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# *Meaningful Play: The Representation of Data in Hybrid Games*

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**ABSTRACT** Within games we are seeing two interesting trends: a renewed interest in virtual reality and a continued rebirth of tabletop games. In some ways these trends represent diametrically opposed play styles and demonstrate some of the challenges with visualizing information within game systems.

While virtual reality represents the continued extension of the body into the world a video game creates, it comes at the cost of isolating players from their actual surroundings and the richness of live social interactions. At the same time, virtual reality games are a natural evolution of the computer's ability to facilitate visual complexity and variability in rules.

Conversely, traditional tabletop games are inherently social but limited in visual and systematic complexity due to the impatience of players, laws of physics and production costs. Still we have seen huge growth in the tabletop game market over the last ten years with more complex European games becoming well known and game nights becoming popular social events.

There is a long history of game design that attempts to fuse the tactile and social nature of tabletop games with the affordances of technology into a unified play experience. These analog and electronic designs are often called hybrid games.

I recently had the opportunity to be a research fellow at the National Museum of Play where I began creating an online history of hybrid games.[1] This paper will discuss visualization strategies found in that history that I believe are useful for designers who want to create social tactile experiences.

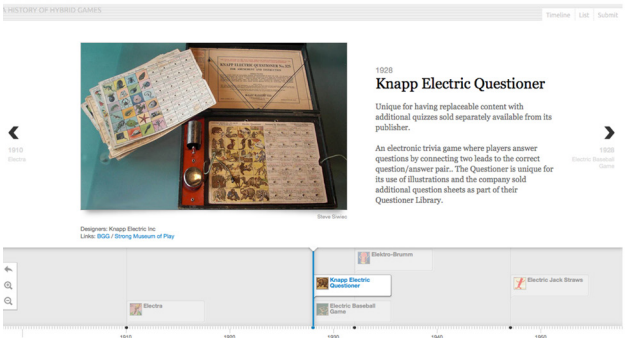


FIGURE 1: *Image of History of Hybrid Game Sites*


FIGURE 2: *Operation by John Spinello and Marvin Glass 1964*

## INTRODUCTION

Games are evolving forms of data visualization, where information is revealed to players based upon a set of carefully articulated rules.

Hybrid games are a subset of these systems, and combine analog and digital components into a unified play experience. A question then arises regarding how rules might be altered, or not, based upon such extended capability. In this paper, we will be looking at hybrid games as a model to examine the role of play as a design-strategy within data visualization.

## OPERATION A HISTORICAL CASE STUDY

Operation is a well-loved dexterity game where players try to remove body parts from a patient using metal tweezers. If players touch the sidewalls while extracting the items, a simple electric circuit is closed and the patient's nose lights up, and a buzzer goes off, signaling that the player has failed the operation. If the player is successful at removing the part they are paid a certain amount of money and the player with the most money is the winner at the end of the game. Operation is perhaps the simplest and most well-known hybrid game.

Operation was designed in 1964 by John Spinello and Marvin Glass and has been a popular children's game

for over 50 years.Yet the simple mechanic it depends on predates it by close to another 50 years.

Wire hoop games were popular carnival attractions around the turn of the 20th century. In the game, players had to move a metal ring from a starting position to a goal while navigating a twisty metal track. Touching the ring to the track would complete a circuit, signaling a buzzer and a failed attempt.

In 1947, Jim Prentice created Electric Jack Straws which combined the basic design of wire hoop games with the folk game: Jack Straws.[2] This game is almost mechanically identical to Operation.

Players remove colored straws though a can with holes on the top using metal tweezers. Touching the sides completes a circuit, turning on a small light and signaling a failed attempt. Players get different points depending on the colored straws they remove and the player with the most points at the end of the game wins. Looking at the design choices found in Operation, along with the differences from its predecessors, we can illustrate some of the design considerations when representing data in hybrid games.

