

Information Architecture Analysis and Redesign for United Airlines Website

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Chapter 1

Introduction

1.1 Objective and Methodology

My targeting website is United Airlines (United.com). I chose United.com because I, as an international student, sometimes feel difficult to look for some services in an airline website. Also, I got a lot of responses from other students who experienced the same difficulties when visiting an airline website. Moreover, I'm interested to investigate the impact of cultural background on labeling system. So I set my scenario as if United Airlines wants to expand its globalization market, what's the positive and negative side of the existing basic labels? At this point, my focus is about the consistency of an airline website targeting global market. The website, to be successful in global market, should first build a consistent and unified foundation before adjusting to different local market.

The context for my scenario, thus, consists of three different forces: the stakeholder of the United Airlines Company, targeted users in the global market, and other competitive airline companies and their websites.

Since United Airlines has a complicated information architecture, I narrowed down my object to the global navigation labels (navigation system choices), which represents the options in navigation systems and try to evaluate it more comprehensively.

I evaluated these global navigation labels from two perspectives: first, do the global navigation labels represent the basic attributes user want in an airline website? Second, do these labels represent the frequently asked attributes?

Basic attributes obviously are the services users desire to find in global navigation system. The list of basic attributes for an airline website is referenced by Factor analysis of airline website attributes (Appendix G). Frequently attributes, literally, are the services user can't immediately find or feel confusing in global navigation system. The list of frequently asked attributes is provided by FAQs.

The labels representing the basic attribute and frequently asked attributes should be placed on various places for customers to reach, such as global navigation system.

gation system and contextual navigation system. But my focus is the labels on the global navigation system. The reason why I pinpoint the global navigation system is based on my observation of user behavior and the principles of information architecture discussed in textbook . Observation on user behavior told me that they would first look for the global navigation system. If failed, they would resort to FAQs. Some of them were patient enough to get to the phase of seeking help; some of them just closed the window after unable to find what they need in the global navigation bar.

For the first perspective, three evaluation questions are raised: are all the basic attributes represented by the global navigation labels? Are the global navigation labels consistent in site and also out of side? Is the classification strategy appropriate for our targeting customers? For the second perspective, two questions are raised: are all the frequently asked attributes represented by the global navigation labels? Are the labels consistent in the domain of airline websites?

Considering the special need for different perspective, I chose two main methods such as card sorting and competitive benchmarking. Then I analyzed the data collected from the evaluation experiments. Based on these finding, I made some suggestions for the redesign of United Airline Website. My design purpose is to make sure the global navigation labels not only represent the basic attributes for an airline website, but also address the frequently asked attributes.

Overall, my strategy for this project is problem solving strategy. The methodology is one main focus, limited scope, various evaluation perspectives, and appropriate evaluation methods.

My investigation process is demonstrated in Figure 1.1.

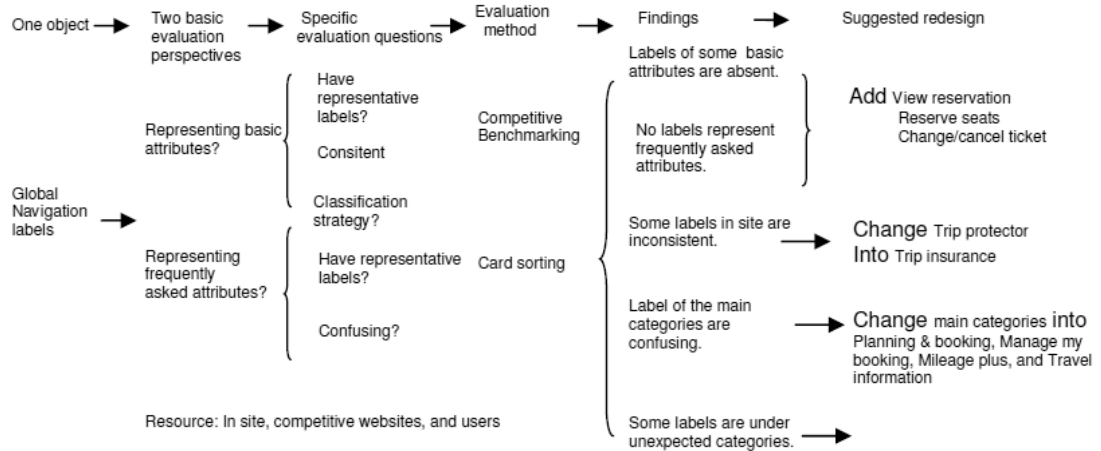


Figure 1.1: Structure of My Project

1.2 Context Analysis

My project started with the investigation of the context. Understanding the goals and the environments for my targeting website is the foundation for the following evaluation and redesign process.

