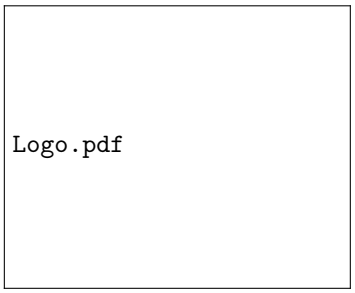

Human Computer Interaction

—

Unified Sports Booking System

Rebecca Devney,
Assima Pathan,
Josh Wainwright,
Andrew Walker

Group 5

Supervisor: Robert Henley

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Abstract

If you currently want to book sports facilities, the only way to search is directly through the individual sports center's websites, or through direct communication. If someone is flexible in the location or choice of sport, they are required to search multiple locations to find the best compromise.

In addition to the difficulties of checking multiple websites, often each of these websites are unintuitive and difficult to use, requiring the user to know exactly when and where they want to use the facilities and often not giving clear information about other possible factors such as cost.

Here, we propose a new, unified interface for finding a time, location and the cost for playing any of a number of sports, at any of the available locations within a given distance or relative to a different location.

Contents

1 Review of Related Work

1.1 User Input

In order to present a user with useful information, our application will have to accept data from them. This is done by means of forms, text input and buttons. To maintain a clean, intuitive user interface, a simplistic approach is often taken to reduce the thinking time required to process information on a single screen. If more information is required, multiple screens are often used.

1.1.1 Timetables

A common set of information presented to a user which represents a considerable challenge, particularly on small screens, is a timetable of available or appropriate times. From this, the user can then select which is most suitable for them. When too much information is displayed on a single screen, this can become confusing or impossible to read. For example, in figure 1 [5], despite a single hour being a common appointment length, the text for these slots is hidden entirely.

A common way to improve the readability of theses complex structures, which often contain a large quantity of data, is to have graded selection of that data. In other words, where there is an option to refine a search to reduce the data needed to be displayed, only the immediately relevant information is displayed, with simple navigation to other relevant data.

This method can be seen clearly in the RedSpottedHanky.com application, figure 2 when a user is searching for tickets for a specific date and time. Although there may be many trains within a narrow time gap, the application shows a small number of tickets with the option to move either earlier or later. Each ticket time is also associated with a number of options relating to ticket price. These are shown only for the currently selected ticket time.

Figure 1: *Google Calendar's cramped calendar.*

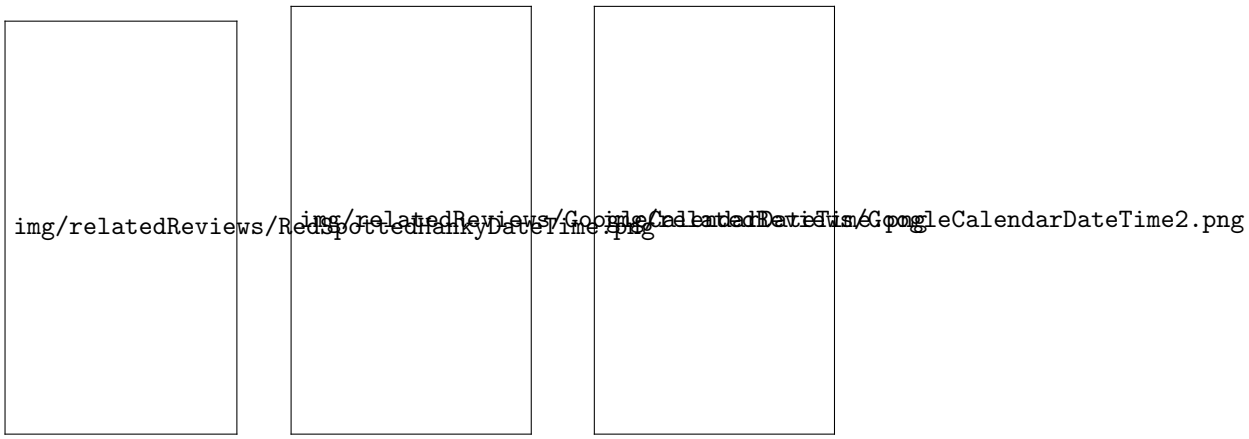
1.1.2 Date/Time Selection

In order to reduce the search range, often a date and/or time selection dialogue is used. Figure 3 shows two different implementations.

Figure 3a, on the right is an example, again, from RedSpottedHanky [6], which shows the time selection associated with booking a train ticket. This design fails since the method of changing time requires very close control when accuracy is required, and is time consuming when the desired time is far from the currently selected time. The movement is performed in single increments or decrements of the hours and minutes. This is despite the functionality described above which lets the user view and switch to other trains at nearby times.

Figure 2: *RedSpottedHanky displays dates more clearly.*

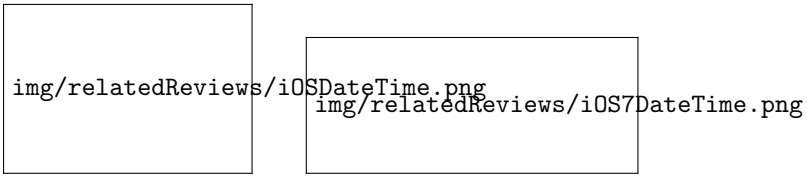
Figures 3b, in the middle and 3c on the left are examples from Google Calendar which shows how the process can be made much more intuitive, simple and fast. Through the use of separate screens with large and clear selection, this selection is much easier to navigate than the scrolling method used above.



(a) *RedSpottedHanky* **(b)** *Google Calendar* **(c)** *Google Calendar*

Figure 3: *The time selection for RedSpottedHanky requires the user to spend to much time selecting the time when larger increments could be used to smoothen the process. Google Calendar, on the other hand, allows simple and fast selection of the hours and minutes through separate screens.*

A combination of both of these is used in the stock iOS, shown in figure 4 [3] where a much easier to navigate scrolling mechanism is used. Though this can still cause the user to spend more time selecting the correct number, the fact that the used can "flick scroll" though the numbers means reaching a value that is far from the currently selected one is much quicker than the RedSpottedHanky.com application.



