Freddie Mercury: Will Heineman
Mike Jones
Andrew Schiffman
Andrew Connor

IST 331
Dr. Frank Ritter

The Pennsylvania State University

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**Introduction**

Freddy Mercury was faced with a monumental hurdle to jump when the powers that be challenged it to present a unique case of the mismanagement of design between the product or information to be obtained and the end user. We are not only to point and stare at the grotesque negligence of the design of said item, but we are to analyze, critique, and put fourth a plan of improvement. This must all be done with the prior working in place to assure that our final design will at least be considered by the individuals responsible for the product. It was a tense time for Freddy, making sure our decision fell within the guidelines. We pulled through and believe to have met the requirements head on, and have chosen the website http://www.videon-central.com for this project.

In today’s modern world, a website is an essential tool for any company. Not only is a website a suitable means of advertising a product, it is also the perfect medium to offer support for those products, as well as announcing news to a worldwide market. But with the recent boom of websites, a company needs more than a basic site in order to get noticed. Their site should be simple to use, while still appearing professional and inviting. Together, all of these techniques can create the perfect site for any company.

**Background**

Currently the Videon web site is only useful for few things. The first use of the site is for people to view products made by Videon. Next people can also see a list of services that Videon provides to customers. The site provides links to PDF brochures which describes in better detail these products and services. The site also provides a
listing of job openings for individuals looking to apply for a job. Finally the site contains basic company info and contact information which someone can use to reach them or find out more info about Videon.

The reason that we find this site interesting is because it's amazing that a company such as Videon has such a poorly designed website. For a major company such a Videon, a website is a prime advertising tool. But in their specific case, their site portrays their company very poorly. Other companies in the same industry such as TI (http://www.ti.com) and Digital Media Applications (http://www.dmapp.com) have large, well organized sites which are pleasant to the eye. And those companies use their sites to advertise their products, post press releases, and simply interact with the public. But Videon's site uses a small, unorganized, unpleasant, and hard to use interface.

**Learning Curve**

This study takes a look into the human mind and its ability to learn a task over time. We believe that time a user spends performing a confusing task will decrease after many trials. We would like to show the amazing amount of time which it takes our subjects to find simple pieces of data located on the Videon-Central website. We believe that even though these tasks should be simple in theory, the current layout of the site makes them confusing.

**Methodology**

For this task, we challenged our subjects to find a press release, which is contained on the corporate website of Videon. This task though simple, is confusing due
to the complexity and poor design of their web interface. We did not tell them the proper way to find this information, and this led to multiple ways of completing the task.

**Experiment**

**Participants**

All 5 of the test subjects were students enrolled in IST 331 at Pennsylvania State University. Because of this, we were able to conclude that they were all experienced computer and internet users.

**Process**

Before the trials began, the instructor told the subject that they needed to find a PDF Document titled “Universal Video Board – PDF”. They were told that they would not have any instructions on where to find it, and they were not allowed to use a site map or a search bar during their search. They would repeat the task 15 times, with the experiment being reset after each iteration.

Each trial began the same way. The mouse was located in the center of the home page, and the timer began once the proctor instructed the subject to begin.

After each trial the history was cleared to eliminate the possibility of a user using the back button or viewing previously visited pages.

Once the subject located and opened the press release PDF file, the proctor would stop the timer, ending that trial. This process was repeated fifteen times for all subjects in order to see if their times could decrease further than expected.
**Results**

The results that we recorded were consistent with our original hypothesis and support the theory that over time a subject can learn to perform a task faster, given multiple trials to practice.

Throughout the study, the average time declined until it reached a minimum time. After they reached this base time, few strayed far from their average. The first trial for each subject took on average 43.81 seconds. The average time for the second trial decreased to 27.43 seconds. And the average time for the third trial was only 9.13 seconds. After the first 3 trials, the times appeared to reach a plateau, where they remained until the end of all 15 trials. This is clearly illustrated in table 1 by subject 3 for trials 6-15. One can see that the subject’s time reached an average between 5 and 7 seconds, and did not deviate more than 1 second between these trials.

