Expedia

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Team Odyssey

Heuristic Evaluation

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Executive Summary

Expedia is a leading online travel booking company that allows users to book flights, hotels, car rentals and activity tickets online through their website and mobile app. The focus of our evaluation is Expedia's mobile app, more specifically the "bundles" workflow that allows users to book hotels and flights at the same time. We utilized Nielsen's heuristic evaluation, a method of evaluating systems for usability issues. We used this method to evaluate the Experia app on the following factors:

1. Visibility of system status
2. Match between system and the real world
3. User control and freedom
4. Consistency and Standards
5. Error prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimal design
9. Help users recognize, diagnose, and recover from errors
10. Help and documentation

We then used Nielsen's "severity levels" to evaluate the system based on these principles, a 0 being no usability problem, through 4 being a usability disaster. Our team individually evaluated the workflow, then brought our findings together for a comprehensive analysis.

Our team found no usability issues on visibility of system status, match between system and the real world, recognition rather than recall, and help and documentation. Cosmetic issues were found in consistency and standards and aesthetic and minimalist design, including slight variations on locations of features. Minor errors were found in the principles of error prevention and flexibility and efficiency of use, including the app lack of search history to provide more efficient searching for users. Finally, we found major usability problems in user control and freedom and help users recognize, diagnose, and recover from errors including payments screening errors. Luckily, we did not find any catastrophic usability errors in the interface. Based on these recommendations, our team would recommend the following: make the bundles workflows non-atomic, allow travel information to be updated while the user is in the bundles workflow, and distinguish credit card validation errors. Without our own usability testing and/or access to Expedias previous research that may have addressed these issues, was may be approaching this evaluation with a bias. Our next steps will be to conduct usability testing to further research and resolve any usability issues found.

Introduction

Expedia is a famous travel company that operates through an smartphone app and a website. Through Expedia, customers worldwide can book flights, hotels, holiday packages and leisure activities. Since 2007, the penetration of smartphones has increased the number of customers accessing travel services through apps. In order to target the growing smartphone user segment, Expedia's goal for this project is to improve the user experience of Expedia's iOS app users. The target population of this project is iOS Expedia app users in the age range of 30-55 years. Expedia has asked us to focus on the "Bundle" feature of the iOS app. This feature allows the users to book vacation packages by booking the hotels and flights in that order.

As discussed in this report, we performed a heuristic evaluation of the "Bundles" feature of the Expedia's iOS app. Heuristic evaluation is a method where evaluators carefully examine a variety of aspects of a system and judge the quality of key usability factors. We conducted the heuristic evaluation on all the steps involved in going through the process of booking a vacation package using the Expedia "Bundles" feature. We had the following two goals for the evaluation:

1. What is working well on the Expedia app according to the Heuristic Principles?
    - These are the good points that Expedia should continue to use as they are helping in delivering a great user experience, which is the ultimate goal.
2. What are areas of improvement where the app may not be following the Heuristic Principles?
    - These are the improvement points that Expedia can work on to improve the user experience of their app and increase user engagement

Methods

Nielsen's Heuristics

According to Nielsen, "Heuristic Evaluation is a usability engineering method for finding the usability problems in a user interface design so that they can be attended to as part of an iterative design process" (*Nielsen, 1994*). Essentially Heuristic Evaluation is a method of assessing the user interface for any potential usability issues, done by a small set of evaluators, in accordance with recognized principles of usability i.e. heuristics.

The scope of our project is limited to the Bundles feature of Expedia's iOS app. We evaluated this feature on the basis of Nielsen's heuristics given below -

1. Visibility of system status (*is the user always informed about the status of the system?*)
2. Match between system and the real world (*are real-world conventions being used?*)
3. User control and freedom (*how easily can the user leave an unwanted state?*)
4. Consistency and Standards (*does the system follow platform conventions?*)
5. Error prevention (*can user errors be prevented easily?*)
6. Recognition rather than recall (*is the user's memory load minimized*)
7. Flexibility and efficiency of use (*is the system flexible enough for all users?*)
8. Aesthetic and minimal design (*is irrelevant information present in the dialogues?*)
9. Help users recognize, diagnose, and recover from errors (*are error messages properly displayed?*)
10. Help and documentation (*is help and documentation available to the user?*)

Along with the 10 different heuristics, Nielsen also proposed the concept of severity levels (*Nielsen, 1994*), as follows -