(a) *RedSpottedHanky* **(b)** *Google Calendar*

Figure 4: *Stock iOS date and time picker is easier to scroll through, but still requires more time than selecting the appropriate number.*

1.1.3 Forms

When entering information that is not limited to a small set of possible values, such as a name, location or arbitrary number, a form must be

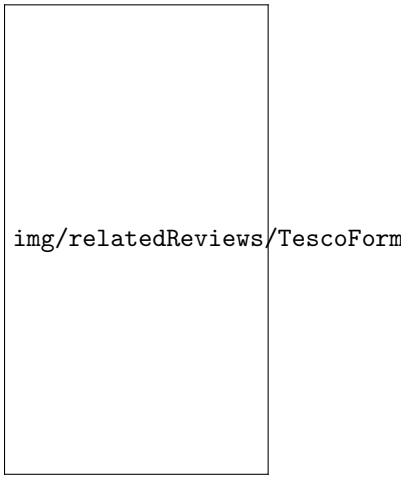


Figure 5: *Large, easy to access text entry*

used to accept the user input. Since touch screens rely of the user being able to navigate to to correct form section, the input must be of sufficient size to allow this movement easily.

Figure 5 show a simple form with two input boxes. Each has a clear border around it so the target for interaction is easier to select.

An important consideration that has been made here is to specify that, for the second set of text input, the data is strictly limited to digits. For this reason, the keyboard switches from a general purpose "qwerty" keyboard to a purely numerical version. Again, this assists the user, both by indicating that only the provided digits are acceptable, and making the input of those digits easier (often the numbers on a touch screen keyboard are only accessible by switching modes).

By contrast, the interface in figure 6 is overly crowded with too many small buttons squashed together. This could cause the user to select the wrong input area, or not be able to navigate the application properly.

Figure 6: *Crowded interfaces make entry more difficult.*

1.2 Current Comparison/Booking Applications

The idea of comparing various services to match your requirements at the best price is widely spread over the web, especially when it comes to booking flights, hotels, transport etc. We want to take this idea and apply it specifically to booking sports facilities across the county. Some applications compare results from different websites; others show available options from different companies on their own website.

1.2.1 Skyscanner

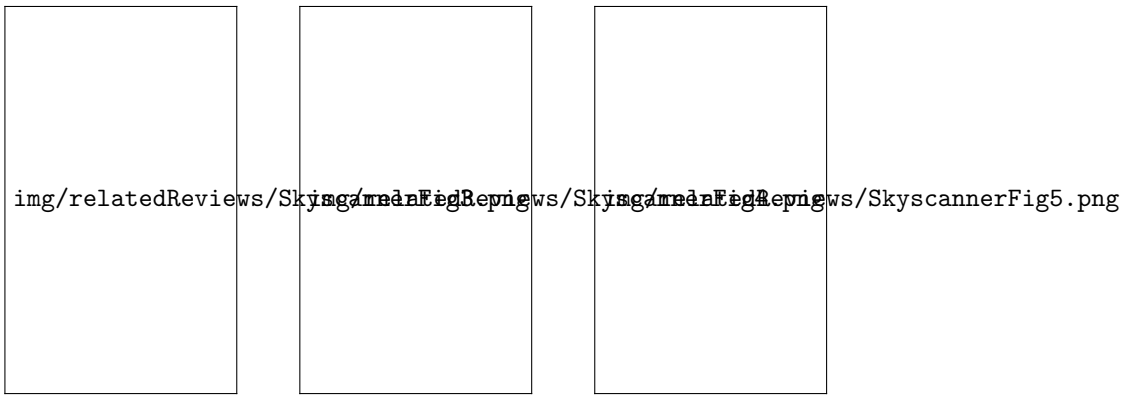
Skyscanner is a flight search app which compares flights and airlines. The app allows the user to search by airport, departure/return date, number of passengers and cabin class. They are then directed to search results matching their criteria. Once the user has chosen their desired flight, they are linked to the airline or travel agent to buy directly.

Figure 7: *Skyscanner's search results*

Strengths

- The date selection page is simplistic and easy to use. The user is provided with a calendar where they can simply touch the date they would like to fly (figure 8a).
- Clear, concise information is shown on the results page. This allows the user to quickly scan the flights available and doesn't clutter the page with information which would not affect most customers' decisions (figure 7). Further details (destinations and times of any stops) can be viewed by clicking on the flight.

- If a return date is not specified, an extra screen is displayed which allows the user to see the prices of different departure dates and the return dates available. This gives the customer an opportunity to change their departure date based on the prices shown. (figure 8c)
- There is a filter option on the results page permitting users to be more specific. For example, particular airlines, direct flights only, flights times etc. (figure 8b)



(a) *Skyscanner's easy to use calendar for date selection.*

(b) *Options available to further filter search results.*

(c) *Screen shows prices of alternative dates.*

Figure 8

Weaknesses

- There is no flexibility in departure date (except for the option of "any" date). However the return date option allows flexibility of one day.
- The "Everywhere" option (figure 9) seems slightly pointless as it is unlikely someone would have no preference as to where they wish to go but have a particular date in mind. It is more likely they have a general idea of where they want to go, for example the country, but there is no option for this.
- When choosing a destination, the user is required to select a specific airport. This restricts the user to where they can fly. For example, they may wish to check prices to a variety of destinations within a particular area or group of Islands with various airports.

Figure 9: *Skyscanner's home screen*

1.2.2 Trivago

Trivago is a hotel comparison website comparing hotels from booking sites such as booking.com and Lastminute.com. The initial search screen boasts many options and filters. As well as the expected search criteria

such as location and check in/out date, the user can also filter by rating, popularity, distance, price and whether the hotel has certain features such as WiFi and a pool etc. A maximum price and distance can also be set within a certain range using the sliding bars (figures 10 and 11). The results show the cheapest price for each hotel available and what booking website the customer can get this price. Once the customer has chosen their hotel, they will be directed to the booking website where they will make the payment.

Figure 10: *Top half*

Figure 11: *Bottom half*

Strengths

- As a location is typed, the number of available hotels is displayed in brackets next to suggested locations.
- Searching is very flexible, for example you can search by hotel name, region, points of interest and city.
- It is possible to search for hotels in the vicinity of a specific address, very useful if you want to find the nearest hotel to a specific location.
- Search results automatically load up at the side of the screen as search criteria is filled out. The user can swipe across to see them, for example once a location had been entered, it will load up available hotels whilst still maintaining the search screen.
- The search results are very clear and simple in that they show enough information without clogging up the screen. The hotel name, rating, stars, distance from the centre, price and a photo are all displayed in a concise manner (figure 12a). The user can then look into more detail by clicking on the hotel (figure 12b).