United Airlines Company targets global market. The goal of United.com is building an efficient platform facilitating the communication between the company and users, connecting users pretty well with all the provided services. Users need and users difficulties, from this perspective, should be the main focus of United.com. However, the website should also concern the business goals to promote the ticket sell and relative sell. A perfectly usable site that fails to support business goals wont last long. A successful airline website should balance user-centered design and business (page 234).

Also, United.com is not living in the vacuum, facing challenges from a lot competitive airline companies which also target global market. This requires the information architecture of United.com not keeping consistent in site, but also to be consistent with other competitive websites and to be unified in the whole field.

Thus, the context surrounding United.com is the interplay of three different forces: the stake holder of the United Airline Company, targeted users in the global market, and other competitive airline companies and their websites.

This interplay of different forces not only builds a foundation for our evaluation, and also explains for a lot of findings based on experiments. Specifically, for global navigation labels, the context explains why there are not only labels representing the basic services user need and also labels representing ticket sale and other promotion program.

As a global company, the information architecture of United.com should be consistent. That means before it considers the factor of different cultural background, it should first build a consistent and unified foundation for the adjustment to different local market. My project at this point mainly focuses on the consistent features or attributes of United.com. I will continue to investigate the difference in the future work.

To concern the unified value of United.com, in competitive benchmarking, I selected the airline websites which once won the best customer service and best global website awards [1][6].

To emphasize the consistency of Unites.com as a global website, in user study, I involved people from different cultural background. The experiment results reflected some difference, although more commence among different user groups.

To consider each force involving in the context of United.com, the resources of my evaluation process include in site, competitive websites, and targeted users. I will concern the resource of domain ontology in the future works.

1.3 Description of United Airlines

My description of United.com mainly goes to the basic attributes of the global labeling system, since its the scope of my project. Also, because United.com is such a complicated website, I will only focus on this scope and try to evaluate it more comprehensively. The following summarizes the features of global labeling system, of which the detailed analysis will described in the evaluation process.

The positive sides of global labeling system consist of four points. First, most of the global labels are representing the basic attributes user need and desire to find on the homepage of an airline website. Second, the classification strategy of the global labels is appropriate according to the domain standard and the requirement of targeting audiences. Third, for the frequently asked attributes, United Airline provides more than one access for user to reach. Fourth, to make the frequently clicked labels more accessible to users, United.com uses facet classification strategy although this causes confusing in some cases.

The negative sides of global labeling system include: first, some labels representing the basic services are not located in global navigation system. Second, some of the global labels are not consistent or do not use preferred vocabularies which make user hard to relate them to the service theyre looking for. Third, the labels of global classification are not unique, which make user hard to differ them. Fourth, the classification of some global labels does not make sense for use, and users are unable to expect the appropriate subsets of each category.

Chapter 2

Evaluations

2.1 Evaluation critique standards and methods

The standers I leaned in class guide my evaluation process, providing various perspectives to assess the objects, and provide appropriate evaluation methods.

2.1.1 Evaluation standards

The evaluation questions are designed according to the basic principles discussed in our textbook and class. These principles support various perspectives to assess the object.

Label system, as discussed in chapter 6 of textbook, should be representative and unique, user-centric, and consistent. Consistency is especially important for global navigation labels. Because a global navigation system typically occurs again and again throughout a site, global navigation labeling systems are magnified through repeated exposure. To evaluate the consistency of the global navigation labels in site and out site, a small content analysis (Appendix B) and competitive benchmarking were conducted.

Classification system, as discussed in chapter 5, inherently reflects different perspectives in the specific context and objectives. Multiple classification strategies could be applied to the same sets of labels, and different strategy will affect the efficiency of communication for the website. The main challenge of organizing information is to minimize ambiguity (page 55). To dig out the ambiguous part, card sorting was conducted (Appendix E). Other than get rid of the ambiguity, the global navigation labels should select one from each of the main categories and applying it consistently, thus these labels are integral to building a sense of familiarity to users (page 93, textbook). These principles are concerned when making decision on suggested redesign.

2.1.2 Evaluation methods

Card sort exercise is conducted because its one of the best ways to learn how my users understand, group, and sort the labels in their own heads. As discussed in textbook (page 255-259), closed card sorts provide subjects with existing categories and ask them to sort content into those categories. This approach is appropriate for assessing my object: the relationship among small sets of global navigation labels. I used online card sorting program, which allows users to sort the attributes according to the predefined labels and to leave their comments. This integrates quantitative and qualitative sides. On the quantitative side, I can capture the percentage of time that users place two cards together. Also, the percentage of time a specific card is placed in the same category. On the qualitative side, the comments from users help me how they explain these predefined labels. At the start of my card sort, I ask users to leave comments on what labels they think difficult to group.

