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Client	Jo Jardina of Dell.com
Design Team	Josh Kim, Zhong Hu, Zoe Halbeisen, Kelly Shashlo
Team Affiliate	University of Michigan School of Information SI 487 - User Experience Capstone
Project Title	Dell Laptop Comparison Tool
Instructors	Florian Schaub, Natalie Zauhar
Deliverable	Current Feature Implementation Heuristics Evaluation
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EVALUATION SUMMARY

| Page	Heuristic	Score (Poor:0 ~ Excellent:5)
2	System Status Visibility	3
4	Match between System & Real-World	1
5	User Control & Freedom	3
6	Consistency & Standards	2
8	Error Prevention	3
9	Recognition Rather than Recall	3
10	Flexibility & Efficiency of Use	3
12	Aesthetics & Minimalistic Design	1
14	Error Recognition, Diagnosis, & Recovery	3
14	Help & Documentation	4

1. VISIBILITY OF SYSTEM STATUS

When selecting a laptop to compare, Dell provides feedback to the users so that they know they have added the laptop to be compared. This feedback is in the form of static and active states. Onces users click "Add to Compare" it becomes active. A tab on the bottom right corner also appears with the text "Compare" with the current number of laptops currently in the list. Users know when they have items in their compare list because the tab is visible. The tab would not be visible if there were no laptops in the list to compare.
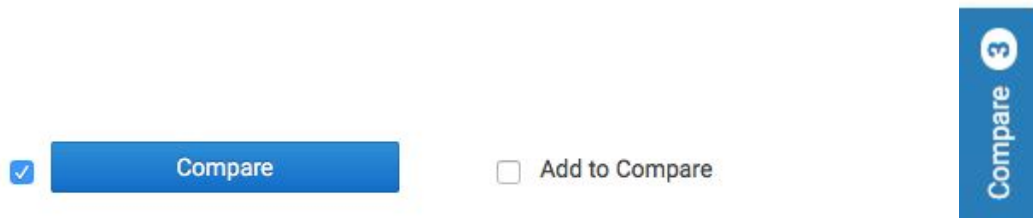
Compare action-buttons (left to right: active, inactive, sticky hovering list-tab)

When there are laptops in the compare list, users can access the compare tab anytime that they are browsing (if they navigate away from the laptop section of the site they will lose their comparison list). When clicking the compare tab, it slides out from the bottom so users can always briefly view the laptops in their list before going to the comparison tool.
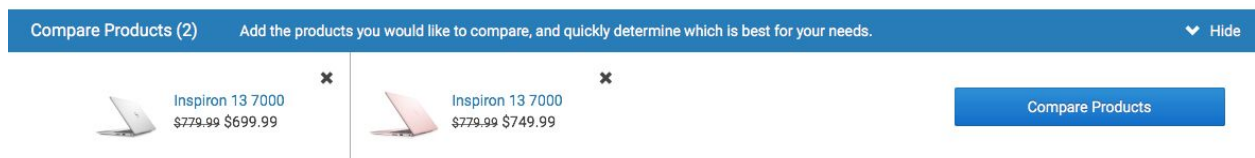
The compare list overlay at the bottom of the screen (expanded)

The immediate visual feedbacks to the actionable items, such as buttons and checkboxes are apparent and clearly visible to the user.

