

**Creating a User-Friendly
Mobile Application Prototype**

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Abstract

In today's world users have access to hundreds of thousands of mobile applications at the touch of their fingers. There are over two hundred and fifty million smart phone users out there and that number is growing with over 80% of Americans owning a smartphone.

There is nothing more frustrating than trying to use an application and not being sure what to do. Colors or fonts can make things hard to read, too many options to click with no real direction; this will cause frustration for the user and negative feelings towards the application. Making sure that a mobile application is user-friendly is essential to its success, the first time a user opens up the application they need to know exactly what to do and how each action will interact.

This project will include a complete sports betting mobile application prototype that covers all the necessary principles of a user-friendly application, along with research to explain why these principles are important.

To make a user-friendly application, it is very important to make sure that the user is engaged. This was done by choosing a color scheme that gives a positive emotion, which will bring the user back and continue to use the application. Also, limit what actions the user can do, this can be done with consistency, constraint, and control. Consistency makes sure that users see similarity on how to perform all actions. Constraint limits the actions a user can perform to reduce any errors. Control makes sure that users of all levels have the ability to use the application.

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Literature Review

Introduction

Sports betting online is a hot topic and slowly becoming available in more and more states. When creating an application to allow users to sports bet online, the most important factor is user-friendliness. Imagine using two separate applications do place bets on, one application is very confusing with no clear answer on how to use it. The other application is very easy to understand. It can be seen exactly what is needed to select on for it to be functional. What one would a user continue to use in the future? More than likely it would be the application that is easier to use. This is of utmost importance for developers for a sports betting application. Actions must be quick, and simple for users and keep them coming back.

To better understand this, examples are required of applications using good and bad user-friendliness practices. This will show what actually works and what does not. Using Figure 4 as an example, the Log In button is very clear and easy to see. That is an example of a good user-friendliness practice. If the button was much smaller or the box color blended into the background of the application, it would make it difficult for some users to see, thus causing an issue for them to sign in.

Screenshots will be included for each application. With each example, there will be several universal principles design arguing whether or not each application has a good user-friendliness.

In this review there are several universal principles of design that are prevalent in good and bad examples of user-friendliness in sports betting applications. They will be discussed in each section below. This review will not touch on any practices that casinos or applications use to keep sports bettors and gamblers engaged and continue to gamble but rather how ANY application can keep users returning. A sports betting application is just an example being used for research.

There are many sources available that touch on user friendliness and the different principles of design. In some cases, it was difficult to find a source touching on a specific principle of design. There were not sources found that went into details about design concepts for sports betting applications, but again, the sports betting application is being used as an example for comparison and a prototype.

How to Obtain User-Friendliness?

It is essential to try and determine a definition for user-friendliness. Merriam-Webster dictionary defines it as “easy to learn, use, understand, or deal with” but that is too vague. The term needs to be applied towards the design choices of a sports betting application.

The book “*User-Centered Design*” talks about many different practices on good design. The term “user-centered design” is essentially a synonym for user-friendliness. In the review the two terms will be interchangeable with each other.

Usability is not the same thing as user-friendliness. Usability, also referred to as human factors, is the study of how humans relate to any product. Usability practices could be implemented in everything from a toaster to a doorknob, and even the packaging of both (Lowdermilk, 2013).

When creating something that is user-friendly, making sure that the user is the main focus is of utmost importance. Since they will be the ones actually using the application, the design has to be in their best interest to keep them engaged and coming back. One way to reach the goal of a user-friendly application is to collect data. This could be done via feedback from users, interviews, and focus groups. This is something that would usually be done during the overall design process, so it was not done for any of these for the critique of current applications or the prototype.

Having potential users to collect this data from is of utmost importance. “If you’re not building an application for a specific client or group of users, then I’d encourage you to find some” (Lowdermilk, 2013). When designing an application, the target audience must be in mind. Without an audience, what is the point of creating an application?

When users provide data, it is very important to also take into consideration if the data is valid or not. Drastic changes cannot be made to the design based on a suggestion from only one user. It is important to remember that each person has different way of overcoming problems or obstacles (Lowdermilk, 2013). One must think outside the box when considering the design of the application and this is why it is important to collect as much data from as many users as possible.

For example, in a study where 19 users are trying a new application, three users liked their old way of doing things, seven saw advantages but wanted changes made before using it permanently, and nine praised the application and made no suggestions (Kelley, 1984). Getting feedback like this on the design is great. Over 84% of users liked the application design, even if some changes may be needed. Those would be the first things to address.

Creating a template is a good plan to start out the design process. Before anything is even made there should be an idea of what the application will look like. This could be in the form of a detailed template, a workflow diagram, or a semi functional prototype (Lowdermilk, 2013). No functional design work needs to be done at this stage, just a mockup of what the end product may actually look like. This will help make the production and deployment stages that much easier.

A well-known acronym known as K.I.S.S, can be applied when approaching a user-friendly design. The acronym stands for Keep It Simple Stupid. It is important to make sure that the design is not too complicated. Otherwise users may be lost or confused when trying to engage with the application. Make sure the design is effective, but not overly complicated. The phrase “less is more” applies when designing an application (Ichikawa & Hirakawa, 1987).

While keeping things simple, it is also important to remember to be creative. It could be a risky move and possibly fail, but it is also how one comes across new insights (Lowdermilk, 2013). Why would a user choose this application if there’s already something out there that looks similar and serves the same purpose? Being creative can make the application design memorable and attract more attention.