(a) *Trivago's earch results screen*

(b) *The hotel in more detail*

Figure 12

Weaknesses

- The 'current location' feature in the search box is useful if you need a hotel there and then, but in reality this is rarely the case. Customers would usually book a hotel at least a day in advance at which point there current location is unlikely to be near an area they would need a hotel.
- There is no option to select how many people and therefore no option for multiple rooms. The user may require multiple rooms if there is more than two of them. Therefore this app is useless for families and people travelling in large groups.
- There are no additional filters past the home screen. Customers may require extra filters such as free parking.

1.2.3 thetrainline.com

thetrainline.com is a train ticket retailer app designed to let customers buy train tickets without the need to have a paper ticket. This app differs slightly in that it independently searches individual trains without searching external websites. Train journeys can be searched by location of departure and destination, departure/arrival time and number of passengers, as shown in figure 13. All available train journeys are then displayed with the cheapest price for each journey. Once the customer has confirmed their chosen journey they can pay for their ticket on thetrainline.com. The customer will be sent a barcode ticket to their mobile phone.

Figure 13: *thetrainline search criteria screen*

Strengths

- When typing the name of the station it suggests possible stations based on the first few letters. Useful if you're unsure of the name of the station. For example, typing 'Birmingham' shows a list of all stations in Birmingham. In addition to this all recent searches are also displayed, so it is not necessary to type the name of the station each time.
- The app uses GPS to find the customers nearest station and it is also possible to set a home station to make it quicker and easier to plan a journey home every day. (figure 15)
- There is no redirection to another website, the customer can pay directly on thetrainline.com which provides a quicker and smoother payment process.
- The results shown are not limited to the specific time chosen, figure 14. This gives the customer an opportunity to choose an earlier or later train if it happens to be a lot cheaper.

Figure 14: *Search results from thetrainline*

(a) *Home screen showing GPS feature*

(b) *Sensitive time selection feature*

Figure 15

Weaknesses

- The time and date selection feature is very sensitive and therefore requires a steady hand when scrolling up and down. The time can also be selected to the nearest minute, which when it comes to planning a journey, isn't particularly necessary considering multiple journeys are shown on the results page. Both these flaws contribute to time taken to find the desired journey.

1.2.4 What we can learn

- Our sports booking app would benefit from having a GPS feature as those looking to play a particular sport would usually prefer to play near their current location. For the same reason, when the results are displayed, a filter for distance to the sport venue could be beneficial to the user.
- It would be useful if a message was sent to the users phone to confirm the booking. This will allow the user to check the booking details they are likely to forget such as court number or price. If the user booked the court well in advance, there could also be an option for the user to request a reminder, say a day before they are due to play.
- When searching for a particular location, the user should have the option to search by either postcode, address, town or city. By entering the city, this gives the user flexibility on location. However if the user does not wish to travel far, the other options would be more constructive. Either way, there is no restriction on how to search for a venue.

1.3 Current Sports Booking Applications

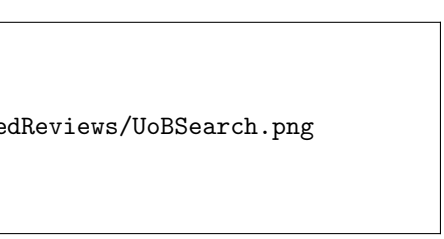
Our application will allow searching across multiple organisations, locations, times and sports to provide available bookings. There are currently no applications that allow searching across multiple organisations' facilities for available sports bookings. There are, however, web applications for specific organisations which:

- have multiple locations, each with many available sports to play,
- have a single location with many sports to play,
- have multiple locations with a single sport to play.

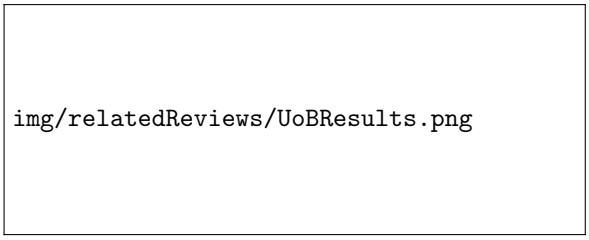
There are also web applications which allow for searching of different facilities but offer no information on available bookings beyond providing contact information for each facility.

1.3.1 University Of Birmingham Sport

The University Of Birmingham has an online booking system for numerous sports available to play at facilities at its campus in Edgbaston [9]. This site allows search by location, type of activity and time. Once the user has entered their search criteria, a list of "activities" are returned. The user then selects an activity and is shown a timetable indicating at what time this activity is available. The activity can then be booked directly on the website.



(a) *Search form*



(b) *List of results*

(c) *Timetable of available bookings*

Figure 16: *The booking interface for University of Birminghan Sport.*

Strengths

- The search form has tick boxes to filter out particular days of the week. A user may only know which days of the week they want to play a sport rather than exact dates. This feature gives the user a quick way to search for this.

- There are quick links on the form to change the date ranges to either today, tomorrow or 7 days time. When a group finishes playing a particular sport one week, they may want to quickly see what is available at the same time the following week; these quick links speed up the process of finding these available bookings.

- It is possible to search solely by time, leaving all sport and location fields blank. If the user knows they want to play a sport at a particular time, but would like to have options on sport and location, the search form in figure 16a allows them to search this way.

Weaknesses

- The option to filter by "activity type" in the search form is actually a filter for location and many of the locations host a variety of different sports. Furthermore, the names of these locations, such as "Sports Hall", often offer no clear indication of which sports are available at a particular location. If the user wants to know what sports are played at a particular venue, they have select that venue and then see which options then appear under the "Activity" drop down box of the search form. This is confusing and unintuitive for the user.

- For many sports, such as badminton where there are multiple courts available for badminton across several locations, there is no way to simply search by that sport. The user is required to go to each court individually to see what times are available for that court. The user is unlikely to have a court preference and most likely just wants to know at what times they can play badminton; this system offers no quick and easy way to do this.