On the other hand, a small problem arises when the items are selected to be compared. Unless the compare list is expanded/active, there is a visual disconnect once additional items are added to the list. For the user, it is clear that an action has been taken once "Add to Compare" button has been clicked, but what kind of action? Excluding the immediate change in state of the compare button, the increase/decrease in number of items in the list is very hard to detect.
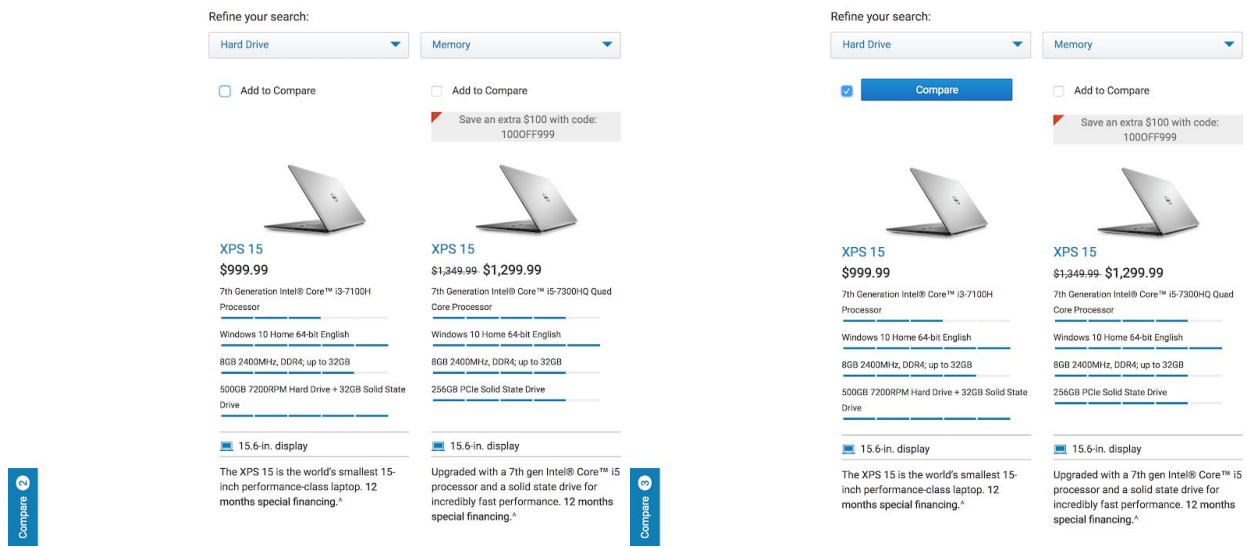
(Left) Before compare button is clicked (Right) After compare button is clicked

With the current positioning of the inactive compare-list, there is not enough visual feedback to indicate the list update. It is recommended to provide the users with a more significant feedback, such as highlighting the selected item, or to add animations to the number of present in the list. If said suggestions are not feasible for immediate implementation, the location of the sticky-hovering compare list tab can be relocated to well-above the top portion of the screen for easier detection.

Within the comparison feature, with the condition of having less than 4 items on the list, there exists a dotted rectangular box, as shown directly below:
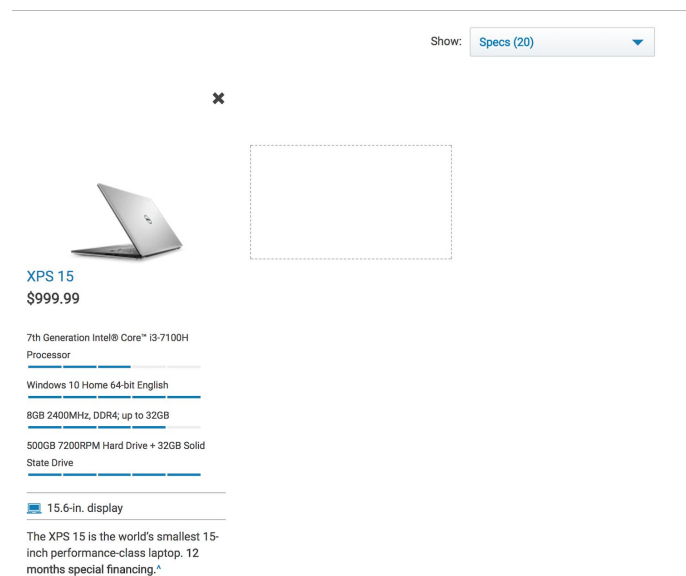
Dotted box in the compare list at the center offers no function.

UMSI

The placement of a dotted box at the end of an item list is often found in many task-oriented lists and a similar feature can be found on Samsung's website (referenced below).

Samsung's implementation of the "Add" box which serves as a button

The current implementation of the dotted box offers no function, and may confuse the users of its purpose. It is suggested that this box be removed, or be given a clear function and text to hint the users of its function.

