Collaboration and Learning in Music Video Games: An Analysis of Rock Band™ Game Play

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Executive Summary

The team performed a study of Rock Band™, a music video game, to evaluate how the game facilitates collaboration, interaction, and learning among its players. We researched what kinds of people play the game, to what extent the game hardware and software interface are usable and easy to learn, and how players negotiate instrument, song, and skill level choices. We wanted to find out how familiarity with other players and acquired game expertise influence group interaction, as well how and when players share knowledge about how to play the game.

Our study employed the following methodologies:

1) A heuristic evaluation to assess the game's usability.

2) A comparative evaluation with the collaborative and casual game Wii Tennis.

3) Development of personas to showcase the different categories of Rock Band players, as well as scenarios to enable us investigate the social dynamics involved in learning the game.

4) Ten interviews to discover the kinds of people who were playing the game and how they learned to play.

5) Four observation studies of Rock Band sessions to acquire empirical knowledge about how players interact during and in-between gameplay. To test our hypothesis that familiarity with other band members (the "stranger" factor) and existing game skill levels influence interaction and types of collaborative behavior, we designed each observation session to include players of different skill levels and familiarity with one another.
We found that players learned how to play by watching how others play and through practice. In-game coaching and verbal encouragement from fellow band members improved the rate of learning and enjoyment. We discovered that most collaboration occurs outside of game play, when players are in between songs. The game demands high concentration from players, which prevents interaction during play.

In short, we discovered Rock Band’s combination of fantasy, popular music, non-competitive, and brief but intense game play sessions are a winning formula for social game play.

We close our paper with recommendations in the following areas: centralized task control, making the fantasy more interactive, how to inspire more discussion among players, how to better engage spectators, and solutions for usability problems cited in our heuristic evaluation.
Project Background

As part of the requirement for SI 689 Computer Supported Collaborative Work (CSCW) course, the team conducted a semester-long project to evaluate Rock Band, a music video game, in the context of how the game facilitates collaboration among the players. In particular, we were interested to know the kinds of people who play the game, and how they learn the instruments and the game to successfully play it to completion, as well as the factors that may affect the collaborative behavior. The team chose Rock Band because the game is known to involve multiple players performing different roles and operating different instruments working collectively towards a common goal of completing a song.

Newer versions of Rock Band implements several advanced features such collaborative play across the Internet. Since the original Rock Band that we were studying allows collaborative play in the same band only in the same physical space,1 our study was focused on in-game collaboration within the same time and space.

Introducing Rock Band

Rock Band is a music video game in which up to four players perform popular songs as a virtual band. The game is controlled with three different peripherals modeled after the three standard rock band instruments: drums, bass and guitar (the guitar peripheral is used for guitar and bass), as well as a microphone for the vocalist. Up to two guitar/bass peripherals may be in use with the game at once.

Rock Band can be compared to many other rhythm or music multiplayer games. These include Guitar Hero, Dance Dance Revolution, Taiko Drum Master, Samba de Amigo, Karaoke Revolution, and Donkey Kongo. These games are a form of entertainment that allows people to use controllers in a similar way to real instruments or sing or beat out rhythms in simultaneous collaborative or competitive play. They all feature scrolling indicators of when and how to interact with the system as players test their skill at execution of the game directions.

The game is rated "T" for teens by the Entertainment Software Rating Board, meaning the content may not be suitable for those less than 13 years of age, due to certain characteristics of the game like language, graphics, and action. However, ESRB ratings prevent only direct sales—parents may purchase the game for their children.

Due to the relatively high cost of the game ($170 for the basic set), potential users of the game may be determined by demographics, although those who cannot afford it may play at a friend’s home or share the purchase cost. This game may be appealing to both genders and multiple age groups, although the game’s rock music content may appeal more to young adult males.
How Rock Band Works

The objective of the game at the elementary level is to complete playing a song. Challenge in the game is provided by the difficulty of songs and individual skill level. Players start by choosing an instrument to play, a song, an avatar of a rocker, and level of difficulty.

![Figure 1: Rock Band Instruments](http://www.jesperjuul.net/ludologist/wp-content/uploads/2007/12/rock-band-game-2.JPG)

To operate the bass or guitar, players must push and hold fret buttons that correspond to descending notes on a vertical track. Players earn score for pressing the strum bar as the notes cross a target near the bottom of the screen while holding the buttons. The whammy bar on the guitar is used during the play of sustained (long and continuous) notes. Bass is generally easier to play than guitar as it typically involves fewer notes.
The drummer must strike the drum pads that correspond to the color of the notes as they descend to the bottom of the vertical track. The foot pedal corresponds to a horizontal gold bar that descends down the track. For both guitar and drums, the buttons and drum pads themselves may be used to navigate through menu and settings screens, along with a start button and directional pad included on the peripherals.

The vocalist meanwhile essentially sings karaoke on the microphone, guided by lyrics and an indicator for pitch and rhythm scrolling to the left at the top of the screen. Interaction with the menu at the beginning of the game is achieved using a separate game controller that comes standard with the respective game platform. There are no buttons on the microphone itself. During play, vocalists are scored based on both timing and pitch. Some sections without vocals will display circles notes, allowing for the microphone to be used as a tambourine and cowbell by tapping it.

For the guitar, bass and drums, as the level of difficulty increases, more notes need to be played simultaneously at a faster rate. For vocals, higher difficulty means the game is stricter about pitch, duration and accuracy, although it does not mind the octave in which the vocalist is singing.

Although players must focus a high amount of attention on their own instructions, they are also working toward a common goal. During game play, players earn points towards a common score. Individually, players earn "score multipliers" as they hit their notes correctly in
succession—any miss will reset the multiplier. Individual players also earn "overdrive" points by successfully playing all white notes that appear during select portions of a song. There is also an "energy meter" on the left of the screen that tracks the performance of individual players. This energy meter also indicates the overall performance of the group through the color and length of the bar (shown in green and full in Figure 2). This gives the group a way to monitor their team’s performance in real time.

Figure 2: Rock Band game play screen


There are several other performance feedback mechanisms, both audio and visual. The tracks of individual players can turn into a flaming background when the player is performing well. On the other hand, if the player is not hitting the notes as expected, the music for the instrument is...
not played in the song’s soundtrack. If the player misses the notes repeatedly and frequently, he/she can fail (after the track glowing red to indicate danger) and not be allowed to continue playing his/her part. If a player fails, other players may have an opportunity to "save" the individual who failed by using their own "overdrive" points.

Different instruments have different methods for deploying the overdrive to save a failed player. The guitar instrument needs to be swung upwards (with the neck in the air) or by pressing the "Select/Back" button. Overdrive for drummers can be deployed by hitting the crash cymbal (which is the green note for right-handed configuration) that appears directly after a freestyle drum fill. Singers can deploy their overdrive by singing in freestyle vocal sections of songs, denoted by yellow artwork in the background of the vocals interface.

A player can only be saved twice. After the third failure, he or she cannot be brought back for that song. Failed players continuously drag the band’s "band meter” down until they are saved. If the player is not saved before the "band meter" reaches the bottom, the whole band fails the song. Because saving depends heavily upon coordination between a player who has played poorly and a player who is doing well, this is one of the key instantiations of teamwork present in the game.

At the end of each successful song completion, the total score for the band is displayed, together with the percentage performance of each individual player, and occasionally a streak and a label for the achievement.
Overall, Rock Band is a game that is challenging on the individual level, but contains many collaborative aspects that make it the most fun when played in a social setting. Throughout our study, we looked at various aspects of the game that support this enjoyable social quality, and also at aspects of the game that could be improved. While we look at parts of the game that directly support coordination between the players such as song selection and saving, we also look at the bigger picture of social dynamics and how teaching and learning takes place during an active gaming session.

**Literature Review**

Since our focus is to look at learning and collaboration with the video game Rock Band, we looked to the relevant literature on video games as we began our research. The social and cultural context is one important part of learning video games, as described by Arnseth (2006).

Similarly, Twidale et al (2005) described a number of video game learning patterns, such as the game being used by more people than it was designed for, with some as observers, or two people cooperatively learning to play a game such as Halo. These examples resonate strongly with learning patterns in Rock Band.

Rock Band groups often change membership within a single session of play because of the number of extra observers. Lewis et al (2007) discussed how experienced members of a group
impart knowledge during membership change. We explored this idea and looked at how experienced players interact with newcomers.

Manninen (2003) discusses the various interaction forms in current multiplayer games, which gives us a useful framework to study the various actions offered in Rock Band, and how they facilitate interaction with other players.

A social and emotional connection may also be an important factor in playing a video game successfully and enjoyably as a group. Kreijns et al. (2007) discuss the social aspects of CSCW systems that enable emotional connections between participants such as trust and belonging. We will refer to this paper for its exploration of social affordances in group learning environments with task-based objectives.

One way in which the game facilitates individual contribution to the group goals is by the overall performance of the group being linked to individuals’ performance. This ties in with what Beenan et al (2004) discussed regarding motivating contributions of members of a movie rating community Movie Lens.

There are also important aspects to the play of Rock Band on an individual level. The game must be enjoyable and challenging to be successful in captivating its audience. Sherry (2006) discusses the role of "flow" (as described by Csikszentmihaly) in video game play, and how it relates to the match between a player's skills and the challenge provided by the video game; we
are interested in how flow contributes to a collective enjoyment of the game in a group. Gee (2003) also states the importance of a match between player skills, motivation and the challenge offered by a game, and how that relates to the "learning" of the game by the player.

**Heuristics Evaluation**

**Methodology**

In assessing the usability and playability of Rock Band in terms of the hardware and software interface, a **heuristic evaluation** of the game was conducted based on five criteria that addressed issues of collaboration and learning, as well as ease of use. The criteria were: general usability, learning, and game play. These criteria were derived from heuristics evaluation criteria found in the literature as well as those developed by the team. Specifically, the criteria were adapted from those used by Sutcliffe and Gault in their heuristic study of virtual reality applications, Kirigin in his evaluation of collaborative software, Behavioristics.com video game heuristics, and Jakob Nielsen's usability principles. The full list of heuristic evaluation criteria is found in **Appendix A**.

Our aim in conducting this heuristic evaluation was to better familiarize ourselves with the game, and rapidly identify areas for improving the game in the areas of group interaction and general usability.
We conducted our heuristic evaluation over three or four sessions. In each session we focused on one or two sets of heuristics; for instance, usability and learning heuristics would be our focus in one session. We split up into two groups – one group (two to three team members) would play the game, while the other group would observe, and make a list of instances where heuristics in the focus set were violated. We would then switch groups, and the team members who had played previously would conduct the heuristic evaluation. Both groups would then discuss the violations of heuristics they had noticed, and we would rank the severity of each instance. Table 1 shows the severity rating scale that we used.

Table 1: Heuristic Evaluation Severity Ratings

<table>
<thead>
<tr>
<th>Severity rating</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>This is not a usability problem, but rather something done well</td>
</tr>
<tr>
<td>1</td>
<td>Cosmetic problem only: need not be fixed unless extra time is available on project</td>
</tr>
<tr>
<td>2</td>
<td>Minor usability problem: fixing this should be given low priority</td>
</tr>
<tr>
<td>3</td>
<td>Major usability problem: important to fix, so should be given high priority</td>
</tr>
<tr>
<td>4</td>
<td>Usability catastrophe: imperative to fix this before product can be released</td>
</tr>
</tbody>
</table>

Heuristic Evaluation Results

From our heuristic analysis, we discovered some usability and interface issues within Rock Band. While the overall game play is relatively intuitive to understand, the interface can seem
quite complicated to a new user. For instance, the many different measures of success during gameplay (stars in the upper right, the individual players’ bars that build up indicating their success, the measure of group success on the left side, and any real-time multipliers and bonuses) may add only confusion for new players. New players may choose to ignore all this extra information and focus only on the individual track they are playing.