- The timetable results groups times into two hour slots but often each booking slot is one hour long. It will show 'available' for a two hour slot when at least one of those two hours is available. Therefore it is impossible to know if the exact hour a user wants to play is available without selecting the containing two hour slot as shown in figure 17.

- There is no indication of price until you select a booking slot for a particular sport at a particular time.

Figure 17: *Display when the 18:00 two hour slot is chosen. However, only one of two hours following 18:00 is available.*

1.3.2 Aquaterra Leisure Centres

Aquaterra is a charity funded by Islington Council who manage several leisure centres and other sports facilities in Islington, London. They maintain a website [4] where users are able to book at each of these facilities. The booking home page shown in figure 18 prompts a user to select which of the locations they would like to make a booking at.

The interface for each of the locations varies slightly, but each will generally show a list of available activities at that location that can be selected to display a timetable of available booking slots within the following week for that particular activity. The price is displayed at this point and the booking can then be made directly on the website after choosing a preferred court.

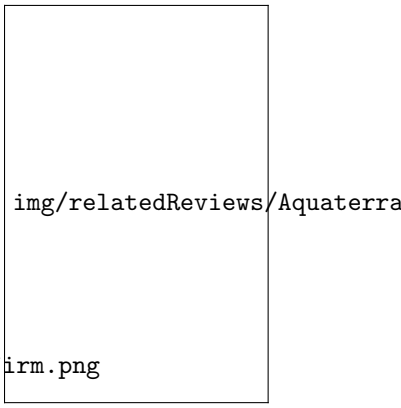
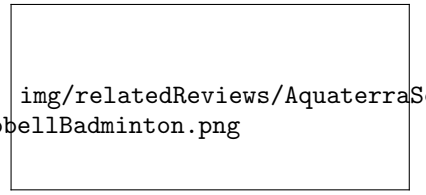


Figure 18: *Aquaterra booking homepage*

(a) *Beginning of timetable showing available badminton slots*



(b) *Confirmation page for a booking slot showing price and choice of courts available*

Figure 20: *The booking interface for badminton at Sobell Leisure Centre*

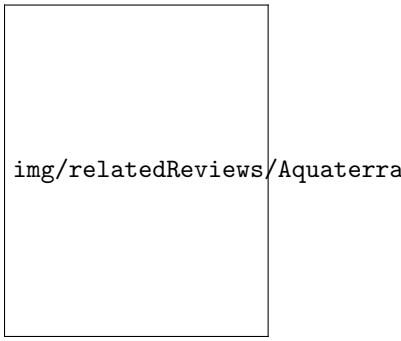


Figure 19: *Facilities available at Sobell Leisure Centre.*

Strengths

- If a user knows the location they wish to play at and the sport they wish to play, then they can see on one page everything that is available to them in the next week. Rows being coloured alternately and having the time displayed at both sides of the timetable makes it easy for the user to navigate to a particular time slot at a glance.
- The timetable for badminton in figure 20a indicates how many courts are available within each slot. If very few courts are available in a preferred time slot, it could indicate to the user that they need to make a quick decision as those courts may soon be booked by someone else. Conversely, if there are many courts available it could indicate to the user that they could delay making a decision on which time to book a court. Providing the user with this information early in the search process could be very helpful.

Weaknesses

- When selecting a location from the page in figure 18, there is very little indication to the user what sports are available at which

location. Therefore if they want to play a particular sport but have no location preference, they are required to go through each option on the homepage to compare what facilities are available for that sport at each location. Furthermore, as each location's page has a slightly different interface, the user has to make sense of each page separately, slowing down their ability to compare information provided for each location.

- There is no indication of price until you select a particular sport at a particular time.

1.3.3 London Tennis

London Tennis is a website designed to help tennis players in London find partners to play with, as well as tournaments to play in and courts to play at. The court search feature in figure 21 allows a user to search for a court anywhere in London including options to search by cost of playing, location and type of court.

Figure 21: *The search form for looking for a tennis court.*

There is also the option to select courts from a map, as shown in figure 23. Users can filter out courts which are free or not free. However, there are no other interactive features on this map. Once a search is performed, the user is shown a list of courts matching their chosen criteria as seen in figure 24a. Once a court is chosen, the user is shown details about the court including exact location, type of court, price and weather predictions for the local area.

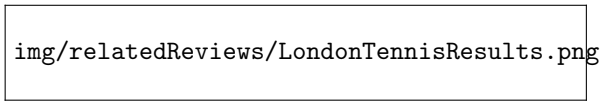
Figure 22: *Drop down to predict input when typing a name of a court.*

Strengths

- The user is able to show only free courts straight away without having to complete any other aspects of the search. This is in contrast to other sites we have seen so far and allows the user to immediately filter by something that is potentially a deciding factor in choosing a court.
- The weather predictions are a useful addition given tennis is very much dependent on good weather.

Weaknesses

Figure 23: *All courts by location on a map with the ability to filter between free and pay-to-play courts*



(a) *List of courts matching a search.*

(b) *Details about a chosen court.*

Figure 24: *The displays for results of a search.*

- The size of the map for searching in figure 23 is too small for the number of courts shown on the map, particularly given there is no option to zoom in to more detail on the map. Though the map does give, at a glance, an idea of where courts are concentrated in London, it is difficult to actually select a court due to how close the buttons to select each court are to each other.

- There is no information about opening times for any of the courts. Although London Tennis is primarily a service to find court locations rather than provide details about available bookings it would be useful to inform the user of when the courts are even open.

1.3.4 What we can learn

- It could be useful to add options to filter by day of the week in addition to buttons that quickly allow searching by times relative to today such as tomorrow or one week from now as this is possibly be one of the main criterias of the users search.

- The naming of options to filter by when searching need to be intuitive and unambiguous otherwise it is difficult for the user to know how to actually search for what they want.

- Using a timetable layout similar to figure 16c could create difficulties in clearly displaying all available options after a search is done. There may be far more booking slots to display in our app given that our search will be conducted over a greater number of facilities. The screen space available will also be smaller than University of Birmingham has on their website. Therefore we need to think of a clearer way of showing the user the results of a search.

