Deliverable C: Design Criteria and Target Specifications

Emma Moore, Sagnjeevie Nagarajah, Sahibjot Singh, Vivian Bai, and Zhaoxin Zhang

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Introduction

The Ross Video Design Challenge is a project assigned to students by the client Ross Video, in collaboration with the Ottawa Sports and Entertainment Group (OSEG). The goal is to design an innovative interface that controls the various graphical and auditory elements used during sporting events. This system is expected to be produced using Ross Video's very own program, Dashboard, which is built specifically for the purpose of modelling interfaces to be used in live events.

The production team at the TD Place Arena are constantly seeking new ways to improve the fan experience. Fan engagement is extremely important during sporting events, as are functional aspects of the control panel. The project will explore ways to integrate viewer engagement features into the arena's display system.

As of now, the team has examined and understood the client's needs and requests from the initial meeting. These were then used to develop an overarching problem statement that describes the main goal: the client needs a user interface which is capable of controlling the output of accurate information and live video feeds, that can be quickly and easily modified during sporting events.

1. Design Criteria

Table 1. List of Design Criteria and Metrics with Importance Priority Ranking.

Rank	Criteria/Metric	Relation	Value	Units	Verification
Functional					
2	Displays a combination of graphics and text	=	yes	N/A	test
3	Configurable display	=	yes	N/A	test
7	Shows sponsor information	=	yes	N/A	analysis
Constraints					
1	Uses Dashboard Software	=	yes	N/A	analysis
4	Simple and user friendly: time needed to set up one element	<	30	seconds	test, measure
5	Set-up time	<	30	minutes	test
8	Cost	<	50	$	analysis
9	Correct screen aspect ratio	=	16:9	N/A	analysis
Nonfunctional					
6	Aesthetics once displayed (attractive look to fans)	=	yes	N/A	prototype

Design criteria will be used to judge the quality of a potential solution, and they will help to choose the solution later on. Some design criteria are also metrics, which represent a need in terms of measurable quantities; these values assist in judging whether the problem has been solved.

The main goal and most important criteria to satisfy is that the control panel can be used to make the screen display any combination of graphics and text needed depending on the situation. This includes showing statistics of the game, live feeds or videos of players, etc. The information displayed needs to be configurable since details will change for each event. The ability to input and display various types of information is very important. The control panel will be simple and user-friendly to ensure that the operator can find a control immediately and input text/images within seconds. The total set-up time required before an event should be kept to a minimum as well, as the clients stated “setup and switching between sporting events and other rentals of our arena/stadium is tedious and complicated.”

The appearance of the display will affect how fans experience the event. The ability to set colors, font, text size, and rearrange elements so that they fit well are important. The control panel itself should also be gentle on the eyes, for an operator who will be looking at it for extended periods of time. The only way to test how users view the appearance is by presenting the product and gathering feedback.

The ability to show sponsor information is also a huge plus, as with any venue, sponsors are very important for keeping the show going. The cost of the project will be kept below $50, though since the project uses Dashboard, the budget will likely not exceed $0. That is why cost has very low priority on this list.

And lastly, the screen’s aspect ratio is 16:9 which is the “international standard format” [1] for many broadcast systems. Therefore we do not expect to have difficulty setting up the display to fit this format, so it is also low priority.

2. Technical benchmarking

Technical Benchmarking will be used to probe the pre-existing market of similar products as a means of comparing the standard of the product being designed, to the standards of competitors. In doing so, a better understanding of the capabilities and criteria users look for when searching for such a product is gained as well as effective methods of implementing the criteria set by the client.

Table 2. Technical Benchmarking of Live Event Video Production Systems/Software

Importance Multiplier (1-3)	**Criteria**	**Scorevision LED Video Scoreboards [2]**	**Unreal Engine [3]**	**Show Control Studio [4]**
3	Displays a combination of graphics and text	yes	yes	yes
3	Configurable display	yes (tailored for sporting events)	yes (for video and special effects editing)	yes (tailored for arenas/events)
2	Built in sponsor features	yes	no	no

3	Simple and user friendly	yes	no [5]	yes
1	Cost	Contact sales (very expensive)	Free to use, 5% royalty if product succeeds	Contact sales (very expensive)
2	Can set correct screen ratio	yes	yes	yes
3	Makes aesthetically pleasing displays	yes	yes	yes
Total Score		**32**	**20**	**30**

🟩 2 points (good) 🟨 1 point (okay) 🟥 0 points (not good)

Capabilities, as requested by the client, were benchmarked with the main categories including, the data displayed, product versatility and ease of use as well as viewer engagement features.

All three products displayed the capacity for graphics display including, real-time video feed and visual effects. The Scorevision system however, specifically geared towards sporting events, was designed with pre-programmed features such as the accolade button which generates an animation on screen when a player reaches a milestone. The Unreal Engine system performs better with real time virtual setting and environment for example broadcasting and sports live show.

The cost of the product is crucial for the developer to choose. Video Scoreboard and show control studios are expensive and made for large companies to use, but those products are user friendly. Unreal engine is a free software but requires coding experience and complex user interface.

Finally, all three products provide a flexible and aesthetic display to attract audiences.

3. Target Specifications

Table 3. Target Specifications, Ideal and Acceptable Values.