In addition, the blue chevron arrow to the right of the feature (can be seen in above image) offers users the feedback that there are additional items to be explored. This is not the case, and should be disabled/invisible in appropriate circumstances.

2. MATCH BETWEEN SYSTEM AND THE REAL WORLD

Dell has a very thorough laptop comparison tool, allowing users to compare an unlimited amount of systems (4 in a single view at a time) across 20 technical specifications. While the technical specifications are, for the most part, words and concepts familiar to an average user, descriptions of the technical specifications are filled with technical jargon, brand specific computer hardware terms, part manufacturer names, and hardware and performance metrics. With almost no explanation of what any of these specifications mean, the tool assumes that the

user has this knowledge. For non-technical and less tech-savvy users, the interfaces do not speak their language or utilize familiar concepts. The tool is almost entirely in system-oriented terms.

(Left) feature filter drop-down (Right) feature listings of products in comparison

One positive aspect is that Dell does include very brief descriptors of the laptops that includes both technical highlights and why they matter.

Overall, Dell does not satisfy this heuristic as it uses system specific terms heavily and does not match them to the real world, effectively alienating non tech experts.

3. USER CONTROL AND FREEDOM

Dell makes it very easy for users to add and remove laptops from their comparison list, so long as the list is expanded/active. They can add and remove laptops from the active and static compare button noted earlier which is located above each laptop listing. If users accidentally

clicked the compare button by mistake, they can easily remove it from their comparison list by re-clicking the compare button, turning it to its static state. Users can also undo by clicking the compare tab which slides the list out across the bottom of the screen. Laptops in the comparison list become visible, and each laptop has a grey "x" in the upper right hand corner.
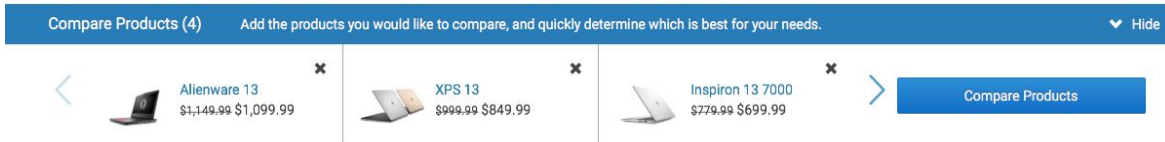
Dell also allows users to easily remove laptops from within the laptop comparison tool itself by keeping the "x" visible in each laptop section. Where Dell lacks in this heuristic is in its ability to enter and exit the laptop comparison tool. While the Compare Products list is visible while browsing for users to easily check back on, once users hit the "Compare Products" button, they are taken to a new page for the laptop comparison tool which displays all the comparisons. To go back to where they were previously browsing, users must click the browser back button, or navigate through the site back to their place.

Navigating while browsing, easy to go back to previous state.

Navigating while in laptop comparison tool, not easy to go back to previous state.

Overall, Dell partially satisfies this heuristic by giving users clear control over adding and removing laptops to their comparison list (and providing multiple ways to do so), but it has room to improve in terms of ability to get in and out of the comparison tool without messing up users' search flow.

4. CONSISTENCY AND STANDARDS

There are places in the comparison table where content listed is inconsistent across categories even when presented in the same row. Within the high-level summary portion of the table: The blurb at the top of each laptop is neither explanatory nor is it similar in content across laptops, yet they all follow the same format. It's also not clickable, so you have to scroll down to read about the details in order to interpret each "special offer."

✖	✖	✖	✖
Limited Time Savings	Limited Time Savings	Experience gaming on a whole new level	Alienware's first 13-inch VR gaming laptop
Inspiron 14 3000 + Wireless Mouse	**Inspiron 14 3000 + Premium Support**	**Alienware 15**	**Alienware 13**
~~$269.98~~ **$229.99**	~~$347.99~~ **$269.99**	~~$1,649.99~~ **$1,399.99**	~~$1,149.99~~ **$1,099.99**

Below this, the special offers explained on each computer are also not labeled. Although they are listed in the same row, the category content is different:

14.0-in. display	14.0-in. display	15.6-in. display	13.3-in. display
The WM126 Wireless Optical Mouse from Dell offers you everyday wireless performance with excellent battery life.	Includes 1 year Premium Support and 1 year Accidental Damage Service.	Embrace the future with the VR Ready Alienware 15 with a 180GB SSD hard drive. 12 months special financing.^	Alienware's most powerful 13" gaming laptop offering unmatched gameplay. 12 months special financing.^
$20 instant off* all Inspiron PCs under $500 when you finance with Dell Preferred Account!^ Included Dell Wireless Mouse-WM126 - Black	$20 instant off* all Inspiron PCs under $500 when you finance with Dell Preferred Account!^ Limited Time: select 2 year Premium Support services for the same Limited Time: select 2 year Accidental Services for the same price	Get 12 months special financing on Alienware PC & console purchases with Dell Preferred Account!^	Get 12 months special financing on Alienware PC & console purchases with Dell Preferred Account!^
Market Value ~~$269.98~~	Market Value ~~$347.99~~	Market Value ~~$1,649.99~~	Market Value ~~$1,149.99~~

The spec categories below the summary table (separated by the add to cart and customize & buy buttons) are easier to interpret because each row content is labeled, so users know that the comparison is consistent across categories:

Processor			
Intel® Celeron® Processor N3060 (2M Cache, up to 2.48 GHz)	Intel® Celeron® Processor N3060 (2M Cache, up to 2.48 GHz)	7th Generation Intel® Core™ i7-7700HQ (Quad-Core, 6MB Cache, up to 3.8GHz w/ Turbo Boost)	7th Generation Intel® Core™ i5-7300HQ (Quad-Core, 6MB Cache, up to 3.5GHz w/ Turbo Boost)
Operating System			
Windows 10 Home, 64-bit, English	Windows 10 Home, 64-bit, English	Windows 10 Home 64-bit English Windows 10 Pro 64-bit English Show Less	Windows 10 Home 64-bit English Windows 10 Pro 64-bit English Show Less
Memory			
2GB, 1600MHz, DDR3L; up to 4GB (additional memory sold separately)	2GB, 1600MHz, DDR3L; up to 4GB (additional memory sold separately)	16GB DDR4 at 2400MHz (2x8GB) See more options	8GB DDR4 at 2400MHz (1x8GB) See more options
Hard Drive			
32GB eMMC	32GB eMMC	180GB M.2 SATA 6Gb/s SSD 1TB 5400 rpm Hybrid Hard Drive with 8GB Cache	180GB M.2 SATA 6Gb/s SSD 180GB M.2 SATA 6Gb/s SSD (Boot) + 180GB M.2 SATA 6Gb/s SSD (Storage)

5. ERROR PREVENTION

Within the summary section of the table, almost all clickable elements (words highlighted in blue), aside from the "Apply" button to apply for special financing and the laptop name, display a pop-up window for further explanation of content. This keeps users from getting lost by keeping them on the same page.

Below the summary section, there are portions of the table that are left blank if the specs are not applicable for the specific laptop being compared. This could get confusing for users, for it looks like the page has not fully loaded or the laptop fails to fulfil their needs.

Alienware's first 13-inch VR gaming laptop

Alienware 13
~~$1,149.99~~ **$1,099.99**

7th Generation Intel® Core™ i5-7300HQ

Windows 10 Home 64-bit English

8GB DDR4 at 2400MHz

NVIDIA® GeForce® GTX 1050Ti with 2GB GDDR5

🖥 13.3-in. display

Alienware's most powerful 13" gaming laptop offering unmatched gameplay. **12 months special financing.^**

Chromebook 3380 Touch
~~$584.29~~ **$409.00**

🖥 13.3-in. **touch display**

32GB of storage paired together with Touch capability makes a great combination for those on the go. Includes an Intel Celeron processor, 4GB of memory, and 32GB of storage.

Adding dashes that line up with each listing or other signaling that the comparison is not applicable for that specific laptop would indicate to users that the comparison does not carry across laptops in this case.