**Data**

*Table 1 - Trial results for all subjects*

<table>
<thead>
<tr>
<th>Trial</th>
<th>Subject 1</th>
<th>Subject 2</th>
<th>Subject 3</th>
<th>Subject 4</th>
<th>Subject 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>19.858</td>
<td>52.26</td>
<td>28.451</td>
<td>01:02.1</td>
<td>56.373</td>
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<td>2</td>
<td>13.718</td>
<td>7.887</td>
<td>11.562</td>
<td>9.562</td>
<td>22.28</td>
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<tr>
<td>3</td>
<td>12.734</td>
<td>10.558</td>
<td>9.78</td>
<td>5.281</td>
<td>7.312</td>
</tr>
<tr>
<td>4</td>
<td>7.5</td>
<td>5.435</td>
<td>8.687</td>
<td>5.047</td>
<td>5.312</td>
</tr>
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<td>5</td>
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<tr>
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<td>5.906</td>
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<td>5.812</td>
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<td>8</td>
<td>5.031</td>
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<td>5.405</td>
<td>4.766</td>
<td>3.828</td>
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<td></td>
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<tr>
<td>9</td>
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<td>3.891</td>
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<td>4.546</td>
<td>6.952</td>
<td>4.265</td>
<td>4.453</td>
</tr>
<tr>
<td>11</td>
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<td>5.358</td>
<td>6.718</td>
<td>3.891</td>
<td>3.688</td>
</tr>
<tr>
<td>12</td>
<td>5.156</td>
<td>4.155</td>
<td>5.687</td>
<td>5.219</td>
<td>3.406</td>
</tr>
<tr>
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<td>6.156</td>
<td>5.5</td>
<td>3.328</td>
</tr>
<tr>
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<td>5.077</td>
<td>6.828</td>
<td>3.953</td>
<td>3.937</td>
</tr>
<tr>
<td>15</td>
<td>5.89</td>
<td>4.281</td>
<td>6.812</td>
<td>5.078</td>
<td>3.5</td>
</tr>
</tbody>
</table>

**Figure 1 – Trial results for all subjects**

**Implications**

We believe that first trial took significantly longer than other trials because the user was given a poorly designed site, of which they were unfamiliar. It is also interesting to note that all of the subjects were compelled to read all of the links and parts of the text in order to find their way to the press release. Many subjects chose to begin with the navigation bar on the left, but quickly became disoriented due to its inconsistency across the site.

This discovery has led us to see a need for a revised navigation bar. This new navigation bar should be easy to read and consistent across the site.

Another interesting discovery that we made was the different paths that were used to complete the task. We did not allow them to use outside resources such as a search engine to aid them, and they were required to manually click through the labyrinth of links leading them to their goal. By the third trial, every subject had chosen a path to reach the press release. Even though this was not the only path or even the shortest path, they chose not to explore the site further to find a faster method, and instead used their original path.
From this finding, we were able to conclude that the site itself is far too confusing, with many links randomly distributed across the site with no discernable pattern. Before the navigation bar can be corrected, this mess of links and random pages must be cleaned up.

**Task Analysis**

This analysis is going to explore two possibly common actions that one might perform while on the Videon-Central website. Unlike prior analyses, this analysis will break down these two actions using both the KLM (Keystroke Level Model) and GOMS (Goals, Operators, Methods, and Selection Rules) methods of task analysis. The first of these two tasks is one taken from the Report “Learning Lab 1” (Heineman, Schiffman, Jones, et al). This report details the findings of research in which subjects were tasked with locating a particular document within the Videon-Central website. We will corroborate this research by breaking down this locating process using both GOMS and KLM.

The second task we will analyze using the two aforementioned models will be the locating and filling out of the Videon-Central contact form. While the filling out of a contact form is by some considered a purely subjective event, we will determine mean times and procedural method for the event and propose possible streamlined alternatives.
Methodology

KLM

KLM is the Keystroke Level Model. It is a model which is able to closely predict the time to accomplish a task by analyzing each individual keystroke which a user must make. Each of these keystrokes, as well as mouse movements, and thought processes are factored into a formula which outputs the estimated time for a user to complete a certain task.

This method is criticized for its assumption that all users are experts at the specified task, and that they do not make any mistakes.

GOMS

GOMS is Goals, Operators, Methods, and Selection. This method of analyzing a task allows the researcher to take an in-depth view of what steps their users complete a task. It does not analyze that data to determine the average time to complete the task like the KLM, but it does help one to understand their system.

Experiment

Participants

For this study we ran 3 subjects. The subjects we chose were all between the ages of 18 and 23, and they were all students in the College of Information Sciences and Technology at Pennsylvania State University. We chose these particular subjects to help eliminate any of the proposed problems which exist in the KLM analysis. All of these
students were assumed to be experienced computer users, and of approximately the same skill set.