Severity rating	Description
4	Usability Catastrophe
3	Major Usability Problem
2	Minor Usability Problem
1	Cosmetic Problem
0	No Usability Problem

Individual Pass

The team first got together to discuss the scope and the definitions of each of heuristics for the project. The scope was established as the user flow from the main landing page of the app to the Checkout screen where the user enters his/ her details. Every screen/ option/ menu including these two screens, would be scrutinized, considering the heuristics. The team then split up and decided to evaluate the Bundles feature, individually and assign a severity to every heuristic. Each team member was also encouraged to take a screenshot and highlight any menu/ option/ text that was a good example of any heuristic. The evaluation was done in 3 passes, where the first pass concerned with the first three heuristics, second pass was about heuristics 4-6 and the last pass covered the last 4 of Nielsen's heuristics.

Analysis

The team got back together after the individual evaluation session. Heuristics that had the highest severity levels were first analyzed. The team then attributed a final severity rating to every heuristic after a brief discussion. The heuristic with majority of severity ratings corresponding to the highest rating, was assigned a high priority. This was done with the rest of heuristics as well and we got a list of heuristics with consolidated severity levels, called **list A**.

We assigned weights to each of the severity levels as following -

Severity Level	Weight Assigned
4	0.8
3	0.6
2	0.4
1	0.2
0	0

For every heuristic by each member, a score was calculated after multiplying the severity level attributed by the, and the corresponding weight, like the concept of a weighted matrix. **List B** was obtained with each heuristic's final score being calculated after adding every team member's individual score for that particular heuristic. List B was used to cross examine list A and surprisingly no corrections were needed to be made to **list A**.

Using the final list of heuristics with their priority levels, the team walked through the Bundles feature on the app. The app was projected onto a secondary display using Reflector, a display mirroring software, to finalize the priorities of heuristics. Recommendations were proposed by individual team members for each of the heuristics. These were then discussed within the team and a set of recommendations for the client, that focused on changes in the user interface, was conceptualized. The screenshots taken by individual members were also projected on the display, discussed among the team members and subsequently suitable recommendations were developed for the client to consider.

Findings and Recommendations

Our team of researchers found that Expedia's iOS app was designed really well in terms of providing a good user experience except for a few minor shortcomings that the heuristic evaluation helped in bringing out. We applied every one of Nielsen's ten heuristics and were able to consolidate our individual analysis as depicted in Table 1. As can be seen from this table, none of the heuristics received a harsh rating of "4" which reflects on the good design of the app, indeed. The key findings have been highlighted in the following sections along with relevant and actionable recommendations.

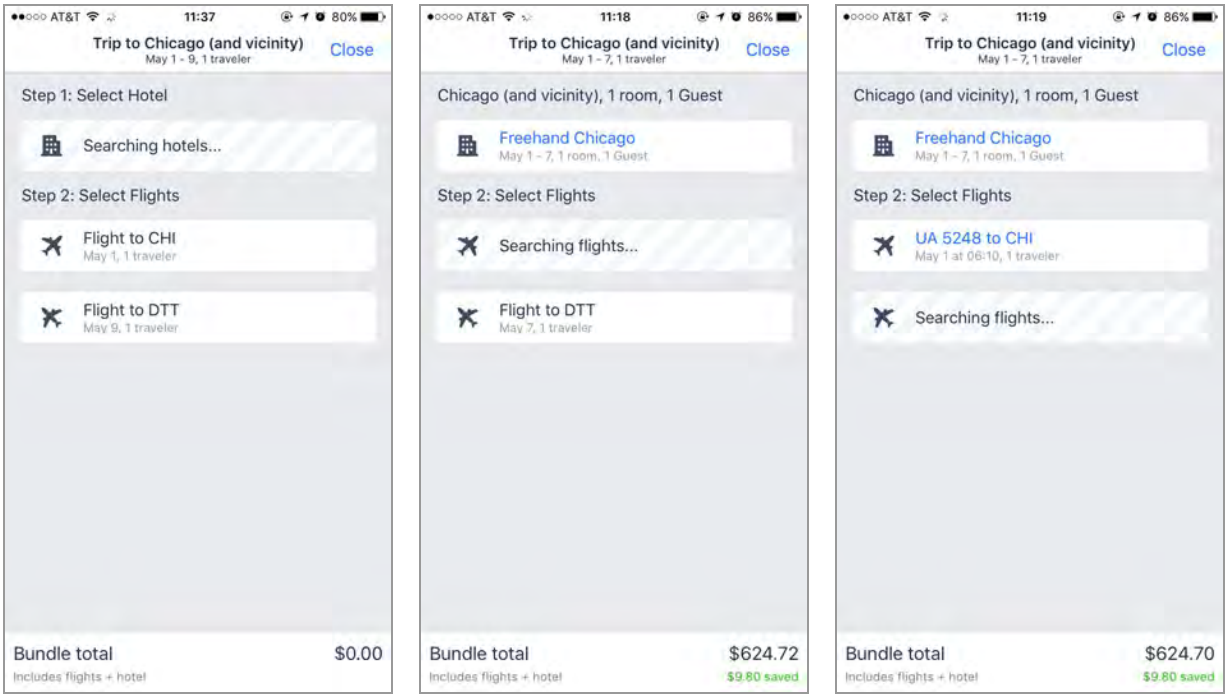
Heuristic	Severity rating
Visibility of system status	0
Match between system and the real world	0
User control and freedom	3
Consistency and standards	1
Error prevention	2
Recognition rather than recall	0
Flexibility and efficiency of use	2
Aesthetic and minimalist design	1
Help users recognize, diagnose, and recover from errors	3
Help and documentation	0