6. RECOGNITION RATHER THAN RECALL

Although the site uses pop-up windows in the summary section, none of the specs listed below the summary section provide any further explanation- users can only see more or less options within the table. This could cause confusion for some less tech-savvy users, for some of the specs are listed in technical jargon that they may be unfamiliar with, like in the Hard Drive section:

Hard Drive

32GB eMMC	180GB M.2 SATA 6Gb/s SSD
	180GB M.2 SATA 6Gb/s SSD (Boot) + 180GB M.2 SATA 6Gb/s SSD (Storage)
	256GB PCIe SSD (Boot)
	512GB PCIe SSD (Boot) + 256GB PCIe SSD (Storage)
	512GB PCIe SSD (Boot)
	1TB PCIe SSD (Boot)
	1TB PCIe SSD (Boot) + 1TB PCIe SSD (Storage)
	Show Less

This might force users to navigate out of the site to look up what each type means or ignore it altogether. Utilizing a pop-up window explanation similar to the summary section could help guide non-technical users through the specs better and reduce the load of having to research each element in question through a source outside of the comparison table.

The comparison tool does allow users to add multiple laptops to be compared. This makes it easier for users to weigh all of their options, instead of having to go back and forth comparing specific items.

Furthermore, uses can check and uncheck specs in a drop-down menu and just focus on features they care about, or features that vary the most between laptops. This could aid users in decision making by helping them visually narrow down the list of options they have to choose from.

7. FLEXIBILITY AND EFFICIENCY OF USE

Dell offers a filter tool for the features that the user desires to compare between products. By default, all those specifications are selected and the user is able to select a custom set of specifications to see. An image of the said filter drop down option can be seen below. This allows users who are familiar with the terms and desired component comparisons to quickly filter out unnecessary component comparisons for an easier comparison traversal.
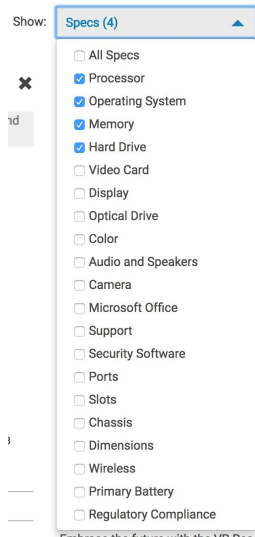
The order in which these specifications are listed within the drop down options can and should be validated by research in user-preference research. This can be done through a series of user-testing and/or a site-wide survey.

Compare tab open/close can be found on the bottom left of the screen once the main compare list has been dismissed.
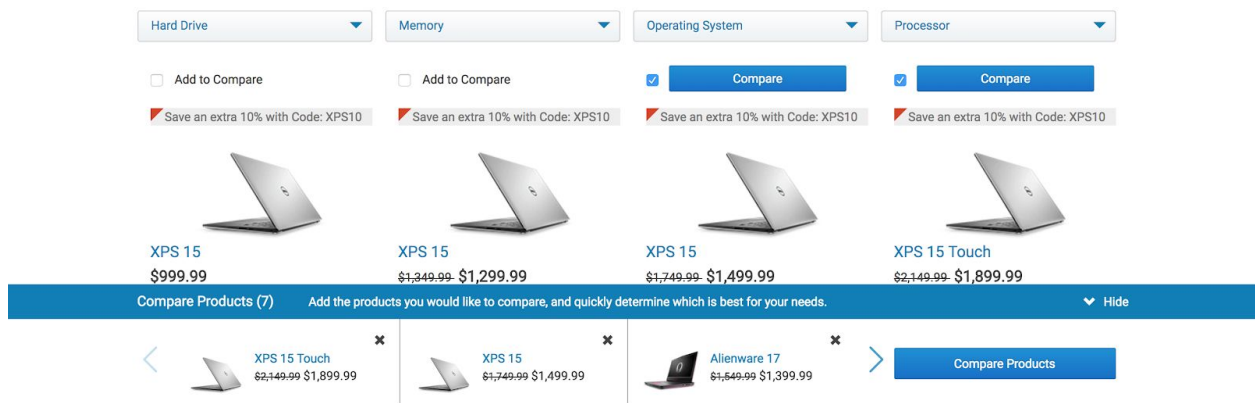
This is the compare list, pre-comparison, shown as an overlay on the screen. Once "Hide" button on the right side is clicked, the overlay tucks away to the bottom left of the screen, as shown below.

