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Group Heuristic Evaluation

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A Better Public Transportation App

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# **Summary for Team Members’ Contribution**

Zhan Li:

1. Established basic format of the report, then created and managed the shared folder.
2. Completing the Introduction section.
3. Drafting the Prioritization section

Yiyun Zhang:

1. Work on problems section

Belmin Oommen

1. Worked on Recommendation Section (For problems 1 to 5)
2. Summary Section

# **Introduction**

After the actual users-based survey and interview research, we have a primary understanding of the SEPTA (Southeastern Pennsylvania Transportation Authority) app clients in real-life environments. Through that research, we also developed personas and scenarios based on detailed narration information. Those materials have become the foundation of our heuristic evaluation for now.

We choose heuristic evaluation due to the lack of time and limitation of resources as an alternative solution for a formal and complete users group evaluation. Through heuristic evaluation, we can quickly figure out the most obvious and deadly design problem without using valuable real users’ resources as evaluators and avoid any legal or moral issues related to using real-life users’ data.

Our heuristic evaluation is based on Nielsen’s ten heuristic evaluation principles and DOET/HCI principles and it begins with individuals’ evaluation for each of our group members. Following the requirements of heuristic evaluation, this incipient isolated individual evaluation is necessary which allows members to located specific design problems without external influence and reflect the truest feeling with the app design.

We selected the five most valuable persons/scenarios combinations and each of the members chooses one of them for their heuristic evaluation. For the evaluation itself, each member applied two passes of evaluation. For the first passes, we try to evaluate the app from the point of view of the persona we choose before. In this case, each member needs to imagine if they are the users from the persona/scenario and evaluate the app with their specific needs and operating logic. For the second press, we are using our point of view for the evaluation.

Each member will produce at least four problems that violate heuristic evaluation principles and give them a specific severity system with a score of 0-4. Additionally, each member also needs to provide a brief solution to fix problems they found.

Based on the individual’s heuristic evaluation and group discussions, we selected the ten most prominent issues to be found here with corresponding re-setting severity score, viable solutions, and analysis of each problem. We hope this group heuristic evaluation can provide pertinent and practicable SEPTA app design improvement suggestions and plan under the limited time and other resources.

# **Prioritization**

After collecting and analysis individuals’ heuristic evaluations sheets, we synthesized all problems which each member figured out based on their persona/scenarios and personal observation. Each member using a similar 0-4 scored severity levels system. Even each member has different detailed descriptions with each level, but every level system is following a basic measurement which is the influence on the core functions and overall user operating goals.

## **New Severity Level System**

In summary, we set a unified severity level system based on individuals’ system description. Here is the new severity level system:

**Score 0**: There is no error, or the issue cannot be considered as an error. In this level, issues mostly like the preference features related to user’s personal likes and dislike. For example, the color choice for interface sections. In this level, error or issues barely have any influence on overall UX (User experience) and core functions

**Score 1**: There is a notable error, but it is so minor and most of users can directly pass it. For example, a typo or something is misaligned. In this level, error or issues have extremely limited influence on the core functions and it has no effect for users to achieve their operating goals.

**Score 2**: There is an error need to be addressed, and it have limited influence on the core functions, and negative influence on the overall UX in certain level. In this level, the error has a low possibility to prevent users to achieve their goals.

**Score 3**: There is a relative serious error must be addressed, and it have major influence on the core functions, and considerable negative influence on the overall UX. In this level, the error has a high possibility to prevent users to achieve their goals.

**Score 4**: The error makes the app unusable, and UX been totally ruined.

Based on the final severity level system, we applied a new evaluation for each problem. Most of problem remine the same severity level from the individual evaluations, and some of them have been assigned a new severity level due to re-discussion and evaluation. For most cases, the evaluation from group members has a good understanding and caught them in correct severity level based on their analysis. However, we decided to degrade some problem’s severity level since we find they have less importance compared to other errors originally assigned same severity level with them.

## **Full Set of Combined Problems**

In these sections, we list all problems our team members find out during the individual heuristic evaluations. For each problem, we included finder’s names; the problem descriptions based on the original evaluation sheets; the problem location; the heuristic or DOET/HCI principles violated; user type affected and both initial and final error severity level.