Applying Universal Principles of Design

This may seem like a very small detail in the design process of an application but deciding on the color scheme is imperative. The choice in color can help present a certain mood or feeling of the design (Alberts & van der Geest, 2011). If users are enticed by the color, it can give off the perception to trust the application, increasing the likelihood that they enjoy using the application and continue to use it. Color does not directly apply user-friendliness, but it helps the way users assess the design. If the design has a bad color scheme and can create a negative

impression of the application, discouraging users from coming back. With a good color scheme, it may help users stay engaged and get a positive feeling towards the application.

For a design of a finance or legal background, the best color scheme is a blue on black design (Alberts & van der Geest, 2011). This is the most trustworthy color, helping to ensure that users will continue to use the application in the future. Continuing with the prototype, using a blue, black, and grey color scheme will be used to provide a trustworthy and enjoyable user experience.

The next principle of design that needs to be taken into consideration is visibility. The principle of visibility states that systems are more usable when they clearly indicate their status, the possible actions that can be performed, and the consequences of the actions once performed” (Lidwell, Butler, & Holden, 2003). This means that users are required to have a clear knowing of what is currently happening and what will happen if a certain action is performed. Visibility also includes anything on the screen that is used to bring focus to an element or action. This includes typeface, opacity, prominence, status, and color/contrast (Lowdermilk, 2013). This is very useful when it comes to user-friendliness. If a user knows the outcome of their action before it is done, they will have a very clear understanding of how the application will work. Using visibility can help the design direct users to important elements as well.

Three of the Universal Principles of design that go hand in hand are consistency, constraint, and control. According to the principle of consistency, systems are more usable and learnable when similar parts are expressed in similar ways. Constraint is defined as "a method or limiting the actions that can be performed on a system." While control states "The level of control provided by a system should be related to the proficiency and experience levels of the people using the system" (Lidwell, Butler, & Holden, 2003)

All of these principles of design go hand in hand when considering a user-friendly design. Making sure that each part of the design is consistent; this will help users understand that everything will work the same within the design and create fluidity. There also must be some constraint provided in a design. This along with consistency will limit the amount of actions a user has to perform, again reducing any change for user error (Szekely & Myers. 1988). Control should be applied to the design by knowing the target audience. In this case it will be gamblers using a sports betting application. All users should be familiar with sports betting, but also, any first-time user shouldn't be totally lost. The three of these together will make a strong, user-friendly design for users of any skill level and reduce any sort of confusion or possible user error.

Current Designs in Circulation

This section will touch on several designs that are already being used and discussing the topics about for each design.

Figure 1. shows the landing page to bet on NBA games on the DraftKings Sportsbook application. It may be confusing for a first-time user to know what to do. This design would not be considered as a user-friendly design. There is a lack of constraint on this design. There is so much information on this page, a user may have no idea what to do. The visibility is also poor. Yes, there is some white text that sticks out from some of the darker text, but it does not really direct the user where to go from there. What option is supposed to be touched or selected? What does each column mean? For example, looking at the first available game of MIL Bucks vs WSH Wizards. It is pretty difficult to see but above each column shows what each one is for. The first box is for the point spread, the second box is for the total points, and the third box is for the money line (or outright winner regardless of score.) There is no clear definitive box or option to

click on. For a first time or casual user this could be some information overload. There are so many different numbers on the page, and it is difficult to see the description. For the everyday or advanced user, yes this may make sense, but as an application trying to make money it is important to be able to capitalize on all users. When someone uses the application for the first time it must be simple enough that they keep coming back and continue to use it.

The DraftKings Sportsbook application does have a good selection of color. The green and different greys pop out on the screen and go well together. It gives off a trustworthy mood and the green could also be associated with money which is something that is wanted on a sports betting application (Alberts & van der Geest, 2011).

Figure 2. shows a screen shot from NBA.com website's Week 6 Pick'em. The issue this application has is there is no betting aspect, just picking the winner of a game. This also has a great color scheme. The logos for each team pop on the white background, while the bold black text is very easy to read. The visibility is also strong on this design. It is clear to see underneath each team's logo the box to "pick" the winner. This also adds the principle of control, restricting the user from making a mistake.

If a user wanted to pick the Lakers to beat the Pelicans, the design tells them what to do without any prior knowledge. Just click "pick" underneath the Lakers logo, and that is it. There's a good amount of constraint with this design as well. The only things that are able to be selected is the "pick" button or the "Matchup Preview" dropdown which provides more information about each team. This limits the user to only three options to click for each game (Szekely & Myers. 1988).

For each figure there are obstacles to overcome. Figure 1. has some struggles with its design. There is lack of constraint, visibility, and other small things. While Figure 2. Is a better design, there is a lack of a sports betting element, so there is actually more design work that needs to be added. Overall, Figure 2. is the better design as it shows that it is much more user-friendly based on all of the previous discussions.

Literature Review Conclusion

After this review it is clear that there are many factors taken into consideration when designing a user-friendly sports betting application. While discussing many different factors and looking at two examples, it is known what steps need to be taken when making a design. The user needs to be the main focus of design and creating something that is quick, yet simple is great; but the designer must also make sure the application design is effective in its purpose. The principles of design that were discussed created a backbone of what is required when creating a user-friendly application.

Considering the two applications reviewed it was found that one is more user-friendly than the other. So, it is clear what design users would continue to use in the future. This will lead us in the next steps when critiquing designs in the future and creating a prototype. It is important to take all of these factors and then apply them to any design in the future. User-friendliness will always be the most important factory for a successful design.

Methodology

When a developer creates an application for sports betting the most important factor is maintaining a user base. If available, people are going to sports bet, there's no denying that. So how does a developer make sure that the application is successful, and users keep coming back?