Table 1 - Consolidated heuristic evaluation severity rating

Findings

Visibility of system status (no usability problem)

We found that the Expedia app does a pretty good job at keeping the user informed about the current status of their Bundle booking workflow. Consequently, we did not find any major or minor usability issues for this heuristic. Fig. 1 shows the progress screen for the Bundles workflow.



(a) (b) (c)

Fig. 1 - Expedia progress page transition through the Bundles flow

(a) Progress for searching hotels **(b)** Progress for searching outbound flights **(c)** Progress for searching inbound flights

Not only does this screen show the progress of booking a bundle, it also shows the consolidated price at the bottom right. The Bundles workflow has three major steps: selecting a hotel, selecting an outbound flight and selecting an inbound flight; this screen is displayed before and after the commencement of each step. We think this lets the user know exactly where they are in the Bundles flow.

Match between system and the real world (no usability problem)

Expedia employs the common travel vernacular across the app and this aligns well with a user's mental model. We did not find any terminology that would be confusing to the user. Moreover, Expedia uses skeuomorphic icons that are in close resemblance to their real-world depictions as shown in Fig. 2.

Fig. 2 - Usage of skeuomorphic icons in the Expedia app

User control and freedom (major usability problem)

The Bundles flow is atomic i.e. a user can not use other features of the app while booking a bundle. A use case where this design might not work is when the user wants to compare the price of bundle with individual hotel and flight prices. We recommend that there be a "minimize" functionality to resume bundle booking within the app (discussed in detail in the recommendations section). Further, there is no provision to modify the travel information after the bundles flow has initiated. In Fig. 1(a), the summary of travel information on the top is non-clickable and can not be used to modify the input data. However, in the case the user decides to alter this information, the app furnishes a pretty straightforward way of exiting the flow and pre-fills the input fields with old values. This allows the user to just update the details they want rather than having to enter all the information again. Other good usability features include the inclusion of "Done" and "Cancel" buttons in the filter sub-screen which gives the user a better sense of control to use this feature (Fig. 3).

