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A Qualitative Consumer Study of Puck and Player Tracking in NHL Broadcasting

1. Introduction

While the National Hockey League (NHL) is the sixth highest grossing league in the world, it has lagged behind other professional sports leagues in its adoption of sports statistics, falling decades behind both Major League Baseball and the National Basketball Association (Graphic Comments, 2017; Randjelovic, 2020). However, this has recently become a burgeoning field; the Summer of 2015 was deemed the summer of analytics in the National Hockey League, in which there was a hiring frenzy for statisticians and data scientists around the league, where each team now has some form of a data analytics department (Condor, 2019). With this increase in staffing of analytics departments across the league, there has also been an increase in the utilization of data and data visualizations within television broadcasting (Dellow et al., 2017).

The NHL was founded in 1917, and at that time tracking of basic statistics was limited to goals and assists. The first wave of the NHL's analytical movement came in 1997, when tracking teams were hired in each arena to record various statistics like shot attempts, blocked shots, hits, and faceoff wins (Klein, 2014). While manual recording of statistics has been around for over a century, technologies such as puck and player tracking are quite recent developments, and when they are fully integrated into gameplay, we will embark on the second analytical movement in the NHL with the advent of big data (Dellow et al., 2017; Mehta et al., 2019).

While more advanced puck and player tracking technology are soon to be introduced, puck tracking technology was initially developed by Fox Sports during the first analytical movement. During the late 1990s, Fox Sports utilized "FoxTrax" in their broadcasts, hockey pucks that were modified to house shock sensors and infrared emitters (Cavallaro, 1997). Sensors in the arena connected these pucks to computer systems which were able to generate on-screen graphics; these included a glow around the puck and trails which changed depending on the hardness and speed of shots (Cavallaro, 1997). The idea behind utilizing these features in broadcasting was to help new viewership track the puck and become acquainted with the game (Cavallaro, 1997). While it was criticized by long-time viewers as a distraction, and was discontinued after a few seasons, it was ultimately deemed to be a technological success (Cavallaro, 1997), and served as the predecessor for the current puck and player tracking technology which has been piloted during the 2020 NHL All Star Weekend and 2021 Playoffs.

This new version of puck and player tracking technology will utilize antennae housed in the arena rafters which will detect sensors placed on the shoulder pads of each player and within modified pucks; there will also be cameras to coordinate the tracking functionality (Gulitti, 2019). This technology will allow for instantaneous detection of various aspects of the game including passes, shots, and puck positioning, as well as the tracking of player movement, speed, distance, and time on ice (Gulitti, 2019). The advent of big data in the NHL has great implications for competitive advantage of teams. As consumers of the game, while we will potentially see the effects in the on-ice product, we will not be privy to the analytical rise occurring in-house among each team (Dellow et al., 2017). On the other hand, television broadcasting where the analytical movement will take shape in the public domain.

1.1 The Present Study

There are several conflicting arguments and criticisms towards the analytical movement in hockey. Some in the hockey community argue against the analytical movement in its entirety, finding that hockey statistics do not capture the "intangibles" that players bring to the game, characteristics like character, grit, fortitude, mental toughness, and high-pressure experience (Burke et al., 2014). Others argue that even though hockey statistics are in their infancy, it is a burgeoning field, and they are not being used or communicated effectively (Dellow et al., 2017). For example, there have been criticisms towards broadcasting in hockey that they have not utilized data and statistics efficiently; they lack focus on explaining why teams are winning and doing well, and that they need to tell stories using the data (Dellow et al., 2017).

In this moment, we are at a critical juncture where there is great potential in the introduction of puck and player tracking technology, in that it will allow for broadcasting to be enhanced by the data it produces. However, it will only be enhanced to the extent that the data is visualized and communicated effectively, and in a way that is palatable to the consumer audience. The NHL tested the viewer experience of this tracking technology during the 2020 All-Star Weekend. This included a display with the game video, speed of players, zone time, where they are shooting from etc. Further, during the current 2021 playoffs, new analytics and data visualizations are being introduced which communicate shot- and save-based statistics to viewers during intermission reports. At this point, the consumer audience perspective towards the introduction of these analytics and visualizations remains unclear. The current study seeks to elucidate the degree to which data is being communicated effectively, is enhancing viewer engagement and knowledge, and is perceived to be a positive viewer experience overall. We are also interested in how different types of viewership (long-time, intermediate, novice) relate to such perspectives.

