

USABILITY TEST REPORT

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TEAM 3: E2BIG

E2BIG

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UX EXPERTS

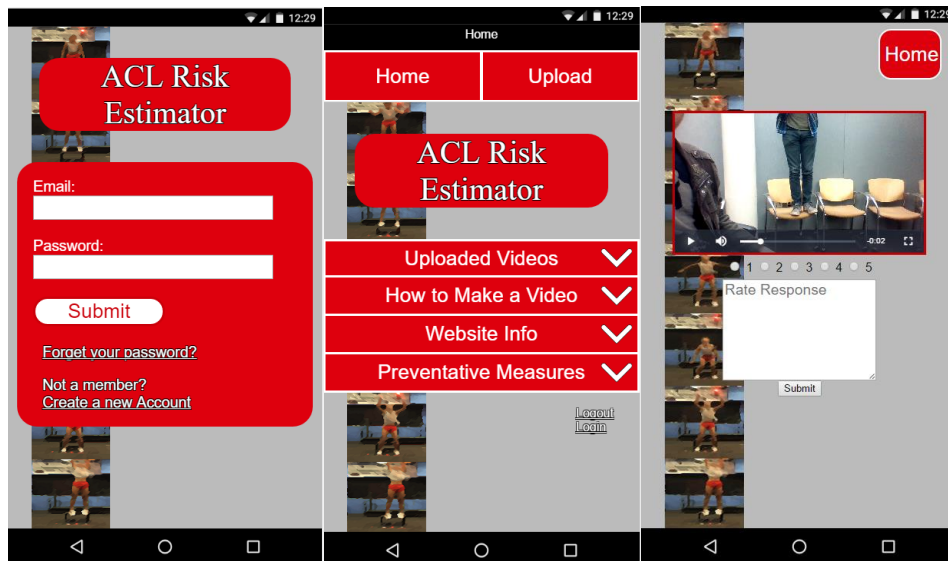
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SCIENTIST

Erich Petushek

ACL RISK ESTIMATOR APPLICATION

The objective of the web application is to allow its users to record and upload videos of athletes so that it can be later analyzed by medical professionals regarding the possible risks of an ACL (Anterior Cruciate Ligament) injury. The intended users of this app are primarily coaches from the Upper Peninsula region of Michigan, but it can be used by other people such as the parents of an athlete. The whole body is to be captured while recording the video from the front of the athlete. Medical professionals would later assess these videos and provide relevant feedbacks to the coaches about the risk of injury. They can even suggest preventive measures to make the athlete less prone to it. The athlete's performance is quantified and feedback is sent through the web application.



INTRODUCTION

DESCRIPTION OF UI

The user interface of the ACL Risk Estimator Application is very minimal and does not include anything apart from necessary components. It has a small form when the user creates a new account, which asks the user only for his name, email address and password. The coach view has drop down menus which include previously uploaded videos, instructions on how to perform a drop test, basic information about the application and the general preventive measures for an ACL injury. For the medical professional view, there are radio buttons and a text field, through which the user can rate the athlete on a five-point scale and provide a feedback to the coach. An embedded video player is also there, to play the uploaded the videos.

The UI of the application consists mostly of solid colors. The background is gray and all the buttons are mostly red. The text on the buttons is white, which enhances the visibility of the application. It also has a small strip of pictures on the left side, which is there throughout the application. The drop down menus have white colored arrows. The uploaded videos have an athlete's name, date and time of upload as metadata attached to them.

TEST GOALS

The primary test goal for the usability testing of this application was to verify if the functionality of the application exactly like it should be. Since, this was a small application with very limited features, the functionality was the foremost thing to be tested. The secondary goal of the testing was to make sure that the application was simple and easy for the user. Since the user base for this application was mainly the coaches from the Upper peninsula, it was important that it did not take a lot of time to understand how the application works and the learning curve is not too steep. Aesthetic appeal was another test goal, so that the application design (in terms of the font, layout and colors) is decent. Different components of the application, such as the registration, uploading a video, analyzing and rating a video etc. were tested with different users for their functionality, ease of use and visual appearance.