Competitive benchmarking is used to indicate a point of reference from which to make comparative measurements or judgments. Borrowing good ideas from our competitors is part of the advantages (page 244-246). However, this approach also has the risk of borrowing bad ideas. Also, you may not get bad ideas but your sample range is too small to observe the tendency helping you to make judgment. In my project, to minimize the risk, I did a lot of investigations and then chose the ten airline websites, of which the customer service and website are highly satisfied by users [1][6].

My sources for concerning global navigation labels mainly comes from competitive sites, I search some articles for existing controlled vocabularies and thesauri, but I did not have time to cover more, which I will address it in the future work.

2.2 Evaluation process

My main focus is the global navigation labels. Overall, I will evaluate them from two perspectives: first, are the global navigation labels represent the basic attributes user need in an airline website? Do those labels make sense to users and can connect uses with the services theyre looking for? Second, are these labels addressing the frequently asked attributes?

Basic attributes obviously are the services users desire to find in global navigation system. The list of basic attributes for an airline website is reference by Factor analysis of airline website attributes (Appendix G). Frequently attributes, literally, are the services user cant immediately find or feel confusing in global navigation system. The list of frequently asked attributes is provided by FAQs. My evaluation emphasized the data from FAQs because FAQs is an important resource reflecting user experiences. The analysis of FAQs in some extent equals to the analysis of user search log. Since Im unable to get the search log, I decide to treat FAQs seriously. Also, learned from text, a good architecture should enable user to find what they frequently need in global navigation

system instead of depending on searching them.

Specifically, three questions are being investigated for the first perspective: Are the basic attributes desired by targeting customers all represented by global navigation labels? Are they unique and consistent in site and out of site? How about the classification strategy behind these labels?

From the second perspective, the problem behind the frequently asked questions could be either no representative label existed or existed but confusing. Based on the assumptions, two questions are raised: are the frequently asked attributes represented by the global navigation labels? If not and I plan to add them in the global navigation system, what are the labels used for other competitive websites? If existed and I assume the reason for frequently asking is confusing, what are the labels used by other competitive websites?

These five questions are raised based on the design principles discussed in class and textbook, which mainly focus on two sides: label and classification strategy.

To investigate each question, I selected two main methods: competitive benchmarking and card sorting, which concerned the resource of user and competitive website. For competitive benchmarking, nine websites were selected considering two resources: the sites which users feel satisfied [1] and the sites are successful on the global market[6]. For the card sorting, I chose free card sorting software online. I select 10 participants from different cultural background.

My design purpose is to make sure the global navigation labels not only represent the basic attributes for an airline website, but also address the frequently asked attributes.

In the process, I found the conflict between users and Airline Company. Especially, some labels are not most desirable by users but they appear on the most obvious place and also various places. This is considering the interests of the company. My redesign tried to balance these two sides interests.

For each small perspective, the evaluation process is demonstrated in such an order: evaluation question, select method, collected data, and findings.

2.2.1 Basic Labels

a) Are the global navigation labels represent the basic attributes user need in an airline website?

a) Are the global navigation labels represent the basic attributes user need in an airline website?

Before evaluating the consistency and unique of the labels, first there should exist labels in the global navigation system representing the basic services. This is really important because if user can not find what they want on the global navigation system, they may close the window of this website. To figure out what are the basic services user expect to see on an airline website, I refer an airline website content analysis article based on user experiment. The paper An Exploratory Analysis of Traveler References for Airline Website Content explores the preferred content attributes on airline website which are expected

by customers. The study was conducted by surveying 903 respondents using an online questionnaire.

From appendix G, I selected all the Airline Website Attributes for which the mean value are lower than 2 to build the foundation for basic label list (the mean value is lower, the attributes are more desirable for the users). The list includes Domestic holidays, destination information, real-time flight information, change a ticket online, cancel a ticket online, view current flight bookings, booking, finding g information on flights, flight schedules, search for a ticket by date, search for a ticket by price, booking flights online, and seat request.

Also, the following attributes are most desirable by users: booking engine, special offers, link to flight routes and schedules, frequent flyer login, customer service phone number, link to FAQ, link to destination information, link to about us, and customer service email.

Looking for all these basic attributes in the global navigation system, which is demonstrated in Appendix A , I found that most of them do have representative labels while some of them do not have labels, such as change/cancel a ticket online, view current flight bookings, and seat request (see Table 2.1).

Table 2.1: Global navigation labels of United.com

Basic Attributes for An Airline Website	Global Navigation Labels
destination information	destination information
real-time flight information	flight status
<i>change a ticket online</i>	
<i>cancel a ticket online</i>	
<i>view current flight bookings</i>	
booking	planning and booking
finding g information on flights	In-flight services
flight schedules	flights or my trip templates
booking flights online	flights
<i>seat request</i>	
booking engine	planning and booking
special offers	special deals
link to flight routes and schedules	route maps
frequent flyer login	my itineraries
customer service phone number	customer service
link to FAQ	customer service
link to about us	customer service

More than that, I found that these absent labels representing the basic attributes are also in the list of frequently asked questions which are listed later in Section 2.2.2. This proves that these labels are so important, which I would suggest to add to the global navigation system.

b) Are they unique and consistent in site and out of site?