Problems are listed in the order of severity and begin with the most critical issues with the highest severity level scored.

1. *Problem description*: Downloading recent schedules

*Problem Location*: Septa Mobile Application (Home Page)

*Heuristic Violated*: Home page usability/ Navigation and Information Architecture

*User-type Affected*: All users of application

*Initial Error severity*: 4

*Final Error severity*: 3

*Finder*: Belmin Oommen

1. *Problem description*: Add to favorites button does not function the way you would think it would. When trying to add a route to favorites it wants me to select a route and pick the specific route. When you do this, you get a lot of different routes with the same name. It was not till I messed around with it for a while did I realized there were multiple types of transportation methods at the top.

*Problem Location*: home screen page

*Heuristic Violated*: Aesthetic and minimalist design

*DOET/HCI Principles Violated*: Visibility of affordances, feedback & signifiers

*User-type Affected*: All SEPTA users

*Initial Error severity*: 3

*Final Error severity*: 3

*Finder*: Nicholas Carmen

1. *Problem description*: Users can only schedule trips based on routes under different isolated transportation methods. When they need to plan a long trip that involves different transportation or route lines, they must switch between different schedules sections pages

*Problem Location*: "Schedules" section page

*Heuristic Violated*: Recognition rather than recall

*User-type Affected*: All users

*Initial Error severity*: 3

*Final Error severity*: 3

*Finder*: Zhan Li

1. *Problem description*: The trip planner in the More tab jumps to an external browser and has no connections or links with the SEPTA app

*Problem Location*: More - Trip Planner

*Heuristic Violated*: User control and freedom

*User-type Affected*: App users

*Initial Error severity*: 3

*Final Error severity*: 3

*Finder*: Yiyun Zhang

1. *Problem description*: When you select a route you want to Add to your Favorites, I do not know how to save it to my screen

*Problem Location*: Favorite page

*Heuristic Violated*: Help and documentation

*DOET/HCI Principles Violated*: Visibility of affordances, feedback & signifiers

*User-type Affected*: All SEPTA users

*Initial Error severity*: 2

*Final Error severity*: 2

*Finder*: Nicholas Carmen

1. *Problem description*: After opening the app, it freezes and then crashes. Re-opening the app allows the open without crashes

*Problem Location*: Opening SEPTA App

*Heuristic Violated*: The app does a good job

*DOET/HCI Principles Violated*: Affordances and signifers. The app does not present any type of signifer to the user on how to fix the app crashing

*User-type Affected*: Experienced site user

*Initial Error severity*: 3

*Final Error severity*: 2

*Finder*: Frederick Brown

1. *Problem description*: The "My Account" feature, which contains account creation and log in, is difficult to find. It is located on the top right corner of the homepage, and only has a little square sign there.

*Problem Location*: My Account Section

*DOET/HCI Principles Violated*: Visibility of affordances & signifiers

*User-type Affected*: Experienced app user

*Initial Error severity*: 2

*Final Error severity*: 2

*Finder*: Yiyun Zhang

1. *Problem description*: The Next-to-Arrive function is duplicated with the schedules feature: it jumps to the schedules page when the Next-to-Arrive feature is not working. Users must choose the services, lines, and stations all over again.

*Problem Location*: Next-to-Arrive

*Heuristic Violated*: Error prevention/ Flexibility and efficiency of use

*User-type Affected*: App user

*Initial Error severity*: 2

*Final Error severity*: 2

*Finder*: Yiyun Zhang

1. *Problem description*: No visible option for help/support

*Problem Location*: Septa Mobile Application (Navigation Menu)

*Heuristic Violated*: Help and documentation/ Help, feedback, and error tolerance

*User-type Affected*: all users of application (Especially new septa riders who use the mobile application)

*Initial Error severity*: 2

*Final Error severity*: 2

*Finder*: Belmin Oommen

1. *Problem description*: The instruction of the unusual traffic notification section is hard to read and understand for users due to too small text font. The instruction and clarification for unusual traffic also be chaotic without highlighted important location and time information