## NARRATIVE

Operation's history is a case study in the power of a unique interactive narrative. Electric Jack Straws and the wire hoop games that predated it were abstract games. In those games, players don't know why they are doing the things they are tasked to do, except that they are told they are necessary in order to win.

In Operation however, players engage in a wonderfully weird fantasy where they are all surgeons slowly removing sometime vital body parts from a patient who has been given no anesthetic. Furthermore, instead of simply reaching a goal or getting points, a player's success in the game is measured in the form of money.

This narrative is visualized in the space in the form of the character, the shape of the operation table and the pieces to be removed. As a visualization it is hardly succinct or efficient and contains a lot of what Edward Tufte would call "Chart Junk."[3]

However, the goals of data visualization in games is often not to make information clear or easily accessible but rather to fold it into narrative forms that engage players in the act of uncovering its meaning.

Often times we see examples of this within data visualization as well. Consider Josh On's They Rule, a visualization tool that allows users to maps the board member's of Fortune 500 companies.[4] While the visualization is minimal in design, one narrative aspect of the piece is the representation of a board member's potential power (how many boards they sit on) as their girth.

While this mapping doesn't tell an explicit narrative it engages the viewer into narrative play as they can search boards to find the largest, smallest and potentially most connected individuals. Narratives in games and data visualizations often times are not fully formed and yet it is an effective strategy to have narrative artifacts that allow users to create their own stories as they explore the data.

## REVEALING INFORMATION

When we think about non-interactive forms of data visualization (charts, graphs, maps, posters, etc.) the general goal is to make data comprehensible, intuitive and easy to navigate. This changes when data becomes interactive, as designers get to decide what data to reveal, hide, and what interfaces should be used for interaction.

Within games, the reveal of information into the game space is one of the ways we classify games. Consider


FIGURE 3: *Electric Jack Straws by Jim Prentice 1947*

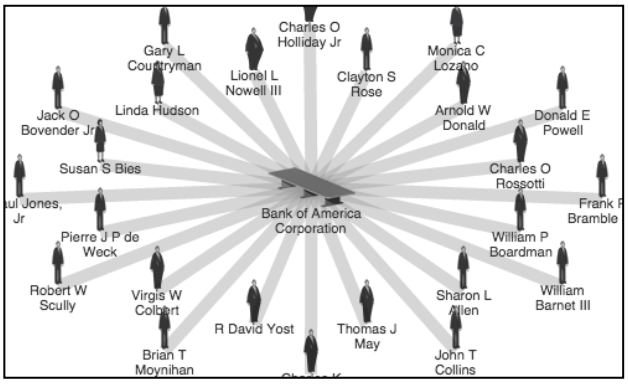


FIGURE 4: *Example of sizes of Board Members from TheyRule.net by Josh On*

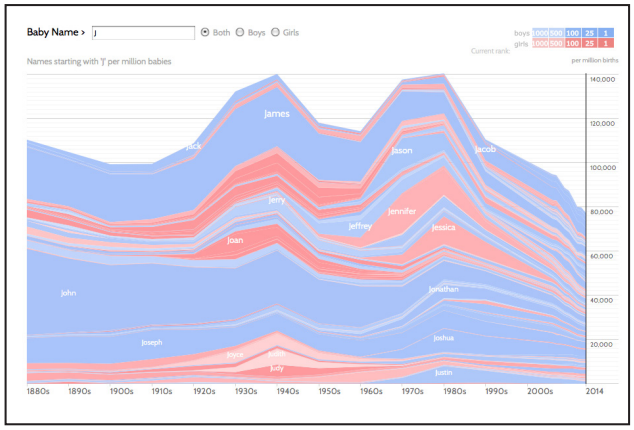


FIGURE 5: *Baby Name Voyager by Martin Wattenberg*


FIGURE 6: *XCom app-driven hybrid game by Fantasy Flight Games 2014. Image via Fantasy Flight.*

bluffing games such as Poker, where the dance between what is known, unknown and suggested give the game it's richness. Within hybrid games the reveal of information is often shared between the game system and the players. In Operation the information that the game system holds is the next operation (in the form of cards) and if a player has successfully removed a piece.