To evaluate the consistency, I captured the existing global navigation labels in Table 2.3. As discussed in textbook (Page 101), creating a labeling table is often a natural extension of the content inventory process. During this process, inconsistency are easier to catch, in United Airlines case, I found two variants of the labels representing flight insurance: trip protector and trip insurance.

Table 2.2: Overlap of absent labels representing basic attributes, FAQs, and Small user interview. From table, we can see that the missing labels for basic attributes in the global navigation system are also the labels frequently asked by users.

Absent labels	FAQs	user interview
1 change/cancel a ticket online, 2 view current flight bookings 3 Seat request.	1 Change or cancel ticket 2 Reserve a seat 3 View reservation 4 Ticket refunds 5 Flight status 6 Book travel on line 7 Check in 8 Baggage 9 Contact us	1 Cancel ticket 2 Reserve seat 3 View reservation

Also, two variants of the labels representing flight information are flight status and flight notification. These labels are also the confusing labels for users based on the comments for card sorting. Based on these, I can conclude that the inconsistency of labels is one of the main problems causing confusion.

Also I found that for the Airline United website, its good for them to put one item under different category, which provides user various accesses, which we will discuss in detail later. But the problem is if you put them under different places using different vocabularies, this would be really confused for customers especially the international customers.

Based on this analysis and also the result of competitive benchmarking, in which labels in italic are the most frequently used labels, I suggest to change trip protector into trip insurance, change your travel plans into ticket change, and also change flight notification into flight status/notification.

Table 2.3: Part of the outline of Global Navigation Labels, which reflects the inconsistency of the labels in site.

Labels of global navigation	Labels of headings	Labels of titles
Travel options	Travel options by United	Travel Options, Reward & Flight Upgrades
Trip protector	Trip protector	<i>Trip insurance</i>
Change your travel plans	Change your travel plans	<i>Airline Tickets, Flight Change</i>
Flight Notification	Flight notification	<i>Airline Flight Status Notification</i>

c) How about the classification strategy behind these labels?

Specifically, the following questions are concerned. What is the classification strategy for these basic labels? In another words, what main categories are they belong to? Is this strategy appropriate for customer from different cultural background? Do my targeting audiences feel hard to put the basic labels under the main categories?

First, in order to know the preferred classification strategy of an airline website, I conduct competitive benchmarking to compare different airline websites

main categories.

Table 2.4 shows that there are usually four categories used to group the global labels, such as plan, manage, services & information, and mileage. The classification strategy behind these labels is chronological, which is simple for my targeted audiences to understand. This strategy is also consistent in the field of airline companies. In Appendix G, the basic attributes of an airline website are grouped into the basic service, advanced service, and extra value service. The categories also can be called booking or make a reservation, after booking, and extra services in the airport and on the flight. Another category is mileage, which is emphasized both from company and users interests. From Table 2.4, we can see that the frequently used labels are Planning and booking, manage my booking, travel information, and mileage.

Table 2.4: Label of the main categories in global navigation system

Category	Label	Total count
Plan	Planning and Booking (2) Booking & online check-in Reservation Reservations Planning & Reservations Planning & Booking Book travel	8
Manage	Manage My Booking Itineraries & Check-in Manage your flights	3
Service & Information	Travel Information (2) Flight & destination information Information Services & Information Travel Guide	5
Mileage	Fly Blue AAVantage Executive Club OnePass Frequent Flyer Skywards Flying Blue SkyMiles Mileage Plus TrueBlue program Rapid Rewards	10

Then, to figure out how users understand the classification of the global navigation labels, I conducted card sorting experiment.

From appendix E and Figure 2.1, we can see the percentage of time that users place two cards together. Also, the percentage of time a specific card is placed in the same category. Based on the results, I found that users are placing Ticket refunds, refunds, and seat upgrade refunds in the same categories which means that these three labels are proximate in their eyes. Also, they put Flight notification and flight status in the same categories. This is different from the existing classification which put them under different categories. Thus, I would

suggest grouping them together since they are literally related in my users eyes.

Other than these two points, the comments from users mainly focus on the difficulty to differentiate customer service and services & information. Based on the comments and also the result referenced by the study (Appendix G), I would suggest changing customer services into FAQs.

Customer service	Itineraries & check-in	Mileage Plus	Planning & booking	Services & information
Our customer commitment	My trip templates	Redeem miles	Route maps	Seat upgrade refunds
Seat upgrade	Change your travel plans	Buy or transfer miles	Travel options	Ticket refund
Refunds	My Itineraries		Making a reservation	Refunds
Ticket refund	Check in online		Vacations	Flight notification
Refunds			Flights	Flight status
			Special deals	Mobile services
				Airport
				Information
				In-flight services
				Promotions
				Destination information
				Travel requirements
				Post travel support
				Upgrades

Figure 2.1: The classification map from users eyes. From the figure, we can observe that users group seat upgrade refunds, ticket refunds, and refunds together. Also, users group flight status and flight notifications together.