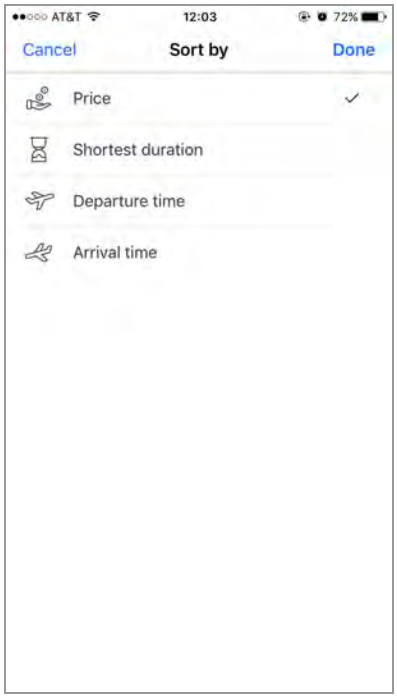
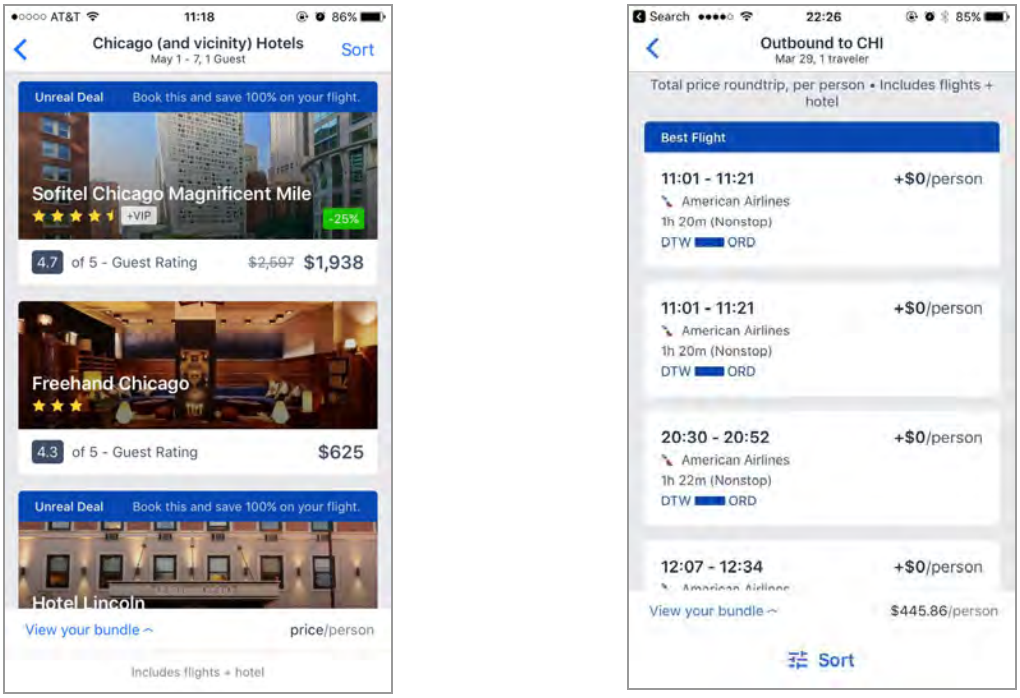


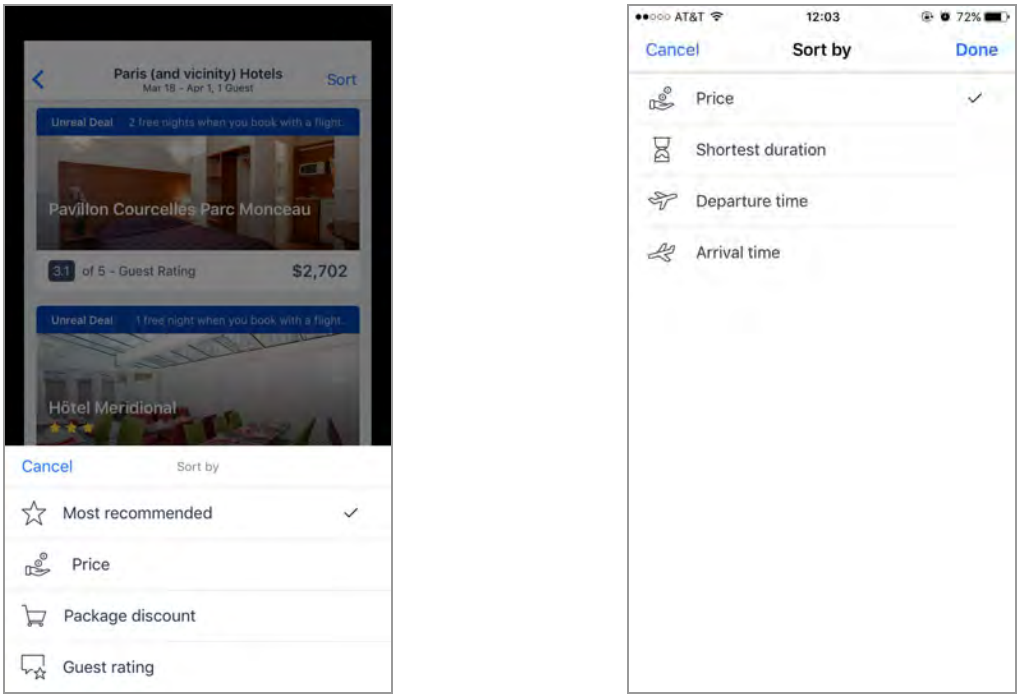
Fig. 3 - "Done" and "Cancel" buttons in the filter screen give a better sense of control to the user

Consistency and standards (cosmetic problem)
The flows for booking outbound and inbound flights are consistent and overall, the flow for booking bundles does not demonstrate any irregularities regarding consistency. The app also employs the iOS design patterns well. A minor usability issues that we encountered under this heuristic are shown in Fig. 4 and Fig. 5.