1.2 Research Questions

1. Are consumers finding the various visualizations to be understandable and engaging?

2. Are the visualizations increasing their knowledge of the game?

3. Are the visualizations palatable and meaningful to the consumer audience?

4. Are there components of the visualizations that are more effective than others?

5. Do different qualitative themes arise out of participant groups, depending on the length of time someone has been a viewer of hockey?

2. Methods

2.1. Participants

This study will include three groups of 20 participants for a total sample size of 60 participants. One group will include long-time viewers of hockey, which will be quantified as more than 5 seasons. The second group will be classified as intermediate viewers, with 1 season up to 5 seasons of having watched hockey. The final group will be novice viewers, which will be classified as less than one season. Participants will be recruited through online hockey forums, webpages, and social media, as well as in-person. For the purposes of this study, participants must be at least 18 years old, able to read and understand English, and have normal or corrected-to-normal vision.

2.2. Procedures

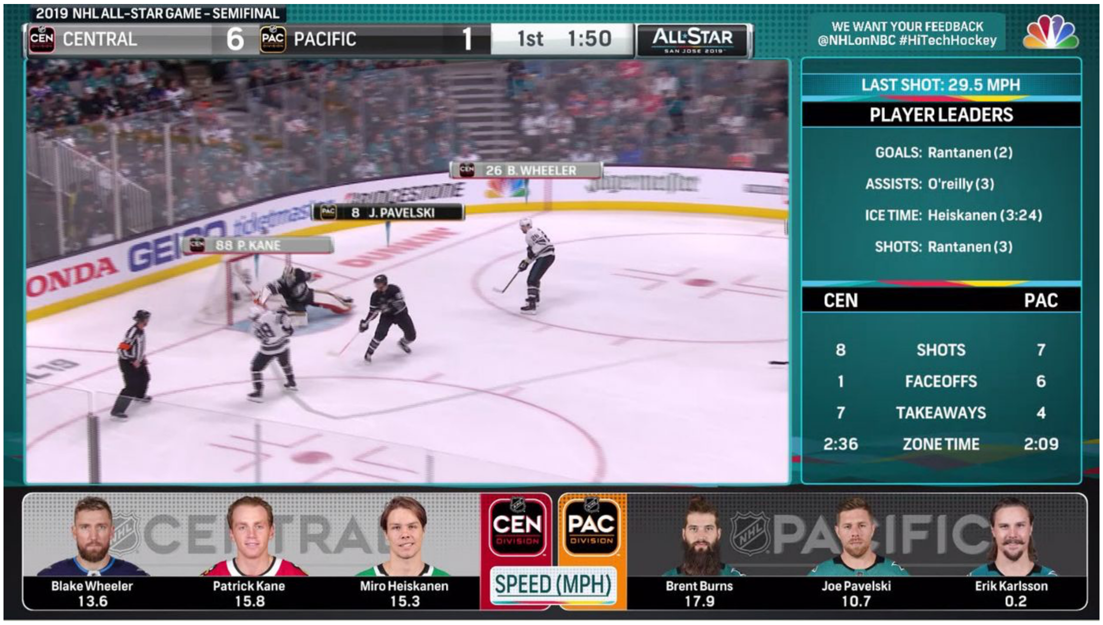
Following informed consent, participants will participate in a 30-to-45-minute interview. Demographic information will be obtained, including the how often and for how many seasons the participant has watched hockey. They will then be presented with the various visualizations (see below) and will asked questions related to their understanding, knowledge, level of engagement, and opinion regarding the use of the visualizations to convey hockey-related data. Questions will be used to assess: their level of understanding of each visualization, the degree to which they find the visualizations engaging and palatable, the degree to which they believe the data is being communicated effectively, the degree to which they find the visualizations to be distracting or meaningful, what components of the visualizations they like or dislike/find more or less effective, whether they would continue to watch hockey with these types of visualizations, and their thoughts on the analytical movement in hockey more generally.

2.3. Materials

The following three figures represent the brief range of data visualizations which are currently being piloted within NHL broadcasting. Figure 1 is the game display that was utilized during the 2020 NHL All Star Weekend on NBC and is a result of both puck and player tracking technology. Figures 2 and 3 represent the visualizations of shot and save analytics that will be used in this study. These are a result of puck tracking technology; in real time it has become possible to pinpoint the exact locations of shots. Figure 1 is an example visualization of shot analytics, which can be used to express player/team shooting percentage and shots from a certain location, player's historical location of shots and goals versus a specific team/goalie, compared to the league average, or their three-year average (Amazon Staff, 2021). Figure 2 is an example visualization of save analytics, which can be used to express save percentage from a certain location overall and by specific team or when killing a penalty, historical comparisons to previous seasons, last X days or X games, comparison to league average and playoff performance compared to regular season (Amazon Staff, 2021).