- Price is likely to be a factor in a user's decision of what sport to play and where, therefore our application needs to either provide a filter to search by price or clearly indicate the price of a booking option as early as possible when displaying results to a user.

- If we are to use a map to display results of a search, it will be difficult given the potentially large number of results to display every option individually on the map, particularly if the map covers a large area. Therefore it may be better to group options together, possibly by colour or different shapes or picture icons, in order to make it possible to read and navigate through the results.

- Weather could be an important factor when a user knows when they would like to play a sport but want to compare what sports are available at that time. When a user is looking at search results for outdoor bookings, it could be useful to display weather predictions for that time, particularly if the search is in the near future as predictions are likely to more accurate for the near future.

1.4 Application Considerations

Depending on the operating system, each platform has it's own specific guidelines on how to provide users with a good experience. Key issues include; page layout, navigation and interaction.

Apple recommends that the most important feature of an app should be displayed at the top-left of the page so that it will be the first thing a user sees [1]. Booking.com and the trainline.com both implement this well [2].

Figure 25: *iOS page layout recommendation*

Figure 26: *Booking page for thetrainline.com [7].*

Users should be able to navigate their way through the app to achieve their goal of booking sports facilities.

There are 3 main styles of navigation;

Hierarchical navigation is where users make one choice on the first screen, another on the second screen and so on until they reach their final destination. To navigate to another destination, the user may have to retrace some steps or start over from the beginning. This could be very inconvenient for the user as they may have to go back several steps or start over.

Content or Experience-driven navigation depends on the content of the application. The navigation also plays an important part of the app experience. The Skyscanner app includes a globe, figure 27, which allows the user to explore the cost of travelling to particular locations. This is a feature provides a unique experience for the user.

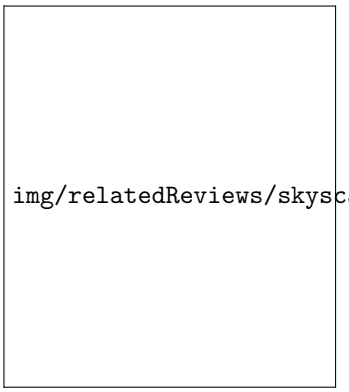


Figure 27: *Skyscanner apps globe feature*

Flat navigation allows users are move from one category to another, as all categories are available from the main screen. This style has been used by many of the apps studied including redspottedhanky.com, booking.com and thetrainline.com

In some cases, it may be better to combine more than one navigation style, but it could also run the risk of overcomplicating the design of the

app and the user's experience.

Some apps like Trivago have a navigation bar, which manages the screen's contents. The user can select to change the search criteria or pinpoint hotels on a map. In the Zipcar app, figure 28, the options in the navigation bar allow the user to perform actions. E.g. 'Reserve' or 'Log in'. These options change depending on where the user is in terms of navigation

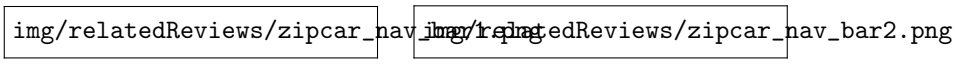
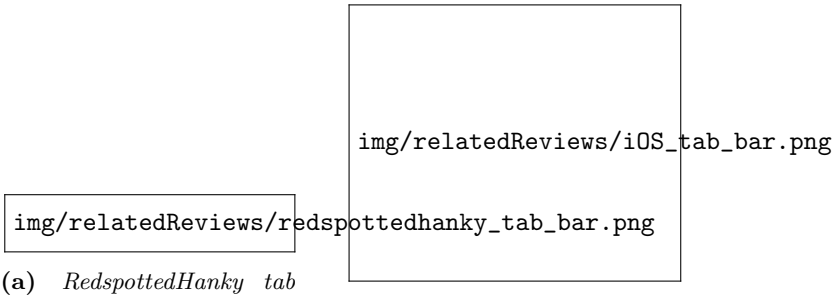


Figure 28: *Zipcar navigation [10].*

Some navigation styles have tab bars placed at the bottom of the screen; this allows the user to switch between different subtasks, views or modes. For example, redspottedhanky.com's app includes the options of switching between finding trains, viewing tickets or account details or finding other information. This is a useful feature that helps a user navigate their way through an app, which thetrainline.com has chosen not to use in their design.

Apple and Microsoft both recommend 44×44 points and a maximum of 5 icons to avoid tab bars being over cluttered.



(a) *RedspottedHanky tab bar.*

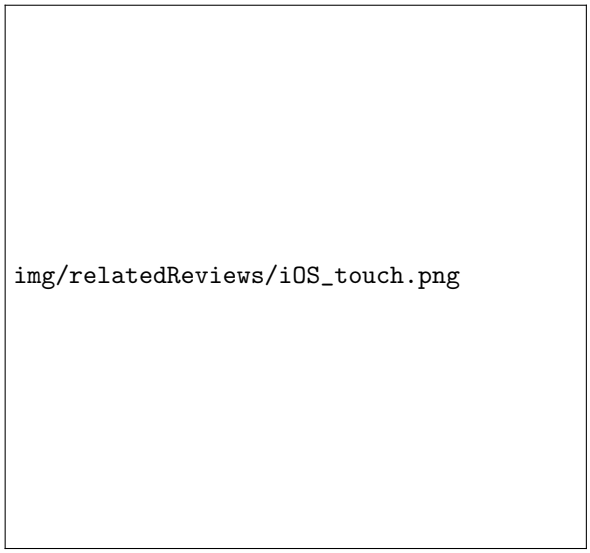
(b) *iOS tab bar.*

Figure 29: *Tab bar icon sizes.*

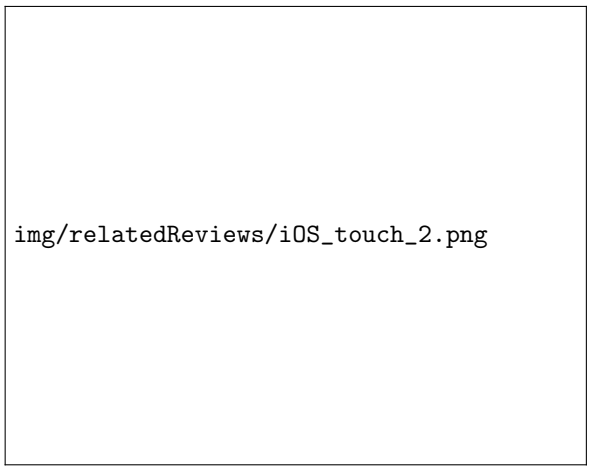
None of the apps studied take into account the orientation of the screen. Users have no option but to use the apps when the phone is in portrait. It would be best to provide users with the choice of holding their device in landscape too. As can be seen in figure 30, Trivago, in particular, contains a lot of details within its side menu; some users may prefer to see slightly bigger, which could be possible when the screen is tilted horizontally.