(a) (b)

Fig. 4 - Inconsistent placement of the "Sort" button in hotels and flight listing screens **(a)** Button placed top right for hotels **(b)** Button placed at the bottom for flights



(a) (b)

Fig. 4 - Inconsistent sort screens for hotels and flights in the bundles flow
(a) Sort widget occupies bottom portion of the screen for hotels **(b)** A separate screen dedicated to the sort widget for flights

Error prevention (minor usability problem)

The Expedia app employs widgets to fill information which prevents a lot of errors from occurring at all. In the initial screen for the bundles workflow, the dates are input using a calendar widget which prevents classic errors such as selecting a date that is prior to the current date and selecting an end date that is prior to the start date. And while the user is selecting flights and hotels, the filter widgets are primarily composed of radio buttons and checkboxes rather than text fields which also prevent a lot of typos. The checkout screen is equally well designed; the credit card expiry date field, again, employs a widget rather than a text input, however, the credit card field does not have any validations for the length of credit card number (Fig. 5). Although, this input field restricts numeric input, there is no restriction on the length of the credit card field. A user might type 15 digits or 17 digits accidentally and the field's border shall become red in that case. We think, that the length of this field should be restricted to 16 digits.

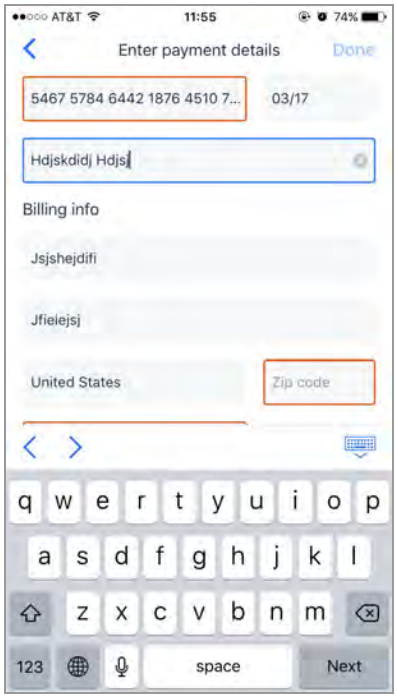


Fig. 5 - No restriction on the length of the credit card number field (in this screen, the user has input more than 16 digits)

Recognition rather than recall (no usability problem)
We think the display of the loading screen in between every major step of bundles acts as a "quick summary" screen on which the user can see which hotel they selected, which flight they booked and how much the bundles is going to cost.

Flexibility and efficiency of use (minor usability problem)
We found some features that could speed up a user's process (accelerators) such as saving the credit card information for future usage. However, this works only as long as the user remains logged in. We also found that a "history" feature wherein the user can access their past trip details when filling out the information might further speed up their workflow.

Aesthetic and minimalistic design (cosmetic problem)
Expedia employs a minimalistic design overall which does not overwhelm the user, however, the hotel review screen could have been better designed (Fig. 6). The reviews are presented verbatim and could have been summarized like Priceline's reviews which show only the key "good" and/or "bad" parts of a user review.