Other issues that we recognized included problems relating to the poor mapping of navigating menus to a multiple player game. Having all four players controlling a cursor to select a single item often caused confusion. New players could press buttons to familiarize themselves with the controller and in the process accidentally ruin the song selection process of another player. In a different portion of the setup, the user who initializes a setup screen must also be the one to exit the screen, an inconsistency in the design that causes confusion.

Table 2 describes what we identified as the top ten most serious heuristic violations, which detract from the enjoyment of the game and ease of use of the interface. Appendix B contains the full set of heuristic violations we observed.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Severity</th>
<th>Heuristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand-eye (and foot) coordination needs more gradual development for beginners than what is available in group play mode.</td>
<td>4</td>
<td>L5</td>
</tr>
<tr>
<td>The song selection list does not specify the time length of each song. Song length varies from 2 – 7 minutes.</td>
<td>4</td>
<td>G14</td>
</tr>
<tr>
<td>All players can navigate and choose songs, which often leads to accidental selections.</td>
<td>4</td>
<td>U2</td>
</tr>
<tr>
<td>On the screen where players activate their controllers, a certain player needs to hit green after everyone has “selected their Rocker.” The indicator for who controls progressing to the song selection screen is not obvious and causes confusion among players.</td>
<td>3</td>
<td>U1, U7</td>
</tr>
<tr>
<td>Skill level choices represent challenges of inconsistent difficulty. There are two scales – a song may be easy or hard, usually determined by tempo, and a player then chooses Easy, Medium, Hard, or Expert difficulty. For example, a “Blistering” song on “Easy” difficulty can be harder than a “Warm-Up” song on “Hard” difficulty</td>
<td>3</td>
<td>G13</td>
</tr>
<tr>
<td>The icons used to indicate which track corresponds to the guitar and bass are similar enough to cause confusion.</td>
<td>3</td>
<td>G10</td>
</tr>
<tr>
<td>The “Start” button is the only way to pause the game, but cannot be easily found without looking at the peripheral. This makes the player vulnerable to missing an upcoming note.</td>
<td>3</td>
<td>U1, U2</td>
</tr>
<tr>
<td>When switching instruments, left-handed players must pause the game at the start of a song and select “lefty mode.” If a right-handed player uses an instrument previously used by a left-handed player, he must pause the game and deselect “lefty mode.”</td>
<td>3</td>
<td>U1</td>
</tr>
<tr>
<td>When a player strikes the drum peripheral, there is loud noise created from the stick hitting the pad. This can overwhelm the song being played and distract other players.</td>
<td>3</td>
<td>U4</td>
</tr>
<tr>
<td>The meter on the left that indicates how well individuals and the group are doing in the current song is difficult to look at because you have to take your attention away from playing to look way over to the left.</td>
<td>3</td>
<td>U10</td>
</tr>
</tbody>
</table>
Comparative Analysis

Methodology

To enrich the knowledge on how Rock Band is learned and played collaboratively, the team did a comparative study with another video game that focuses on collaboration during play. Initially we were planning to compare Rock Band with other music games such as Guitar Hero or Dance Dance Revolution (DDR). However, we found that the basic interface and game play was very similar—Guitar Hero had players hitting the buttons on their instrument corresponding to the notes scrolling down, while DDR involved stepping on the squares on the floor that corresponds to that on the screen—so we decided that comparing Rock Band with those games will not provide new information on how the game is learned. Furthermore, those games primarily involved the element of competition rather than the collaboration that is observed among players of Rock Band. As such, the team chose to compare the multiplayer game play of Rock Band with Wii Tennis, specifically its "Doubles" mode of play, involving two players collaborating with each other. The complete findings of the comparative study can be found in Appendix C.

Comparative Analysis Results

We compared and analyzed the type of collaboration exhibited between Rock Band and Wii Tennis, the goals, the interface (including peripherals), various aspects of game play such as feedback, and the cognitive demands of each game.
Summarily, we found that both games mimic real-life activities, contain the element of fun in the context of social collocated play, and involve cooperation. The differences are mainly in how players interact with each other. In Rock Band, because the game requires a high degree of attention to the screen, there is less interaction among players, while in Wii Tennis, players only need to focus on a single object, the tennis ball, at one time, so there is more opportunity for interaction with other players, such as in teaching how to serve an ace. There is also more negotiation in Rock Band in terms of selecting instruments and songs, while in Wii Tennis, players rarely need to negotiate.

Table 3: Findings of Comparative Analysis

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Rock Band</th>
<th>Wii Tennis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interface Graphics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Avatars</td>
<td>The characters/avatars are more detailed and specific.</td>
<td>The avatars/characters are generic and do not have many attributes like Rock Band.</td>
</tr>
<tr>
<td>• Actionable items</td>
<td>Track of moving notes</td>
<td>Tennis Ball</td>
</tr>
<tr>
<td><strong>Physical Interface</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Gestures</td>
<td>Secondary input – swinging the guitar upwards to ‘save’ a player from being thrown off the game.</td>
<td>Primary input – swinging the Wii Remote like a tennis racket to hit the tennis ball.</td>
</tr>
<tr>
<td>• Peripherals</td>
<td>Microphone, Guitars, Drums – real instrument lookalikes.</td>
<td>Wii Remote used like a tennis racket – not a tennis racket lookalike.</td>
</tr>
<tr>
<td>• Input</td>
<td>Fingers to strum the guitar, hands and legs to play the drums, voice to sing the songs.</td>
<td>Swinging the arm which holds the Wii Remote.</td>
</tr>
<tr>
<td><strong>Game play</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Feedback</td>
<td>Audio and graphic – on screen.</td>
<td>Tactile, audio and visual.</td>
</tr>
</tbody>
</table>
- **Competition**: All players win or lose. | One team wins or loses.

- **Collaboration**: Teaching how to play, ‘saving’ team members from being thrown off the game. | Teaching how to play; in case of doubles game, the player at the back of the tennis court can hit the tennis ball that is missed by the player in the front of the court.

- **Consistency rewards**: Yes – unlocking songs | Yes

- **Skill levels**: Yes – choose from easy, medium, expert and hard | Yes – earn skill level

- **Duration of play**: Depends on players | Depends on players

- **Input rate**: Fast and continuous | Medium to Fast

### Player Interaction

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Low to Medium</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attention</strong></td>
<td>High</td>
<td>Low to Medium</td>
</tr>
<tr>
<td><strong>Awareness of other players</strong></td>
<td>Less - due to need to focus on individual instrument tracks</td>
<td>More - due to focus on a single object (tennis ball)</td>
</tr>
<tr>
<td><strong>Learning</strong></td>
<td>Hard – need to achieve good hand-eye-feet coordination</td>
<td>Easy – just need to swing the Wii remote to hit the ball</td>
</tr>
<tr>
<td><strong>Negotiation</strong></td>
<td>Instruments and songs</td>
<td>Rotation of player</td>
</tr>
<tr>
<td><strong>Periods of interaction</strong></td>
<td>Mostly in between plays because</td>
<td>Mostly during game play</td>
</tr>
</tbody>
</table>

### Personas and Scenarios

**Methodology**

Based on interviews with people who play Rock Band and discussing personal experience, as well as from Rock Band forums on the Internet, we gained an understanding of the different kinds of players, ranging from the die-hard gaming enthusiast to the sociable person whose reason for playing is to connect with people rather than “to beat the game.” We also investigated demographic information about people who played Rock Band. Using this information, we defined several aspects that would form the core of each of our personas:
• Quote/headline for each persona

• Goals related to playing Rock Band and/or socialization

• Basic characteristics such as age, occupation, favorite music genre and favorite instrument for each persona.

• Metrics such as enthusiasm for gaming, desire to socialize, desire for attention, and frequency of playing Rock Band. These served as a means to identify, compare and contrast the motivations people have for playing Rock Band, and the extent to which they play the game. They also give us an understanding of how skilled they are at the game, and whether they would be likely to enjoy teaching or learning the game.

Results

Based on the above metrics and characteristics, we developed a draft of what each user category of Rock Band would be. The five personas that were developed covered a wide range of users such as teenagers who are obsessed with the game, social gamers who are enthusiastic to play with friends for fun, casual gamers who do not care too much about the game but see the game as a way to socialize and have a good time and finally the hardcore gamers who excel at playing and are experts in one or more aspects of playing the game.

The details of the five personas we created can be found in Appendix D. The following is the abridged version:
### Table 4: Personas of Rock Band Players

<table>
<thead>
<tr>
<th>Persona</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amanda Moss</strong></td>
<td>• Plays Rock Band once a month.</td>
</tr>
<tr>
<td></td>
<td>• Her goal is to contribute to group success and also have a good time.</td>
</tr>
<tr>
<td></td>
<td>• She has a high desire to socialize and seek attention while playing yet her enthusiasm to play is medium</td>
</tr>
<tr>
<td><strong>Stuart Garstrom</strong></td>
<td>• Male hardcore gamer who plays Rock Band up to four times a week and owns the game.</td>
</tr>
<tr>
<td></td>
<td>• Goals for playing the game are displaying his expert by playing harder songs and connect with old friends</td>
</tr>
<tr>
<td></td>
<td>• His enthusiasm for gaming, seeking attention during play and desire to socialize are all high</td>
</tr>
<tr>
<td><strong>Gracie Washington</strong></td>
<td>• Female casual social gamer who plays Rock Band every other month.</td>
</tr>
<tr>
<td></td>
<td>• Her motivation to play the game is to build rapport with her coworkers and she doesn't care much about the game</td>
</tr>
<tr>
<td></td>
<td>• She plays the bass on easy level and sings the songs only after having a few drinks</td>
</tr>
<tr>
<td></td>
<td>• Her desire to socialize is high but enthusiasm in gaming and seeking attention while playing the game are both</td>
</tr>
</tbody>
</table>
Jason Vanderbilt

- Male social gamer that owns Rock Band and plays it thrice a month
- His motivation to play the game is business networking and building better relationships with colleagues with whom he frequently plays
- He wants to bring people together, have fun and his desire to socialize and need for attention are both high but enthusiasm to play the game is medium

Sophie Aaron

- Female, eighth grade student, she plays Rock Band whenever she can - it is the latest obsession for her.
- She plays on hard level and likes to sing.
- Her desire to socialize and need for attention is high while her gaming enthusiasm is sky high!

We also created several scenarios based on some of the typical situations in which we learned of Rock Band being played. We used three of our personas to guide the scenario development, and came up with an interesting mix representing multiple age groups and contexts. These also allowed us to think about the social dynamics involved in play in more detail as well as how people learn to play the game. The full scenarios are found in Appendix E.

Research Methodology

Individual Interviews

The team conducted interviews to discover the kinds of people who play the game and how they learned it. Interviewees were selected from those who responded to an e-mail that was sent
to a general purpose mailing list to which approximately 400 graduate students, faculty, and alumni attached to the School of Information at the University of Michigan subscribed. The e-mail that was sent out is found in Appendix F.

These interview subjects were people who have played Rock Band collaboratively with other players at least once. The interviewees that we recruited were all from the School of Information except for one interviewee who was a graduate student from the College of Engineering. The participants were in the age range of 22 to 30 years and the recruitment was gender neutral. Interviewees were briefed before the interview about confidentiality and anonymity of the subjects that will be enforced in the study and all signed an informed consent form. Ten interviews were conducted and the subjects were interviewed for about 45 minutes. The subjects were asked about their experience in the game, particularly in the context of group collaboration and learning, as well as the motivations and challenges faced during the game. The subjects were given an incentive in the form of cookies for spending their time in talking to us. Appendix G contains the interview questions that were asked during the individual interviews.

**Observation Studies**

The team also conducted observation studies of Rock Band sessions that provided us with empirical evidence as to how people actually interacted with each other in learning the game. We recruited the participants for the observation study from the same electronic mailing list as the interviewees, but in separate e-mails specifically worded for the purpose of observation.
study, asking them to identify their experience with Rock Band, if any, and time availability. The e-mail can be found in Appendix H. Follow up emails were sent to respondents to indicate their level of familiarity with the other respondents in the observation study pool. It was important for us to know whether participants knew each other because we wanted to measure the impact of prior social interaction on instruction and collaboration during game play. We wanted to observe the way players interacted and collaborated in different situations.