By automating the later, the game achieves it's magic: the patient on the operating table comets to life, he has a reaction, a protesting voice in the buzzer. The simple circuit also automates the game's most important rule (not touching the side walls when removing an object), which would be nearly impossible for players to judge. How we choose to reveal information in games and data visualizations often determines their feel. Take, for example, the Baby Name Voyager by Martin Wattenberg.[5] After loading, we are presented with a very dense area graph and a prominent input field labeled baby name.

As we type into the field, letter for letter ("j", "ja", "jas", etc.) the chart dynamically sorts, revealing the popularity of the name over time. This is the magic of the visualization, the system reveals the data to the user in a playful, surprising way that calls for further investigation.

## SHARED PLAY SPACE

In Operation all players sit around the "operating table," they watch one another's actions, they perform for one another, they can smack talk, share strategy and perform a myriad of other social interactions that enrich the experience of the game.

Interacting in real space and time is often missing from both digital games and data visualizations in large part due to the limitations of current technologies and our reliance on personal rather than shared social devices. We tend to stare at screens instead of one another and what is lost is the ability to read social cues, converse easily and engage in tactile play.

## SONIFICATION

Most people who have played Operation can probably describe the buzz that the game makes when you fail a surgery. It is loud, shrill, and jolting due to the tense nature of the game.

Using sound as a means of feedback in hybrid games has been extremely common throughout their history. It is far cheaper than using a display and it doesn't need to be visually oriented.

Sound is commonly used in these games to describe the state of the game, randomize elements, add narrative flourish, or act as a timer. As voice recognition and AI technologies advance, it will be interesting to see how using sound as an input mechanism will create new interactions for both hybrid games and data visualizations.

## MODERN HYBRID GAMES AND THE FUTURE

Operation is still a successful design because of its use of narrative, how it elegantly reveals information, the social play it engages and its use of sound. However, it is a fifty-year-old game, and there are many modern hybrid games being produced that are leveraging some new technologies that are well worth noting.

Here are a couple trends we are seeing in modern hybrid games:

### APP INTEGRATION

This is perhaps the biggest trend in hybrid game design right now. With games like Golem Arcana and XCOM: The Board Game, we see designers leveraging smart devices to track positions within a game space, create random events, provide upgradable content as well as use the device to help teach the game.[6]

FIGURE 7: *Osmo computer vision based game system. Image via Osmo.*


FIGURE 8: *Anki Drive AI driven race cars. Image via Anki.*

FIGURE 9: *Microsoft Hololens augmented reality demo with Minecraft. Image via Microsoft.*

### COMPUTER VISION

There are a few games using computer vision in combination with smart devices to create new forms of play. Most notably are the Osmo platform and the Smart Play system from Ravensburger . Both track various game piece in real space and translate them into a hybrid experience.[7]

### AI

Artificial Intelligence is beginning to make its way into hybrid game designs most notably with Anki Drive, a racing car game that uses robotic cars that players control via their smart phones.[8]

### AUGMENTED REALITY

Augmented Reality is being used in a variety of hybrid game designs like Roar! Catch the Monster and also in Mircrosoft's Hololens project.[9]

## CONCLUSION

By studying time periods where technologies and form factors are in flux, I believe we can question assumptions made concerning technology.

This allows us to find missed design opportunities that might not have been technically possible at the time. Considering how hybrid games create meaningful play with limited tools, and leveraging today's technology, there is an opportunity to create novel experiences that engage users in playful social interactions with data.

## BIOGRAPHY

Jason Corace is a game designer and educator whose work focuses on the exploration of games and new media art. He holds an MFA in Design Technology from the Parsons School of Design and is currently a professor at the Maryland Institute College of Art.

## NOTES

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