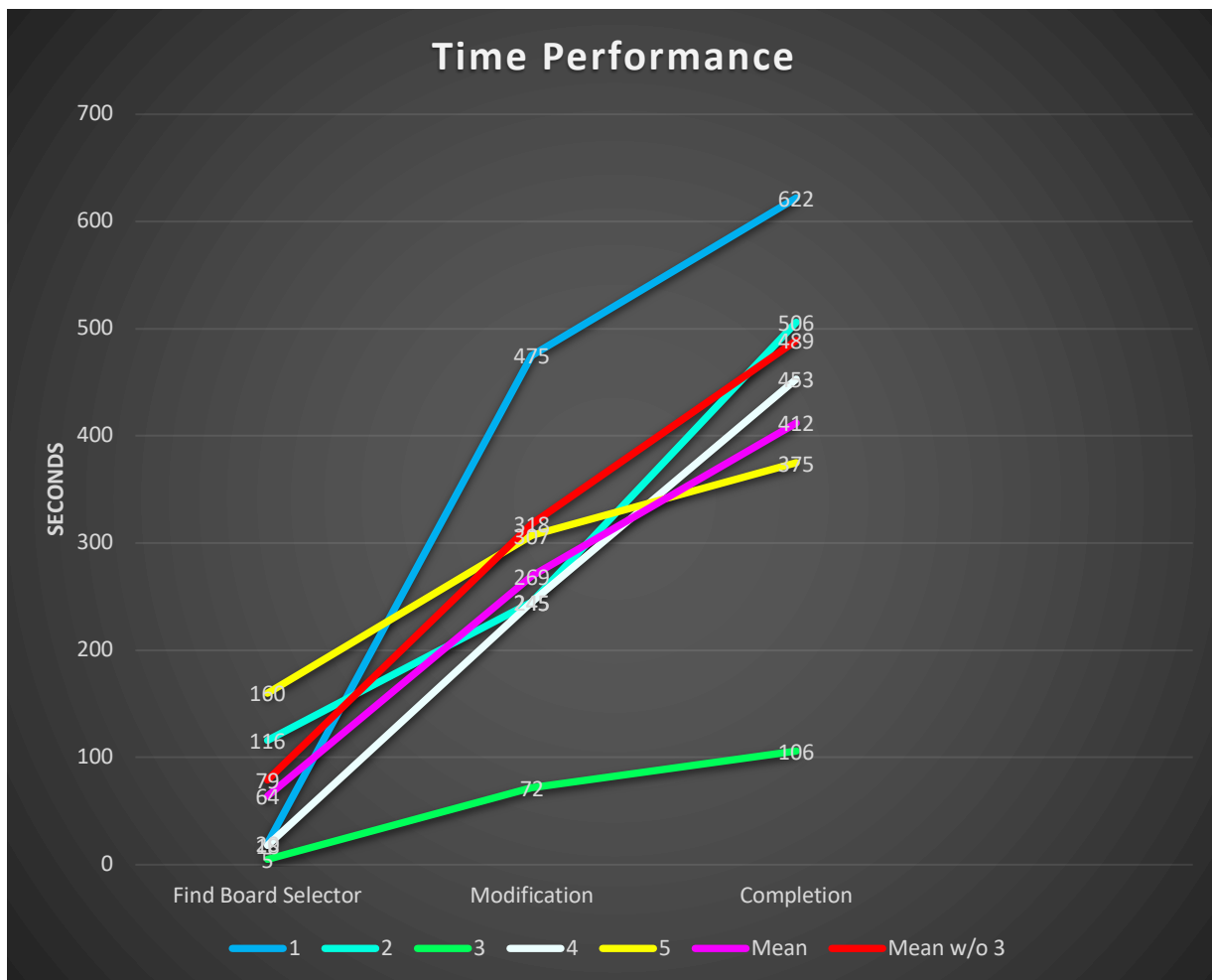
	Participant ID					Mean	Adjusted Mean
	1	2	3	4	5		
<i>Attractiveness</i>	13	17	18	12	14	14.8	74
<i>Controllability</i>	11	11	10	7	13	10.4	52
<i>Efficiency</i>	12	15	15	9	12	12.6	63
<i>Helpfulness</i>	12	6	13	10	10	10.2	51
<i>Learnability</i>	11	7	11	7	10	9.2	46
Total	59	56	67	45	59	57.2	N/A

