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Analysis of Player Preference in Networked Audio Games

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Abstract

Different types of games have been made accessible to people with visual impairments (VI) by creating audio enhanced versions of the games. This paper analyzes a website created and run by several of the authors (rsgames.org) that offers 17 different free to play audio games. The results of this analysis may help to understand the types of games played by people with VI and may provide an indication of what kinds of games should be made in the future and what types of features should be present in games. A survey of 55 active users showed that background music and having played the non-digital version of the game the top reasons for enjoying the audio version of the game.

Keywords

Audio games, blind, visually impaired, accessible gaming, non-visual games.

Introduction

A person who is blind can play many commercial games. Games that utilize standard dice are playable without modifications as the dice themselves contain tactile information that uniquely identifies each side of the die. Commercial video games have been modified to use enhanced audio and tactile feedback in order for them to be played by a person who is blind (Allman 2009, Morelli “VI Tennis” 2010, Morelli “VI Bowling” 2010, Yuan 2008). Board games may need modifications, or may need to be rebuilt from scratch in order to be playable by people who are blind (Corday 1980, Wang 2006). This paper looks specifically at board, dice, and card games that were made accessible to a person who is blind by converting them to audio only networked computer games. An Internet site was created in 2009 and different games have been added to the site periodically. This paper is organized as follows. First the gaming site is described, then the available games are described, then usage statistics and the results of player surveys are revealed, next a discussion on the statistics is performed, and then the paper is concluded.

Rsgames.org was started in 2009 in an effort to curtail the lack of games accessible to blind and low vision players around the world. It was originally started simply as a Monopoly server/client, the client at the time only available for Windows. It has since grown into a multiplatform system accommodating anywhere from 60 to 100 plus simultaneous global connections. Utilizing a central server, storing user authentication and game data in an SQL database, with a client for Windows, Mac OS X and Linux, sight impaired players can play a variety of popular board and card games.

A custom library, called Accessible Output, allows the client to hook into the APIs of numerous commercial, free and open-source screen-reading technologies. Additionally, it permits the game's output to be directed to a Braille display. There are 19,136 registered players on the site. In a period of 28 days (04/01/2015-04/29/2015), there was an average of 5.896 new accounts created per day. It averages 1,500 unique visitors a week. The architecture has one central server where all the game data (sounds, code etc.) is stored. The single client then connects to the server and retrieves the data for each game. In this way, when a new title is released, only the new sounds for that particular game must be downloaded to the user's machine; nothing else is done client-side.

Discussion

Rsgames.org contains 17 game titles available. The titles available for play are: 1000 Miles, Apples to Apples, Battleship, Bingo, BlackJack, Cards Against Humanity, Dreidel, Farkel, I doubt it, Monopoly, Pig, Rummy, Shut The Box, Toss Up, Uno, Yatzee and Zombie Dice. Several of the games allowed for players to play against other players, or against bots if no other players were available for immediate play. Those games include 1000 Miles, I Doubt It, Monopoly, Pig, Toss Up, Uno and Zombie Dice. A more detailed description of the most popular games (Table 1) including an analysis of the accessibility of the original games and modifications to make them more VI accessible follows.

Uno

Uno (Mattell Games Uno 2016) is a popular card game where players take turns and attempt to lose all of their cards. Players hold cards in their hands and try to match either the color of the card, or the value of the card with the card on the top of the discard pile. If the player is unable to match either the color or value, the player must pick up a new card and add it to the cards he is holding. In addition to standard cards with numbered values, players may also pick up action cards such as cards that reverse the direction of play (clockwise to counter-clockwise) or instruct a player to skip the turn. Players with VI can enjoy this game by playing with a sighted peer who will announce the color and number of the cards the player is holding. There are also special prints of the cards that contain braille in addition to the standard graphics that will assist players with VI.

The audio game version can be played with real people or by adding bots. The game begins by announcing the color and value of all cards held by the player and the top card in the discard pile. The player only knows about the number of cards held by his opponents. Up and down arrows cycle through the cards in the player's hand and the option to draw a new card. As the game is played, the number of cards remaining in the opponents' hands is not announced. The top card in the discard pile is only read at the start of the player's turn, which may make it difficult for the player to decide what card to place if he missed that audio cue.