*Problem Location*: "Alters" sections, instruction page for specific unusual traffic notification

*Heuristic Violated*: Match between system and the real world

*User-type Affected*: All users

*Initial Error severity*: 2

*Final Error severity*: 2

*Finder*: Zhan Li

1. *Problem description*: Opens the SEPTA App to the homepage, is seeking to book a fare and the app crashes and redirects to the Iphone home page

*Problem Location*: Opening the SEPTA App

*Heuristic Violated*: User does not need to consult external info on app use/ The app does a good job of preventing user errors/ The site can provide more detail about error messages

*DOET/HCI Principles Violated*: Visibility of affordances & signifiers

*User-type Affected*: Infrequent SEPTA User

*Initial Error severity*: 4

*Final Error severity*: 2

*Finder*: Frederick Brown

1. *Problem description*: Application has confusing operating Logic

*Problem Location*: Septa Mobile Application (General)

*Heuristic Violated*: 8. Aesthetic and minimalist design/User control and freedom

*DOET/HCI Principles Violated*: Visibility

*User-type Affected*: User who occasionally uses Septa Services

*Initial Error severity*: 4

*Final Error severity*: 2

*Finder*: Belmin Oommen

1. *Problem description*: The schedule data is not correct

*Problem Location*: Schedules page

*Heuristic Violated*: Match between system and the real world

*User-type Affected*: App users

*Initial Error severity*: 4

*Final Error severity*: 2

*Finder*: Yiyun Zhang

1. *Problem description*: Mobile Application crashes

*Problem Location*: Septa Mobile Application (General)

*Heuristic Violated*: Error Prevention/ Help users recognize, diagnose, and recover from errors

*User-type Affected*: User who occasionally uses Septa Services

*Initial Error severity*: 4

*Final Error severity*: 2

*Finder*: Belmin Oommen

1. *Problem description*: Viewing incomplete or incorrect information about the traffic schedule

*Problem Location*: Septa Mobile Application (Traffic Information Feature)

*Heuristic Violated*: Trust and credibility/ Search usability

*User-type Affected*: User who occasionally uses Septa Services

*Initial Error severity*: 3

*Final Error severity*: 2

*Finder*: Belmin Oommen

1. *Problem description*: Cannot understand how modern technologies work. Understanding new mobile applications is difficult so for a better experience an intuitive design for ease of use is necessary for a better experience

*Problem Location*: Septa Mobile Application (General)

*DOET/HCI Principles Violated*: Visibility of affordances, feedback & signifiers

*User-type Affected*: SEPA Traveler

*Initial Error severity*: 3

*Final Error severity*: 2

*Finder*: Nicholas Carmen

1. *Problem description*: Doubt the correctness and timeliness of the app

*Problem Location*: Schedules page

*Heuristic Violated*: Error Prevention

*User-type Affected*: SEPTA Traveler

*Initial Error severity*: 2

*Final Error severity*: 2

*Finder*: Nicholas Carmen

1. *Problem description*: Users need to select starting and destination points by clicking text-only station names without any visual mapping between those station's geographical location with their name

*Problem Location*: "Schedules" section, starting and destination point selection page

*DOET/HCI Principles Violated*: Good mapping

*User-type Affected*: Novices

*Initial Error severity*: 2

*Final Error severity*: 2

*Finder*: Zhan Li

1. *Problem description*: Users cannot close the pop-up screen when they activated the app, it is doing not respond to the user's operations and failed to provide feedback to let the user know what happened now

*Problem Location*: Pop-up windows in the starting screen

*Heuristic Violated*: Visibility of system status

*User-type Affected*: All app users

*Initial Error severity*: 2

*Final Error severity*: 2

*Finder*: Zhan Li

1. *Problem description*: The home page looks very bland and uninviting, there are few options for navigation, how do I know which tab to select to fit my needs

*Problem Location*: SEPTA App homepage

*Heuristic Violated*: Icons and graphics are standard and/or intuitive/ The site is pleasant to look at/ Color is used to structure and group items on the page

*DOET/HCI Principles Violated*: Natural mapping and head and world knowledge

*User-type Affected*: Infrequent SEPTA User

*Initial Error severity*: 2

*Final Error severity*: 1

*Finder*: Frederick Brown

1. *Problem description*: The Home page seems to offer concise options but may be too vague for the users. The app has bland colors such as the muted blue that is the main shade on the home page and the tabs seem to be not follow natural mapping.