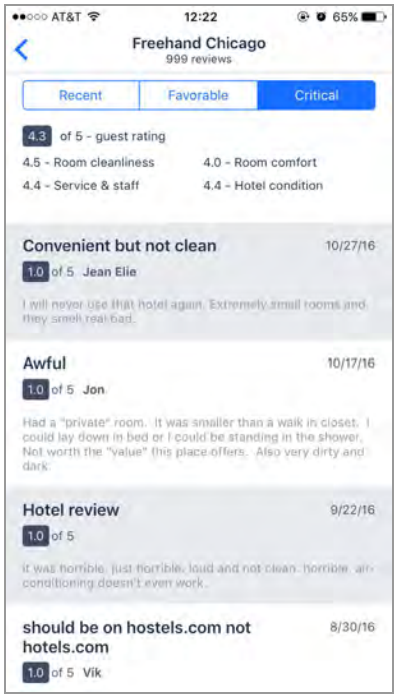
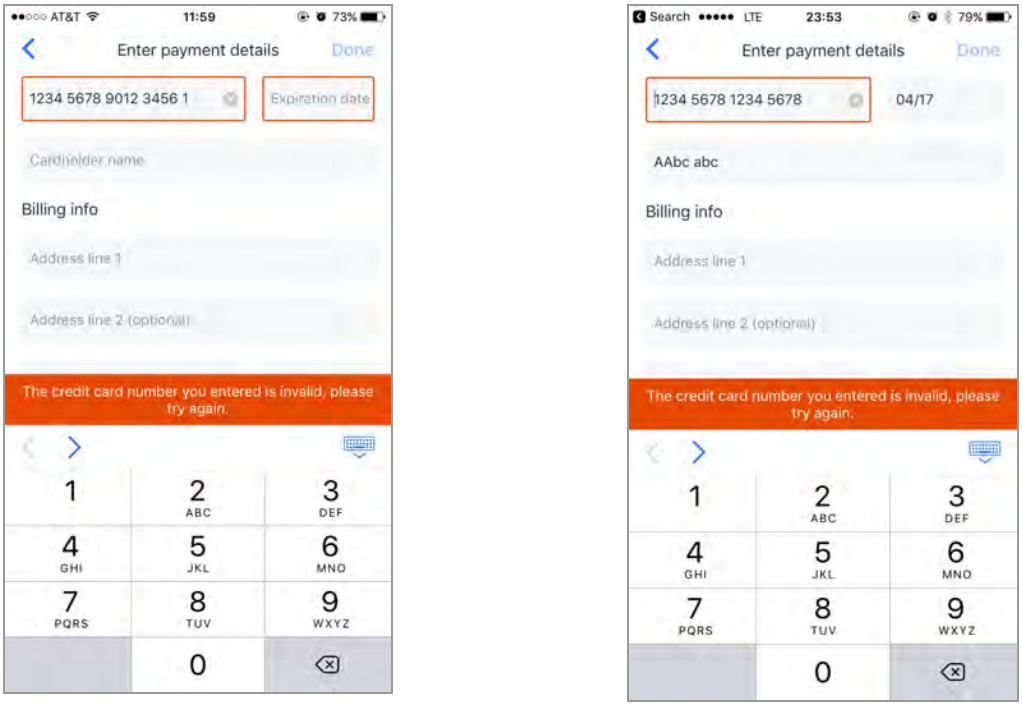


Fig. 6 - Hotel reviews screen not quite minimalistic

Help users recognize, diagnose, and recover from errors (major usability problem)

Expedia has a pretty good error prevention mechanism throughout their bundles workflow except for the credit card field in the checkout screen. As mentioned before, there is no limitation on the credit card field and consequently the user can type less or more digits required for a valid credit card number. Another error the user can commit is typing an invalid 16-digit credit card number. However, the app shows a generic error and does not tell the user whether they committed an “invalid length” error or “invalid number” error with regard to a credit card number (Fig. 7).



(a) (b)

Fig. 7 - Invalid credit card error
(a) Error message for entering more than 16 digits **(b)** Error message for entering invalid 16 digits

The error message is vague and does not suggest the course of actions to correct it. It should mention about whether the user entered more or less digits or whether they entered an invalid number overall.

Help and documentation (no usability problem)
We think Expedia's iOS app is simple to use and the user can learn it quickly with minimal or no help at all.

Recommendations

Recommendation #1: Make Bundles non-atomic
The user can not resume their Bundles workflow if they decide to check or compare prices within the app. We recommend that the Bundles flow can be "paused" by minimizing it and being displayed as a clickable widget on the top or bottom of the app screen as the user navigates around the app. We think this will greatly enhance the user experience as the user will no longer have to go through the entire Bundles flow if they choose to exit in between and wish to resume.