Farkel

Farkle (Legendary Games 2016) is a dice game for two or more players where players alternate throwing six dice and achieving a score. After each throw, a player must set aside one or more scoring dice that were just rolled. If the player cannot set any dice aside, he has *farkled* - his turn is over and he must pass the dice to the next player. Prior to passing the dice, his combination of thrown dice are assigned a score and that becomes his score for that round. Players add their score for a particular round to their total score and play continues until on player reaches a predetermined point total such as 10,000 points.

The audio game features background music and follows the rules of Farkle. Players roll 6 dice, and are then given a list of the valid moves. Players can choose any of those moves, or end their turn. Players hear everything about their opponents turn.

1000 Miles

1000 Miles (Parker Brothers Mille Bornes 2016), also known as Mille Bornes, is a multiplayer card game where players compete against each other attempting to be the first player to achieve 1000 miles. Players are given distance cards, hazard cards, remedy cards, and safety cards. Players can penalize other players by placing hazard cards, overcome hazards by placing remedy or safety cards, and make progress towards the final goal by placing distance cards but only if there are no hazards on the player. When a player reaches 1000 miles in distance cards, the game is over and each player's cards in play are totaled to create a score. The player with the highest score wins the game. Like other card games described here, a special deck of cards can be created or purchased that enhances the cards with braille in order assist a person with VI.

The audio game features up beat rock music as the background music. Using the default settings, players play for 5000 miles, but this value can be changed in the settings. Players can use the arrow keys to highlight their cards and hear a description for each card. They can also select to draw a card or discard a card. There is no option to get the status of the opponents other than to listen to the narration of what takes place during their turns. This multiplayer game allows the use of bots.

Yahtzee

Yahtzee (Milton Bradley Company 2016) is a popular dice game for one or more players. The game of Yahtzee consists of players rolling 5 die with the hopes of creating combinations. Different combinations pay out different point values, for example rolling three of a kind can earn the player 17 points, while rolling four of a kind will earn the player 24 points. On a given turn a player can roll the dice up to three times. The player is required to roll all dice on the first roll of a turn, and on the remaining two rolls the player may choose to only roll a subset of the dice. After thirteen rounds, the player with the most points is declared the winner. As with all dice games, players with VI can feel the tactile information contained on a standard die. The rest of the dice games listed below are assumed to be able to be played this way unless otherwise noted.

The audio game features similar jazzy background music and dice rolling sounds. Players roll the dice to see who goes first. On the player's turn, he can roll the dice or view the score card of his or any of his opponents. As players roll dice, the status of the game is audibly announced including the values of all dice rolled, and what dice were kept. Players use the arrow keys to highlight different dice, and then use the space bar to select the dice for a re-roll. When the player is satisfied with the status of the dice, he chooses to score.

Table 1. Percentage of Games Played, Menu Order, and Release date.

Title	%	Order	Release
1000 Miles	11.49	5	6/19/11
Apples to Apples	1.16	8	12/20/11
Battleship	2.20	6	6/16/11
Bingo	1.43	12	7/31/13
Black Jack	2.15	3	12/25/10
C.A. Humanity	2.72	16	9/1/14

Title	%	Order	Release
Dreidel	0.52	13	11/27/13
Farkel	20.15	9	12/20/12
I Doubt It	1.14	15	12/20/13
Monopoly	8.32	1	12/20/09
Pig	2.90	11	3/17/13
Rummy	4.23	10	12/20/12
Shut the Box	1.39	7	4/14/12
Toss Up	4.36	17	12/20/14
Uno	24.03	2	8/30/10
Yatzee	11.81	4	12/20/10
Zombie Dice	1.56	14	12/20/13

Data was collected from the website over the time period of 3/29/2015 through 5/4/2015 to analyze player behavior. The data collected is for every game that is started, not every game that was played to completion. In all 52,850 games were started in total comprised of the individual 17 game titles. The average number of games started per title was 3157 (SD=3711). The individual break down of games played per title is shown in Table 1. The responses from the survey about preferred games are in line with the actual game play statistics.