Figure 1

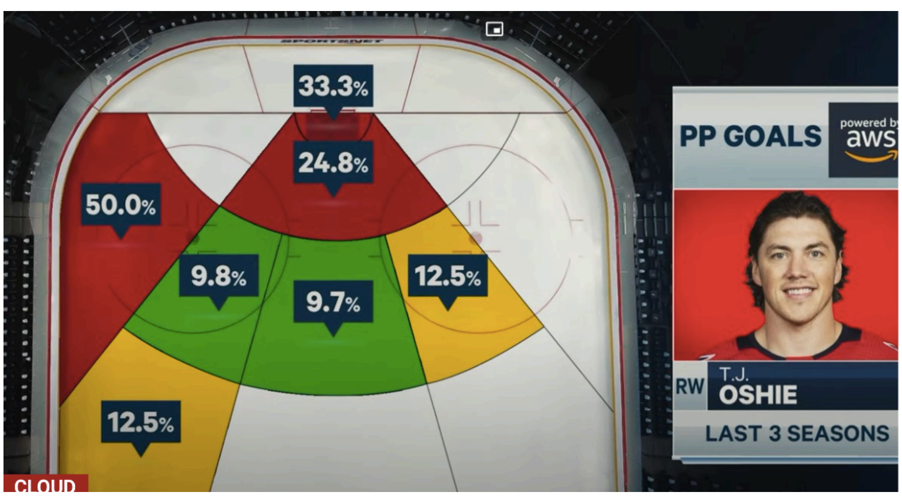
Gameplay Broadcasting



Note. On-screen display includes gameplay with labels over players; score and game clock; speed of last shot; leaderboard of goals, assists, ice time, and shots; team statistics of shots, faceoff wins, takeaways, and time in the offensive zone; and on-ice player profile pictures with their current speed.

Figure 2

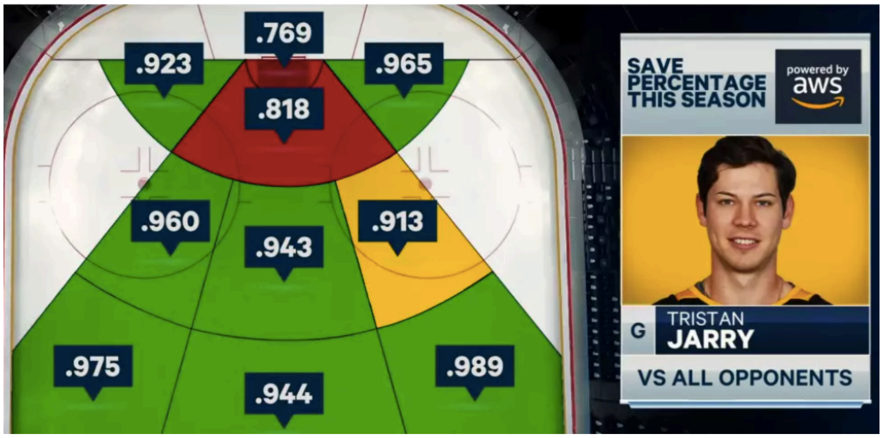
Shot Analytics Data Visualization



Note. Example of shot analytics data visualization used during intermission reports, highlighting T.J. Oshie's powerplay goals the last three seasons, with the ice divided into sections, and colours used to indicate percentages, with green being less than 10%, yellow 10-20% and red greater than 20% (Amazon Staff, 2021).

Figure 3

Save Analytics Data Visualization



Note. Example of save analytics data visualization used during intermission reports, highlighting Tristan Jarry's save percentage this 2020-21 season versus all teams, with the ice divided into sections where shots came from, and colours used to indicate save percentage, with red being less than .910, yellow between .910 and .920, and green greater than .920 (Amazon Staff, 2021). Red indicates a poor save percentage, whereas green indicates a good save percentage.

2.4. Statistical Analyses

To analyze the qualitative interview data, we will conduct a thematic analysis using NVivo V. 12 (QSR International, Melbourne, Australia). To conduct the thematic analysis, we will follow these steps: reading and re-reading the data, producing codes, searching for and developing early themes, and revising and classifying themes (Braun & Clarke, 2006). We will utilize an inductive approach to allow the data to guide the development of themes. With any qualitative analysis, prior experience, knowledge, and assumptions can bias the interpretation of data; to mitigate this, multiple researchers will review the same transcripts to assess for reliability of codes and themes. Disagreements will be resolved through re-examination of the data and discussion.

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