Recommendation #2: Allow travel information to be updated while user is in Bundles flow

Once the user has initiated the bundles flow, they are bound with the date they input. If the user realizes a mistake in the traveler info or even the dates the user has to start over again. We recommend that the user be allowed to update this info while inside the bundles flow. While we acknowledge that this might not work well with the flights since the are date-specific (very dynamic), it would work for hotels. The user shall be able to modify the traveler information with the hotel and flights selected and this will result in an update of the bundle selected. If the flights can not be accommodated for the update information, an indication of some sort can be shown to the user asking them to rebook the flights. And if the hotel is able to accommodate this change, another indication (a green tick, perhaps) can be shown to let the user know that they do not have to re-select the same hotel.

Recommendation #3: Distinguish credit card validation errors
The error message should specify what caused the error and be separate for the two kinds of errors, namely invalid length and invalid card number. The current implementation shows the same error message and might confuse the user regarding what caused the error pop-up to show.

Discussion

Based on the findings that we generated from the heuristic evaluation, we had a good understanding to the potential usability issues that Expedia's mobile app faces. However, heuristic evaluation itself has a limitation that it can be biased and partial without conducting usability testing. By observing the users interacting with the product throughout the entire process, we might be able to observe more usability flaws as well as validate our heuristic evaluations. For the next step, we plan to conduct usability testing of the app with our target audience.

Since our team did not have the access to the previous user research reports and usability testing that Expedia had done, our current evaluation might present some findings that might have already been considered and tested by Expedia. Therefore, it would be very helpful if the previous usability testing and user research data can be made accessible to us, which would be a great resource to validate our current evaluation.

Conclusion

Overall, from our thorough evaluation based on Nielsen's heuristics, we formed good understanding of what is working well and what needs to be improved in the Expedia app. Also, we have identified major usability issues within the Bundles workflow in the app and the findings can serve as guidelines in future usability testing. According to our findings from the heuristic evaluation, we suggest Expedia to make Bundles nonatomic, to allow travel information to be updated while user is in bundle flow, and to distinguish credit card validation errors. We believe the user experience can be enhanced if the aforementioned recommendations are considered and implemented.

Appendix

I. Individual Input for Heuristic Evaluation

Kehan Liao

Heuristic Evaluation	Severity Level	Notes
Visibility of system status	0	The app gives enough amount of feedback to indicates what is going on in the system.
Match between system and the real world	0	The app uses natural languages for information display and is designed in a logical ordered workflow.
User control and freedom	2	Not be able to change travel information after the bundle workflow has started. Users need to quit the entire search and restart again.
Consistency and standards	1	“Sort” feature UI design not consistent in hotel search section and flight search section.
Error prevention	2	In the payment information page, there’s no error notification when enter wrong invalid card number as long as the card number starts with “4”.
Recognition rather than recall	0	The information, action, and options are clear to users.
Flexibility and efficiency of use	2	Once the user logged in the app, user will remain logged in. It serves as an accelerator for users to use. However, the system does not have a “search history” feature for users who wants to do separate their travel planning researches into several times.
Aesthetic and minimal design	0	The app did a good job to keep the interface design aesthetic and with minimal information.
Help users recognize, diagnose, and recover from errors	2	Not enough alert information (“invalid card number”) when users entered wrong card number.
Help and documentation	0	App design and system workflow are straightforward. App doesn't need documentations.

Megan Kipp

Heuristic Evaluation	Severity Level	Notes
Visibility of system status	0	System provides adequate feedback to interpret status
Match between system and the real world	0	System uses familiar language for travelers and does not cause confusion
User control and freedom	3	System does not allow users to create their own workflow. It is rigid, and does not easily allow edits in searches without starting from the beginning.
Consistency and standards	1	System displays slight inconsistencies in placement of sort feature
Error prevention	2	System could improve error prevention in the payment fields, which is an important area
Recognition rather than recall	0	System displays loading screens that provide quick refreshers to the user
Flexibility and efficiency of use	1	System lacks certain “history” features that could improve efficiency for frequent users
Aesthetic and minimal design	1	Overall good, but could clean up and summarize reviews
Help users recognize, diagnose, and recover from errors	2	With payment errors, the system does not clarify exactly where the error lies
Help and documentation	0	System overall very easy and clear to use