*Problem Location*: SEPTA App homepage

*Heuristic Violated*: Icons and graphics are standard and/or intuitive/ The site is pleasant to look at

*DOET/HCI Principles Violated*: The tab options are really high up on the home screen and breaks natural mapping

*User-type Affected*: Experienced site user

*Initial Error severity*: 2

*Final Error severity*: 1

*Finder*: Frederick Brown

1. *Problem description*: The app did not provide any effective accelerators or convenient operations for the pro users. No matter if they are inexperienced users or old users, they all need to follow the same operating sequence to achieve their goal. The "Favorite routes" section is cut apart from other sections of the app

*Problem Location*: The overall structure of the app

*Heuristic Violated*: Flexibility and efficiency of use

*User-type Affected*: All users

*Initial Error severity*: 1

*Final Error severity*: 1

*Finder*: Zhan Li

## **Problems**

The problem list from the last section shows the most critical problem of the SEPTA app is the recent schedules download feature, which impacts all users of the application. If users choose the download later option, the pop-up window comes back every time after the user presses the back button. This design violates homepage usability and navigation and information architecture. For homepage usability, the repeating pop-up window causes extreme frustrations for users when switching to the homepage. This is also the reason for bad navigation and information architecture because users cannot go to the homepage and get desired information as they expected or follow the normal operations. In this case, the homepage feature of the SEPTA app is affected.

The second problem is the add to favorites feature. The process of adding a target route to favorites is different from normal users’ expectation or experience. Multiple transportation services’ stations, locations, names and routes are under the same page, or with the same names, for users to make the choice. It is very frustrating and confusing that impacts all users to use this feature, selecting or picking a specific route and adding to favorites. This design violates aesthetic and minimalist design, as well as visibility of affordances, feedback signifiers principles, because multiple, repeated, redundant information is contained in a single or the same choice menu. The home screen, which is the homepage feature, is affected because of this design.

Another problem scored 3 as its severity level is the schedule trips feature. It affects all users because users need to switch between different schedules sections and pages frequently in order to plan a long trip travel plan which involves multiple transportation services or routes. The design behind this phenomenon is because the schedule trips feature is based on the categorization of multiple SEPTA services, users have to pick one transportation method to start the planning process. It violates the heuristic which is recognition rather than recall because users have to memorize information and details from previous pages when they are switching sections between different SEPTA services. Thus, the schedules page and the schedules feature are affected in this situation.

The last problem of level 3 severity identified is the trip planner. It is an additional feature which is under beta testing for the current version of the SEPTA app. It requires jumps to an external browser in order to display and use the functions, and impacts all users of the application. Since it has no connections and links with the SEPTA app, users are not able to control the jump behavior or any operations inside the SEPTA app, as well as potential safety issues, so this design violates user control and freedom. There are several additional features in the more tab and the trip planner is one of them, so the more page is affected because of this problem.

The fifth problem in the prioritized problem list is the save button in the add to favorites feature. It impacts all SEPTA app users because it causes confusion about how to save the target route to the homepage screen. This feature is lack of tutorial and obvious sign to guide users add the route to their favorites at the homepage with clear and minimal operations. Therefore, the help and documentation heuristic violated, as well as the visibility of affordances, feedback and signifiers principle. For the SEPTA app, the homepage and next to arrive features are involved and affected by the use of add favorite button.