It was decided that players would be grouped based on whether they knew each other as we wanted to observe if a prior knowledge of each other would affect teamwork and collaboration among the players. All four players of a same skill level were not chosen. Instead, we decided that for two observation sessions, one player would be an expert and one would be a novice with little to no prior experience at playing Rock Band while the remaining two players would be of any skill level and for the remaining two observation sessions, all the players would be novices with little to no experience at playing Rock Band. By having a mix of skill levels in this fashion, we were expecting to obtain valuable data about collaboration and learning while playing Rock Band. Based on the information about their skill levels, familiarity with others and time availability, we selected and placed participants in the following groupings of four (because Rock Band supports up to four instruments simultaneously) for observation:
Table 5: Grouping for Observation Study

<table>
<thead>
<tr>
<th>Group</th>
<th>Description</th>
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<tr>
<td>Group 1</td>
<td>4 people who know each other, at least 1 player is experienced at playing Rock Band and at least 1 player has little to no experience.</td>
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<tr>
<td>Group 2</td>
<td>4 people who do not know each other, at least 1 player is experienced at playing Rock Band and at least 1 player has little to no experience.</td>
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<tr>
<td>Group 3</td>
<td>4 people who know each other, all players have little to no experience playing Rock Band.</td>
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<tr>
<td>Group 4</td>
<td>4 people who do not know each other, all players have little to no experience playing Rock Band.</td>
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Experienced players were determined by their indication that they have consistently passed while playing any instrument in Rock Band set on at least at the Medium level. The participants that we recruited were all from the School of Information except for one participant who was not affiliated to the University of Michigan. The participants were in the age range of 22 to 35 years and the recruitment was gender neutral.

Prior to the start of the observation study, participants were briefed about the confidentiality and anonymity that will be implemented in the study, as well as their rights. Informed consent in writing was obtained from individual participants. The observation study script is found in Appendix I. Each participant was assigned to one researcher to observe and record their conversation and behavior, specifically the nature of interaction between the players during game play and in between songs. Appendix J shows the standardized form used to enumerate the game as it progressed during the observation study.
In order to replicate the conditions in which the game is usually played, participants were allowed to choose the instruments and the songs they would like to play. This allowed us to observe on what basis the participants select songs and how they negotiate amongst themselves to decide which player plays a particular instrument, such as who plays the guitar or the drums or who wants to sing. We were also able to observe how the participants decided which song to play, how they handled song failure and repeated song failures, how instructions on operating the game peripherals were given, as well as how to play the game in general.

Each group was asked to play for approximately 45 minutes, and observed in separate, independent sessions. After the observation study, each participant was interviewed briefly by one researcher. The participants were asked questions pertaining to game play and also collaboration that may have occurred during the game. These questions were asked to get better qualitative data from the observation study. The list of post-observation study questions is found in Appendix K.

Findings and Recommendations

Before we explain the findings, we would like to give a brief overview of what happened during each of the four observation study sessions:

Observation Session 1: This group consisted of players who knew each other with one novice and one expert and two players with any skill level. The vocalist was given the choice to select the song and there was a lot of interaction between songs while the players were intensely
concentrating while playing the song. The novice player who had never before played Rock Band asked questions about how to play frequently and was taught the workings of how to play readily by one of the players from time to time while the expert player offered help and advice when asked and when players often failed during play.

**Observation Session 2:** This session consisted of players who were strangers with one novice and one expert and two players with various skill levels. The expert player played the drums really well and was an expert in true sense. The player who was supposed to be a novice was not exactly a novice as that player played the guitar on medium most of the time though he did not know how to save a failed player with the guitar, which he learned during this session. When the session started, the players chose the instruments and did not switch instruments until nearly the end of the session.

**Observation Session 3:** This session had players who knew each other who had little to no experience playing the game. The group picked up the game much faster than we anticipated, which might be attributed to all of the players having either observed the game being played or having tried Guitar Hero or at least one of the instruments involved in Rock Band on a previous occasion. However, we did see a lot of misunderstandings about the operation of the peripherals resolved through explanations from one novice to another. The group rotated roles such that they all had a chance to try all parts of the game. The vocalist was given the choice of choosing the songs.
Observation Session 4: This session had strangers who had little to no experience playing Rock Band. Except for the first song, everyone stuck to playing the same instruments throughout the session. The one swap occurred between two female players involving the drummer and vocalist. The female singer regularly asked if other players would like to swap roles, but there were no takers, so she continued reluctantly. Interestingly, one male player on the guitar kept humming to the songs but refused to become the vocalist. The other male player who played the guitar on easy skill level made a few attempts to pass a song on medium, but failed and he later reverted to easy.

We focused our investigation on the aspects of learning and collaboration that emerge when people play Rock Band. Overall, we found that the game is highly social and collaborative, and also requires players to overcome a significant learning curve when first learning the game or challenging themselves to play at a higher skill level.

A) SOCIAL AND COLLABORATIVE ASPECTS OF ROCK BAND

A1) Rock Band as a medium for social interaction

Most people view the game as a means of social interaction with others, a good “party game.” Often large groups will form surrounding the activity of playing Rock Band. Several of our participants said that having a real life audience cheering on the players motivates and encourages them, increasing their enjoyment.
During the post-observation session interview, one person commented that the play wasn't as "energetic" during the observation session, and hypothesized that it could have been because it was just four of them playing. He said usually there are a bunch of people who jump in and sing, and cheer the players.

To a lesser extent, people play in private to master skills and perform better in public or to enhance group play experience by making more songs available by unlocking them.

During an interview, one expert player stated that she did play alone at times, and that it "sounds really sad when you say it out loud." She also said, "it's not the same game by yourself."

Another expert player said he played alone once in a while to unlock songs, especially before a Rock Band "party" that he was hosting, so there would be more songs available for the guests to play.

A2) **Most in-person collaboration happens outside of gameplay**

Partly due to the amount of attention the game demands, most in-person interaction and collaboration happens outside of gameplay, for instance during song selection and negotiation of instrument selection.
This sort of "outside gameplay" interaction takes the form of discussing which song to play, negotiating who gets to play what instrument, requests for specific information on how to play the game made by novices, instructing novices on how to play, particularly based on observations made by experienced players of the novice's gameplay during the previous song, and requests for help in navigating the interface by players who are not familiar with the interface as it relates to selecting songs, avatars and instrument skill levels.

We witnessed less experienced players have trouble understanding how to operate the interface for changing preferences and making menu selections. This prompts experts to step in and resolve uncertainty.

**Switching Instruments:** At one observation study, involving experienced players and one novice who all knew each other, the participants would ask one another at the end of every other song if anyone wanted to play a particular instrument; participants would also state that they would like to play a particular instrument. There was an emphasis on sharing, and ensuring that every player got a chance to play the instrument of their choice, but based on a previous interview with one of the participants, we feel this might be because the three experienced players had played together before and they had followed this system of rotation and sharing.

In the observation study with strangers at varying skill levels, the group switched instruments only once, approximately 5 minutes before the end of the 45 minute session, at the suggestion of
one of the guitarists, who also then volunteered to sing. The rest of the participants then selected other instruments.

In another observation study, the group of inexperienced players who knew each other agreed to a round-robin method of switching instruments whereby players shifted instruments to their left after every two songs, although this decision could be influenced by the time limitation imposed on the players.

The group of strangers who were novices did not switch instruments amongst themselves, except for two people who swapped the drums and vocals as the person who was initially doing the vocals did not know any of the songs. The group then stayed with this combination, and did not seem to want to switch, except for the participant who was doing the vocals for almost the entire session. During the post-observation interview, this is what the vocalist had to say:

"I was playing drums first, but I switched to the microphone because person X did not know any of the songs. I didn’t either. But I figured once we started playing, we might switch more often. But then the guys didn’t want to let anyone else try the guitar or bass—that was a little odd. I kept trying to persuade people to switch… I guess I could have been more direct."

This was the perspective of another participant from the same session:

"It would have been fun to switch…we didn’t switch because we still did all right…we were new [to the game], so [we] wanted to get a good run of time on each part [instrument]."
"Who wants to sing?" The participants encouraged the person who was to do the vocals to select a song. This again, in the case of the first group might have been because one of the participants who owned the game (and had played before with two of the others) had a "house rule" that the singer should select the song, as it was difficult to sing the song if one did not know it.

This cooperative spirit was also displayed by the second group of strangers with mixed skills, where the rest of the group asked the singer to select the song; one or two participants commented that it was easy enough to follow on the drums or guitar even if one didn’t know the song, but it would be difficult to do the same on vocals.

The third group consisting of inexperienced players also decided that the vocalist would be the one to select the song, although there was some negotiation in terms of reserving the song for another player who was not singing at the time.

However, not all the participants in the fourth group (novices who were strangers) were quite so cooperative. Two participants volunteered to sing, but did not know the songs very well; however, the other two participants were very reluctant to sing, even though at least one of them appeared to know most of the songs, and was humming and singing along softly. The participant who ended up singing for nearly the entire 45-minute session made this comment:
"I felt just a little bit frustrated because I ended up singing most of the time... Once we kept doing the same song over and over again, it was getting repetitive. So it lessens the fun. It’s fine to try more difficult songs a few times, but for easy songs, it seems to go on forever.”

However, though some of the participants were reluctant to sing, they did ask the vocalist to select a song she knew.

**Novice/expert interactions:** Between songs at the observation study with friends of mixed skills, the novice would ask questions about gameplay, and the experienced players would answer. Sometimes the experienced players would explain aspects of playing the game to the novice based on observations they had made during gameplay.

For instance, each of the three experienced players in the mixed skills friends group pointed out to the novice (at different times during the session) to hit the strum bar while holding down a button on the guitar.

The novice also asked about game feedback:

Novice: How do I know when I’m successful? Does it glow?

Experienced player: It kinda explodes.
A3)  Cooperation and encouragement as a means to reduce potential power differential

One way that cooperation as a team is upheld is by allowing the singer to choose, since he or she is in what is often considered the least desired role of play, but at the same time, that puts power in the hands of the singer. During the study with strangers at varying skill levels, a participant who had been doing the vocals for the major part of the session expressed that she felt she took over.

One expert participant from the same session said she felt she had to strike a balance between challenging herself by playing at more difficult levels and doing well, and trying "not to show off" as others were playing at easy and medium.

Players also encouraged each other often. For instance, in the session with friends at varying levels, an experienced player told the novice that she had done well on her first try.

In the session with strangers at varying levels, one participant who was to play the drums right after another participant had been playing excellently on hard and expert, commented a little apologetically that he played the drums on easy. Another participant said she played the drums on easy too.
During the same session, the expert drummer apologized once:

*Expert drummer:*  Sorry guys!
*Other participant:*  You were expert...I think we can give you a break there!

**A4) Establishing common ground among strangers**

The group of strangers of mixed skill levels looked to the interface as a means of establishing common ground. The avatars were a point of conversation - and often amusement - for all the participants, as they frequently made jokes about their avatars. The song "Epic", which appeared in the list of songs, also became the focus of numerous jokes amongst this group of strangers.

The group of strangers who were novices did not talk much amongst themselves as the other groups had; this might have been due to their individual personalities as well as the fact that they did not know each other. They did notice and make comments about the avatars; for instance, at the end of a song when the group failed:

*Vocalist:*  It’s booing me!
*Other participant:*  It’s booing all of us.

We also found that people often referred to the way things are with their usual group; they had a sense of group solidarity. Having some familiarity with play styles, or at least knowing the people fairly well, makes people more comfortable in helping to make decisions about
gameplay. In the second group, one participant commented about not knowing what people were comfortable doing, and that she did not really want to sing the whole time, but did not want to force the microphone on someone else either. The person was in a dilemma because she wanted to wait for them to volunteer.