Gaurang Alat

Heuristic Evaluation	Severity Level	Notes
Visibility of system status	0	Progress bar is present, when flights and hotels are being searched When entering data before searching, it shows the field name in title bar when entering data in the text box
Match between system and the real world	0	Icons are skeuomorphic - flight and hotel icons in the Bundle's user flow, Amenities in each of the hotel info, icons inside the sorting feature
User control and freedom	3	Done and Cancel options are present, when you click on sort function Presence of a Back button for every result (flight, hotel) Arduous task to exit when user is already inside the Bundles flow (major issue)
Consistency and standards	0	Consistent user flow for booking hotel and flights Identical flow for booking to and fro flights
Error prevention	2	Credit Card textbox does not prevent user from entering more than 16 digits
Recognition rather than recall	0	The calendar view informs the user about the day of the week for a particular date
Flexibility and efficiency of use	2	Card payment info is stored and accessible only if user is logged in History of searches is absent (important feature for frequent travelers)
Aesthetic and minimal design	0	The overall design is clutterless and minimal
Help users recognize, diagnose, and recover from errors	3	Chances of user errors are minimized since the app has drop down menus instead of text boxes No error message when more than 16 digits are entered in credit card number field
Help and documentation	0	There is an icon to get more information in Flights as well as the final Bundles screen (just before checkout)

Sanmeet Jasuja

Heuristic Evaluation	Severity Level	Notes
Visibility of system status	0	It looks pretty good overall. The status bar is present when making a reservation
Match between system and the real world	0	The system is easy to understand with no technical jargons for the user
User control and freedom	2	The app does not allow users to explore other options when the user is already in a single activity process.
Consistency and standards	2	The filter and sort options are not consistent in different app features
Error prevention	2	Credit card number input field allows for more than 16 digits.
Recognition rather than recall	0	The flow is good with relevant cues to recall any information that user might need.
Flexibility and efficiency of use	1	Autofill and history feature is missing for frequent travellers
Aesthetic and minimal design	0	Overall a clean and beautiful design
Help users recognize, diagnose, and recover from errors	3	On incorrect input of credit card, it is not clear what the error is.
Help and documentation	0	No issues in this heuristic

Navdeep Singh Bagga

Heuristic Evaluation	Severity Level	Notes
Visibility of system status	1	I gave this rating on the basis of the Bundles workflow. I think a tiny minimalistic progress bar on top or the bottom or integrated with the Bundles summary at the bottom could augment the system's visibility.
Match between system and the real world	0	No problem at all. I didn't find any term that I didn't understand or that was too technical for me to comprehend.
User control and freedom	2	The current Bundles flow is atomic i.e. the user has to go through the entire workflow to conclude it. There is no possibility of being able to resume the Bundles workflow after a detour into other features of the app,
Consistency and standards	2	Not only is the "sort" button placement different for hotels and flights in the Bundles workflow, the resultant screen containing various filters is also different for the two. While I understand that the filters for hotels and flights can not be same, but the way they are presented should be consistent.
Error prevention	2	Expedia does its best to prevent errors by employing widgets rather than text fields. The usage of calendar to input details in conforming with the current industry standards and overall everything is pretty solid but the checkout screen has one major issue. There is no validation on the length of the credit card. Although trivial, this needs to be addressed.
Recognition rather than recall	0	The Bundles flow is not a complex one and Expedia does a pretty good job at this heuristic.
Flexibility and efficiency of use	0	I found Expedia app to be very efficient and flexible.
Aesthetic and minimal design	0	Kudos to Expedia for executing minimal design so well.
Help users recognize, diagnose, and recover from errors	1	The credit card error plagues this heuristic again. The error displayed is vague and does not suggest a course of actions that would eradicate that error.
Help and	0	I think the Expedia app is well-designed and any user can

documentation		start leveraging its features from day one. Help and documentation are not needed as such, according to me.

II. Final Heuristic Evaluation

	Gaurang	Navdeep	Sanmeet	Megan	Kehan	Severity	Weighted Scores	Priority
Visibility of system status	0	1	0	0	0	0	0.2	
Match between system and the real world	0	0	0	0	0	0	0	
User control and freedom	3	2	2	3	2	3	6	
Consistency and standards	0	2	2	1	1	1	2	
Error prevention	2	2	2	2	2	2	2	
Recognition rather than recall	0	0	0	0	0	0	0	
Flexibility and efficiency of use	2	0	1	1	2	2	1.2	
Aesthetic and minimal design	0	0	0	1	0	1	0.2	
Help users recognize, diagnose, and recover from errors	3	1	3	2	2	3	4.4	
Help and documentation	0	0	0	0	0	0	0	

*Red - Highest priority
Green - Lowest Priority