TEST DESCRIPTION

After asking the participants to sign a consent form, the tests were divided into two questionnaires and three test scenarios. There was a pre-test questionnaire, where the participant was asked about how comfortable he is with a smartphone and how much does he know about an ACL injury. The participants were then asked to perform three test scenarios. The first test scenario required the user to create an account in the application and then login using the credentials he registered with. Then the participant was asked to record a video of one of the development team members performing a drop test and then upload it as the second test scenario. The third scenario involved the user logging in as the medical professional and then watching the video. The participant was then asked to rate the video and write a small feedback for the coach. After the three scenarios, every participant was given a set of post-test questionnaire which asked them about their experience with the application. They suggested various ways in which the application could be improved. All the tests were conducted in the rooms Rekhi 101 and Rekhi 324.

ORIGINAL TEST PLANS

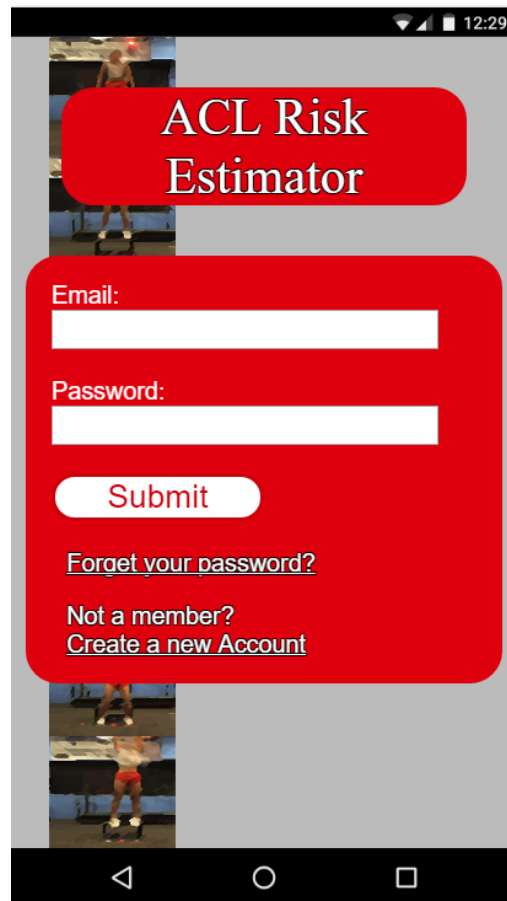
1. TEST SCENARIO - 1

Test Scenario Name

Register and login as a coach

Test Goals for the scenario

The main goal of this test scenario is to register and then login as a coach into the application. This would verify if all the login functionalities work correctly.



Quantitative measurement list

- Time taken by the user to create an account, and then login.
- Number of times the user consults or the number of doubts he has regarding the registration form or login page.

Scenario description

- Assume that you are the coach of a sports team at a local high school and you want to estimate the risk of an ACL injury for one or more of your athletes by using the ACL Risk Estimator Application. To use the application, you need to register yourself first and then login with your username and password.

Task list

1. Open the ACL Risk Estimator application on a smartphone.
2. Tap on "Create a new account".
3. Fill in all the details in the form and tap "Register".
4. Now login using the username and password which were registered.

Qualitative measurement list

- Does the user make any comments while creating an account or login?
- Was there any lag in the application?

Potential observations of participant

- The level of difficulty that the user faced while creating an account.
- Did the user try to login before creating a new account?

Post Scenario interview or questionnaire questions

- How confident were the users in using the application, before and after this scenario?
- Did the user have any comments about the interface of this scenario?

Test setup details

This test is to be conducted in a well-lit room. A timer would be used to determine the quantitative measures.