By making sure that it's easy for the users to engage with the application. To help determine what makes an application "user friendly," some of the universal principles of design will be used to help rate what is good or bad on an application. Online sports betting is an up and coming industry and slowly being introduced in different states.

There are millions of applications for people to use. All vary in different functions, design styles, and usage. This research is based on sports betting applications, so those will be the main focus of review. Different sections and screen shots of each application will be provided. Good and bad principles of design will be argued for each screen shot and application. To support each argument, scholarly articles will be reviewed and discussed standing for or against the design.

After the critique of current applications, a prototype of a sports betting application will be attached. This prototype will take all previous arguments into consideration and attempt to make an extremely effective application that is based around user friendliness.

Within the literature review, scholarly articles will be used to support or oppose the different principles of design that are being presented. Most of the articles being reviewed are current but some are dated. There may be some caution that this could cause parts of the review to be flawed, but any article is ensured to be relevant even if several years old. Using these articles will help define what practices are good or bad when making sure an application is user friendly. This is essential to critiquing current applications and when designing the prototype. In the end, a use-friendly application is the main priority. The project will be evaluated by applying all topics that were researched and reviewed. The end result will be a prototype design of the optimal user-friendly sports betting application.

Design Planning

When starting to plan the design, it was time to take all the information from the literature review and start to come up with some key concepts. Again, the main key here is a user-friendly design. This will keep people to continue using the application. Making sure that the design attracts the user is a necessity, and the first step in that will be the use of color. As stated earlier, the main colors used will be black, blue, and grey. The entire prototype will follow this color scheme to provide a trustworthy mood (Alberts & van der Geest, 2011). Visibility is also a very important factor. This goes hand in hand with color. It is of utmost important that the look and design of the prototype makes it appealing to the user.

The next factors of the all have to deal with usability. When designing this project, users must not get lost or confused with too many different options. Each click needs a clear a concise action that the user will be aware of before performing it. It is possible to push users towards the expected outcome within the design. Limiting the amount of information, the use has access too will help. Using the principles of consistency, constraint, and control will help make a design that is homogenous between all pages, limits what actions the user can perform, and having a design that lets users of all skill levels know exactly what to do.

To help get a start on the design it was important to review comparable applications and see if there were any common practices among them.

Prototype Design Process

When designing the prototype, the first step was choosing a platform to create it on. There are many different tools that are available, and it could be difficult to find one that works. For this project there were three pieces of software used to make the prototype.

First is an illustration program called Ink Scape, which is comparable to Adobe Illustrator. It's freeware and available to download for anyone. The program was used to make designs such as the application logo. The second program used is called GIMP, which is comparable to Adobe Photoshop. Again, this is freeware and can be downloaded from the internet at no charge. This was used for any image editing. The last program used is called Marvel Prototype. It is a web-based application designed specifically for mobile prototyping and has many built in features. Anybody can make an account with one free project and then for any additional projects there are fees.

The first step was designing the logo which was done with Ink Scape. The color scheme had already been chosen to be a blue, black, and grey scheme. The font had to be something that translated well to a digital platform. The font used is called "Hauser" and can be found at dafont.com. The black background and white text are very simple, yet effective and give the application a modern look but also provide the emotion that it is trustworthy.

The prototype design gives the look and feel of a fully functional design. The user does not have to do anything but click, all fields are prepopulated, but the user is free to navigate throughout the application. As stated throughout the research, the main goal is to create the optimal user-friendly experience. This was done by reducing the clicks for user and make sure there is fluidity throughout the entire prototype and using fonts and images, that were easy to see and understand their meaning (Lowdermilk, 2013). The one issue is that the Marvel Prototyping tool does not allow the use of custom colors, so everything is a very plain color instead of the color scheme included.

When the user opens the application, it is imperative that they understand everything that is required of them to use the application. On the home screen in Figure 4, there are several

actions a user can make. They can type in their email and password, touch “forgot password?”, show the password entered, login, and 2 different options to sign up. This doesn’t provide any room for user error. All actions are clear and concise, and the user knows exactly what to do. This is a great example of a login page, and something that the prototype will mimic.

The Marvel prototyping program is a great tool for this project. It provides many pre-populated screen shots and graphics that are able to be customized, as well as allowing personal images to be uploaded. The prototype allows a user to go through each screen of the application and to see as how it would work as if it were fully functional.

Results

The prototype application was very successful in making sure that users knew how to interact with the application without any prior experience with it. It would be recommended for anyone designing a mobile application to first create a prototype to make sure that it will be user-friendly. Doing this step first makes the entire design process flow much easier. If the designer already has a successful vision in mind, all that is left to do is to get it developed into production.

Marvel is a great tool for the prototype process. It is easy to share with many different people across all platforms. It was very easy to use and offers many pre-populated examples as well as the freedom to include any personal images and designs. Having the prototype available supports the research done and gives the test user a great opportunity to see how effective the application would be.

Discussion

The prototype is ready, and all design decisions have been made. The blue, black, and grey color scheme are in place, which is known to create a positive emotion for applications that involve activities such as sports betting and gambling; and the important principles of design constraint, control, and consistency are prevalent to reduce and errors by the user (Lidwell, Butler, & Holden, 2003). At this point the main design phase is done. All research has been completed and the prototype has all key elements that are going to be required.

If this project were to continue, there are additional steps that would be taken to ensure optimal user-friendliness is achieved. After finishing the prototype there would need to be some way to test and get feedback on it. The most effective way to do this would be a focus group. Several users could be set up to trial the prototype and provide any type of suggestions, likes, and dislikes about the prototype. Another option would be to have the people in the focus group use the prototype and a similar application for the same task. This gives the tester something to compare and contrast with. Once feedback was received, any adjustments could be made and then repeat the process of a focus group. This would be a way to improve the application and make sure that it is achieving the highest possible user-friendliness.