**Recommendations For Problems**

Through numerous medias of collect data such as surveying users, interviewing users, creating scenarios and personas, and heuristic evaluation pertaining this paper was able to gather relevant information regarding if heuristics were violated and how this violation directly impacts the users of the SEPTA App. The creation of personas and evaluation of heuristics provides great insight into the magnitude of varying issues within the app and identifying the ways in which the app can undergo improvements to better suit the needs of its user groups. This papers analysis in previous sections underlines approximately nine problem descriptions that produce an error severity rating of either three or four. Severity ratings this high must be resolved immediately due to the urgency that these issues put fourth; these errors dramatically influence core functions ultimately producing a negative experience for the user and in some cases even makes the app unusable.

As stated in the paragraph above, identifying problems that qualify such a high severity level must be dealt with and amended immediately. One problem identified that completely dismantles the integrity of the SEPTA App is their presence of inaccuracies with the schedule data. If the schedule on the SEPTA App is not accurate to what schedule these modes of transportation are actually following, this essentially makes the app unusable; hence why this problem was rated a four in error severity. To remedy this problem, this paper is recommending that if there is a change in scheduling, that this information is promptly changed in the app; having a person designated to report these changes in the app would result in these changes being reported almost instantaneously with the in-person changes. The SEPTA App should also include a feature that is a notification of any schedule changes and redirects the user to the new updated schedule when the notification is pressed. Another issue that ranks a four in severity is the app has confusing logic to users and this directly violates the heuristic principle eight that states, ‘aesthetic and minimalist design/User control and freedom.’ The recommended approach to fixing this issue is an aesthetic makeover of the app, ridding the app of unnecessary clutter, and better optimization of the apps systems. An app that is confusing for users to navigate with many menu options or the app crashes frequently, does not follow the guidelines of Human-Centered Design and should better tailor their app’s design to the intended user groups immediately. Another pressing issue that should be fixed immediately is the lack of usability in the favorites function on the app. The SEPTA App distinguishes itself from competitors by having the favorites’ function that allows users to save routes that they take frequently, so they can re-book them quickly. This function is a great in theory, but in actuality it creates a lot of frustration for SEPTA users because many different routes have the same or similar names so users can unknowingly select an unintended route as their favorite that shares a common name with the route that they frequently use. This problem has a relatively quick and simple fix; every route offered by SEPTA services should have a different name. Regardless, if these routes are similar, they should all have identifiable and distinguished names from one and other.

After properly dealing with the more severe errors within the SEPTA App, the less severe errors should be remedied after. Majority of these problems identified by this paper have to do with the app’s overall lack of affordances and signifiers. One of these problems is with the ‘my account’ feature; on the app, this feature is very difficult to locate because of its small size and odd placement. This problem does not provide users with an appropriate signifier for a very important feature on the app. To properly address and fix this issue, the ‘my account’ feature should be much larger in size and should follow the principles outlined in Fitts Law and be

placed in a position closer to the lower-half and middle of the screen. Another error that ranks lower in severity is the issue of users’ inability to close pop ups from the app. This error creates frustration from the user because they are unable to close the pop up and are not provided with feedback about how to remedy the situation. This paper recommends adjusting the software of the app, so that this issue does not happen every again. Problems such as this rank lower on the severity scale, but still have the potential to upset the user enough to not want to use the app in the future or recommend it to their fellow peers.

Ultimately, it is of the utmost importance of the SEPTA App to upkeep their app by user feedback. These app users interact with the SEPTA App daily in some cases and therefore have valid insight into problems that arise during their interactions with the app. Some of the issues identified are less pressing than others, furthermore higher severity errors must be remedied immediately. Although the lower severity errors present less emanate threats to users inability of using the app, they still cause user dissatisfaction and should be properly corrected.

**Summary**  
 To summarize, by looking for heuristics and DOET violations, a lot of major flaws about the Septa application was discovered. Since heuristics are basically general principles that all interfaces should follow, violating those shows that the application is definitely not truly optimized and can be improved. Also, preforming the heuristic evaluation exercise has showed us that there can be multiple ways to solve a problem. Many of the problems were stated across everyone’s evaluations and we each came up with different ideas on how to fix the issue. By comparing the different solutions, the team is able to isolate the best and most efficient way to solve the problem. The problems identified and solutions that the group came up with will truly help enhance the user experience for the Septa application.