Figure 30: *Trivago input [8].*

The way all of the apps function is through a touchscreen interface. Users may be used to certain functions such as 'pinch to zoom' and other interactions defined below for iOS. It will be important to consider these interactions to make the app easy to use



(a) *iOS touchscreen interactions*



(b) *iOS touchscreen interactions*

Figure 31

Other ways the user could provide input include using speech recognition. For example, the user could say the sport, date, time and location instead of having to input text or select options.

2 User Personas

In order to fully test and improve the prototypes that have been designed, a set of user personas has been developed. Together, they represent a very wide range of use cases, user abilities, and user preferences.

The four user personas that have been examined in specifically are

- and elderly user,
- a proffessional working person,
- a student at university, and
- a younger child.

Together, the profiles for these example users include several different requirements and restrictions, as well as demands on accessibility. They have been chosen as examples of real world user situations that would require certain aspects of the design to be carefully considered to maximise useability.

By using these personas as a limiting guide, emphasis can be placed on ensuring that all aspects of the final design are suitable for as wide a range of users as is appropriate, and allows, if nessessary, the tayloring of this application to a particular subset of the population.

The table below demonstrates the wide range of use cases encompassed by these personas and allows the relative abilities and requirements to be compared (E — elderly, W — working, S — student and C — child).

	Not Important				Very Important
	1	2	3	4	5
Time	E		S	C	W
Location	W		C	E	S
Sport	W	C	E		S
Price	W	E		C	S

	Incompetant			Competant
Technicallity	E		W	S/C

2.1 Elderly Persona

Name Howard Evans
Occupation Retired
Age 65

Main Goals

- Increase his overall physical activity.
- Maintain his independence from his wife.
- Limit his time using computers.
- Pay for the activity at the venue.

Description

Howard lives on the outskirts of York with his wife. Howard's wife works most days of the week as a supermarket shop assistant and their youngest son has now left home for university in London, leaving Howard with a lot of spare time on his hands. To help stay connected with his dad, Howard's son has bought him a smartphone in spite of Howard's inexperience and frustration with technology. For this reason he also prefers not to put any sensitive information in his phone, like credit card information.

Though Howard was very active in his working years, he has come to enjoy a more sedate life since retiring last year from his job as a construction manager. Recently diagnosed with osteoarthritis, Howard has been advised to exercise more regularly to help strengthen his muscles and joints. Howard has always been competitive, and would happily try his hand at any sport he could find. However, joint pain in his knees often restricts him from some high impact activities.

No longer able to drive, Howard relies on walking and public transport to get around during the week when his wife is not at home to drive him.

Scenarios

- Howard's doctor has just told him he needs to start doing more activity. Howard has a lot of free time, but he doesn't know what sports he wants to play and doesn't know what facilities there are in York so he searches on his phone to see what his options are.
- Howard has gathered a group of 4 old friends to play sport with him this Friday when they are all free. They're happy to play anything involving a racquet. If it goes well, he wants to make it a regularly weekly activity.
- Howard has been having a lot of knee pain over the last few days so his doctor has suggested he try swimming. He doesn't think he can travel too far from his house and is worried he would need disabled access at the pool and doesn't want to feel rushed at the pool by younger and faster swimmers.

Pain Points

- joint pain in his hands often causes difficulty and discomfort when using his mobile phone.
- has very little patience with technology.

- would often prefer to play close to public transport facilities.
- joint pain in his knees often makes walking up stairs very uncomfortable.

2.2 Working Persona

Name Janet
Occupation IT Consultant
Age 33

Main Goals

- To play sport on her way home from work and at weekends
- To ease the stress of work and recent break-up
- Get involved in group sports to meet new people

Description

Janet lives in a flat in Sheffield but must commute to Leeds during the week for work. Her job as an IT consultant can be stressful and very time consuming and often requires working late into the evenings. Due to her busy work schedule, Janet is restricted to playing sport on occasional evenings and at weekends. She doesn't have any children and currently lives on her own after recently coming out of a long term relationship. And for that reason, she wants to get out of the flat as much as possible and take her mind off things by staying busy and active.

Janet wants to play sport on her drive home from work as she does not have time to go home first. The fact she has a reasonably long commute gives Janet a large area in which she can play sport, and therefore a greater selection of sport centres to choose from. Due to her successful career, Janet has a decent income so is not restricted by budget and is willing to pay extra for playing at peak times. Her eagerness to stay active and keep busy means she is very much up for playing any sports, even if she has never played them before.

Although Janet works in the IT industry, her experience with using apps on a smart phone is limited.

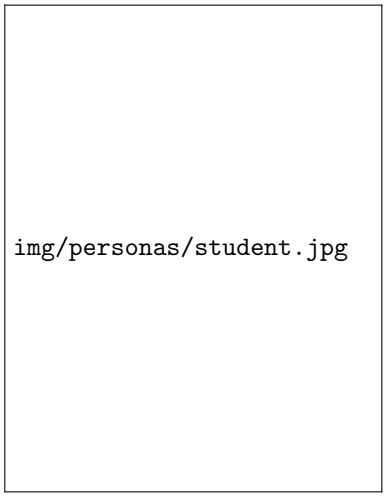
Scenarios

- Janet feels like playing a team sport on Friday, she doesn't mind what sport but doesn't fancy doing something on her own. She has two friends who would like to get involved but would be willing to join other groups.
- It's a Tuesday evening and Janet has a table tennis session booked for 7pm. She has just been called in to an urgent meeting at work and doesn't think she can make the timeslot she has booked. She would like to see if she can push her timeslot back an hour, if not she must cancel.
- Janet has checked the weather forecast for next Saturday and it is looking to be a beautiful day. She has a coffee date at 2pm so can play any time before then and would like to play a sport outside.