Another way to find the best outcome of the prototype is to make a few different versions, each version would have a small variance. For example, the color scheme was an important piece of the prototype. Research has already shown that the blue, black and gray would be the most successful colors, but it is also important to see what users prefer. Even if it was a slightly different shade of blue or gray to test with (Alberts & van der Geest, 2011).

Several versions could be made with different color schemes and see which was the most pleasing. This could also be something brought to a focus group like discussed above.

After any of the steps mentioned above are implemented, the entire process would start over again. With each new update or version created, it would be put through testing such as a focus group. This could be seen as tedious and repetitive, but it will ensure that any issues the application may have will be resolved. Without that approval from users, then there is no way to say that the application is user-friendly; the key concept is that the user needs to have a positive emotion towards the application.

These steps will help make the application achieve the highest possible user-friendliness. By doing so, it will increase the likelihood that a user will come back and keep using the application. After the process has repeated however many times is required, the design is complete. The prototype has reached its highest possible user-friendliness and can be called a success.

Conclusion

With so many different applications available today, it is important to stick out and keep users coming back. Beating the competition is not an easy job and the best way to do this is by making it as user-friendly as possible. It is very important to make sure that all users are able to utilize the application and limit any difficulties. This will make sure users continue to choose this application over others. If the application is too difficult to operate, this will cause users to become frustrated and create a negative perception of the applications design. Having an application with a reputation of poor user-friendliness is a recipe for disaster and should be avoided at all costs.

Having a full prototype really helps understand how user-friendliness is one of the most important factors when discussing the success of a mobile application. If users are confused when trying to navigate through the application there is a good chance that they will not like the application or continue to use it.

Making sure that the color scheme and the proper design principles are included will ensure that an application is successful. Using the blue, black, and grey color scheme created a mood that users found appealing for a sports betting application, increasing the likelihood of them to continue using the application. Consistency was used to make sure users saw similarity among all flows in the applications, constraint was applied to users couldn't perform actions that were unnecessary, and control was used so that users of all skill sets were able to use the application without any issues (Lidwell, Butler, & Holden, 2003).

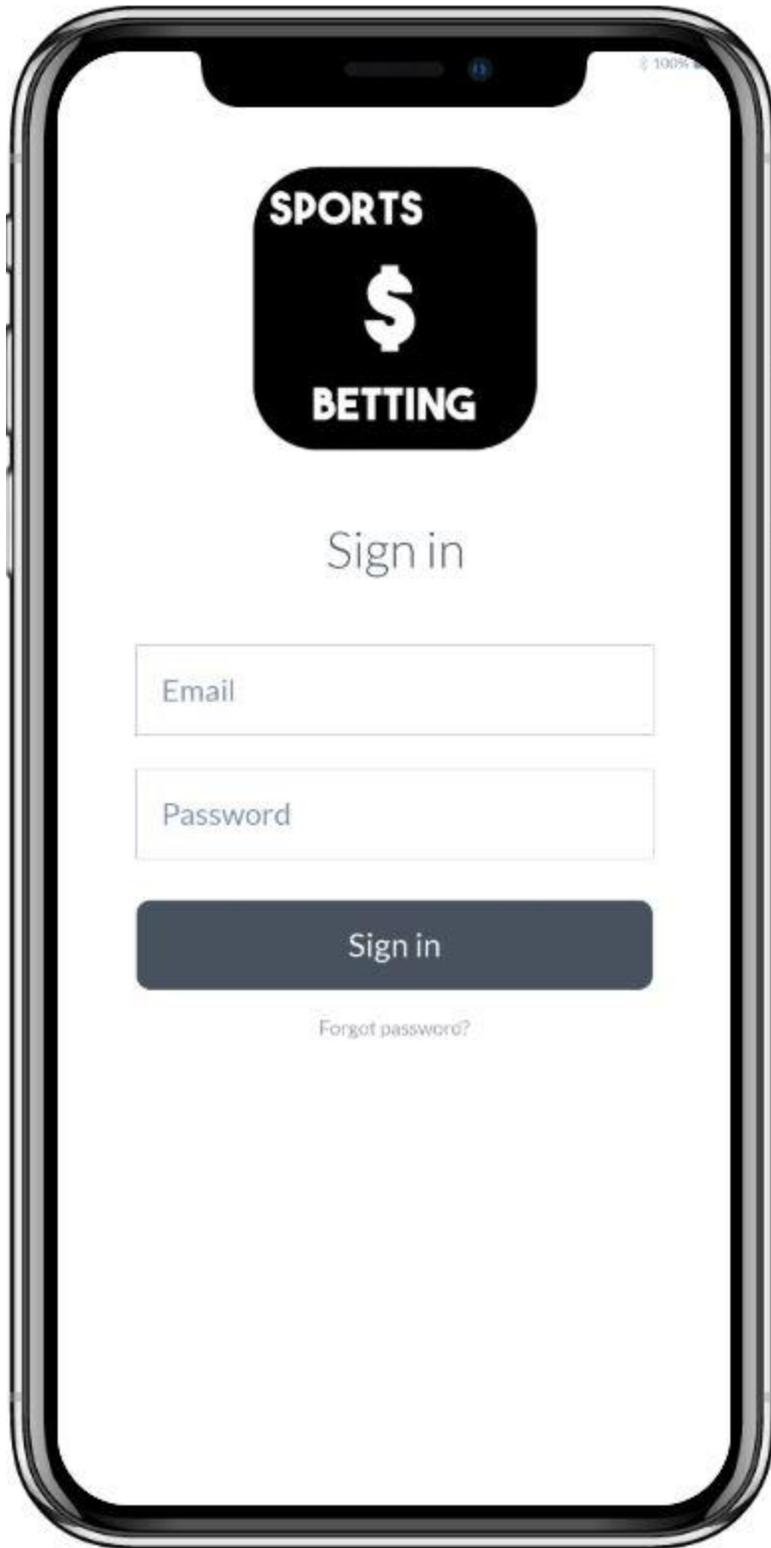
The research and practices discussed layout a great foundation for any designer trying to find out information regarding user-friendliness. The prototype included in the project was able to provide a great example for any future developers. Having a successful example with user-friendly practices already implemented makes this a great resource to use in the future.

