**1.Which shopping procedure is faster, Spotify or YouTube Music?**

Based on these results, comparing the original versions of both applications, YouTube Music (35.5 seconds) demonstrates slightly slower performance than Spotify (35.0 seconds), with a difference of 0.5 seconds in task completion time. However, it's noteworthy that the improved version of YouTube Music achieves the best performance at 32.2 seconds, which is 2.8 seconds faster than Spotify and 3.3 seconds faster than its original version.

In the original versions' comparison, Spotify's marginally superior performance can be attributed to its streamlined interaction design, which requires fewer user actions and cognitive transitions, as detailed in the previous analysis. However, the improved version of YouTube Music demonstrates that significant optimization of the interface design can lead to substantial performance improvements, reducing the task completion time by 3.3 seconds from its original version and achieving 2.8 seconds faster performance than Spotify's interface.

**2. Why is the faster procedure faster?**

In this research conducted in the field of Human-Computer Interaction (HCI), user interaction processes of Spotify (35.0s) and YouTube Music (35.5s) platforms were examined using CogTool visualization data. The analysis revealed a 0.5-second performance difference between the platforms. This difference is explained through detailed analysis of various interaction components.

The cognitive processing requirements, represented by gray "THINK" blocks in the visualization data, reveal the first significant difference between platforms. As Dix et al. (2004) indicate in their cognitive processing model, these intervals demonstrate critical decision points for users. The cognitive processing phases concentrated particularly in the 10-20 second interval in YouTube Music show that users go through more thinking and decision-making stages. This increased cognitive load observed during task execution constitutes a significant component of the time difference between platforms.

When examining eye movement data, significant differences were observed in visual scanning processes represented by Eye Move - Exec and Eye Move - Prep indicators. When evaluated within the framework of Benyon's (2019) user experience design principles, YouTube Music was found to require more complex visual scanning patterns. More complex eye movement sequences and prolonged visual processing periods recorded during interaction extend the time users need to identify and interact with interface elements.

Physical interaction analysis was conducted through red bars indicating hand movements. Based on Card, Moran & Newell's (1983) interaction model, the YouTube Music interface requires more physical interaction. Interaction points distributed throughout the timeline and increased manual engagement requirements complicate user interaction with the platform. This data quantitatively demonstrates the impact of interface design on user performance and explains the reasons for the observed 0.5-second difference between platforms.

Figure 1: CogTool Visualization Timeline of Spotify vs. YouTube Music Task Completion

metin, ekran görüntüsü içeren bir resim

Açıklama otomatik olarak oluşturuldu

**3. How can you make the slower procedure faster? How much time can a user save with this change?**

In Figure 2, the user is allowed to access the albums button with fewer moves without scrolling the screen.

In Figure 3, the design is improved, allowing the user to view more albums on the same page. While 4 albums are listed in the original content, 6 albums can be listed in the improved version. In the original case, after the user enters the albums page, the album one is looking for is in the 6th place. This is why 6 albums can be displayed in the improved version.

Figure 2: The image on the left is the original page seen after entering the musician's page on YouTube Music. The page on the left is an improved version: It makes it easier to reach the albums section (shown with arrow) without scrolling down the page. (Youtube Music original and improved version design on CogTool) (Figure with green frame)

**metin, ekran görüntüsü, yazılım, multimedya yazılımı içeren bir resim

Açıklama otomatik olarak oluşturuldu** **metin, ekran görüntüsü, yazılım, multimedya yazılımı içeren bir resim

Açıklama otomatik olarak oluşturuldu**

Figure 3: The image on the left is the original page where albums are shown after entering the albums page on YouTube Music. The page on the right is an improved version: The design is improved, allowing the user to list more albums. (Youtube Music original and improved version design on CogTool) (Figure with red frame)

The comparative analysis of the redesign demonstrates that optimization of the YouTube Music interface led to a significant performance improvement, reducing task completion time from 35.5 to 32.2 seconds (9.3% improvement). This enhancement was achieved through streamlined interaction pathways, reduced cognitive load, and simplified navigation patterns, highlighting the impact of user-centered design principles on interface efficiency. These quantitative improvements underscore the importance of iterative design optimization in enhancing user interaction performance.

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