For the newly added attributes and the confusing attributes from card sorting, I conducted competitive benchmarking to see which labels are frequently used by competitive websites, which is demonstrated in Table 2.5

2.2.2 Frequently Asked Attributes

As mentioned before, the frequently asked attributes are decided by FAQs. One question is excluded from deep investigation because it's not directly relative with label issue. Other than that, Top 9 FAQs are transferred into 8 labels: contact United, change or cancel my airline ticket, view my reservations, check flight status, book travel by phone, baggage restrictions, check in, and reserve a

Table 2.5: Label of the main categories in global navigation system

Change cancel a ticket	Change cancel a ticket
Ticket refunds	Manage my booking (2) Contact us FAQs Travel and check in Cancellation and delays Travel tools
view reservations	Manage my booking Booking & online check in Reservations (2) FAQs Manage your flights air
Flight status notification	Travel information (2) Prepare for travel Traveling & check in Travel tools help air
Seating	Reservations Manage my booking (2) Prepare for travel

seat. Two questions including how I can contact United and how I can contact Customer Relations are grouped into one label contact United.

For frequently asked attributes, three main questions are raised:

a) Are the frequently asked attributes represented by the global navigation labels?

- Change or cancel ticket
- Ticket refunds
- Reserve a seat
- Flight status
- View reservation
- Book travel on line
- Contact us
- Check in
- Baggage

b) If not and I plan to add them in the global navigation system, what are the labels used for other competitive websites? If exited and I assume the reason

for frequently asking is confusing, what are the labels used by other competitive websites?

To address the vocabulary issue, I also used competitive benchmarking to figure out the preferred vocabularies for the confusing labels which include travel protector and customer services coming from comments of card sorting. The preferred vocabularies are shown in Table 2.6.

Table 2.6: Frequently used labels for confusing labels.

Confusing terms	Refrequently used labels
Customer service	FAQs (3) Contact us (3) Help (2)
Ticket refunds	Ticket refunds (4) Refunds (3) Compensation
Change/view reservation	Change/view reservation (2) Manage reservation My reservations Booking change Change your travel plans Change/cancel flights
Travel protector	Travel insurance (2) Trip insurance (3) Trip protection (2)
baggage restrictions	Baggage information
reserve or change a particular seat	Seating (2) View available seats Change seats

Chapter 3

Suggestions for Redesign

My suggested redesign mainly consist of three types: first, change the main categories of global navigation labels into plan and booking, manage my booking, travel information, mileage, and FAQs; then, add view reservation, reserve seats, and change/cancel ticket under manage my booking; third, change trip protector into trip insurance; fourth, move refund under manage my booking which is close to change/view reservations and also put ticket refunds and seat upgrade refunds under refund; fifth, change customer services into FAQs and then put all the labels under FAQs(see Figure 3.1).

Figure 3.1 Suggested redesign for global navigation labels. As shown in table, labels in red are changed names, labels in blue are changed classifications; and labels in green are newly add labels.

Planning & booking	Manage my booking	Mileage Plus	Travel information
Flights Hotels Cars Vacations Travel Options Book with miles Special deals My trip templates Timetables Route maps Destination information Trip insurance Group travel	View reservation Reserve seats Change/cancel ticket Upgrades Check in online Refund – Ticket Refunds -- Seat Upgrade Refunds	Join Mileage Plus My mileage summary Earn miles Redeem miles Buy or transfer miles About Mileage Plus Mileage Plus support	Flight status/notification Mobile services Baggage Travel requirements Children, pets, & assistance Airport information Airport clubs & lounges In-flight services Economy Plus annual Our Customer Commitment Refunds

Figure 3.1: Global navigation systems after redesign. As shown in table, I suggest to change the labels in bold, to change the classifications of labels in italic, and to add the labels in both bold and italic.

My evaluation analysis justifies for each of the five group suggestions.

First, the existing classification strategy, as discussed in, is appropriated for United Airline considering the context; however, I would suggest changing the labels of the main categories. This change is suggested based on the result shown in Table 2.4. Moreover, I would suggest changing Customer Service into FAQs for two reasons. First, from the comment of card sorting, users felt hard to differentiate customer service and service. Second, the referred content analysis of Airline Website (appendix G) demonstrated that user desire to see FAQs in the homepage.

Second, for the global navigation system, three labels are suggested to add. This is because these labels are simultaneously appearing in the list of absent labels of basic attributes, FAQs, and small user interview (Table 2.2). The preferred vocabularies of these labels took the result of competitive benchmarking into consideration. My suggestion for classification of these two labels concerned the result of competitive benchmarking (Table 2.5 and Table 2.6).