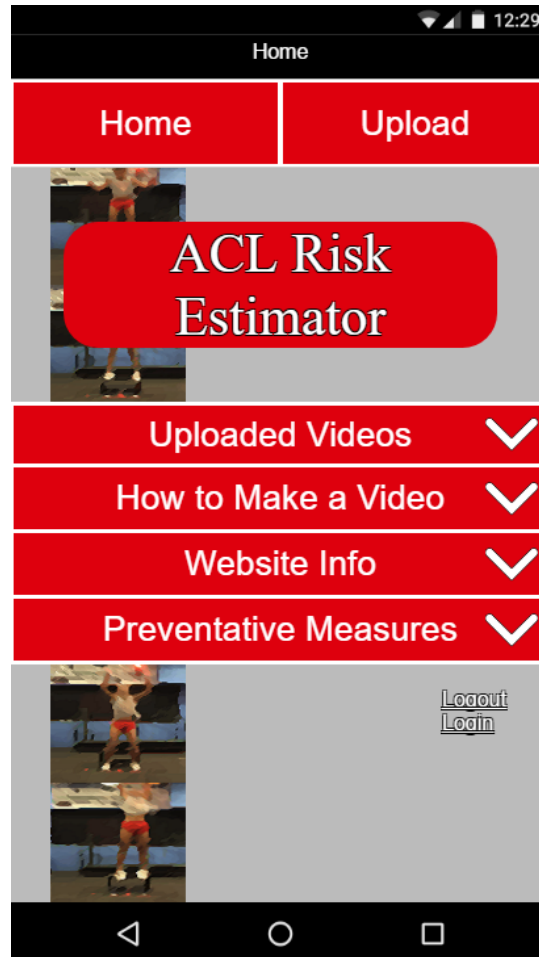
2. TEST SCENARIO 2:

Test Scenario Name

Recording and uploading a video

Test Goals for the scenario

The main goal of this scenario is to make the user record and upload a video, after logging. This would verify if all the functionalities for uploading the video work correctly and the user feels comfortable uploading the video.



Quantitative measurement list

1. Time taken by the user to record a good video.
2. Time taken by the user to upload the video using the application.
3. Number of times the participant asked doubts about the application.

Scenario description

Assume that you are a basketball coach at a community college and you want to estimate the level of risk of an ACL injury for one of your players. You have already created an account, and now want to upload a recorded video to be analyzed by a medical professional.

Task list

1. After logging in, enter the homepage of the application.
2. If there are any doubts regarding how to make the video, the button for “How to Make a Video” can be tapped and proper instructions would be given.
3. A “Website info” button is also there, in case any additional information is needed.
4. When ready, upload the video by tapping the “Upload” button on the top right corner.
5. A video file should be chosen and an athlete’s name should be entered.
6. After selecting and entering the name, the “Upload” button should be tapped.

Qualitative measurement list

- Was there any lag during the entire scenario?
- Did all the buttons function properly?
- Was the video selected and uploaded successfully?

Potential observations of participant

- User’s expressions while going through the instructions.
- Did they ask for any clarification in between the scenario?

Post Scenario interview or questionnaire questions

- How confident were the users in using the application, before and after this scenario?
- Did the user have any comments about the interface of the application?

Test setup details

This test is to be conducted in a well-lit room, where a proper video can be recorded. A timer would be used to determine the quantitative measures. Apart from that, a small platform or a chair would also be used to perform the vertical drop test.