Pain Points

- Unpredictable work schedule.

2.3 Student Persona



Name Jenny Stevens
Occupation Student
Age 20

Main Goals

- To fit tennis around her timetable on a regular basis
- To find cheap sports facilities locally

Description

Jenny is a 20-year-old university student. She began playing tennis over the summer and would like to start playing regularly, she is not interested in any other sports.

Her university is situated in a large city. Jenny lives in a shared house close to the university's campus. As a student, she has a limited budget and would prefer to play somewhere close to the university. This would keep her travel costs down and she would be able to fit in a round of tennis in between attending lectures. She would also prefer places that would offer her a student discount or reduced price for multiple bookings.

Jenny organises her daily activities and social events on her mobile phone and would find it convenient to book sports facilities and keep track of her bookings through an app.

Scenarios

- This semester, Jenny has no lectures on Monday mornings, Wednesday afternoons and between 11am and 2pm on Thursdays. She would like to book a tennis court for one of these times.
- Jenny has decided she could also fit in a round of tennis this weekend at any time other than Saturday evening, as she plans to go out with her friends.
- Jenny has a major assessment deadline next week and decides to spend her time during the day working. However, she would like to book for an evening session for any day during the week.

Pain Points

- Jenny is only interested in tennis, and sometimes finds it difficult to locate this amongst all the other sports on offer
- She has a limited budget; she would prefer facilities that provide student discounts or other offers
- She would like to use sports facilities within walking distance from university, to fit around her timetable and to keep travel costs down

2.4 Child Persona

Name Joe Wyatt
Occupation School student
Age 14

Main Goals

- Stay active and have fun playing sports, with his father if possible.
- Try out new sports
- Make friends

Description

Joe lives at home in a small town with his father, Pete. He is very active, playing many sports at school and outside and enjoys trying new sports whenever the opportunity is available. His father is keen to encourage him to participate in a wide range of activities so that he can make friends and stay fit.

Joe is at school every day, but has afternoons after school, and the weekends available. His father tries to find times when they can spend time together so sometimes take an afternoon off work to play sport with Joe.

Pete commutes just a short way to work by car, so doesn't mind travelling a bit to find some good facilities and has also been very active in the past so is always up for trying out new sports.

Joe is very adept with the latest technology, but occasionally has difficulty with words and colours since he has very mild dyslexia and red-green colorblindness.

Scenarios

- With summer approaching, Joe wants to start a new sport outside. He's not too concerned what it is, but it needs to be close to home, as he'll need to get the bus there.
- Its the end of term and Joe wants to organise a squash tournament with a group of friends and his Dad. They want to book a couple of courts nearby for after school during the week, but they're not to concerned about the day.
- Pete and Joe want to play a game of tennis, but the court they sometimes go to is not of great quality. This time, they don't mind going further, and want to spend a bit more to get really good courts.

Pain Points

- Sometimes has difficulty reading small text with bad colours.
- Pete is keen to get a good deal whenever possible, but not at the expense of good facilities at the right time.

3 First Prototypes

3.1 Prototype 1

3.1.1 Presentation

Tools: proto.io

Rationale This prototype focuses on a content driven display showing users immediately what is available local to them with interactive tools for adjusting their search.

Home Map On opening the app, the user is immediately shown this map home screen with the date and time set to the current time and the location centred on the user's location.

1. The tab bar links to pages where the user can decide which sports and dates to filter into the search. The location tab will prompt the user to enter a new postcode to centre the map on or ask them if they would like to reset to their current location.
2. Icons represent locations to play sport. Where a single sport is available to play at a location, a picture for that sport is shown. Where more than one sport is available, a plus sign is show to indicate that several sports are available at that location. When a user presses a sports icon, they are shown the book now screen.
3. Colour shows, using a traffic light scale, either:
   (a) availability of courts/facilities. Green indicates there is full availability at the location where red indicates there is only one booking left at this time.
   (b) price of bookings at this location. Green indicates all bookings are free at this location and red indicates prices are expensive (in comparison to other activities in the area).
4. Settings button brings up a small drop down box to ask the user which of the two options they would like colour to indicate, availability or price.
5. Map is navigable in the same way as the phone's native map application. The user can zoom in and out with finger gestures and pan left, right, up and down. As the user changes their location/zoom level, the sports icons update to cover the new area.
6. The current day being shown, with arrows to navigate through all days which are selected in the dates tab. By default, this is all dates, but the user can filter the dates via the dates tab.
7. A time slider which can be moved in hour increments. The icons shown on the map will change to accurately show what bookings

Figure 32: *The home map screen*

are available for the hour following whatever time this slider is set to by the user.

8. A weather prediction for the date and time currently selected.

Sports filter A page to filter which sports are shown on the map home page.

1. Buttons for quickly selecting or deselecting all sports.
2. Checkboxes; when ticked, the chosen sports are included in the search.
3. A bar that can be either pressed or dragged up to close the sports selection tab and return to the map home page.
4. The tab bar remains so the user can navigate between sports, date and location selection without having to do so via the home screen.

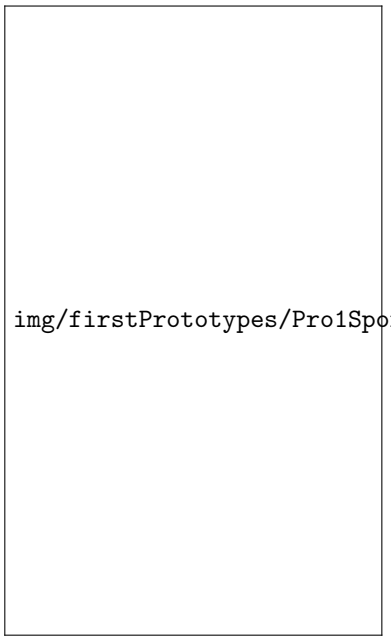


Figure 33: *Sports filter screen*

Dates filter A page to filter which dates are included in the search. Dates which are highlighted are included in the date navigation on the map home page. (no 4 on the home screen)

1. Arrows to move between months of the year.
2. Days of the month. A user can press a number to highlight it, or swipe around the screen to highlight several dates in one swipe, e.g. swiping across a whole row to highlight an entire week.
3. Days of the week. A user can press one of these days, such as M for monday, to highlight every occurrence of that day in the month.
4. A bar that can be either pressed or dragged up to close the dates selection tab and return to the map home page.
5. The tab bar remains so the user can navigate between sports, date and location selection without having to do so via the home screen.