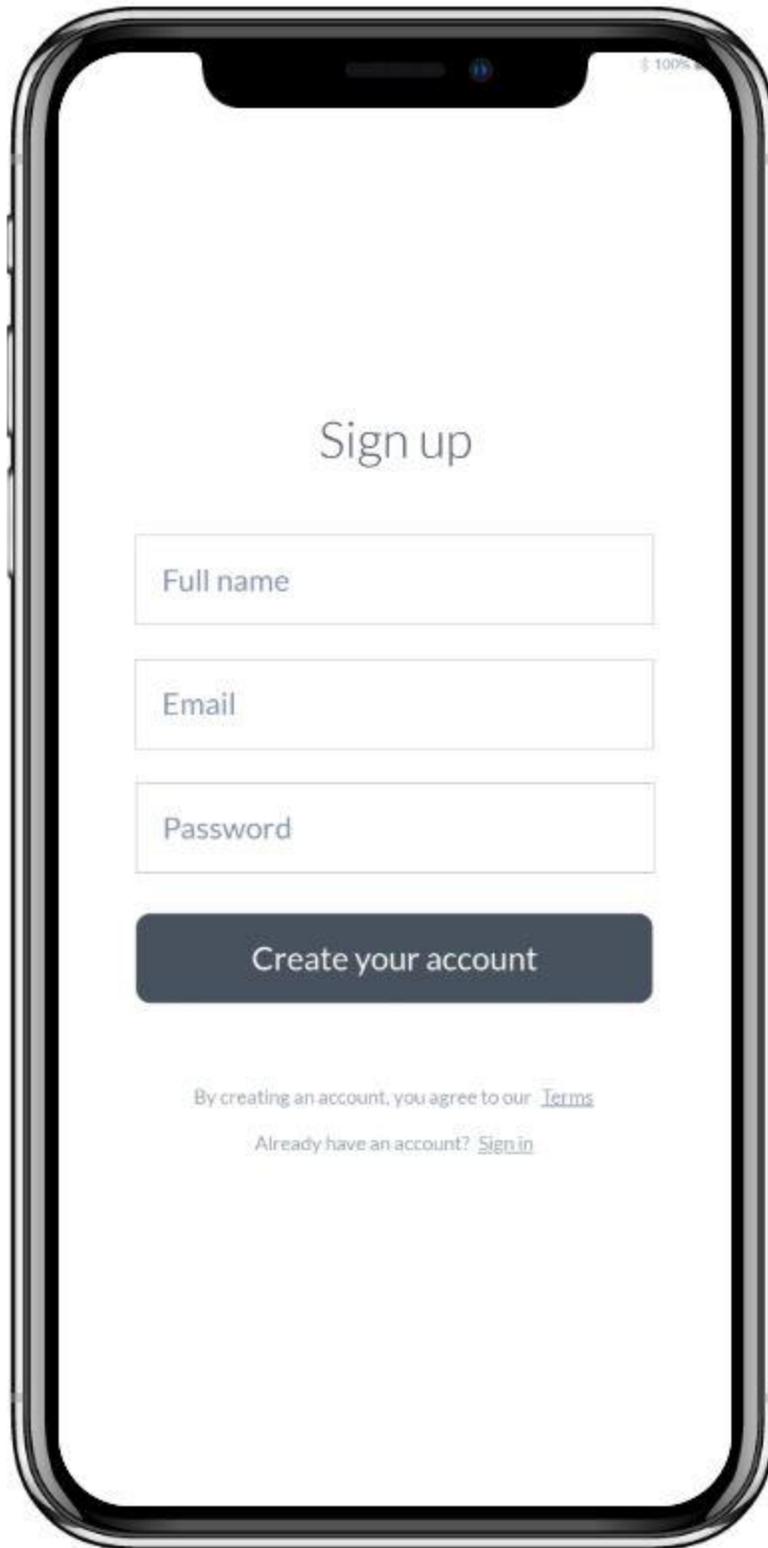
Screenshots of Prototype

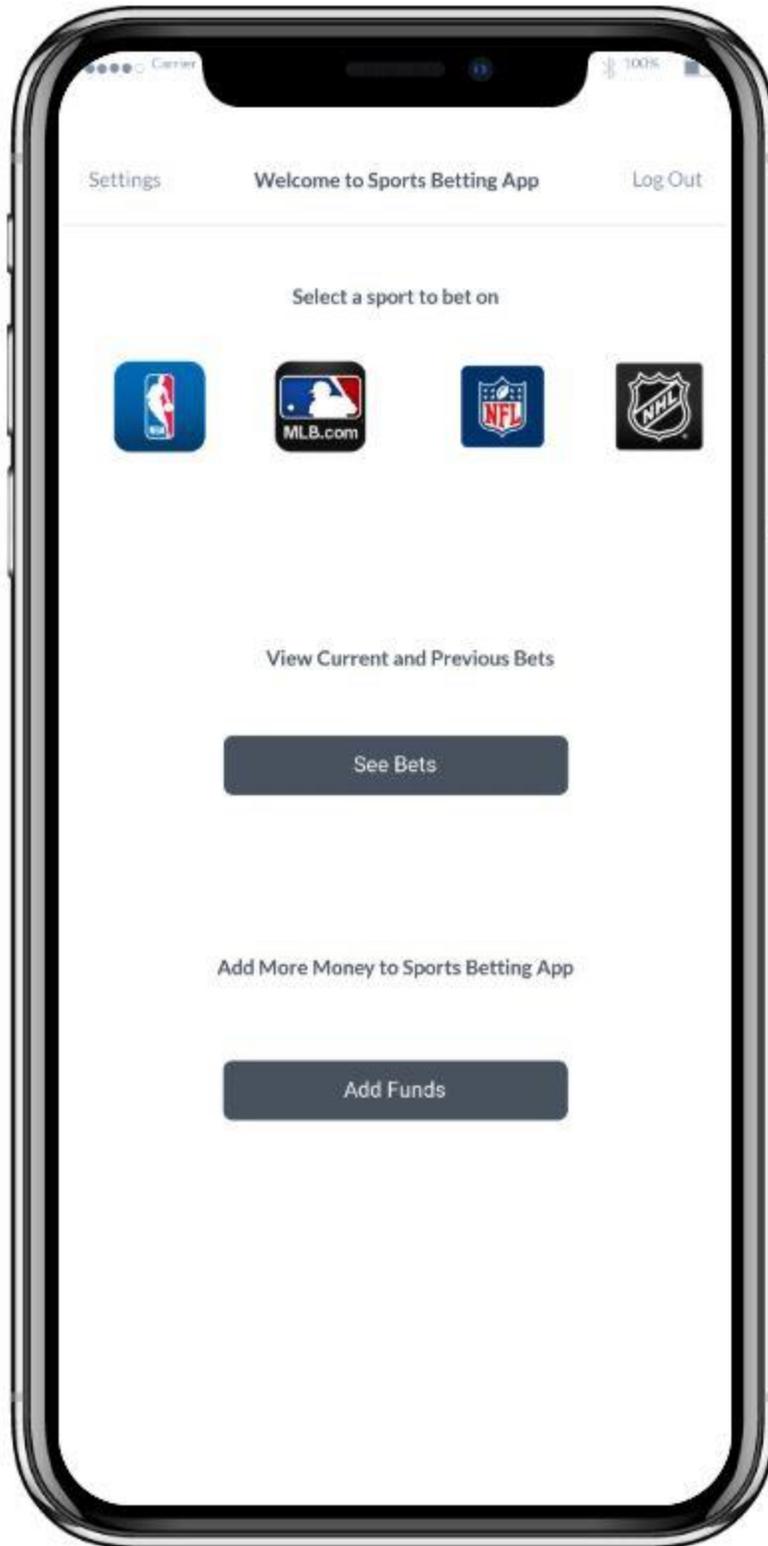
And Link to Project

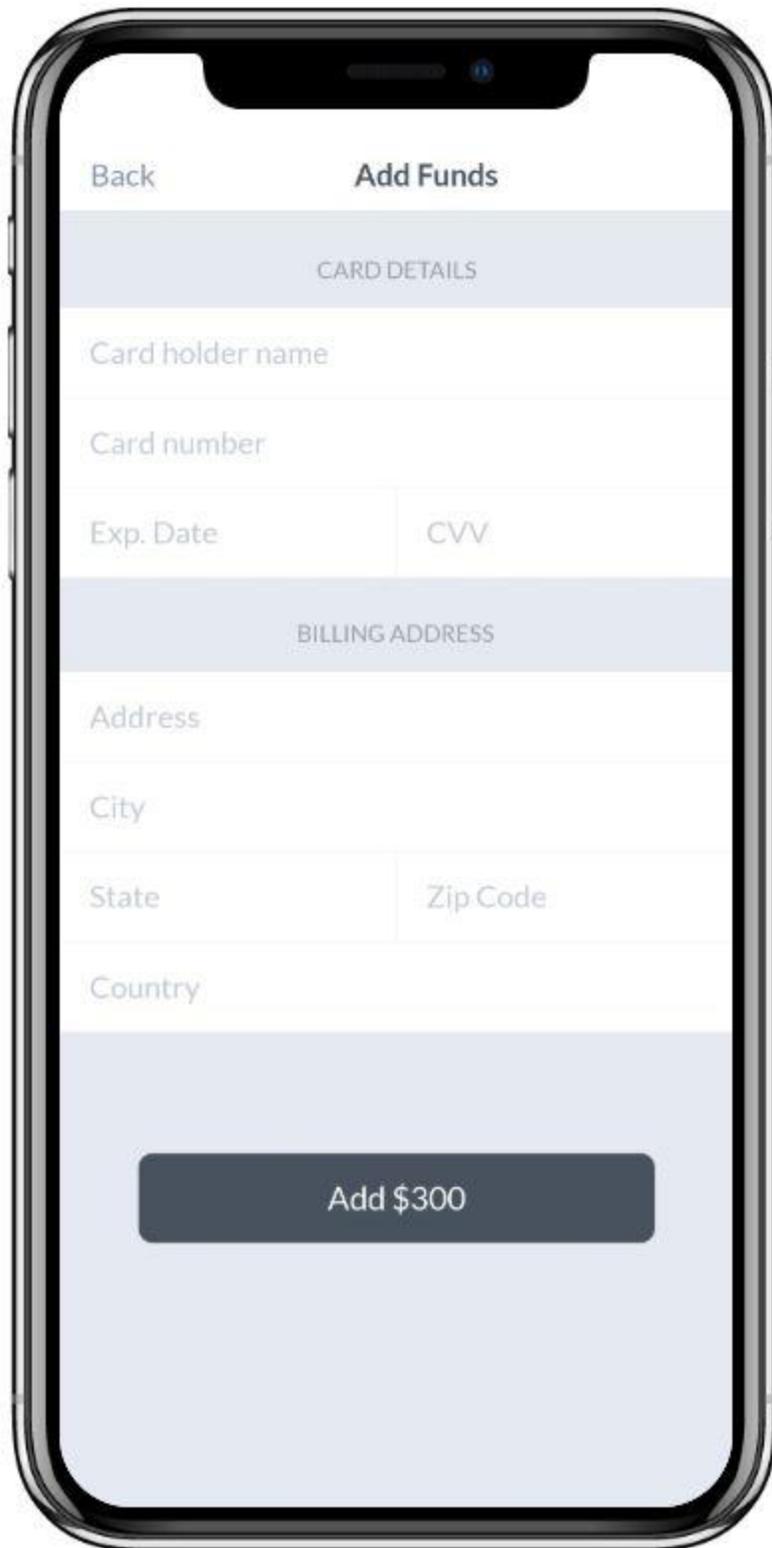
<https://marvelapp.com/60792ij>











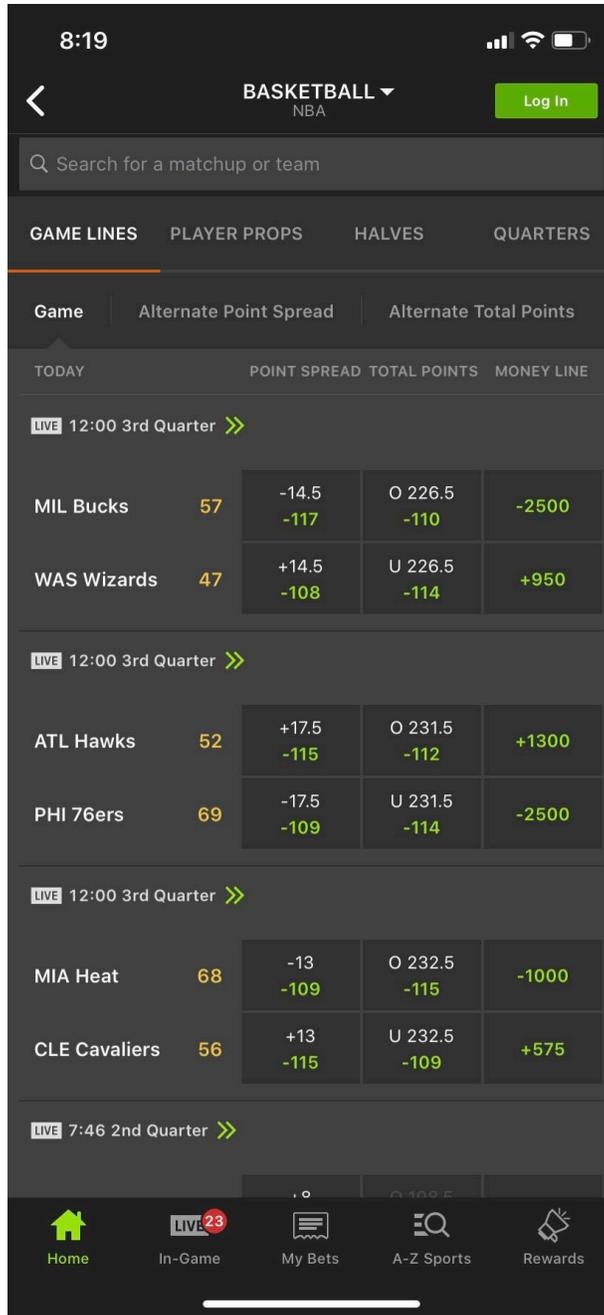


Figure 1 shows a screen shot from the DraftKings Sportsbook iOS Application. This screen shot is taken from the landing page of the NBA games to bet on for 2/24/2020 at 8:19pm EST

MAKE YOUR WEEKLY 6 PICKS

FEATURED MATCHUPS