Compare list (inactive), located at the bottom-left of the screen

Current implementation is flexible and rather easy to use, but lacks memory-features such as save comparison list for later, or list the user compared last for quick access.

Overall however, the user-flow in order to get to the comparison feature is quite confusing and cluttered, not giving the expert-users much efficiency over novice users.

8. AESTHETIC AND MINIMALIST DESIGN

7th Generation Intel® Core™ i3-7100H Processor	7th Generation Intel® Core™ i5-7300HQ Quad Core Processor	7th Generation Intel® Core™ i7-7700HQ Quad Core Processor	7th Generation Intel® Core™ i7-7700HQ Quad Core Processor
Windows 10 Home 64-bit English	Windows 10 Home 64-bit English	Windows 10 Home 64-bit English	Windows 10 Home 64-bit English
8GB 2400MHz, DDR4; up to 32GB	8GB 2400MHz, DDR4; up to 32GB	16GB, 2400MHz, DDR4; up to 32GB	16GB, 2400MHz, DDR4; up to 32GB
500GB 7200RPM Hard Drive + 32GB Solid State Drive	256GB PCIe Solid State Drive	512GB PCIe Solid State Drive	512GB PCIe Solid State Drive

Dell's use of visual product-benchmarking

Self-contradictory design and use of the blue-bars, widely adopted within Dell's website serves little technical purpose. Self-contradictory in that it attempts to use minimalistic visuals to convey 'comparativeness' feature–however, with the use of the bars, it may create more confusion for the user.

Dell's comparison feature displays a lot information at once, many of which can be shortened or removed: components that are the same as all the others, short description/intro of the laptop, numerous numbers not regarding final price, order code, repeating information across products, and etc.

Dell also includes a rather-lengthy features section, after the comparison feature. With images and technical language, it can further cause confusion as to which product it is referring to, instead of giving the holistic breakdown of laptop-components in general and what they are.

Processor				Help Me Choose
7th Generation Intel® Core™ i3-7100H Processor (3M cache, up to 3.0 GHz) See more options	7th Generation Intel® Core™ i5-7300HQ Quad Core Processor (6M cache, up to 3.5 GHz) See more options	7th Generation Intel® Core™ i7-7700HQ Quad Core Processor (6M cache, up to 3.8 GHz)	7th Generation Intel® Core™ i7-7700HQ Quad Core Processor (6M cache, up to 3.8 GHz)	

Operating System				Help Me Choose
Windows 10 Home 64-bit English See more options	Windows 10 Home 64-bit English See more options	Windows 10 Home 64-bit English See more options	Windows 10 Home 64-bit English See more options	

Memory[i]				Help Me Choose
8GB 2400MHz, DDR4; up to 32GB (additional memory sold separately)	8GB 2400MHz, DDR4; up to 32GB (additional memory sold separately)	16GB, 2400MHz, DDR4; up to 32GB (additional memory sold separately)	16GB, 2400MHz, DDR4; up to 32GB (additional memory sold separately) See more options	

Highlighted components from the specification list

Above is an image of when and how the components are highlighted, which presumptively means a 'better' component. For a typical user this difference may not be clear, especially when the same components within different products are all highlighted. This highlighting feature adds to the visual confusion without clear purpose.

In most of the component descriptions, there is the word 'with' which can easily be removed and not inflict effectiveness of description. There are tons of information already, we can cut down on the word-count as much as we can, without suffering quality of information.