**Materials**

All of the experiments were performed on iMacs running Windows XP. Mouse emulation was achieved using the Mac Mighty Mouse. The reason that we chose to use Windows XP nearly 81% of computers run Windows XP as opposed to the 5% which run MacOS (Awio Web Services LLC, 2007). We did not want to experience the same problems that we faced when testing in Learning Lab 1:

One factor which adversely affected out data was whether or not a subject was a native Macintosh user. After the study, we questioned users on whether they had previous experience on this platform. Only subject 3 used a Macintosh on a daily basis. This led to less problems with the actual Mac interface and input devices. Other users repeatedly touched the side buttons and the center scroll button which brought up widgets and the menu select HUD. Being unfamiliar with these windows, users then had to spend time determining how to get rid of them (Heineman, Schiffman, Jones, et al).

**Process**

To set up the experiment for the first task of finding the PDF document “Universal Video Board – PDF” we proceeded to recreate the conditions present in the report ““Learning Lab 1” (Heineman, Schiffman, Jones, et al). The subject started with the Videon-Central.com homepage in front of them on the screen. The mouse was positioned in the middle of the screen and the browser was modified to not re-color a
hyperlink after it was clicked on. In this way, the user could not simply follow their prior path by visual cues. The subject was handed a slip of paper on which the aforementioned PDF’s name was written while being directed to locate the PDF within the Videon-Central website. The subject could then start whenever they wished, and the timer was started when the subject’s hand touched the mouse. It should be noted that no search bars or sitemaps were available for subject reference.

The second task of filling out the Videon-Central contact form was handled in much the same way as the first. Subjects were set up in front of the computer with the same starting conditions as in the prior experiment. They were then instructed to navigate to the contact page and fill out all of the form fields in a normal and complete manner. As before, the timer was started when the subject first touched the mouse. However, the entire task was then reset and the subject was asked to fill out the contact form a second time; in this instance only filling in the name, phone, e-mail, and Info needed form fields.

**Results**

For the first experiment, we found that the actual time which it took the subject to find the PDF document was actually less than the average that the KLM predicted (See Appendix A – Experiment #1 for a breakdown of the average KLM of this task). This is possibly attributed to the fact that all of the subjects were IST majors, and hence well versed in search techniques. However, the location of the PDF was equally unknown to all subjects and again, no search tools were available at any time. These controls limit the influence that any amount of experience could have over the outcome of the experiment. (See Appendix B – Experiment #1 for a GOMS procedural of the task).
For the second experiment, we found that the time taken by the subject was less than the time predicted by the KLM (See Appendix A – Experiment #2 for a breakdown of the average KLM of this task). This general overestimation of both tasks may suggest erroneous result or a possible flaw in the design of the experiment. Future experiments can prove or disprove this. However, as KLM is simply a tool for averaging it is more likely that the actual times are simply following with the lower end of the trend (See Appendix B – Experiment #2 for a GOMS procedural of the task). "The Keystroke-Level Model has several restrictions: The user must be an expert; the task must be a routine unit task; the method must be specified in detail; and the performance must be error-free. These restrictions are important and must be carefully considered when using the model." (Card, Moran, Newell, 1980).

Data

Table 2: Actual vs. KLM predicted times for both subject tasks.

<table>
<thead>
<tr>
<th></th>
<th>Predicted Time</th>
<th>Actual Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment #1</td>
<td>36.4 sec</td>
<td>21.1 sec</td>
</tr>
<tr>
<td>Experiment #2</td>
<td>65.04 sec</td>
<td>55.3 sec</td>
</tr>
</tbody>
</table>

Appendix A – Keystroke Level Model (Average Model):

Experiment #1 – Finding PDF Document:

1. Determine that link is in products M
2. Point to products link P
3. Click on products link BB
4. Wait for machine to load page W
5. Determine that link is Image Enhancement M
6. Point to Video Image Enhancement link P
7. click on Video Image Enhancement link BB
8. Wait for machine to load page W
9. Locate AVC2510 page M
10. Point to NSC AVC2510-based Video Processing Solution link P
11. Click on NSC AVC2510-based Video Processing Solution link BB
12. Wait for machine to load page W
13. Locate the PDF File M
14. Point to Universal Video Board - PDF link P
15. Click on Universal Video Board - PDF link BB
16. Wait for page to load W

Total Time = 4M + 4P + 4BB + 4W = 4(3.0) + 4(1.1) + 4(0.2) + 4(0.5 ) = 36.4 sec

Experiment #2 – Contact Form:

1. Locate contact link M
2. Move mouse to contact link P
3. Click on contact link BB
4. Wait for page to load W
5. Move mouse to first input P
7. Keystroke "TAB" K (1)
8. Keystroke "My Company" K (10)
9. Keystroke "TAB" K (1)
10. Keystroke "555-240-2501" K (12)
11. Keystroke "TAB" K (1)
13. Keystroke "TAB" K (1)
15. Keystroke "TAB" K (1)
17. Keystroke "TAB" K (1)
18. Keystroke "State College" K (13)
19. Keystroke "TAB" K (1)
20. Keystroke "Pa" K (2)
21. Keystroke "TAB" K (1)
22. Keystroke "16801" K (5)
23. Keystroke "TAB" K (1)
24. Keystroke "email@email.com" (15)
25. Keystroke "This is a sample text. It is the average length of a simple request which a user may type" K (90)
26. Move mouse to "Send Info Request" P
27. Click "Send Info Request" BB

Total Time = 1M + 3P + 2BB + 1W + 180K = 1(1.2) + 3(1.1) + 2(2) + 1(1.5) + 213(0.28) = 65.04 seconds

Appendix B – GOMS Analyses:

Experiment #1 – Finding PDF Document:

1. Move cursor to products link
2. Click products link
3. Move cursor to Image Enhancement
4. Click Image Enhancement link
5. Move cursor to NSC AVC2510-based Video Processing Solution link
6. Click NSC AVC2510-based Video Processing Solution link
7. Move cursor to Universal Video Board – PDF link
8. Click Universal Video Board – PDF link

Experiment #2 – Contact Form:

1. Move cursor to contact link
2. Click contact link
3. Move cursor to first field
4. Click first field
5. Type "William Heineman"
6. Press Tab key
7. Type "My Company"
8. Press Tab key
9. Type "555-240-2501"
10. Press Tab key
11. Type "123-456-7890"
12. Press Tab key
13. Type "123-456-7890"
14. Press Tab key
15. Type "1234 College Ave."
16. Press Tab key
17. Type "State College"
18. Press Tab key
19. Type "Pa"
20. Press Tab key
21. Type "16801"
22. Press Tab key
23. Type email@email.com
24. Press Tab key
25. Type "This is a sample text. It is the average length of a simple request which a user may type"
26. Move cursor to Send Info Request button
27. Click Send Info Request button

Appendix C – KLM Analyses (Optimized Model):

Experiment #2 – Contact Form (optimized):

1. Locate contact link M
2. Move mouse to contact link P
3. Click on contact link BB
4. Wait for page to load W
5. Move mouse to first input P
7. Keystroke "TAB" K (1)
8. Keystroke "555-240-2501" K (12)
9. Keystroke "TAB" K (1)
10. Keystroke "email@email.com" (15)
11. Keystroke "This is a sample text. It is the average length of a simple request which a user may type" K (90)
12. Move mouse to "Send Info Request" P
13. Click "Send Info Request" BB

Total Time = 1M + 3P + 2BB + 1W + 180K = 1(1.2) + 3(1.1) + 2(.2) + 1(.5) + 135(.28) = 43.2 seconds

Implications

The implications for the Videon-Central website are quite far-reaching. We have found through experimentation that in both tasks the actual times are less than the predicted times. However, we still feel that these times are more than they should be for
such simple and common tasks. These tasks, which are core to purpose of Videon-Central.com should be more intuitive than they are. To show just how much improvement is possible, we developed an optimized version of task #2, removing redundant and unnecessary categories from the contact form. This resulted in an estimated time of only 42.3 seconds, an improvement of more than 20 seconds over the original (See Appendix C – Experiment #2 for a breakdown of the average KLM of this task).

Further work will have to take place to determine a maximally optimal way of finding the PDF in task #1. As of now, there are several paths within the site that you can use to get to this PDF. We merely focused on one to keep within the scope of this report. These multiple paths will have to be eliminated or brought under some cohesive order before any real KLM can be done on them. However, it can be said with the search times currently in question that there is no doubt improvement is required and easily obtainable.

**Perception Interaction**

Internet users are presented with thousands of sites everyday, most of which do not effectively draw the user’s attention to the proper areas. We believe that Videon-Central’s site exemplifies many poor HCI design choices. Through this study, we will find a few key problems, and offer alternate solutions to them.

**Methodology**

One of the first problems that we spotted was the use of large colorful graphics which were not related to the content of the page. We wanted to prove that while these
added color to a page, they were on the whole distracting users from the true content of each page.