<p>Trail Blazers vs Pacers Thursday 8PM ET, TNT</p>  <p>Portland Trail Blazers (26-32)</p> <p>Pick</p>	<p>Lakers vs Warriors Thursday 10:30PM ET, TNT</p>   <p>Los Angeles Lakers (43-12)</p> <p>Pick</p>	<p>Nuggets vs Clippers Friday 10:30PM ET, ESPN</p>   <p>Denver Nuggets (39-18)</p> <p>LA Clippers (37-19)</p> <p>Pick</p>
Matchup Preview ↑	Matchup Preview ↑	Matchup Preview ↑
<p>Rockets vs Celtics Saturday 8:30PM ET, ABC</p>   <p>Houston Rockets (36-20)</p> <p>Pick</p>	<p>76ers vs Clippers Sunday 3:30PM ET, ABC</p>   <p>Philadelphia 76ers (35-22)</p> <p>LA Clippers (37-19)</p> <p>Pick</p>	<p>Lakers vs Pelicans Sunday 8PM ET, ESPN</p>   <p>Los Angeles Lakers (43-12)</p> <p>New Orleans Pelicans (25-32)</p> <p>Pick</p>
Matchup Preview ↑	Matchup Preview ↑	Matchup Preview ↑

Figure 2 shows a screen shot from NBA.com website's Week 6 Pick'em. This screen shot is taken from the landing page of the NBA games to bet on for 2/24/2020 at 8:19pm EST