A5) Players strategize using the game’s feedback during game play

When players have a good enough understanding of the game and its various methods of feedback, they develop skills to monitor the group’s status during the game. While they may not always be aware of how well others are doing depending on the level of difficulty they are having with their individual portion of the song, they learn to pay attention to various cues in the interface. This includes watching to see when they can enter overdrive mode and how well other players are doing, using the information on the individual tracks or the left sidebar. Players may even strategize whether or not to use overdrive based on the status of their teammates. As one player said,

“There have been cases I preserved my overdrive if somebody’s about to fail rather than using it ahead of time when it won’t do anything. I’ll wait until they’ve failed or they start to get better.”

This finding also ties into the way learning occurs in Rock Band. In several observation studies, players used their awareness of each other’s status when they called out instructions that might help another player to improve his or her gameplay.
B) TEACHING AND LEARNING IN ROCK BAND

B1) Novices experience a learning curve

Beginners are more focused on their individual performance. If they are inexperienced with games of this sort altogether, the game requires them to acquire a new sort of hand-eye coordination. They are aware of the instructions and advice given by experienced players, but since they are exerting a high level of cognitive effort to overcome the learning curve, they are not very attentive of how other players are performing during the song. They experience considerable frustration during the initial learning phases. They want to place importance on how they perform and learn so that they do not fail all the time and can contribute to group success. For instance, after trying a couple of songs, a participant who had never played Rock Band before said:

"This is supposed to be fun? It's complicated!"

She commented after the session that she felt the game was too intense and needed focus. She said it was not easy to converse or joke with other players. She also expressed frustration every time she missed a note.

A beginner that we interviewed expressed her difficulties with learning to play. She said it is hard to coordinate the screen with the keys; she felt like the second time she played, after a significant gap, she was holding the guitar peripheral wrong and pressing the wrong keys.
B2) Interaction increases when there is a surprise or failure potential is increased

During our observation sessions, players interacted infrequently during the middle of playing a song unless something spurred them to interact. The most frequent interactions mid-game included "saving" a failing player, calling out brief instructions to newbies, and generally sharing an amusing or frustrating situation that arises during gameplay. This is mainly due to the high attention demands of gameplay.

In the group of friends of mixed skills, an experienced player looked over at the novice when he heard her say "doesn't work." He noticed she was not pressing the strum bar on the guitar she was playing, and told her to do so.

In the group of friends who are novices, one participant got caught up in helping another participant when the latter tried the guitar for the first time, so much so that she stopped playing her own part to talk to her and show her how to play. One interviewee stated,

"You don't notice the team work [normally] but notice it when people play badly."
Although skill levels help to balance play, goals differ based on experience

The different skill levels help to make the Rock Band experience fun and challenging for everyone. As one interviewee said,

“The game as it’s designed does a pretty good job at balancing, letting each player kind of pull their own weight without dragging everybody else down. The ability to set each controller (the plastic instrument) to each level so they can play on expert but I can play beginner and still have the same experience, relatively.”

People with different levels of experience may also have different goals or criterion for “success” when they play, as well. Novices want to learn the minimum amount of information required to complete a task before their first try, and then advance their skills and knowledge through observation and practice. For beginners and intermediate player groups, the group success is mainly about passing the song, having fun. Although expert players may also play for the social nature of the activity, the success of the group is also about being able to pass difficult songs.

During our interviews with two experienced players, both of whom owned the game, they mentioned the thrill associated with beating challenging songs. One said that Everlong and Rush were "tough" and it gave him an "incentive to get through them." The other mentioned that she tried to "play Metallica songs and pass on hard."
Recommendations

Throughout our observation studies, interviews, and research we found that player response to Rock Band was overwhelmingly positive. When asked how they would improve the game, most participants in the study asked for more of the same - more songs, more instruments, and more genres of music. Aside from some confusion about who controlled the ability to progress through menu screens and left-handed player gripes about the process of switching hand orientation, no one in our observation studies suggested any changes to how the game is played.

Two frequently used words by participants about why they like the game are "fun" and "unique." What makes Rock Band so enjoyable and different from other multiplayer games?

Collaborative, Not Primarily Competitive - Rock Band isn't the first multiplayer game to offer a collaborative mode - first person shooter, role playing, sports, and real-time strategy games have long provided gaming objectives for teams. However, Rock Band is unique in that there are no human opponents. Advanced players may choose to compete against each other for high scores. However, the primary objective of gameplay in Rock Band for non-competitive players is to pass a song, not displaying skills or scoring points to prove which player or team of players is better than the other.
**Different Players, Different Skill Levels, Same Game** - Individual skill level choice allows novice and expert players to play together at the same time. Conventional multiplayer games effectively punish more advanced players for teaming up with more novice players. In a first-person shooter with a collaborative mode, where everyone competes on the same playing field, an expert player ultimately needs to make up for novice player’s skill deficit.

**Fast-Paced but Non-Violent** - The game features musical objectives that don’t feature graphic representations of violent behavior, but requires intense attention typically demanded by violent games. Rock Band gameplay typically demands intense individual concentration, leaving little brain space for casual conversation. In-between songs, groups were generally engaged in lively discussion. Perhaps the lack of interaction during gameplay causes players to actively engage each other in-between gameplay.

**Good Music, Good Fantasy** - The use of popular songs bootstraps players into the game. Experts, novices, spectators, and those unfamiliar with the game can leverage the songs into common ground for interacting with one another. Many of the songs in Rock Band (the set list) were major radio and sales successes. Further, the release dates of songs in Rock Band are evenly distributed across four decades. This ensures that players of different ages and musical tastes will have a high chance of finding a song to identify with. In our observation sessions, players frequently chose songs they had heard before and liked. One player we observed selected only songs she had heard before, and when she ran out of songs she knew, she didn’t know what to play.
**Play Installments Are Short** - Songs in Rock Band generally last between three and six minutes. Levels in conventional multiplayer collaborative games often last much longer and upon completion serve up the next level for immediate play. When players finish a song in Rock Band, they are directed back to the set list with no prompt to initiate another session of play. We observed rich social interaction during undirected time in-between gameplay.

In sum, Rock Band offers players a collaborative and visceral task that facilitates the formation of common ground and interaction outside of gameplay. Rather than fix what ain’t broke, we suggest improvements in five categories that build on the success of this winning formula.

**Centralized Task Control**

One cause of individual confusion and inter-group friction we observed was the game’s decentralized task control. Specifically, any individual player can scroll through and select with his or her controls during group song selection. We observed less experienced players often pressing the guitar fret button and hitting the drum pads simply because it’s fun, but this led to accidental song selections and frequent back-tracking. The avatar select screen was more often stumbled upon by accident than for the purpose of choosing a character because it is the prior screen to the set list, and players would accidentally press the button that backtracks the task flow to this screen.
In addition, the avatar selection screen assigns the first player to press a button as the “leader.” All other players must have their avatars selected for the “leader” to have the ability to progress on to the song selection screen. When players were confused about who controlled the ability to move on, they often randomly pressed the button that typically moves them forward in a task flow. Except in this case, pressing the “forward” button would deselect the avatar (and when pressed again, reselect.. and so on…), disabling the “Leader’s” ability to move the group forward. There must be a better way.

The simplest potential solution would be to assign avatar deselection and reselection to different buttons. As is, assigning what is effectively a backward step to the standard button for forward progression represents an easily fixed usability flaw.

**Interactive Fantasy**

Everyone wants to be in a rock band, but few people have the chance or musical skills. Rock Band immerses players in the visual fantasy of playing in a successful Rock Band with its avatars and performance animations. Narrative elements also work to immerse the player, such as brand-name clothes and music gear, touring “different cities”, and loading screens that feature still images of avatars partying as well as enjoying fame (flying in a charter jet, a billboard promotion, etc.). However, Rock Band doesn’t give players the opportunity to directly interact with this fantasy life off the stage.
In the spirit of Rock Band’s collaborative and brief game play installments, we suggest engaging players to directly interact with this fantasy with a variety of themed mini-games. Our group had fun thinking of these suggestions:

- **Groupie Surge** – Everyone is obsessed with your band, and an excited crowd is banging on the door to your tour bus. Stop the situation before it gets out of hand by tossing signed t-shirts to each person in the crowd before time runs out and the cops shut you down.

- **One Drink Too Many** – The band drank too much before the show, but the fans deserve your best performance. Survive one minute playing through a song with notes scrolling down a blurry track. Players could adjust the challenge level (the degree of blurriness) by specifying how much they had to drink.

- **Angry Crowd** – You played a blistering four hour set, but the audience is obsessed with your band and they aren’t happy you’re calling it a night. Deflect the bottles and other objects hurled at the stage while making a hasty exist.

- **Cops Outside** – Your hotel party is out of control and the cops are about to shut you down. Players must be totally still and silent until the cops go away. (The guitars have accelerometers that could detect movement, and the microphone could pick up surrounding noise.)
• **Broken Down Van** – Your band van has broken down in the middle of nowhere. Flag down another car by making a lot of noise at the exact time a car passes by.

**Give Players More to Talk About**

In our observation studies, we saw that in general the less players knew each other the more they sought common ground by discussing whatever was displayed on screen. Sometimes players reacted to the wild appearance of avatars while other times they chatted about the “fun facts” served up on lengthy loading screens. We believe these loading screens, which last between 10 and 20 seconds, can be designed to encourage discussion among players.

• **Music Trivia** – A typical loading screen appears long enough for a single music trivia question. Multiple choice answers could be mapped to buttons on the controllers or instruments. We acknowledge this introduces a small degree of competition into a game successful for its collaborative play, but the player to answer first correctly could receive an award that benefits the group – such as a free “save” or a “big rock ending, courtesy of…”

• **Talking Points** – The loading screens currently feature “Did You Know” facts about the band that originally performed the upcoming song. Rock Band could directly engage discussion between players and spectators by posting conversational questions such as “What was the first album you bought?”, “What is your best concert experience?”, and “Which artist performed the most MP3s you have?” As we observed, people tend to talk
about what is displayed on screen, and we expect players and spectators would talk more if
the loading screen text was made more relevant to their lives.

• **Highlight Reel** – At the end of each song, the game presents players with statistics about
how well they played (percentage of notes hit) and a label that summarizes their unique
impact such as “Energy Hoarder” or “Savior.” We observed players pausing on this screen
to interpret and discuss their performance, taking satisfaction in or expressing
embarrassment about how they played. While the percentage of notes hit was pretty
straightforward and easily understood, labels that denote unique impact tended to confuse
players - especially novices.

We would like to see the game generate a highlight reel that features notable moments. This
would do a better of job of providing context about labels for novices as well as spotlighting the
desired behavior that labels represent such as saving other players or a an extended streak of
notes.

To develop an algorithm that could generate this highlight reel, future research would be
needed to determine what moments are “notable”, when these moments start and end, how
many moments to include, and the appropriate length of a highlight reel.
Collaborative Avatar Creation

We observed players reacting strongly to and enjoying the wild appearance of avatars. Currently avatar creation is an individual activity that comes at the cost of group interaction. We propose that players should be able to collaboratively create avatars, which would save time and engage other players in the creative process.

Engaging Spectators

Clapping during song: Rock Band is a very intense game and demands constant attention from the players during game play. This degree of intensity affects collaboration and interaction between players. A way to incorporate interaction and team spirit between players is by making them do something together and at the same time. A good way to achieve this is clapping for the song. Rock Band can prompt the players to take a quick break from playing the instruments for sometime and urge all the players as well as the audience to clap while the song keeps playing. This would break the monotony of the intense drumming and guitar strumming and act as a breather for the players. The players and spectators can obviously talk, laugh and communicate while clapping until they resume playing the instruments.