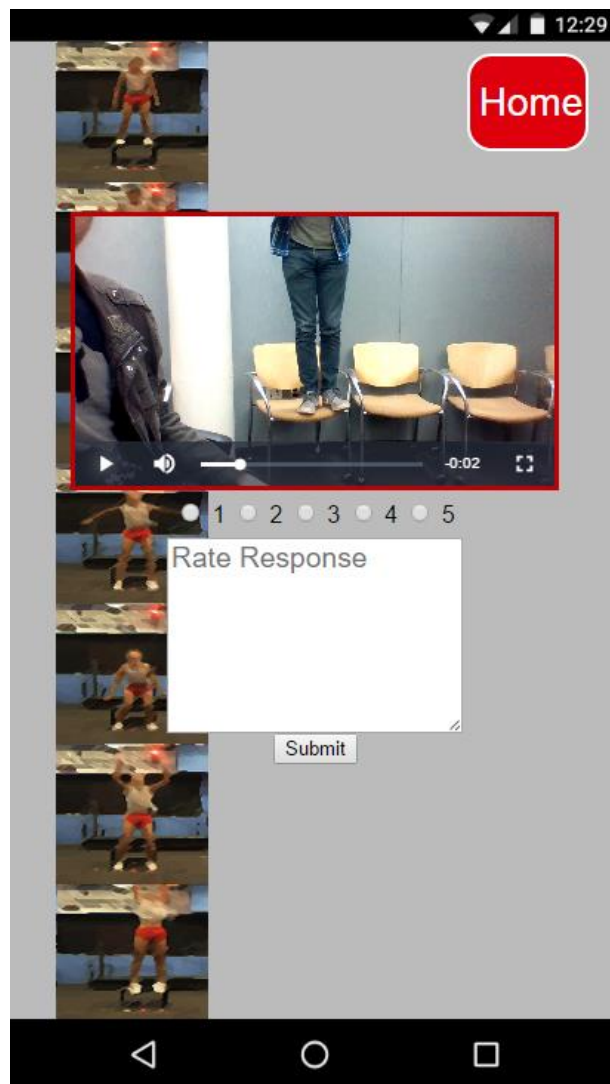
3. TEST SCENARIO 3:

Test Scenario Name

Analyzing the video

Test Goals for the scenario

The main goal of this scenario is to analyze the videos that have been uploaded and then provide a feedback to the coach about the risk of ACL injury.



Quantitative measurement list

1. Time taken by the user to browse and open the uploaded video
2. Time taken by the user to rate the risk and provide feedback.
3. Number of times the participant asked doubts.

Scenario description

Assume that you are a medical professional at the UP Health Center and your job is to analyze and provide a feedback regarding the risk of an ACL injury for an athlete's vertical drop test.

Task list

1. After logging in with the credentials of a medical professional, enter the homepage of the application.
2. Browse the videos and select the one that has to be rated.
3. Play the video, and mark the radio buttons according to your analysis of the video.
4. Put additional comments and suggest preventive measures accordingly

Qualitative measurement list

- Was there any lag during the entire scenario?
- Did all the buttons function properly?
- Was the video selected played properly?
- Was the user able to enter text into the comment box without any constraints?

Potential observations of participant

- User's expressions while going through the instructions.
- Did they ask for any clarification in between the scenario?

Post Scenario interview or questionnaire questions

- How confident were the users in using the application, before and after this scenario?
- Did the user have any comments about the interface of this scenario?

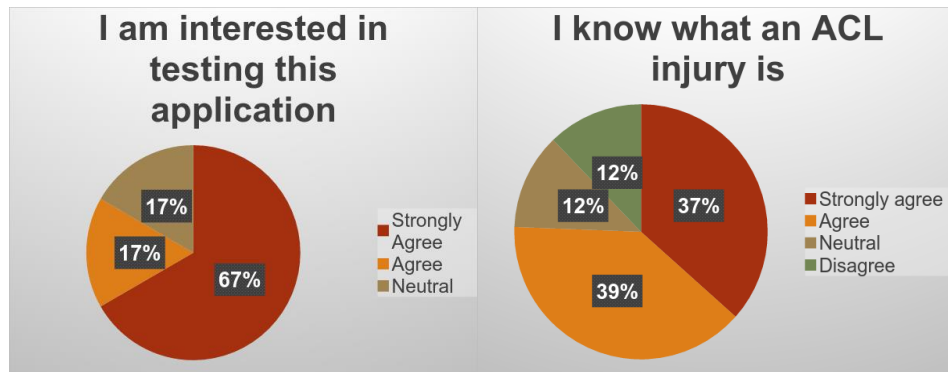
Test setup details

This test is to be conducted in a well-lit room. A timer would be used to determine the quantitative measures.