…… …… ….	**Criteria/Metric**	**Measurement**	**Ideal Value**	**Acceptable Values**
1	Uses Dashboard software	yes/no	yes	yes
2	Displays a combination of graphics and text	yes/no	yes	yes
3	Configurable display (has several built in "templates" for display elements, ex. Stats, player names, birthdays)	# of built in templates	5	4-10
4	Simple and user friendly. Time needed to modify one element (find buttons + input text)	Seconds	10	< 30
5	Device set-up time	Minutes	30	< 60
6	Aesthetics once displayed (attractive look to fans)	% of responses that are positive	> 70%	Majority (> 50%)
7	Number of sponsor information	# saved at a time	15	5-20

8	Cost	$ (CAD)	0	50
9	Can set correct screen aspect ratio	yes/no	yes	yes

First of all, the product must be created using the Dashboard software. The product then needs to be capable of its basic intended function: to be able to display graphics and text. Thus, the metric is simply yes/no. Next, versatility can be measured by the number of built-in elements on the control panel, like templates (for example, there can be one element for controlling the display of fan birthdays, which can include a button and a text box, etc.). The total number of elements listed by the client is 8, however, instead of completing all 8, the goal will be to perfect up to 5.

A simple way to measure whether the product is user friendly or not is to measure the time it takes a new user to perform a task using the product. Ideally, it should only take a few seconds to complete a task once the user becomes familiar with the software. To account for lack of familiarity when testing the new product, if a first-time user can complete one task in under 30 seconds then the product is likely simple enough to learn and use. Additionally, required set-up time of under an hour would be preferred since the client specified fast and easy set up as one of their needs.

The only way to really measure how attractive the appearance of the display is, is to present it to potential viewers and ask for feedback. The goal will be to survey at least 20 people (including, but not limited to people who have watched sports in a stadium before), asking if they would be impressed by the appearance. The goal is to achieve a majoritarily positive response, since 100% is unrealistic due to the subjectiveness of what is "aesthetically pleasing.”

Sponsors will likely be known before an event and their information is less subjective to sudden changes, therefore, the ability to save the information of sponsors beforehand is useful. We estimate around 10-15 sponsors will need to be shown for each event.

The cost of this project is not expected to exceed $0, however, even accounting for unexpected factors, the cost of this project should not exceed $50 CAD.

Finally, last but not least, it is vital that the aspect ratio of the screen is taken into account when designing the control panel. The content shown on screen should fit to the correct size otherwise it will look unprofessional. For a venue as large as TD place, it is important that the display looks neat and professional.

4. Reflection

Throughout this process, the client needs help to create our design criteria. The client helped us know what they needed when designing an interface to control the various graphical and auditory elements used during sporting events. The client view helped guide us to develop the design criteria. Converting user needs into design criteria, benchmarking and deriving target specifications have allowed us to conceptualize more progressive design ideas by laying out the individual criteria in terms of "functional", "non-functional", and "constraints", and then ranking the importance of each criterion. They told us about the graphics they wanted and the dashboard application to create a wholesome experience for the fans in attendance during the client meeting. This resulted in the decision that displaying a combination of graphics and text is the most important criteria. Having a configurable display that is simple and user friendly was also deemed very significant as it plays a direct role in the overall efficiency and effectiveness of the design. The client meeting strongly impacted the ranking of the design criteria. The client placed a strong emphasis on creating a convenient and seamless layout that will allow the operator to find and control specific functions very quickly during gameplay and easily input game-specific information. As a result, any design criteria linked explicitly to the execution of that demand were ranked to a higher level of importance. Furthermore, design criteria with a low rating showed that they didn't require the dashboard operator's high level of attention. The cost and screen aspect ratio are two examples of design criteria ranked lower based on the client's needs. There have not been any significant changes in the needs that were specified in deliverable B. However, after further considerations, specific needs have been readjusted or slightly adjusted to create a comprehensive design criteria list. For example, creating a wholesome fan experience helps the fans be more interested in the game. This has been expanded to create the non-functional requirement for an aesthetically pleasing display to elevate the fan experience. Meeting with the client provided much-needed insights that were very useful in developing design criteria and specifications and deciding on their relative importance.

Conclusion

A set of design criteria, formatted by examining the needs of the client, formed a discernible framework to be followed in the upcoming stages of the project. Specifically, aspects of display and configuration capabilities. In terms of target specification, the interface should be understood and easily controlled by users. The system must be able to display graphics and text in quick intervals. Furthermore, these graphics options should be easily configurable in mere seconds, utilizing a series of 5 templates for different occasions. Considering these criteria in relation to the benchmarking completed, it was determined that the Scorevision Scoreboards system would be optimal to use as a reference when proceeding with the design process.

References

[1] “16:9 aspect ratio,” *Wikipedia*. Oct. 05, 2021. Accessed: Oct. 06, 2021. [Online]. Available: https://en.wikipedia.org/wiki/16:9_aspect_ratio

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[4] “Show Control Studio.” https://www.daktronics.com/en-us/products/software-and-controllers/show-control/show-control-studio (accessed Oct. 06, 2021).

[5] D. Stewart, “Unity vs Unreal for Beginners: Which Is the Best Game Engine?,” *Virtual Tilt*, Mar. 10, 2021. https://virtualtilt.com/unity-vs-unreal-for-beginners/ (accessed Oct. 06, 2021).