Third, based on the result of competitive benchmarking (Table 2.3 and 2.6), I suggest changing trip protector into trip insurance, changing your travel plans into change/view reservation, flight notification into flight status/notification.

Fourth, for the subset of the main categories, I suggest to group flight status and flight notification and then put it under travel information. In addition, I suggest to put ticket refunds and seat upgrade refunds under refund and then put it under manage my booking. Moreover, I would put it relative to change/view reservations. These suggestions are based on the results of card sorting (Figure 2.1).

Please see Figure 3.2 for the screenshot of the redesigned global navigation system.

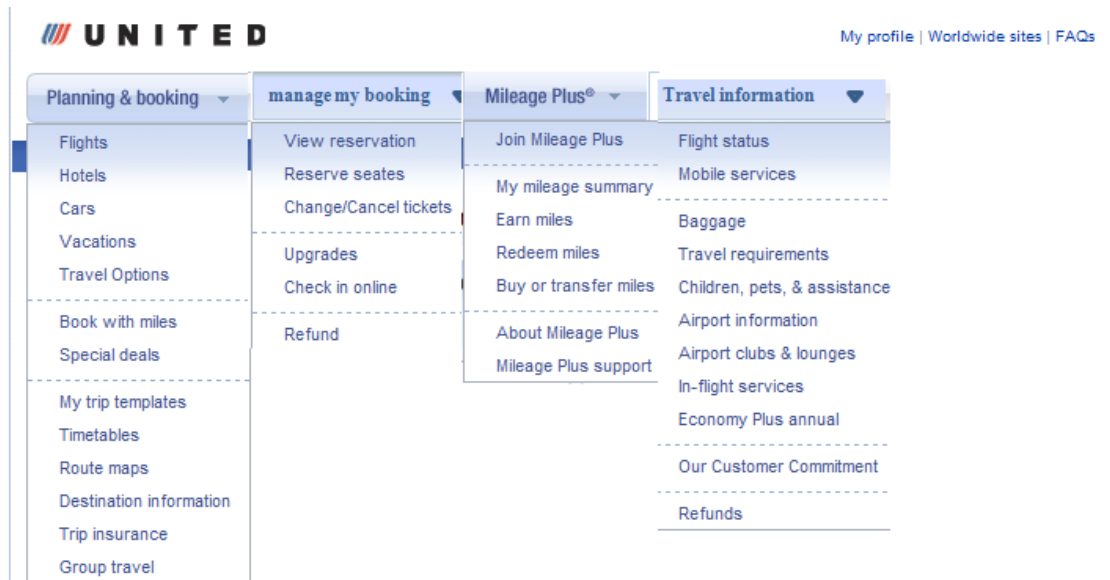


Figure 3.2: Screenshot of the redesigned global navigation system.

Chapter 4

Future Work

In card sorting, I found that users sometimes group cards based on their own understanding of the labels. When we use labels for our categories, we run the risk that users will miss our meaning. If the labels mislead users to other objects, the accuracy of the classification results would be influenced. I'm thinking of using synonyms to describe objects in the future work, which may help users efficiently understand the meaning of the labels.

Also, I'd like continue to investigate the cultural background's impact on user's understanding of labels. In this project, I mainly focus on the consistency of the labels in site and out of site; I do not emphasize the difference which might be brought from the factor of culture and language.

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Appendix A: Global navigation system of United Airline



Appendix B: Outline of Global Navigation Labels

Label	Destination's heading label	Destination's <TITLE> label
Global navigation system labels		
Flights	Search for flights	Begin flight search
Hotels	Hotels	Hotels
Cars	Cars	Rental Cars, Car Rental with United Air
Vacations	United Vacations - Book your flight	United Vacations: Vacation Package to & hotel together and save
Travel options	Travel options by United	Travel Options,
Reward & Flight Upgrades		
Book with miles	Search for flights	Award search
Special deals	Special deals	Discounted Airline Flights & Airfare Deals
My trip templates	My trip templates	My trip templates
Timetables	Timetables	Flight Timetables, Download to PC, PDA OR Blackberry
Route maps	Route maps	Flight Route Maps and destinations worldwide
Destination information	Destination information	Airline Travel Planning, Vacation Destination information
Trip protector	Trip protector	
Trip insurance		
Group travel	Group travel (groupsplus)	Discount airfare for group travel:United Groupsplus
My itineraries	My itineraries	Air Travel and Flight Itineraries at United.com
Change your travel plans	Change your travel plans	Airline
Tickets, Flight Change Requests Online at United.com		
Upgrades	Upgrades	Airline Flight Upgrades with United Mileage Plus
Check in online	Easycheck-in online	Airline Flight Online Check-in at United.com
Flight Notification	Flight notification	Airline
Flight Status Notification		
Ticket refunds	Ticket refund	Ticket refund
Seat upgrade refunds	Seat purchase refund request	Airline
Ticket Exchange, Flight Upgrade Refund Request		
Flight status	Flight Status	Flight Status
Mobile services	Mobile services	Mobile Wireless Travel Information, on the go travel info