Back-Up Singers: It is fun to sing songs together and a way to incorporate this is to allow a backup singer to sing along with the main vocalist in Rock Band. Both singers can use the same or different microphones and the game will have the ability to detect and allow multiple singers
to sing. Singing together allows collaboration and interaction because the singers have to sing in tune with each other and balance the singing quality.

**Take a Break** (for instrument hogs): As Rock Band is an intense game the load on players can be reduced if the game just prompts the players to go take a break after a few songs are continuously played. The break time period can be small but significant enough for players to interact with each other and let loose or drink a glass of water.

**Usability**

**Lefty Mode switch during instrument selection:** During the observation study, when a mix of left-handed and right-handed players were involved, we noticed some difficulty when instruments were switched. The game does not currently allow for a Lefty Mode to be selected or deselected during the instrument selection screen—it is currently only settable during gameplay, which participants often forget to do, and when they do, the game is interrupted. So, providing this option upfront will reduce game interruption and potentially improve the gameplay.

**Song duration and progress bar:** Rock Band does not currently provide an indication of the duration of the song or how long it remains to be played. This sometimes concerns players who would like to know if they could play another song before ending the session, as well as players who have a member failing and would like to know if they have enough time to complete the
song without saving. So, having a capability to sort the songs by duration at the song selection screen, and a progress bar during gameplay will help address the problem.

**Intelligent and Dynamic Challenges:** For novices, an easy challenge may be too hard and lead to failing the song, while for more advanced players a hard challenge may be too easy. An algorithm could be developed that monitors the percentage of notes hit and varies the challenge during play so that a player maintains a threshold based on the percentage of notes hit. This would prevent novices from failing out and give experts a challenge that pushes their skills to the max.

Other recommendations to address the usability issues of Rock Band include a battery-life indicator on the controller to supplement the on-screen message asking players to "reconnect the device;" drum pads that produce less distracting sound when hit; and allowing players to join or leave the game at the instrument selection screen without requiring existing players to reset their instrument selection.

**Lessons Learned**

Over the course of this project, we have learned a lot not only about the social and collaborative aspects of the game Rock Band, but also about experimental design and research. Due to the limited time frame and nonexistent budget for the study, we were limited in our recruitment and the granularity with which we could screen participants. We found it hard to recruit novice
players with the recruitment method we had approved by the IRB and had to allow in several players who had played either Rock Band or Guitar Hero a few times when we would have preferred those who had never touched a music game. For instance, in our second session, as mentioned above, the one “novice” played guitar on medium through most of the session without trying anything new until the last song. This limits the validity of any conclusions drawn based upon the level of experience of players.

We also found that several of those who had never touched Rock Band had been around watching while friends played and developed a concept of how the game worked in that way, which limited the number of players who were giving a fresh first time impression of the game.

Overall, while our small sample set of only four observation studies, limited demographics for recruitment, and loose screening criteria limit the conclusions we can draw, we think that our study points out a number of interesting possibilities for further research.

**Conclusion**

Although we were aware of the social nature of Rock Band before we began this study, it was interesting to observe the overwhelming theme of “fun” that nearly all the interviewees and observation study participants spoke about. They commented that the game offered a way to “bring people together” and “have fun.”
Based on our analysis of individual participants’ perspectives of group play, the group dynamics that emerged during our observation study, and our evaluation of the game’s interface, we developed a set of recommendations that would enhance the collaborative nature of gameplay, and increase the “fun quotient.”

Since we observed that most in-person interaction occurs outside of gameplay (between songs), we suggest these could be good times for the interface to promote person-to-person interaction and short conversations through fun group activities and mini-games. We also make recommendations for involving spectators, encouraging players to switch instruments to avoid situations where some players might monopolize particular instruments, and a way to encourage more people to volunteer to sing, vocals usually being the least preferred part of the game. In addition, we also unearthed some usability issues with the game, and have suggested ways these could be remedied.

Overall, we found that Rock Band is perceived as a very enjoyable game, particularly in social settings. We believe it does a good job of proving a means of entertainment for groups of people, but that it could be enhanced to be even more “fun” by providing more ways for people to interact outside of actually playing the songs.


References

[http://gamestudies.org/0601/articles/arnseth]


[http://gamestudies.org/0301/maninin/]


Appendices

Appendix A: Heuristics Evaluation Criteria

Sources
A: Heuristic evaluation of virtual reality applications by Alistair Sutcliffe and Brian Gault
B: Video Game heuristics (http://www.behavioristics.com/downloads/usingheuristics.pdf)
C: Jakob Nielsen

General usability
U1. The status of the system is visible and understandable (C)
U2. User control and freedom (C)
U3. Consistency and standards of interface, actions, system’s responses (C)
U4. Prevention of common errors (C)
U5. Flexibility and efficiency of use (C)
U6. Generally aesthetically pleasing and minimalist design (C)
U7. Gives a clear indication of errors, and helps users recognize, diagnose, and recover from errors (C)
U8. Appropriate help and documentation is accessible (C)
U9. Provide immediate feedback for user actions. (B)
U10. The interface should be as non-intrusive to the Player as possible. (B)
U11. Make the menu layers well-organized and minimalist to the extent the menu options are intuitive. (B)
U12. Art should be recognizable to player, and speak to its function. (B)

Learning
L1. Upon initially turning the game on the Player has enough information to get started to play. (B)
L2. Players should be given context sensitive help while playing so that they do not get stuck or have to rely on a manual. (B)
L3. Sounds from the game provide meaningful feedback or stir a particular emotion. (B)
L4. Players do not need to use a manual to play game. (B)
L5. Get the player involved quickly and easily with tutorials and/or progressive or adjustable difficulty levels. (B)
**Game Play**

G1. Player’s fatigue is minimized by varying activities and pacing during game play. (B)

G2. Natural engagement, suspension of disbelief. Interaction should approach the user’s expectation of interaction in the real world as far as possible. (A)

G3. Compatibility with the user’s task and domain. The game and behavior of objects should correspond as closely as possible to the user’s expectation of real world objects; their behavior; and affordances for task action. (A)

G4. Provide clear goals, present overriding goal early as well as short-term goals throughout play. (B)

G5. There is an interesting and absorbing tutorial that mimics game play. (B)

G6. The game is enjoyable to replay. (B)

G7. The game is fun for the Player first, the designer second and the computer third. That is, if the non-expert player’s experience isn’t put first, excellent game mechanics and graphics programming triumphs are meaningless. (B)

G8. Player should not experience being penalized repetitively for the same failure. (B)

G9. Player’s should perceive a sense of control and impact onto the game world. The game world reacts to the player and remembers their passage through it. Changes the player makes in the game world are persistent and noticeable if they back-track to where they’ve been before. (B)

G10. The first player action is painfully obvious and should result in immediate positive feedback. (B)

G11. The game should give rewards that immerse the player more deeply in the game by increasing their capabilities (power-up), and expanding their ability to customize.

G12. Pace the game to apply pressure but not frustrate the player. Vary the difficulty level so that the player has greater challenge as they develop mastery. Easy to learn, hard to master. (B)

G13. Challenges are positive game experiences, rather than a negative experience (results in their wanting to play more, rather than quitting). (B)

G14. The Player experiences the user interface as consistent but the game play is varied. (B)
# Appendix B: Heuristic Violations by Category of Heuristic

## Usability Heuristics

<table>
<thead>
<tr>
<th>Issue</th>
<th>Severity</th>
<th>Heuristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>When the batteries are low on a controller, it asks you to reconnect the device rather than replace the battery</td>
<td>4</td>
<td>U7</td>
</tr>
<tr>
<td>When a player strikes the drum peripheral, there is loud noise created from the stick hitting the pad. This can overwhelm the song being played and distract other players.</td>
<td>4</td>
<td>U4</td>
</tr>
<tr>
<td>The meter on the left that indicates how well individuals and the group are doing in the current song is difficult to look at because you have to take your attention away from playing to look way over to the left.</td>
<td>3</td>
<td>U10</td>
</tr>
<tr>
<td>When switching instruments, left-handed players must pause the game at the start of a song and select “lefty mode.” If a right-handed player uses an instrument previously used by a left-handed player, he must pause the game and deselect “lefty mode.”</td>
<td>3</td>
<td>U1</td>
</tr>
<tr>
<td>On the screen where players activate their controllers, a certain player needs to hit green after everyone has “selected their Rocker.” The indicator for who controls progressing to the song selection screen is not obvious and causes confusion among players.</td>
<td>3</td>
<td>U1,U7</td>
</tr>
<tr>
<td>The “Start” button is the only way to pause the game, but cannot be easily found without looking at the peripheral. This distraction makes the player vulnerable to missing an upcoming note.</td>
<td>3</td>
<td>U1, U2</td>
</tr>
<tr>
<td>All players can navigate and choose songs, which often leads to accidental selections.</td>
<td>3</td>
<td>U4</td>
</tr>
<tr>
<td>Interface elements such as the stars in the top right of the screen, the bars and circles near each player’s track are unclear in meaning to the inexperienced user.</td>
<td>2</td>
<td>U1</td>
</tr>
<tr>
<td>Graphic elements of the virtual performances can be distracting - such as spotlights or grainy filters.</td>
<td>2</td>
<td>U6</td>
</tr>
<tr>
<td>Withdrawing one player from the group requires all players to leave and the remaining players to rejoin</td>
<td>2</td>
<td>U11</td>
</tr>
<tr>
<td>Guitar, Bass peripherals: The “raised bump” on the middle button of the fretboard is too small for its purpose: letting players orient their finger position without looking during play.</td>
<td>2</td>
<td>U5</td>
</tr>
<tr>
<td>Percentage of notes hit unknown until song completion.</td>
<td>2</td>
<td>U9</td>
</tr>
<tr>
<td>Text feedback, “messy,” “strong” etc. is not very noticeable when you’re playing</td>
<td>1</td>
<td>U9</td>
</tr>
<tr>
<td>Virtual band movements (instruments and vocals) are not synced to the actual lyrics of the song, or the peripheral buttons being pressed by players.</td>
<td>1</td>
<td>U12</td>
</tr>
<tr>
<td>Issue</td>
<td>Severity</td>
<td>Heuristic</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>The flash or explosion when you hit a note correctly is good visual feedback</td>
<td>0</td>
<td>U9</td>
</tr>
<tr>
<td>Good use of redundancy: The guitar fret buttons and drum pads can be used to control the interface, even though they also feature a directional pad and general buttons.</td>
<td>0</td>
<td>U5</td>
</tr>
<tr>
<td>The meter on the left is a good indicator of how individuals and the group as a whole are doing. Good use of color.</td>
<td>0</td>
<td>U1</td>
</tr>
</tbody>
</table>

### Learning Heuristics

<table>
<thead>
<tr>
<th>Issue</th>
<th>Severity</th>
<th>Heuristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>In general, there is very little context sensitive help</td>
<td>4</td>
<td>L5</td>
</tr>
<tr>
<td>Hand-eye (and foot) coordination needs more gradual development for beginners than what is available in group play mode.</td>
<td>4</td>
<td>L4</td>
</tr>
<tr>
<td>The audio feedback when you’re playing bass can be overwhelmed by other instruments (especially the Drums, which can be loud from the interaction with the controller).</td>
<td>3</td>
<td>L3</td>
</tr>
<tr>
<td>Ability to pick up the game as a beginner may depend in part upon prior musical experience, knowledge of the songs, and instructions given by other players; the game is rather intuitive but may still require a little explanation or prior knowledge.</td>
<td>2</td>
<td>L1, L4</td>
</tr>
<tr>
<td>For bass, guitar, and drums, audio feedback sounds like the song is being played successfully with real instruments when they players are doing well. Similarly, the audio disappears or sounds poorly played when the players are doing poorly.</td>
<td>0</td>
<td>L3</td>
</tr>
<tr>
<td>Deploy to save icon that appears when you can save another player is good context sensitive help</td>
<td>0</td>
<td>L2</td>
</tr>
</tbody>
</table>