In general, the current feature is visually cluttered with dated design. Compared to its competitor, Apple, Dell's compare feature comes short in terms of minimalistic design approach:

Price	$1299	$1599
Display	**Retina display** 12-inch (diagonal) LED-backlit display with IPS technology 2304-by-1440 resolution at 226 pixels per inch with support for millions of colors 16:10 aspect ratio Supported scaled resolutions: • 1440 by 900 • 1280 by 800 • 1024 by 640	
Processor	**1.2GHz** 1.2GHz dual-core Intel Core m3, Turbo Boost up to 3.0GHz, with 4MB L3 cache Configurable to 1.3GHz dual-core Intel Core i5, Turbo Boost up to 3.2GHz, with 4MB L3 cache; or 1.4GHz dual-core Intel Core i7, Turbo Boost up to 3.6GHz, with 4MB shared L3 cache	**1.3GHz** 1.3GHz dual-core Intel Core i5, Turbo Boost up to 3.2GHz, with 4MB L3 cache Configurable to 1.4GHz dual-core Intel Core i7, Turbo Boost up to 3.6GHz, with 4MB L3 cache

A screenshot of Apple's laptop comparison list

The main difference can be noted as the amount of repetitive information on Apple's implementation. When two products house the same component/specification, Apple reserves

duplicate information and only writes it once across both items. On the other hand, referenced from page 12, Dell's implementation repeats the same information for every product listed.

Apple also takes typography into careful consideration throughout the website. Large, bolded font makes information easier to traverse through, with less visual clutter of lines, boxes, colors, and buttons throughout the specification lists. The comparison interface on Apple serves one-purpose: to allow users to compare items. This purpose is visually portrayed with no extra visual accents or special pricing tags.

Dell can take a similar approach in reducing the amount of color, use of strong lines, less-important information, and repetitive information to minimize visual clutter. One aspect that can, and should be increased are the font sizes for easier reading.

9. HELP USERS RECOGNIZE, DIAGNOSE, AND RECOVER FROM ERRORS

Accidentally removing a comparative product from the comparison list has no way of recovery. Even when done so, there is no visual feedback of which product was removed, and when the user were to compare very similar products, it will be difficult to tell which product he/she mistakenly removed from the compare list. The interface should offer a method of 'undo' or add again to offer users a simple method of recovery.

Whilst comparing, clicking on another category/catalogue item from the navigational menu will take me away from the current context, without asking or without quick method of recovery other than pressing the browser's back button. Once the user accesses the comparison feature, this feature should always be accessible, and other items should be able to be added onto the comparison list. For example, once the user visits the comparison feature interface, thereafter, wherever the user goes on the website, a small comparison tab should show at a fixed location on the screen for easy access and list modification.

Users are able to 'compare' the same product over and over again!
Dell's comparison feature is address-bar based, so users like me can copy and paste order codes to compare items, but duplicate items are allowed! This should be fixed.

10. HELP AND DOCUMENTATION

The 'Need Help? We're here for you' options are nice, but becomes annoying to users that are more experienced, as it consistently asks and expands itself. Programming it to remember user's action would be alleviate the frustration when the help is not necessary.
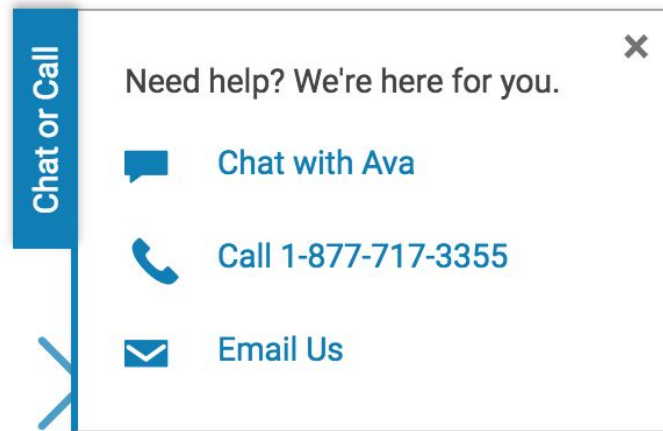
Help Tab that is placed on the right-hand side of the screen.

It is suggested that this tab be expanded only once, and if the user dismisses the pop-up, that it stays closed until manually interacted with.

In addition, once the user first clicks on the 'add to compare' checkbox from the product catalogue, a few guiding steps on how to perform the comparison would also aid users to utilize the feature more.

Lastly, as previously mentioned within heuristics number 2 (Match between system and real-world), it would be helpful to include a "?" button next to a few device features to offer details of the component.