Appendix C: Labels representing the basic attributes

Airlines	First-level labels of global navigation system
Air France	Booking & online check-in / Flight & destination information / Preparing your trip / At the airport / On board / Flying Blue / Business services
American Airlines	Reservation / Travel Information / Fare Sales & Special Offers / AAdvantage / Products & Gifts / Business Programs & Agency Reference / About Us
British Airways	Flights and holidays / Manage My Booking / Information / Executive Club
Continental	Home / Reservations / Travel Information / Deals & Offers / OnePass Frequent Flyer / Products & Services / About Continental
Emirates	Flying with Emirates / Destinations & Offers / Plan & Book / Business Rewards / Skywards
KLM	Home / Plan and Book / Prepare for travel / Flying Blue / KLM for business / About KLM / Customer Support
Delta	Planning & Reservations / Traveling & Check-in / SkyMiles
Ryanair	Home / Cheap car hire / Cheap hotels / Hostels and B&BS / Villas & Apartments / Travel Insurance / Credit Card / Cruise Holiday / Get \$100 Free / Airport Transfer / Gift Vouchers / Campsite Holidays
US airways	Book travel/ travel tools/ dividend miles / specials/ contact us Planning & Booking / Itineraries & Check-in / Mileage Plus / Services & Information
Jet Blue	Book travel / Manage your flights / Travel deals / Where we jet / TrueBlue program
Southwest airlines	Air,Car, Hotel,Vacations / Travel Guide / Rapid Rewards

Appendix D: labels of frequently asked attributes (Upper level cell is the labels used in the competitive sites; lower level cell is the category these labels are belong to)

	Customer services	Ticket refunds	Change/view reservations	Travel protector	Baggage restrictions	Flight notification	Reserve or change a particular seat
Air France	Contact us	Ticket refunds	Manage your reservations		Baggage		
		Contact us	Booking online		Preparing your trip		
American Airlines	FAQ	Refunds	My reservations	Trip Insurance	Baggage information	Flight status/notification	View available seats
		Reservations	Reservations	Travel information	Travel information	Travel information	Reservations
British Airways	Contact us	Information	Change reservation	Travel insurance	Baggage essentials		Seating information
			Manage my booking	Flights and holidays	Information		Manage my booking
Continental	Contact us	Refund policy	Change/view my existing reservations	Trip insurance	Baggage Information	Flight status/information	
		Reservations	Reservations	Products & services	Travel information	Travel information	
Emirates	Help Center (contact us + FAQ)	Lost tickets, refunds, and cancellation	Booking change	Travel Insurance	Baggage	Flight status	Seating
		FAQs	FAQs	FAQs	Plan & booking	Plan & booking	FAQs

KLM	Customer support		Change online		Your Baggage	Up-to-date Information	Seating plans
			Manage my booking		Prepare for travel	Prepare for travel	Prepare for travel
Delta	Need Help? (FAQ etc)	Ticket change & refunds		Trip Insurance	Baggage	Flight status/upgrades	
		Traveling & check in		Plan a trip Planning & Reservation	Traveling & check in	Traveling & check in	
US Airways	Contact us	Refund status	Manage flights		Baggage	Flight Schedules	
		Travel tools	Travel tools		Travel tools	Travel tools	
Jet Blue	Help	Compensation	Change/cancel flights		Baggage information	Flight status Notification	Change seats
		Cancellation and Delays	Manage your flights		Help	Cancellations And Delays help	Manage your flights Help
Southwest	Help	Refunds	Change/cancel reservation	Trip Protection	Baggage policies	Flight status updates	
		Travel tools	Air	Air	Air	Air	

Appendix E: Card Sorting

Raw data of card sorting:

This table shows the % of times each item was placed in each group	Customer service	Itineraries & check-in	Mileage Plus	Planning & booking	Services & information
Redeem miles			100		
Buy or transfer miles			100		
Special deals	30	10		60	
Travel options		10		70	20
Making a reservation	10			90	
Flights		10		90	
Vacations	10			90	
My trip templates		50		50	
Change your travel plans		40		50	10
Route maps		60		40	
My Itineraries		100			
Check in online		100			
Our customer commitment	90				10
Ticket refund	40	20			40
Refunds	50				50
Upgrades				40	60
Promotions	30				70
Flight notification	10	10		10	70
Flight status		20			80
Destination information		10		10	80
Travel requirements				10	90
Post travel support				20	80
Airport information					100
In-flight services					100
Mobile services			10		90
Seat upgrade refunds	40			20	40