### Game Play Heuristics

<table>
<thead>
<tr>
<th>Issue</th>
<th>Severity</th>
<th>Heuristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill level choices represent challenges of inconsistent difficulty. There are two scales – a song may be easy or hard, usually determined by tempo, and a player then chooses Easy, Medium, Hard, or Expert difficulty. For example, a “Blistering” song on “Easy” difficulty can be harder than a “Warm-Up” song on “Hard Difficulty”</td>
<td>4</td>
<td>G13</td>
</tr>
<tr>
<td>Some “Easy” songs are too difficult for beginners.</td>
<td>3</td>
<td>G12</td>
</tr>
<tr>
<td>The song selection list does not specify the time length of each song. Song length varies from 2 – 7 minutes.</td>
<td>3</td>
<td>G14</td>
</tr>
<tr>
<td>Issue</td>
<td>Severity</td>
<td>Heuristic</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>The icons used to indicate which track corresponds to the guitar and</td>
<td>3</td>
<td>G10</td>
</tr>
<tr>
<td>bass are similar enough to cause confusion.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to 5 stars are awarded for group score, but the exact milestones</td>
<td>3</td>
<td>G11</td>
</tr>
<tr>
<td>for each star level are not revealed. (i.e., 40,000 points for 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>stars, 50,000 points for 5 stars)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When playing, you have a sense of whether the game needs your</td>
<td>2</td>
<td>G14</td>
</tr>
<tr>
<td>attention in the next few bars, but you have almost no sense of how</td>
<td></td>
<td></td>
</tr>
<tr>
<td>far you are through the entire song.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>There is no reward for scoring 100% on a song.</td>
<td>2</td>
<td>G11</td>
</tr>
<tr>
<td>The avatar select screen does not clearly indicate when a character</td>
<td>2</td>
<td>G5</td>
</tr>
<tr>
<td>is selected or who controls progression to the song selection list.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using the drum pedal can be tiring, as can strumming and gripping</td>
<td>2</td>
<td>G1</td>
</tr>
<tr>
<td>the controllers. On some songs, you may have to play the same note</td>
<td></td>
<td></td>
</tr>
<tr>
<td>or pattern repeatedly for a few measures which may increase fatigue.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Player winning streaks are minimally highlighted during and after</td>
<td>2</td>
<td>G13</td>
</tr>
<tr>
<td>play, whereas failures are extremely prominent. More recognition for</td>
<td></td>
<td></td>
</tr>
<tr>
<td>successful players ought to be considered.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If a player continually misses a note or rhythm, if he or she does</td>
<td>1</td>
<td>G8</td>
</tr>
<tr>
<td>not improve their gameplay, he may continue to mess up until they</td>
<td></td>
<td></td>
</tr>
<tr>
<td>fail the song.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>While the game may be set to different skill levels for each</td>
<td>1</td>
<td>G12</td>
</tr>
<tr>
<td>instrument, beyond that the players must conform to the expectations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>of the game.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Although players may become absorbed in the gameplay as one might</td>
<td>1</td>
<td>G2</td>
</tr>
<tr>
<td>become absorbed in playing a real instrument, there are significant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>differences from a real world band playing real instruments.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Players have the ability to unlock songs by playing well, but the</td>
<td>1</td>
<td>G9</td>
</tr>
<tr>
<td>exact mechanism for unlocking isn’t revealed.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The game is enjoyable to play and replay, although most players</td>
<td>0</td>
<td>G6</td>
</tr>
<tr>
<td>wouldn’t choose to play the same song over and over.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During solos, a percentage complete displays and changes as you</td>
<td>0</td>
<td>G14</td>
</tr>
<tr>
<td>progress through the solo.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If you perform badly, you have the possibility of recovering if you</td>
<td>0</td>
<td>G8, G13</td>
</tr>
<tr>
<td>improve quickly. If your teammates are doing well, you may have</td>
<td></td>
<td></td>
</tr>
<tr>
<td>additional leeway.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Several of the bonuses make the track more colorful and interesting,</td>
<td>0</td>
<td>G13</td>
</tr>
<tr>
<td>presenting the challenge of maintaining the bonus as a positive thing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Players receive various bonuses for excelling during gameplay: unison</td>
<td>0</td>
<td>G11</td>
</tr>
<tr>
<td>bonus, bass groove, playing a certain sequence or for a certain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>amount of time without missing notes gives you bonuses such as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>multipliers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The short term goal of playing the next few measures is very</td>
<td>0</td>
<td>G4</td>
</tr>
<tr>
<td>visible, and the goal of completing a song is understood.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issue</td>
<td>Severity</td>
<td>Heuristic</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>The pace of the input require of a player varies with the skill level selected for that player. You hit less notes to succeed on the “Easy” skill level, but it doesn’t interrupt how the song sounds.</td>
<td>0</td>
<td>G12</td>
</tr>
<tr>
<td>Users have a sense of control over the success of the song. If you don’t hit the right notes, you don’t get any sound.</td>
<td>0</td>
<td>G9</td>
</tr>
<tr>
<td>The basic elements of the user interface are the same throughout gameplay, but the different songs have different moods, tempos and input patterns required for success, keeping things interesting.</td>
<td>0</td>
<td>G15</td>
</tr>
<tr>
<td>Notes glow and burst if you hit them, otherwise they scroll past you and the track eventually turns red.</td>
<td>0</td>
<td>G10</td>
</tr>
<tr>
<td>The buttons and other inputs on the controllers mimic the real world as well as those kinds of inputs can by being locationally proximate to where they would be on real instruments. The drums interaction is fairly realistic although one of the drums maps to cymbals when played.</td>
<td>0</td>
<td>G3</td>
</tr>
<tr>
<td>Gameplay is player-centric rather than technology or design-centric</td>
<td>0</td>
<td>G7</td>
</tr>
</tbody>
</table>
Appendix C: Comparative Analysis with Wii Tennis

Wii Tennis Overview

Wii Tennis is one of the games in Wii Sports, which was developed by Nintendo and released in 2006. Wii Tennis is one of the five sports simulations which are designed to be played with the motion-sensing capabilities of the Wii Remote. The Wii Remote is used to perform real life sports actions such as hitting the tennis ball with a racket. The players receive tactile feedback of actually hitting the tennis ball with a tennis racket via the remote.

The rules for each game are simplified to make them more accessible to new players. The game features a standard play mode, training mode, and multiple player options. The standard play mode mimics the real world method of playing the sport, which in this case is a singles tennis match and doubles tennis match. Training mode is a single player option that allows a player to practice certain aspects of tennis and rewards them with medals. Multiplayer tennis requires each player to have their own remote.

One notable aspect of Wii Tennis is that it allows two players to compete with each other (a singles tennis match) and two players to collaborate with each other (a doubles tennis match). The in-game characters are taken from the Wii’s Mii Channel. The user is allowed to create a Mii or a customized avatar that can be imported into games that support the feature. The non-player characters in the game were also created using the Mii Channel toolset.
In order to have your avatar swing at the ball with their racket, you use the Wii Remote in a similar fashion to a real tennis racket. The yellow arrows in the diagram show the rotation which happens from the arch of your swing, while the blue shows that your aim is determined by the direction in which the overall swing moves.
Figure C.3: A player finishing his swing

Comparative Analysis Findings

Game Objective

Rock Band’s objective is to complete playing a song, with up to four players playing the instruments to a satisfactory degree of accuracy.

The goal of playing Wii Tennis is to get the ball into the opposing team’s court and score points to win the game.

Game play

In Rock Band, there are individual scores for each player and a group score. In Wii Tennis, there is a group score only and no individual score. The group score is points won by each team of players in the case of a doubles match. Basically, the rules of the game of tennis are followed in Wii Tennis.

Rock Band has skill levels Easy, Medium, Hard and Expert. Wii Tennis does not have skill levels but there is a Standard Play mode, Training Play mode and Multiplayer mode. The Standard player mode is the typical singles match with one player and two player mode. Training mode is a single player option that allows a player to practice certain aspects of the sports and rewards them with medals. The multiplayer mode has players competing against each other and also collaborating with each other against other players.

In Rock Band, when a player fails his part, another player who is playing consistently and successfully can help continue the game play by "saving" the failing player. This is done by performing certain gestures such as swinging the guitar in the upward direction, singing loud on the microphone when asked to, and performing the multi-
colored drum rolls to the end of the green note. In a Wii Tennis doubles match, players in the front part of the tennis court cannot help the player at the back part of the tennis court if that player misses the ball. On the other hand the player at the back of the court can always have a chance to play the ball which is missed by the player in the front part of the court.

In Rock Band, all players need to finish their part for everyone to finish the song which means that group success depends on individual success. In a Wii Tennis doubles game, the front court player can opt not to play, thus the back court player needs to play all the balls to win. The cost of performing badly individually in RB is greater than in Wii Tennis because in the former, players only get one song but in the latter, players get to play a number of sets.

In Rock Band, the duration of play is one song which means successfully finish playing the song. In Wii Tennis, duration of play is one game until the game is won by one team of players.

**Attention Demands**

In Rock Band a good amount of attention and concentration is needed to accurately hit the notes for instruments like the drum and guitars. In Wii Tennis, attention is focused on hitting the tennis ball and scoring a point in order to win.

Rock Band is more complicated to learn due to the hand, eye and foot coordination required for playing the instruments. The game also demands a considerable amount of concentration and focus. In Wii Tennis, it is required for each player to be aware of their partner’s movements to play the ball correctly and score a point. For someone who is new to both games, it is relatively easy to learn how to hit the ball correctly in Wii Tennis, than to hit the correct notes while playing Rock Band. This was something we uncovered during our exploration of both games. Overall, it is easier to learn to play Wii Tennis than Rock Band.

In Rock Band, input consists of hitting the right notes for all the instruments and the rate of input is fast and continuous. In Wii Tennis, input consists of hitting the tennis ball to the opposite side of the tennis court and the rate of input is medium to fast and intermittent.
Appendix D: Personas of Rock Band Players

Persona 1

Amanda “Zig” Moss

Goals
- Hang out with friends
- Meet new people
- Pass songs on easy, to contribute to group success (and enjoyment)

I’m no diehard Rock Band fan, but it’s a fun way to hang out with people.

Desire to socialize
Enthusiasm for gaming
Wants attention

Amanda is a senior at the School of Art and Design, at the University of Michigan, Ann Arbor. She used to play the clarinet in high school, and dabbled in singing with a rock band when she was a sophomore. Though art school keeps her very busy, she makes sure to keep her social life active, as work-life balance is very important to her. She enjoys hanging out with friends, and meeting new people; on Friday and Saturday nights, she usually hangs out at a friend’s place, or gets together with a bunch of them at a local pub.

She has not really played any video games until one of her friends bought Rock Band, and began hosting Rock Band parties. Though she has never understood some people’s craze for gaming, she tried out Rock Band anyway. Initially, she found it hard to pass a song – “I guess it’s because I haven’t played as many video games as the others. It’s just hard to hit the buttons exactly when they scroll past the line.” But she got the hang of it after a couple of sessions, though she stays on easy.

“I can pass a song on easy, but I don’t want to try medium because I don’t want to risk failing the group - most of them play on hard and expert! It would be silly if I failed on medium. Besides, we have fun when we play and I don’t want to stall the game.”

Though she has some experience with singing for a real rock band, she doesn’t usually take the microphone when she plays the game. “It’s just more fun to play guitar… and most of the songs are ‘guy’ songs, not ones I like personally. I do sing sometimes, though, like when everyone else refuses to sing.”

She prefers to set the guitar to “bass” as that is less challenging than playing rhythm/lead guitar. “It’s not like I’m trying to get really good at the game. I just want to be able to play reasonably well and have fun.”

Pratibha Bhaskaran
Liz Blankenship
Jon Cohen
Saurabh Koparker
Nik Resaidi Rashid
Stuart Garstrom

Goals

- Reclaim lost youth
- Connect with old friends by playing songs they enjoyed together
- Display skills and receive respect

“Rock Band takes me back.”