Website Analysis and Measurement Inventory (WAMMI) is a professional website analysis service to measure relatively new technique to measure user experience. WAMMI is applicable in wide range of domain including e-commerce. WAMMI evaluates a website's usability from five dimensions; *Attractiveness*, *Controllability*, *Efficiency*, *Helpfulness*, and *Learnability*. Thus, WAMMI can provide an analysis by each of the dimension measured, as well as the overall user experience. The *Board Selector* involves complex manipulation of preferences while Channel Island Surfboards (CIS) attempts to enhance the fun and pleasant image associated with surfing. Interface analysis technique such as WAMMI is the best option to evaluate multidimensional and rather complex website. According to WAMMI website, the international average score for each of the dimension is 50. A score greater than 50 suggests that the specific dimension of the website is higher than the overall international average. Based on this principle, the website's *Attractiveness* is 24 points higher than the average, suggesting that the website was perceived to be more appealing to the users. *Efficiency* also scored higher than the average by 13 points. *Controllability* and *Helpfulness* were above average by only by 1 to 2 points. However, *Learnability* fell below average by four points, meaning that users had slightly more difficulty learning how the website operated than the average websites. The overall or Global Usability Score (GUS) mean was 57.2 which was computed by simply dividing the sum of total scores by the number of participants. This score may not be accurate because WAMMI assigns varying weights to the dimensions which increase or decrease the actual reported scores. The actual scoring and analysis are only available for purchase.

TIMELINE PERFORMANCE ANALYSIS

The time consumption was assumed to be strongly associated with usability. That is, the amount of time a user spent performing the task under analysis should increase with the reduction in perceived usability, such as the dimensions measured by WAMMI, of the website. Time was taken at completion of each of the following task; finding the *Board Selector*, familiarization with the *Board Selector*, and task completion. Familiarization was assumed established when the user began reducing or deactivating the options in the system to broaden the search.

Participant ID	Find the Board Selector	Modification by reduction	Completion
1	00:20	07:55	10:22
2	01:56	04:05	08:26
3	00:05	01:12	01:46
4	00:18	04:05	07:33
5	02:40	05:07	06:15
Mean	01:04	04:29	06:52
Mean w/o 3	01:19	05:18	08:09



Mean without participant 3 was calculated because participant 3 had used the Board Selector before and more knowledgeable in surfing.

CONCLUSION & DISCUSSION

To assess the usability of Channel Island Surfboard's *Board Selector*, hierarchical task analysis (HTA), NASA task load index (TLX), Website Analysis and Measurement Inventory (WAMMI), and timeline performance analysis were conducted. The primary task was defined as "narrow the list of 36 surfboards available on Channel Island Surfboards' website down to a number between two and five". The initial HTA revealed three major sub-tasks; (1) finding the *Board Selector* link, (2) system familiarization, and (3) manipulate the system to narrow or expand search result to a list containing two to five surfboards. TLX resulted in weighted overall task load of 53.88. Weighted result suggested that mental demand for the *Board Selector* was the greatest. The participants rated high in *Effort* and *Frustration* as well. The observer sensed participants' frustration during the observation when their search repeatedly resulted in "No Match". Some participants asked the observer if the system, *Board Selector*, could actually work. Physical demand and temporal demand can be neglected due to the lack of the demands for the two dimensions; minimal physical activity and time insensitivity. WAMMI showed that *Attractiveness* of the website was high. The participants rated high in perceived *Efficiency* as well. On the other hand, perceived *Learnability* of the *Board Selector* was particularly low. The system did not specify whether or not all or certain preferences must be given. In fact, the system would initiate a search even without any options chosen. In other words, one preference or characteristic chosen may be enough to filter out a large number of surfboards. However, due to the lack of description, the users could only learn this nature of the system through trial and errors which may be the reason behind low rating in *Learnability* and the development of frustration. Timeline analysis revealed that there were no significant differences between the users in find the *Board Selector*, system familiarization, and task completion time when participant 3 was excluded from the sample. Participant 3 had prior experience in the system and knowledge in surfing. Participants 3 knew that not all preference/characteristic options needed to be selected for the system to work. Hence, participant 3's time consumption in completing the task was remarkably lower than the rest in all three sub-tasks. Interestingly, participant 3's TLX was not the lowest but the 3rd highest (or lowest) in the sample. Participant 1, who had taken the greatest amount of time (10:22) rated the task workload the lowest (40.00). Observation, TLX, WAMMI, and timeline performance analysis all pointed towards problem associated with the lack of description of the *Board Selector*'s search requirements. Unfortunately, this study was very limited in sample size ($n = 5$). With a larger and more adequate sample size, results may differ. To further support or validate the correlation between the *Board Selector*'s lack of description and difficulty experienced in system familiarization, further research evaluating the time consumption to task completion between two groups, with description and without description, is necessary.