More than 44% of all games played were either Farkel or Uno. Why are these games favored when compared to the other games? One possible reason could be that they are easier to access when logging into the site. When players first login, they are presented with a list of games, and that list of games is always in the same order. Games at the end of the list may receive less play because it is harder for players to find them. Uno is the second game in the list, while Farkel is located in the middle of the list at position 9. The first 8 games on the list sorted

by order in the menu contain 61% of the play, while the last 9 games on the list contain 39% of the play.

Table 2. Avg. Game Rating (1 poor, 5 great) and percentage of respondents who have played the non-digital version of the game

Title	Rating	Played % (Non-Digital)
1000 Miles	4.13	15.38
Apples to Apples	3.62	17.31
Battleship	3.67	53.85
Bingo	3.33	84.62
Black Jack	3.49	59.62
C.A. Humanity	3.58	11.54
Dreidel	2.34	7.69
Farkel	4.57	21.15
I Doubt It	3.27	13.46
Monopoly	4.13	88.46
Pig	3.16	13.46
Rummy	3.47	26.92
Shut the Box	3.08	19.23
Toss Up	3.22	7.69
Uno	4.38	73.08
Yatzee	3.98	51.92
Zombie Dice	3.16	5.77

Another possibility could be that older games receive more play. Games that have been on the site longer could be more familiar to the players and as a result they may get more play. 62% of the games played came from games that were in the first 8 games to be released (4/14/12 and before) while 38% of the games played came from the 9 games that were released after 4/4/12. Although overall preference is given to games that have been around for a while and games that are in the first half of the list, these are not stand out statistics as Farkel, whose play makes up over 20% of all play, is located in the latter half of both of these lists.

In order to try to figure out what makes a better audio game, 55 active users were surveyed about why they play the audio games on this site. When players log in to the site they are presented with a message of the day. A message was posted that asked players to voluntarily and anonymously take a survey about the games contained on the site. The statistics used from these surveys were taken from the first 55 respondents.

Players were asked to rank each game from 1-5, where 1 is a poor game and 5 is a great game. The results of this player survey are shown in Table 2. Falling in line with the usage statistics, players preferred to play Farkel and Uno over all the other games. One reason that people preferred these games could be that they prefer these games because players are familiar with the game play from playing the non-digital version of the game. Surveyed players were asked whether or not they have played the non-digital version of the game. The most popular games players had played as a non-digital version were Monopoly (88.46%) followed by Bingo (84.62%). Uno came in third place at 73.08% and Farkel ended up in 8th place with 21.15% of players having played the non-digital version of the game. By these numbers it appears as though familiarity of the game by playing the non-digital version of the game does not have any effect on the rating given to the audio computer game.

Table 3. What game features are most important?

Category	Average Rating
Background Music	4.44
Played Non-Digital Version	3.59
Game Sounds	3.52
Social Features	3.48
Works with Screen Reader	2.56
Playability	2.42

Surveyed players were asked about different features of games that they felt were most important when playing audio computer games (Table 3). Most important was background music, followed by playing the non-digital version of the game and game sounds. It may be considered surprising that background music was rated more important than works with a screen reader. The games are playable using the built in audio cues without using a 3rd party screen reader. That may explain why the screen reader importance was ranked so low.

Table 4. How often do you play games on this site?

Category	Percentage
Several Times A Day	16.36
Once a Day	1.82
Several Times a Week	25.45
Once a Week	10.91
Several Times a Month	25.45
Once a Month	5.45
Several Times a Year	10.91
Once a Year	0.00

Table 4 shows self-reported values for frequency of play and Table 5 shows self-reported average duration for each game play session. Most players spend between 30 minutes and 2 hours during one gaming session and log in several times a month to several times a week. Based on these results, it is suggested that new audio games contain great background music

with an average play session time of 1 hour, and players will expect to play the game on a regular basis.

Table 5. How long is your average play session?

Category	Percentage
< 10 Min	0.00
>10 Min and < 30 Min	18.18
>30 Min and < 1 Hour	30.91
> 1 Hour and < 2 Hours	334.55
> 2 Hours	14.55

Conclusions

This paper presented an analysis of games and player behavior on an online audio computer game site. Players found background music and familiarity with the non-digital version of the game as the most important features of computer audio games. It was also discovered that most players spend between 30 minutes and 2 hours per play session, which indicates game play time should be within that range. Although no significant trends were discovered, the data presented here and collected from primarily blind players, is important to take into consideration when creating new games for people who are blind.

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