Analysis of collected data from card sorting:

Customer service	Itineraries & check-in	Mileage Plus	Planning & booking	Services & information
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Our customer commitment Refunds	My trip templates Change your travel plans Ticket refund My Itineraries Check in online	Redeem miles Buy or transfer miles	Route maps Travel options Making a reservation Vacations Flights Special deals	Seat upgrade refunds Flight status Mobile services Airport information In-flight services Promotions Destination information Travel requirements Post travel support Upgrades Flight notification
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Comments:

1. Hard to differ customer service from services & information.
2. Hard to understand the difference between flight status and flight notification.
3. Confusing about the difference among refunds, ticket refunds, and seat upgrade refunds.
4. Not really understand the difference among itineraries, trip, travel, and flight.
5. Confusing about the label trip protector.

Appendix F: Small Usability Test

Lab: User information and behaviors. Scenarios: Search tasks scenarios

My design aims to track the relationship between organization of website and user search behavior. The interaction is supposed in such a context: as a customer, when you access to an airline website (<http://www.united.com>), what search tasks do you usually need to accomplish?

- 1 Imagine you are on the homepage of this website, now you try to find the place to book a flight.
- 2 When you go deeply to the place booking a flight, what will you do if you want to find the best deal for you itinerary?
- 3 Suppose now you've successfully booked the flight you want, you try to set up you seat in advance.
- 4 Before you're heading for the airport, you want to check the status of your flight and also print out the electronic ticket.
- 5 Now imagine another case, if you want to cancel your flight and get ticket refund, how could you do that? What category on the homepage would you expect to provide such services?
- 6 Now, let's go back to homepage. If you just reserve a ticket, how could you confirm your reservation through the homepage?

Observational study

In this experiment, I played the role as an observer. The following is my recording of the user's search behavior.

	Page visited	Why was it visited?	Found something useful?	Comments
1	http://www.united.com/	Book flight	useful	
2	http://bit.ly/Etz0L	Find a good deal	Useful Categorized as price	The information on the side is a little distracting
3	Go back to homepage	Set up seat	Not quite useful	Expect a quick link to pick up seat after finishing booking flight
4	Go back to homepage	Check status of flight and print our electronic ticket	Not easy to find	Expect under itineraries, allow you to check detailed information about the flight, and to print out the electronic ticket.
5	homepage	Flight cancel and ticket refund	Hard to find something useful	Expect FAQ on the top No option on the top but on the left side or marginal place.
6	homepage	View reservation	Not easy to find something useful	The user finally reached to frequently asked question section, which is located on the bottom, not in obvious place.

Appendix G

Factor Analysis of Airline Website Attributes

Website Attributes	Mean ^a	Factors						
		Value-Added Services	Targeted Information	Advanced Booking Features	Basic Look and Book	Trust & Interaction	In-Flight Options	Frequent Flyer Programs
Domestic holidays	1.95	0.83						
Overseas holidays	2.00	0.83						
Extra services (e.g., car rental)	2.11	0.78						
Finding information on destinations	1.99	0.61						
Destination information	1.96	0.50						
Airline merchandise	3.00	0.41						
Corporate information	3.00		0.73					
Career opportunities	3.15		0.64					
Real-time flight information	1.99		0.63					
Information for business travelers	2.70		0.63					
Change a ticket online	1.34			0.87				
Cancel a ticket online	1.43			0.87				
View current flight bookings	1.32			0.69				
Multicity bookings	1.52			0.42				
Finding information on flights	1.13				0.74			
Flight schedules	1.13				0.71			
Search for a ticket by date	1.19				0.63			
Search for a ticket by price	1.18				0.57			
Booking flights online	1.28				0.48			
Privacy policy	2.04					0.79		
Secure site	1.21					0.74		
Site search	2.00					0.43		
Contacting the airline	2.00					0.42		
Seat request	1.71						0.60	
Fleet information	2.71						0.55	
In-flight services	2.41						0.55	
Accessing frequent flyer services	1.92							0.75
Joining a frequent flyer program	1.96							0.60
Rotated eigenvalues		3.3	3.0	2.7	2.4	1.9	1.6	1.6
Cumulative %		11.8	22.4	32.0	40.5	47.2	53.1	58.8
Alpha		0.84	0.75	0.81	0.70	0.59	0.67	0.5
Factor mean ^a		2.20	2.72	1.40	1.18	1.81	2.28	1.94

^aBased on the following scale: 1 = extremely important to 4 = not at all important.

Desirability of Homepage Attributes

Attribute	Percentage
Booking engine	88.5%
Special offers	85.7%
Link to flight routes and schedules	79.5%
Frequent flyer login	65.3%
Customer service phone number	61.5%
Link to FAQ	42.1%
Link to destination information	37.5%
Link to about us	14.3%
Customer service email	—
Other	2.4%