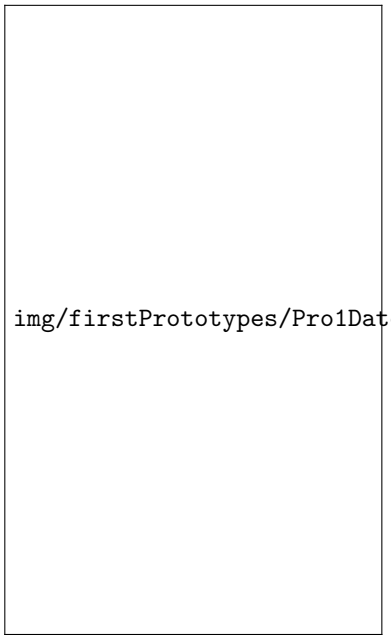


Figure 34: *Dates filter screen*

Book now screen This screen appears when a user selects a sports icon on the home page. The screen does not cover the whole of the previous page, allowing the user to still see the date of the booking and the weather prediction for that time. The user can press the x to close this screen and return to the search.

1. The sport available at this location. If several sports are available at this location, a drop down arrow is show next to the sport name to allow the user to select other sports at that location.
2. User can get directions through their phone's native map application, call the reception of the offices to get more information or navigate through pictures of the facilities.

3. The user can still attempt to change the time or date on the screen. If a booking slot is available at the newly selected time then details on the book now screen will change to reflect the change in time and price (if applicable). If a booking is not available then the text between the sport name and 'Location Details' will be replaced by a message telling the user no booking is available at this time.
4. The 'Book Now' can be pressed to take the user to an external pay site or the website of that sports facility to pay for the booking.

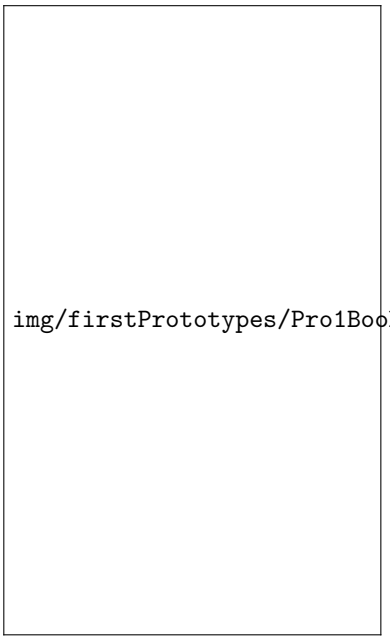


Figure 35: *Book now screen*

3.1.2 Evaluation

Criteria	Rating	Comment
Visibility of system status	+	The time and date of the current results are always shown on the home screen.
Match between system and the real world	+	Map applications have become ubiquitous so use of the map should be intuitive.
User control and freedom	0	There are intuitive ways to return to previous screens and navigate between screens. However, an undo or return button could be added to return a user to a previous page they were on.
Consistency and standards	−	May not be clear that the dates on the map screen correspond to those in the dates filter tab.
Error prevention	0	Relatively few screens reduces the number of places an error can be made. Ensure there is a confirmation message before letting the user book facilities.
Recognition rather than recall	0	Clear icons are used to indicate each sport. No indication on map screen of which dates they can scroll through unless they go to the dates tab to see selected dates.
Flexibility and efficiency of use	0	Swiping on dates filter tab can speed up date selection. No bulk booking, if user knows they want to make several bookings, they have to search and process each indiviually.
Aesthetic and minimalist design	+	Keeping sports and date filters tabs separate from map results and grouping icons when several sports are available leaves map search results clear from clutter.
Help users recognize, diagnose, and recover from errors	−	If a user changes time or date on the booking screen they will be shown a message if a booking is not available at that time. However, there is no undo button to return to the original selection.
Help and documentation	−	Currently no descriptions or tutorials telling the user how to use they system. Could add a help icon which allows users to see what each page does or an initial tutorial on first use of the application.

User	Scenario	Rating	Comment
Elderly	Searching for new sports in the area	0	Howard is given an immediate visual representation of what sports are available near him when opening the app. However, with his lack of experience with technology, use of the map may not be intuitive to him and he may prefer options to read results as a list.
	Raquet sport with 4 friends on friday	0	Howard could tick only racquet sports on the sports filter tab and fridays on the dates tab. However, there is no way for him to bulk book if he wants to regularly play.
	Swimming nearby with knee pain	−	There is currently no way to search for facilities that have disabled access. This could be included in the description of the facility on the booking page but Howard would still have to look at each search result individually.
Working	Team sport on friday	+	Janet can select the relevant sports and dates to show relevant results. Could have quick buttons on the sports tab screen to quick select all team sports to speed this up.
	Change/cancel booking at late notice	−	As booking payments are held outside the application there is currently no way to cancel bookings or even see previous bookings. Could add a screen to add favourite booking slots to so users can potentially see previous bookings.
	Outdoor sport early saturday	+	Janet can select the relevant sports and dates to show relevant results.Could have quick buttons on the sports tab screen to quick select all outdoor sports to speed this up. The weather prediction on the map screen also helps inform her search here.
Student	Tennis court at specific times	+	Jenny can select tennis from the sports tab and all preferred dates from the dates tab and then quickly browse through her options on the map.

	Weekday evening session	+	Jenny can select all days from the date tab then set the time to evening on the map and scroll through each day seeing which day suits her best.
Child	Outdoor sport close to home or on a bus route	0	If Joe chooses his preferred outdoor sports from the sports tab, he will be shown those close to him straight away. However, there is no indication of bus routes on the map. An option could be added to overlay local bus routes on the map.
	Booking several squash courts for after school tournament	−	There is no way for Joe to book several courts at one time or several dates at one time. Could add an option on the booking screen to book several courts at once or add a basket function so users can select all the bookings they want and then pay for them together.
	Could have some kind of rating system to the location description on the bookings page and some way to search for highly rated locations.		

3.1.3 Conclusion

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