RESULTS

1. PRE-TEST QUESTIONNAIRE

There were five questions in the pre-test questionnaire which were used to determine how comfortable the participant was with using a smartphone and how much they knew about an ACL injury. The following results were obtained.



- All the participants were extremely comfortable using a smartphone.
- All the participants were extremely comfortable in recording a video using a smartphone.
- 4 out of the 6 users (67%) strongly agreed to being interested in testing the ACL Risk Estimator application. None of the participants disagreed in being interested in the testing.
- Only 1 participant (12%) did not know what an ACL injury was, whereas all the others either had some idea about it or knew exactly what it is.
- Only 1 participant knew how to perform a vertical drop test when they were asked about it. The rest had to be briefed about it.

2. TEST SCENARIO - 1

The first test scenario of the participant creating an account and then logging in using the credentials he registered with, had some quantitative and qualitative measures associated with it. The results are as follows.

Quantitative:

Avg. time taken	Avg. number of doubts
35 seconds	0

- The average time taken by a user to create an account and then login was 35 seconds approximately. The quickest was 20 seconds and only one user took more than 45 seconds because he misspelt his email address a couple of times.
- No participant had any doubts regarding the registration or the login process.

Qualitative:

- Only one user made comments about him mistyping his email address a couple of times. Apart from that, none of the participants made any comments while registering and logging in.
- No lag was observed in the application at all with any of the participants.
- No bugs were encountered with any of the participants.
- No application errors were observed. Only one user made a user error of mistyping the email address.
- None of the users tried to login before creating an account.
- None of the users used the forget password feature.

There were no difficulties faced by any of the users during the registration and login process. Every participant found the interface quite simple and unambiguous. One of the participant suggested after the scenario, that it would be better if the password constraints like its length would be displayed just below the textbox, so that every new user knows the required password length for registering.

3. TEST SCENARIO - 2

The second scenario of the participant recording and uploading the video had some quantitative and qualitative measures associated with it. The results were as follows.

Quantitative:

Avg. time taken by the user to record video	Avg. time taken by the user to record and upload	Avg. no. of doubts	Avg. no of times the video was recorded	Total number of bugs (all participants)
25 seconds	1 minute	0.33	1	1

- The average time taken by a participant to record a video was about 25 seconds. The recorded video was not more than 3 seconds and thus it did not take a lot of time to record.
- Only 2 out of 6 participants asked doubts. Both of them had the same doubt about how to record a proper video i.e. on what part of the body they have to focus while recording the video.
- All the participants recorded a good video in the first time itself. None of them had to record more than one video.
- The average time taken by a participant to record and upload the video i.e. run through the entire test scenario was 1 minute. All of them recorded the videos easily and then uploaded it quickly by searching it in the directory it was saved to.
- There was just 1 bug in the entire test scenario with one participant. This bug however, was a fatal one because the application crashed. The reason for the crash was that the server stopped running on the system. One of the team member quickly recovered the application from the error after restarting the server.

Qualitative:

- None of the participants felt any kind of lag in the application during the entire test scenario.
- All the buttons worked perfectly.
- Only one participant tried to upload a video without typing the name of the athlete, for which he got an error message and could not upload the video.
- Only one bug was encountered, from which the application was recovered quickly by one of the team members.

There were no difficulties faced by any of the participants, and they found the entire application very simple. One of the initial mistakes that the users (3 out of 6) did were to click at the "Uploaded Videos" instead of the "Upload" button. The primary reason being that "Uploaded Videos" was the

first thing that they saw. They quickly realized what they did, and then started looking for the “Upload” button. The participants suggested to rename the former button to “Previously uploaded videos”. Another suggestion that the participants had for the application was to change the color of “Logout” button, so that it is easily visible. Apart from the one bug, there were no other significant errors in the entire scenario.