**Experiment**

**Participants**

For this experiment we recruited random students from The Pennsylvania State University. They were selected by asking for volunteers within the IST 205 classroom and were not asked to share about any visual problem that they might have had, including glasses or color blindness. Because we did not question them about possible afflictions, we can assume that they would all be average users.

**Materials**

For this test we designed a slideshow that contained different sized, colored, and position fonts, as well as sample layouts for the Videon homepage.

The first slide contained seven 7’s. Each one was the same font, size, and character, but they were different colors. We wanted to find if a user would be drawn to colors of higher contrast, and what color in particular they would be drawn to on a black background such as that found on the Videon webpage.

The next slide aimed to test if size played a role in drawing attention to a character. Again, we had seven 7’s in the same font and color, but this time they were all different font sizes.

On the next slide we included once again, seven 7’s, but in this slide all seven characters were identical, the only difference was their placement on the screen.
Our fourth slide depicted the current Videon homepage. It included the navigation menu, logo, and opening text.

Next we used the same slide, but moved the pictures in the logo around. This was done to prove that certain elements of that logo were distracting, no matter their location on the screen.

The next slide was once again the same homepage, but in this one we removed the most distraction elements of the logo.

Our next slide removed all of the extra elements from the Videon opening picture, leaving only the Videon logo, navigation, and the opening text.

The eighth slide simply added contact information to the bottom of the page. This was done to determine if it would distract the user or whether they could overlook it until they needed that information.

Our final slide was our idea of a much better layout for the Videon website. It included a less distracting logo, colorful headers, and a more colorful navigation bar.

**Process**

Beginning the test, the user was sat at a computer and given these instructions:

“For this test, you must identify the first word, phrase, or picture that catches your eyes. For each slide, please point to the first item that you saw.”

There was no time limit, but the user was asked to perform this quickly, and asked if they were ready to continue after each slide.

Once they reached the last slide, they were thanked for their participation, and then allowed to leave.
Results

From this study, we can make many conclusions. The first, which we would like to discuss, is how contrast directs the user’s immediate attention. It was clear that high contrast text and images drew the user to look at certain aspects of a page, while other low contrast items were overlooked. This is important while designing any interface because the author should take this into account when determining what is visually important on a page.

The next conclusion we can make is that size matters. Users are drawn to larger objects on a page. As with contrast, a developer should take into account the size of an object or text when judging its importance to the user.

Another finding, which we have made, is that people read a page from the top down. Some look from left to right, and others look from right to left, but all subjects in our study read from the top to the bottom. One can note that this is important when displaying any data on a page. You should always present your text in a hierarchical manner.

Our final finding is that color can be a powerful tool in any interface. Large colorful images are particularly tempting to the eye. Users will quickly look at these images if they exist on a page. So if you have important information, which a user needs to know, it would be unadvisable to include colorful images around that text. Instead, one may consider placing that text in a color different from all of the other text in order to make it stand out.

While there have been multiple studies on this subject, many developers still do not take these principals into account when designing an interface. Videon has done a
poor job at attracting the user, with their colorful graphics distracting a user from finding what they are looking for. If they would take this advice into account, their site would become an effective advertising tool for their company instead of the 1995 Geocities site it is now.

**Proposed Changes**

There are some major changes which we would like to see Videon implement into their site. The first of which is to get rid of the ultra high contrast color scheme. Instead using a black background with yellow and white text, we recommend that softer colors are used. Not only will this make the site easier to read, and easier on the eyes, but it will bring about a more professional appeal. The dark colors currently used should saved for important information which the user should not miss.

Our other desired change would be to remove many of the graphics across the site. These graphics appear to be purely filler items, many of which seem to have been taken from a stock photo collection. They should be replaced with relevant graphics and actual photos of products and the facility. This would create a more aesthetically pleasing layout as well as a more informative site.

Another important change is the creation of a uniform navigation bar which would is displayed on every page. This would allow users to move through the site with greater ease and reduce the confusion which the current navigation bar causes. Our final proposed change is a restructure of the entire site. This would make it easier to navigate the site, and eliminate many of the duplicate links and pages which currently exist. Figure 1 shows the site map how it currently exists.
The New Videon-Central

Figure 3 - The new Videon-Central.com homepage

Figure 4 - The old Videon-Central.com homepage
Figure 5 - The new Videon-Central.com contact page

Figure 6 - The old Videon-Central.com contact page
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