Age: 35  
Occupation: Customer Service Manager  
Favorite Music: Rock

Plays Rock Band four times per week  
Favorite Instrument: Drums  
Skill Level: Medium

Desire to socialize  
Enthusiasm for gaming  
Wants attention

Stuart plays 55 poker hands, but he secretly hates to gamble. He hasn’t made a friend outside of work since college and lost touch with his buddies soon after graduation. Friday poker nights with guys from the office are his only social activity. Except for his girlfriend of six years - who he also met at work. She prefers to stay in on weekends and watch game shows. When his colleague hosted a poker night just after Christmas 2007 - he invited everyone to try out his son’s present – Rock Band. Stuart owns just about every system and over 200 video games, but he resisted buying Guitar Hero because the peripherals looked lame compared to the drum set he played in his college band. He declined to play, but after a few beers he couldn’t resist the chance to play drums on Nirvana’s “In Bloom”. He chose the “Hard” skill level and failed the first few times, but finally dropped down to Medium... and then Easy. That night, Stuart was the last guest to leave.

When he went to buy the game, he went home empty-handed. $170 was too much to pay out of his budget. Plus his girlfriend would freak out. So to bring down the cost, he traded in 10 Playstation games and made his purchase. Within a few hours of solo play - all on Easy mode - he was determined to improve, beat the game on Hard, and then invite his bandmates from college to play. However, his girlfriend was so annoyed by the noise made from the drum peripheral that she hid his drum sticks. He got them back by inviting her to play with him and she was soon just as hooked. He beat the game on Hard after two months of playing 5 hours a week. When his old bandmates came over, his girlfriend stuck around to play along. To his dismay - his girlfriend was more popular than he was. When Stuart invited his old bandmates to come again next week, they all asked him to bring his girlfriend along. Stuart wondered if they were coming back for Rock Band or for his girlfriend.

Stuart was about to return the game when he came home to find his girlfriend playing with her friends. He invited them all to play at the next bandmate reunion. His old bandmates and his girlfriend’s friends hit it off. Instead of Friday Night Poker, now Stuart enjoys Rock Band nights.

Team Rock On

Pratibha Bhaskaran  
Liz Blankenship  
Jon Cohen  
Saurabh Koparkar  
Nik Rozaidi Rashid
Gracie Washington

Goals

• Enjoy spending time with Jesse and her friends
• Avoid embarrassment (especially singing) when playing Rock Band
• Build rapport with her coworkers

“I tag along sometimes when my friends play Rock Band, but I don’t like to sing! Maybe after another beer...”

Age: 30
Occupation: Assistant manager at Staples
Favorite Music: Rock, Alternative

Plays Rock Band every other month or so for the past year
Favorite Instrument: Bass
Skill Level: Easy

Desire to socialize
Enthusiasm for gaming
Wants attention

Gracie has been working at Staples for the past few years and recently became assistant manager, which includes closing the store several nights a week. She usually works about 45-50 hours per week, Sunday through Friday.

When she’s not working, Gracie enjoys watching Sex in the City, baking (especially with chocolate), having girls’ nights out at the bars with some friends from college, or going on dates off and on with Jesse, a guy she met at a night club. She’s not really into video games, but it seems that lately her friends have all been buying games for the Nintendo Wii. Once in a while, she and Jesse will go to her coworker Jerry’s place where they will usually end up breaking out Rock Band or Boom Blox, casual games Jerry owns that are meant for playing in groups.

Gracie doesn’t like the social pressure involved in playing these games. While she knows it’s just a game, she feels like she doesn’t play video games often enough to really get the hang of it. Jerry and Jesse both play Rock Band pretty often, and she thinks it draws attention to her to play on the Easy skill level when others around will be playing much more complicated patterns, but she feels left out if she doesn’t play at all so she’ll rotate in and play Bass on Easy every once in a while. She also wants her coworkers to view her as a team player so that she can advance to a full manager position at work.

The group she plays with mostly males, so another thing that she feels social pressure is when the group selects a song with a female vocalist. The group often looks to her to sing, but she usually refuses until she’s had a few drinks and becomes less self-conscious. Gracie thinks singing is less desirable than playing Bass because she thinks "it’s way more obvious if you don’t know the song or suck at playing.” Even so, a drink or two later when she’s no longer worried about embarrassment, she’s happy to sing or play and has a decent time with it. She enjoys hanging out with this crowd and generally likes the music available for play in Rock Band.

Team Rock On

Pratibha Bhaskaran
Liz Blankenship
Jon Cohen
Saurabh Koparkar
Nik Rozaidi Rashid
Jason Vanderbilt

Goals

- Business networking and climb up the corporate ladder.
- Socialize and build better relationships with colleagues.
- Have a lot of fun with his friends.

“I like to socialize through Rock Band. My friends and I often play after going to the bars.”

Age: 26
Occupation: Marketing Consultant
Favorite Music: Rock/Alternative

Desire to socialize
Enthusiasm for gaming
Wants attention

Jason is a Marketing Consultant at Vanguard & Co. in Pittsburgh, PA for the past four years. He loves his job and also Rock Band which is a recent addition to his social life. Jason always liked to play video games but Rock Band is “gripping” according to him because it is a cool multiplayer game. While Jason is not a hardcore gamer, he has quickly realized that Rock Band comes with a nice perk which is the ability to invite people over to play the game and have a blast.

Jason has been playing Rock Band for the past eight months regularly. He likes Rock/Alternative Rock music and had played drums briefly in a band in middle school. He understands rhythm and plays the guitar on Easy level. For him, drums are more fun and he can play them at Medium level. He doesn’t like to sing the songs. “I’m really bad at singing, let someone else sing” is what he says. When asked about any favorite songs, he says, “It doesn’t matter what song is played most of the time. I just want everyone to have a good time.” In the beginning, Jason heard about the game from a colleague at work, it sounded cool and so he checked it out. He then purchased the game with an agreement with some friends at work that they would get together at his place and play the game. This work ed out well and after the initial phases of learning together and figuring out how to play the game, he and his friends now frequently enjoy it with snacks and beer or even dinner.

He really doesn’t care about gaining expertise in the game but wants to socialize through the game. He invites his work colleagues over at least three times in a month, welcoming them to bring significant others or other friends as well. These Rock Band gatherings have proved to be helpful as Jason’s social circle has expanded consistently. He is even dating someone he met through one of his colleagues two months ago at one such Rock Band party. In Jason’s words; “I don’t regret buying Rock Band at all, it is the first game I ever purchased and it’s been great.”

Team Rock On

Pratibha Bhaskaran
Liz Blankenship
Jon Cohen
Saurabh Koparkar
Nik Rozali Rashid
Sophie Aaron

Goals

- Spending time with best friends
- Singing at the hardest skill level
- Playing well in other Rock Band instruments so she can perform equally well in Concert Band

“...I don’t know most of the songs, but Rock Band lets me sing like I know them.”

Age: 11
Occupation: Eighth grader
Favorite Music: Pop Rock, especially by Disney artists

Play Rock Band every weekend or whenever done with homework
Favorite Instrument: Vocal
Skill Level: Hard for vocal

Desire to socialize
Enthusiasm for gaming
Wants attention

Sophie is a chirpy girl who likes to sing and dance. Like many teens her age, she loves Jonas Brothers and the movie High School Musical. She listens to them while doing homework, and sings out loud when she is having fun with her friends.

It was one of her friends who introduced her to Dance Dance Revolution, and she loved dancing along with the music, but she could not sing. It was the same with Guitar Hero. But when Rock Band came out, she loved it and pestered her father to get her the game. Fortunately, the summer holidays just started and her father also wanted to reward her for getting all As at the end of her seventh grade.

Sophie started having her friends over to her house to play the game, and sometimes she would play at her friends’ houses. She tried all instruments, but she was really at home with the microphone. Her friends knew this and would encourage her to sing at a harder level, although everyone also learned the drums and guitars.

While summer has ended, Sophie and friends do keep playing over the weekend, although she has commented that “Wouldn’t it be great if we can play High School Musical songs on Rock Band?” and “I don’t know these songs well, but my friends said that I sure sing like I do.”

In the eighth grade, Sophie is enrolled in Concert Band class and hopes her skills in Rock Band the game will come in handy, somehow.

Team Rock On

Pratibha Bhaskaran
Liz Blankenship
Jon Cohen
Saurabh Koparkar
Nik Rozaidi Rashid
Appendix E: Possible Scenarios in Rock Band Play

Scenario 1: Stuart Goes From Student to Teacher

With 72% of his perfect drum solo complete, Stuart Garstrom’s girlfriend Melissa stomps in the front door. He doesn’t miss a beat. She hovers silently over him, perched on the stairs that descend into their finished basement, grimacing at him. He misses the last note in a rare "Big Rock Ending", a costly error that subtracts 7,340 points from his potential score.

Before Stuart can press a button, Melissa states she called him three times and inquires why he didn’t pick up. They had agreed to go to dinner and a movie - and she was scared something terrible may have happened. Stuart says he must have been "in the zone" because even he didn’t hear the phone ring. Melissa grumbles to herself but is more concerned with making it in time to catch a date movie. Stuart says he’s busy and asks if she’ll wait 15 minutes. "Don’t tell me you’re busy with that game!" barks Melissa. But indeed he is. Melissa snatches the game from the XBox disc tray, dashes to their bedroom, and the door goes slam!!!

Stuart taps their bedroom door with a Rock Band drum stick. Melissa cries, "You never spend time with me!" Stuart says that’s because she hates everything he enjoys. But Melissa likes video games - she plays The Sims and Puzzle Pirates. But that reinforces Stuart’s point because he doesn’t like those genres. She’s not even willing to try a playing game like Rock Band with him. Melissa says she doesn’t like competition. Stuart says in Rock Band they could play to win together. Melissa opens the door just a little. Stuart encourages her to just try it once, and if she
doesn't like the game, he'll take her out to The Olive Garden for their anniversary. Melissa pokes her head out and leans in for a smooch. Stuart takes her hand and leads her to the basement.

Melissa wants to play guitar and Stuart suggests she play it on Bass because it's easier. Melissa notices that the character Stuart selects looks just like him. She spends the next 15 minutes creating her avatar. She chooses the easy skill level - Stuart selects hard - and then she picks the track: Bon Jovi's Wanted Dead Or Alive (her favorite band in high school). She yelps with delight when the song starts because the music reminds her of a time when she and her best friend in high school played hooky to drive 200 miles for a Bon Jovi concert. But her happiness is shortlived - she doesn't know what she's supposed to be doing and fails after unsuccessfully playing any notes.

Stuart explains the game - "press the button that matches the color on the screen when the circle goes past that line." But she fails again. And again. They Weezer's "Say It Aint So" and she manages to hit a few notes, but fails about half way. She asks if they can go out to dinner now, but Stuart knows if she doesn't like the game now, she never will. He takes another guitar peripheral and tells her to watch him play. But she doesn't want to just stand around and watch. So they both play the same bass part, but she fails the song as she looks back and forth between Stuart playing and her setup. When she fails again, she sets her guitar down and pulls Stuart away.
"You give up too easily," Stuart sighs. She replies, "You're one to talk, you give up on everything. Even your real rock band." You always blame me for everything!" Stuart sighs, "Our singer left the band. It's not my fault." Stuart realizes she hasn’t tried the microphone. He hands it to her and she reluctantly accepts it. Her voice is nice, and more importantly for Rock Band, on pitch. She knows all the words for Wanted Dead or Alive - she even sings a bit with her eyes closed - and passes the song. After another half hour, Melissa tries the bass again and passes her first song with an instrument.
**Scenario 2: Saturday Night Live - Rock Band Version**

It's been a hectic week of work, and Jason Vanderbilt is all set to relax and hang out with friends at the party he's hosting Saturday night. Ten people are coming - seven of them from work, and three of them are bringing their significant others. This party is going to be different - Jason is going to unveil his newest toy - Rock Band! He's played it before with a few of his work buddies, but this is the first real party they're having.