4. TEST SCENARIO - 3

The third scenario, in which the participants were asked to login as a medical professional, watch the video, rate it and then type a small feedback about it, had some quantitative and qualitative measures associated with it.

Quantitative:

Avg. time taken by user to browse and open the video	Avg. time taken by the user to complete all the tasks	Number of times the participants asked doubts	No. of bugs encountered
15 seconds	40 seconds	2	5

- The average time taken by the user to browse the video and then watch the video was not more than 15 seconds. Only one participant took more time, because he had uploaded two videos consecutively and wanted to watch and rate both.
- All the tasks in the scenario were completed in around 40 seconds by every participant. I.
- 2 out of 6 participants had the doubts about how the rating system is supposed to work i.e. what do the numbers mean. The other 4 participants were told how the rating system works before the scenario, otherwise they may have had the same doubt.
- 5 bugs of two types were encountered during the scenario. All of them were related to the video player.
 - Two times, the video player did not minimize properly when the button was clicked to do so, and extended to most of the screen making it a little difficult for the participants to see the radio buttons.
 - The other three bugs were that the video didn't play when it was in the minimized version at all and stopped after every second. It, did, however play when it was extended to full screen.
- Though there were 5 bugs, none of them was fatal. They just led to a slight confusion with respect to the presence of the radio buttons.

Qualitative:

- No lags were faced by any of the participants during the scenario.
- The video did not play properly on 3 occasions, where it would play only when in full screen mode.

- All the buttons functioned as they were designed to. However, the minimize video button did not work properly on 2 occasions. The video did minimize, but still extended much beyond the boundaries of the video player, making it difficult to mark the radio buttons.
- There were no constraints for the text box and the participants could type freely.

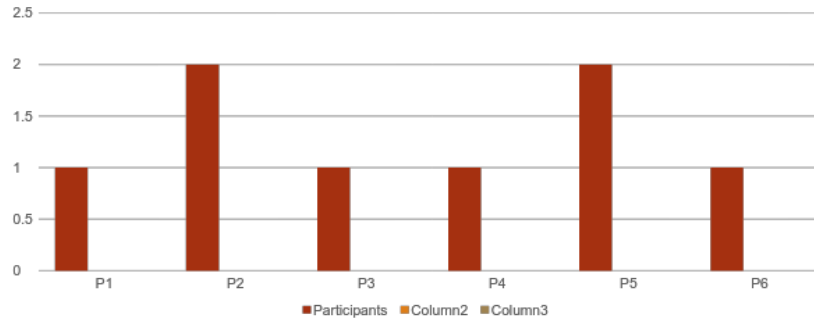
The bugs in this scenario were non-fatal to the application but made it difficult for the participant to see the radio buttons. Some of the suggestions that the participants had were to improve the video player, so that the playback is smooth. Another important suggestion was to include the instructions about how to mark the radio button in the application itself, so that there is no confusion regarding the rating for the medical professional. The participants considered this scenario to be very easy and simple if the problems with the video player were ignored.

5. POST-TEST QUESTIONNAIRE

There were 8 questions in the post-test questionnaire, out which three were open ended questions asking the participant for his views about the best and worst part of the application along with suggestions to improving it. The results for the questionnaire were as following.



- All the participants were extremely satisfied with the overall experience of the application.
- All the participants agreed that they would recommend this application to the various coaches because of its utility and simplicity.
- All the participants agreed that the interface of the application was simple and in accordance with the utility of the application.
- All the participants agreed that the instructions given to them were unambiguous and clear, and they had no problem in understanding what they were supposed to do in every test cast.