Figure 3 shows an image of the logo form the digital project of the prototype application

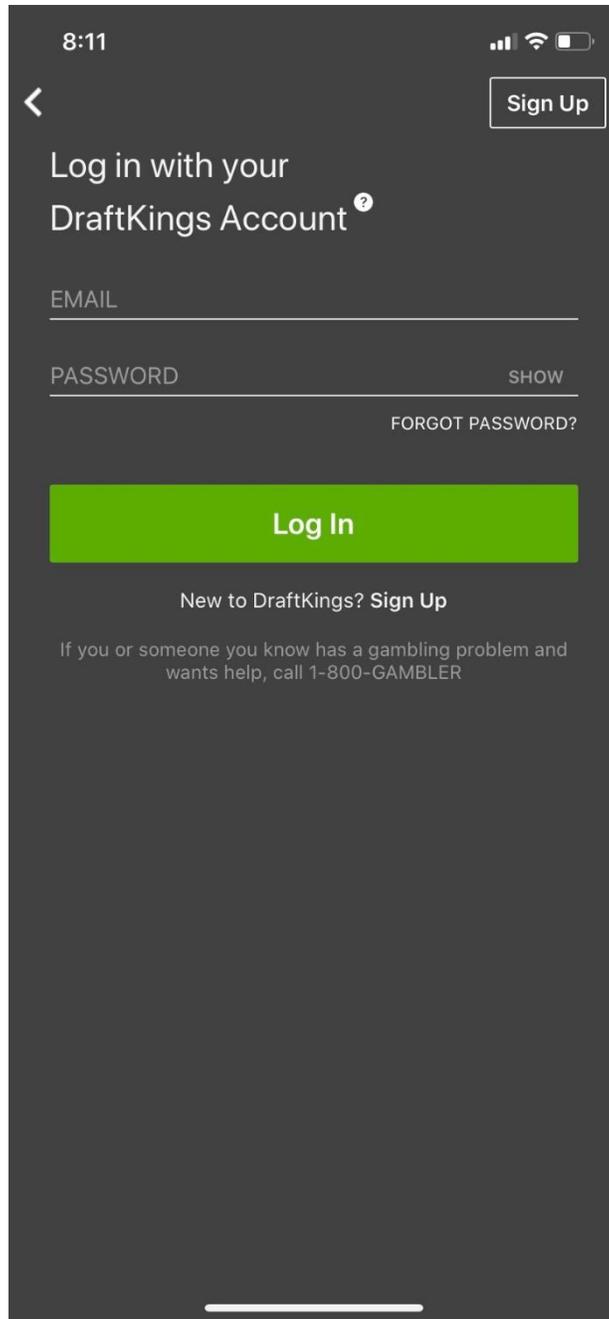


Figure 4 shows a screen shot from the DraftKings Sportsbook iOS Application. This screen shot is taken from login page on 3/22/2020 at 8:11pm EST

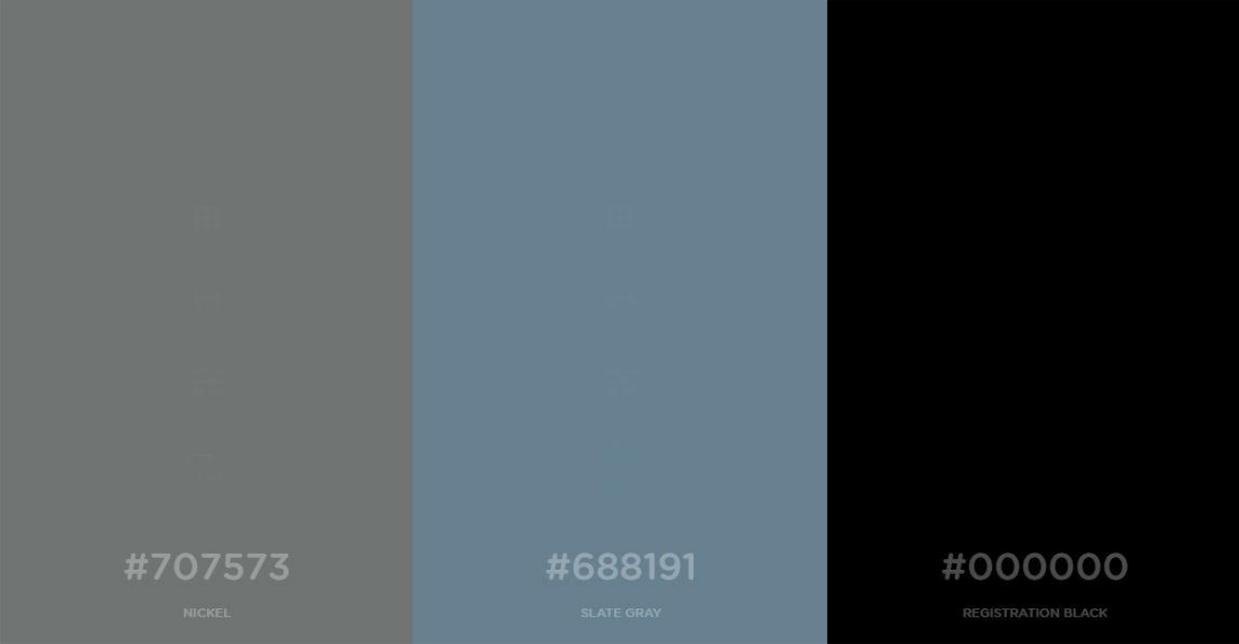


Figure 5. Color Scheme to be used for the Sports Betting Mobile Application Prototype

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