It's 8 pm and people start trickling in. Only three of the guests have played Rock Band before, and they're pretty good at it. They pick up the instruments enthusiastically and begin playing. The others look on in interest, amusement - and in the case of a couple of people - disinterest (they haven't heard of Rock Band and they're not into gaming). Soon, the drinks are flowing, people are talking and laughing...and the Rock Band players successfully finish a set of four songs in a row.

Jason suggests that some of the others try the game. A couple of people smile hesitantly, one shrugs, but Brian Wilson, an outgoing guy in Jason’s work group calls out that he would like to try the drums. The drummer gets up, and hands the drumsticks over to Brian, and a couple of people note, with a laugh, that he doesn’t seem very pleased to be parted from the drums. Another guy, Sean Connors, decides to try the guitar, and Amanda Moss, a garrulous woman with a loud voice gets up and grabs the mic. The new group fails the first two songs. "How does this thing work?" says Brian, exasperated. "I'm sure I'm pressing the right buttons."
"Oh you need to hit the strummer while you're holding down the buttons," says Jason. He goes over to the group and explains briefly to them, how the game works and how to use the controllers. The group tries again, fails the next song, but gets through the one that follows. Everyone cheers enthusiastially.

An hour into the party, people who've never played are more willing to try, now that they've seen the others play, have gotten acquainted with everyone else and are more relaxed. People switch instruments after every song now, though nobody really wants to sing (except for Amanda). There's a lot of good-natured banter, with people yelling at someone, telling them it's their turn to sing, and that person pleading that they'd rather not sing.

For one song, Jason plays with Sean and Amanda. Sean is going through a hard drum solo, and misses a number of beats in quick succession. Jason, who's built up a good score, sees the message on the screen that tells his to "save" his friend. He tilts up his guitar and "saves" Sean. "Thanks man!" grins Sean, and goes on to finish the song with an accuracy rate of 68%.

A couple of hours later, people start leaving. "Great party, it was fun! I didn't think I'd be any good at video games!" says Alicia, who tried Rock Band for the first time that evening, and passed 2 of the 4 songs she played on easy. "When are we doing this again?" laughs Sean, as he leaves.
**Scenario 3: The Rock Band Triplets**

Sophie Aaron, Jenny Craig and Kayla Hills have been friends for three years now. They share many commonalities: they live in the same area; they have just graduated from middle school; next fall, because of the way Ann Arbor Public Schools allocate attendees based on home address, they will be attending the same high school. The girls, as with most teenagers, also share a love for music -- they each have iPods in their ears most of the time, listening to the same kind of music. In effect, the three are pretty much like triplets.

The summer holidays have just started, and none of them knows what they will do for the next two and a half months. Probably some of them will go somewhere once their dads get to go on leave. Jenny did mention that they might be going to Florida. In the meantime, the girls will hang out at the playground on the housing estate. Occasionally they will come together at Jenny's basement to play on her Wii. After several intense sessions of playing Wii Party Games, game fatigue began to creep in.

At the end of one session, as they were all staring blankly at the Wii Welcome Screen, Sophie suggested to Jenny, "Do you remember people talking about this music game Rock Band before school ended? We all like music. Why don't we try that?" "Good idea," Jenny said. "I'll try to talk to Dad about this. He did ask if I wanted something for my good grades." She did, and before long, they were opening the big boxes of Rock Band instruments that just arrived.
Once all were set up, they came to the point of deciding who plays what. "I wanna play the drums!" Jenny exclaimed, grabbing the drumsticks. "Well, Kayla, you can play the guitar first, then we'll all swap. Agreed?" suggested the kind-hearted Sophie, as she went for the mic. Kayla on the other hand was examining the guitar and trying to figure out how it works, since there were no strings. "I know how drums typically work, but how do you play this... thing?" asked Kayla. "Let's see if there is a manual on this thing. Hmm.. let's do the tutorial instead," said Jenny as she went though the manual's content. Everyone then went through the tutorials for both the guitar and drums.

As they were scrolling through the list of songs for the first attempt together, Jenny commented that all the song titles did not seem familiar at all, although some band names did ring a bell. Eventually, they settled for the first song in the list, "When you were young", presumably the easiest. After selecting the instrument, character and difficulty level, the girls started playing their first ever Rock Band song together. Sophie sang horribly, but Rock Band was forgiving as long as she knew how to pitch her voice. Kayla and Jenny did not play that well either, having missed several notes that were flowing down the screen. Before long, the song stopped. They failed. Immediately Kayla asked to do it again. Apparently she wasn't satisfied with her performance. "Same song?" asked Sophie who was controlling the control pad. "Yeah." But once they failed the song the second time, Kayla had to go home.

The next day, the girls congregated again at Jenny’s house. This time Sophie wanted to play the drums. Jenny was reluctant to give in as she was getting comfortable with the instrument,
having spent most of the night training on the drums after her friends left. "Jen, did you play all night long?" asked Kayla. "I just couldn’t stop. This thing’s addictive," claimed Jenny. This time they finished the song for the first time. Her friends were curious how she played so well when she did not know the songs. "It’s all about hand and eye coordination," claimed Jenny.

The jamming session continued for several songs and reoccurred often for several weeks. Jenny's mom occasionally complained that they were playing too long and too loud. So occasionally they do go out to the playground. Whenever they played Rock Band again, they took turns on various instruments, although Jenny tended to play the drums more. Sophie has gotten tired of singing and has opted to just watch when her two friends were insistent on playing the guitar and drums. Realizing that it’s not fun to see Sophie on the sidelines, everyone agreed to rotate instruments and the singing after every two songs. They continued to have fun this way, occasionally inviting other friends over to show off their talents, until Jenny had to leave for her Florida vacation.
Appendix F: Interviewee Recruitment E-mail

Hi everyone,

Have you played Rock Band? If you have 45 minutes to spare we’d like to interview you.

Whether you’ve tried the game just once, score 100% on expert songs, or fall somewhere in between - we’re looking for all skill levels!

Please let us know a few times that work for you.

As an added bonus - free cookies at every interview! Yum!

Thanks,

Team Jon, Liz, Nik, Pratibha, Saurabh

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About Rock Band:
Rock Band is a music video game in which up to four players perform popular songs as a virtual band. The game is controlled with three peripherals modeled after the three standard rock band instruments: drums, bass and guitar (a guitar peripheral is used for guitar and bass), as well as a microphone for the vocalist.

Learn more here: http://www.rockband.com
Appendix G: Individual Interview Questions

Experience with the system
1. Have you played a similar game before? What is it? What platform?
2. How long ago have you played Rock Band?
3. Tell us about the first time you played Rock Band?
4. How many hours do you play Rock Band in a week?
5. When was the last time you played Rock Band? Where did you play it?
6. Do you have a fixed group that plays Rock Band? How many people?
7. Does each group member play the same instrument every time? On what basis do you rotate roles? Please rank each instrument in order of preference.
8. Do you own the game? Whose game is it? Who bought the game?
9. Have you played alone?
10. How familiar are you with the game interface (i) the hardware (ii) the software display interface?
11. How many songs do you usually play in a group? Or what determines whether you want to play more or not?

Experience with group members
1. Do you know your group members?
2. How long have you known them? How often do you meet them?
3. Do you know what skill levels they are at?
4. Do you know if they have music background? What sort? Instruments? Singing?

Goal setting and managing expectations
1. Have you ever explained to others how to play the game? What is the purpose? To whom did you explain?
2. Who taught you how to play, and how did they do so?
3. Do you know of the game play rules? How you win or lose?
4. Have you tried the tutorial for each or any instrument?
5. What was the level you started with? How fast did you go up a difficulty level?

Awareness of Others
1. During play, do you notice (are you aware of) how others perform? On the screen? In real life around you?
2. What did you do in case others not performing well?
3. Have you ever "saved" other players? Do you ever avoid saving people when you notice they need it? How do you feel about it?
4. How do you interact with the people you are playing with? Do you talk during play?

Cooperation and team work
1. Have your team ever failed a song? How did you react? What did you do afterwards?
2. How did you help others play the game better?
3. Have you ever played in a group that had one person who failed much more than others? What happened?

Skill levels
1. What difficulty level (for which instrument) did you choose to start with?
2. What was your skill level before you played the game (this round)? What is it now?
3. How long (how many songs at the same level) did it take you to up a difficulty level?
4. What was your team score for the last song? How do you feel? What do you think can be done to improve the score?

Challenge, motivation and competitive spirit
1. Have you failed your group before? How do you feel? What did the others tell you or do to you?
2. Have you ever felt demotivated? What happened?
3. What do you think makes you want to try again?

Feedback about system or group dynamics
1. To what extent do you think teamwork is important in Rock Band?
2. What incentives do you think are important for group success in Rock Band?
3. What aspect of the hardware would you change if you can to play better?
4. What aspect of the software interface (menus, game play) would you change to be able to play better?
5. What aspect of the group will you change to play better?
6. What aspect of the whole game will you change to play better? Online challenge with other teams (yes, this is a leading Q)?
7. Do you know/Have you unlocked songs before?

Others
Demographics (age, gender, job)
Appendix H: Observation Study Recruitment E-mail

Subject: Rock Band video game: Seeking participants for observation in a Study

Hi everyone,

Want to play Rock Band? We’re evaluating Rock Band and are interested in observing people during gameplay. We will host your session in the home of practitioner Jonathan Cohen (or if you would prefer, your home). You will be placed with three other people who you may or may not know. If you would like to participate in our study, please let us know:

1) Which of the following times you can make:
   1. 12:00 00/00/00
   2. 12:00 00/00/00
   3. 12:00 00/00/00
   4. 12:00 00/00/00

2) Whether you have played Rock Band before, or played other music video games such as Guitar Hero, Dance Dance Revolution, Karaoke Revolution, Samba De Amigo, Space Channel 5, Elite Beat Agents?

3) The skill level at which you play the above games (Easy, Normal, Hard, Expert)?

4) Approximately how many times have you played Rock Band or other music video games?
   Never
   1-3 times
   4-10 times
   more than 10 times

If we select you as a potential participant, we will ask you if you know or do not know the tentative list of other potential participants and ask other potential participants whether they know or do not know you. This step is necessary so that we can construct groups according to our research goals.

Thank you,
Team Rock On (Jon, Liz, Pratibha, Nik, Saurabh)
Text of the follow-up email:

Thank you for your interest in our study. Please let us know whether you know any of the other potential participants in our study. If you are selected, we will pair you with other participants based on your prior relationship. This is important for our research goals, and if you are selected and partake in an observation session, we will be happy to discuss our methodology afterward.

Thank you,

Team Rock On (Jon, Liz, Pratibha, Nik, Saurabh)
Appendix I: Observation Study Briefing Script

Pre-Play
Hi, and welcome to our study! My name is ___ and this is ___ (and so on). We are working on the study together. Today you are going to play Rock Band for approximately 45 minutes, followed by a brief interview and debriefing. You can take breaks whenever you like. Your participation is voluntary - you may leave at any time. You and your group may choose to play whatever songs you like as many times as you like during the session. We will be observing at a distance and will not be able to answer any questions about how to play the game. Feel free to introduce yourselves and begin to play whenever you’re ready.

Post-Play
Thanks for playing! We’d now like to interview each of you about your experience. [researchers will pair up with participants and interview separately]
Appendix J: Observation Study Data Collection Template

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Appendix K: Post-Observation Study Questions

1. Talk to us about your experience today.

2. What did you learn about how to play Rock Band?

3. Talk to us about what happened when ___ (mention a situation e.g. involving teaching or learning the game, that arose during the session that was noted by the researcher).

4. What don’t you understand about how to play Rock Band?

5. How would you improve Rock Band to enable better collaboration?

6. How did you feel about playing with the other people?

7. Talk to us about what it’s like to explain the game to other people [include with references to group play]