- When asked about rating the simplicity and ease of use of the application on a 5-point scale, 5 being extremely difficult to use and 1 being extremely easy, no participant selected the difficult as more than 2. Three participants rated it as extremely easy.
- When the participants were asked about what they liked most in the application, all of them had a unanimous answer of the application being straight forward, easy to use and extremely simple.
- Some of the things that the participants said they disliked in the application were:
 - The background strip of images was slightly distracting and it would have been better had the entire application consisted only of solid colors in the interface.
 - Two participants said that they did not like the way that the drop down menus were used in the application, and it would be better if those could be modified a little.
 - Apart from that the other thing that three participants did not like was that no additional information about the constraints in the registration form or about the five-point rating scale was mentioned.
- Most of the suggestions that the users had have been mentioned in the results for each scenario. Apart from that, some other suggestions were:
 - The extra features in the drop down menu could be condensed into one button which would then guide them to the different resources.
 - The presence of a “Login” button on the homepage after logging in seemed redundant and should be removed.
 - The aesthetic aspect of the application could be improved to use color schemes which fit together and every important feature can be easily seen.

CONCLUSION

In conclusion, the application was found to be extremely simple and easy to use. Most of the participants mentioned that the learning curve would not be steep for the middle-aged coaches of the Upper Peninsula, who are the primary user base for the application. There, however, were some usability concerns too. All the participants became very confident in using the application after the testing procedure. Apart from once, the application never crashed, hence most of the usability concerns are for bugs which are non-fatal. The participants provided the team with valuable suggestions as well, which gave the team more idea on what parts of the application to improve. One of the most important and creative suggestions that a participant provided was to include small questionnaires along with the video to both the coach and the medical professional. It would enhance the estimation of risk for the medical professional and provide the coach with a good detailed analysis of his athlete.

USABILITY CONCERNS

- The video player currently seems to very buggy and doesn't respond to the minimize button properly at times. It works perfectly fine when it is in full screen mode though.
- No information is provided about the constraints of the various fields while signing up as well as the five-point rating scale (for the medical professional).
- The background colors of the text fields sometimes change to red (like the background), making it hard for the user to recognize where exactly he needs to type.
- The running server of the application should be robust, and not stop unexpectedly, otherwise the application may crash.

SUGGESTIONS

- The interface should be restricted to just solid colors. If background images are being used, they should be used in a way that it is not distracting.
- The video player should be redesigned and some aspects of it should be tweaked so that there are no bugs during playback.
- Instructions or information about password/username restrictions and the five-point scale for the medical professional, should be provided within the application.
- The title of one of the drop down menus should be changed from "Uploaded videos" to something else (like "Previous videos") because almost all the participants selected that to upload the video for the first time.
- The layout of the buttons could be changed, and more texture could be added to them to make the application look aesthetically better.
- A small multiple choice questionnaire can be added to the application, to make the analysis easier and to obtain a better as well as detailed feedback.

APPENDIX A

UNDERGRADUATE TEAM ATTENDANCE

Day 1: April 14, 2017 at Rekhi 101

4 p.m. - 5 p.m. : Eric Widmann And Chetan Chaurasiya

5 p.m. - 6 p.m. : Eric Widmann And Chetan Chaurasiya

6 p.m. - 7 p.m. : Eric Widmann And Chetan Chaurasiya

Day 2: April 15, 2017 at Rekhi 101/ Rekhi 324

1 p.m. – 2 p.m. : Bryce Williams and Michael Wallace

2 p.m. – 3 p.m. : Bryce Williams and Michael Wallace

3 p.m. – 4 p.m. : Bryce Williams and Michael Wallace

APPENDIX B

BUG REPORTS

S. No.	Bug Name	Bug Location	Bug Description	Bug Severity
1.	Crash	Coach homepage	Application crashed when the server stopped	HIGH
2.	Bad video playback	Medical professional video player	Video does not minimize	MEDIUM
3.	Stuttering video	Medical professional video player	Video stops after a couple of frames	MEDIUM
4.	Color of textboxes	Entire application	Background color of textbox changes from white to red	LOW

IMPORTANT LINKS

Team Website: <http://www.csl.mtu.edu/classes/cs4760/www/projects/s17/group3/www/>

Final Design Presentation:

https://docs.google.com/presentation/d/1MXL4F30QUm1nHF08wj7kEo7gYPExakQEO1NY-1FGo5M/edit#slide=id.g2023966575_1_7