

## Collaboration and Learning in the Video Game Rock Band

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### ABSTRACT

We analyze collocated collaboration and learning in the popular music video game Rock Band. Through observation sessions and interviews with new and experienced players of Rock Band, we find Rock Band is a highly social game in which most interaction between players takes place between songs. The game play caters well to all levels of experience and provides enough challenge to encourage learning and hold interest for players of varying levels of skill. Through our examination of the elements of learning and collaboration in Rock Band, we uncover what makes it a successful casual social game and make suggestions for future design improvements.

### INTRODUCTION

Recent advances in technology have led to the emergence of casual and social video games that appeal to non-traditional demographics [13]. Rock Band has sold 4 million copies and generated \$600,000,000 in revenue on mainstream gaming consoles within the first year of its release (2007) [5]. While part of the success of this genre of games is due to the ease of learning associated with new peripherals, much of the success is due to the casual and social group-based nature of such games. Understanding successes in casual games such as Rock Band is an important goal for research in interface design, collaboration and learning technologies. We are especially interested in how people interact in the game, both as they learn to play and when teamwork and collaboration factor into gameplay. We study the complex and varied types of interactions Rock Band players have with each other.

### LITERATURE REVIEW

The social and cultural context is an important part of learning video games [1]. Similarly, Twidale et al [12] 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. [8] 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 [9]

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. [7] discuss the social aspects of Computer Supported Cooperative Work systems that enable emotional connections between participants such as trust and belonging in learning environments with task-based objectives. Players work towards developing a common ground with each other [3]. 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 [11] discusses the role of “flow” [10] 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 [6] 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.

### **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 different peripherals modeled after three standard rock band instruments: drums, bass guitar and lead guitar (the same guitar peripheral is used for lead and bass), as well as a microphone for the vocalist. Up to two guitar peripherals may be in use with the game at once. The objective of the game at the elementary level is to complete playing a song. As players succeed on individual songs, new songs are occasionally “unlocked.” 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. To operate the bass or lead guitar, players must push and hold fret buttons that correspond to descending notes on a vertical track. These 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 drummer must strike the drum pads or pedal that corresponds to the color of the notes as they descend to the bottom of the vertical track. The vocalist sings into the microphone, guided by lyrics and an indicator for pitch and rhythm scrolling at the top of the screen.

Players may choose from four skills levels - easy, medium, hard and expert. During game play, players earn points towards a common score. Individual players also earn “overdrive” points by successfully playing all white notes that appear for select portions of a song. There is an “energy meter” on the left of the screen that tracks the performance of both individual players and the group through color and the length of the bar. At the end of each successful song, the total score for the band is displayed, together with the percentage of notes hit for each individual player.

### **METHODOLOGY**

We studied Rock Band through a detailed analysis of the interface using heuristic evaluation, interviews with players of the game, and non-participant observation sessions. Within the heuristic evaluation, we explored details of the interface and examined game mechanics. Participants in our interviews and observation sessions were selected from those who responded to an e-mail that was sent to an open mailing list that reaches approximately 400 graduate students, faculty, and alumni of the School of Information at the University of Michigan. In the nine interviews we conducted with people who had varying levels of experience with the game, we asked questions about their experience playing the game, particularly how they interact with

others when playing the game. We conducted four observation sessions, with four participants in each. To observe how familiarity with other band members 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 different levels of familiarity with one another.

## TYPES OF INTERACTION

We found several main categories of interaction in Rock Band. First, we look at the overall social dynamics of play. Next, we look at how players coordinate for various in-game decisions. We then look at the ways learning and teaching occur in the game. Finally, we look at different ways that the interface and the players may level the playing field.

### Rock Band as a Medium for Social Interaction

Rock Band is a means and reason for social interaction. People prefer to play in groups, and when they do, they bond over the shared interactions.

**Groups and Audiences:** Most people view the game as a means of social interaction with others and play it almost exclusively in groups. While the game accommodates four simultaneous players, Rock Band is often an occasion for larger groups to gather, observe, and engage in turn-taking behavior. During a post-observation session interview, one person commented the play was not as “energetic” during the observation session as usual. He said usually there are spectators who jump in and sing, and cheer the players.

**Improving Group Experiences by Playing Alone:** Some people play in private to unlock songs and master skills. During an interview, one expert stated that she did play alone at times, but that “it’s not the same game by yourself.”

**Establishing Common Ground among Strangers:** Both groups of strangers we observed looked to the interface as a means of establishing common ground. The avatars and songs were conversation topics. Several interviewees said playing Rock Band gave them something in common with a person they did not know very well. In the post-observation interviews, experienced players referred to a sense of group solidarity with their usual group. Having some familiarity with teammates’ preferences made people more comfortable making or objecting to decisions. In one group of strangers, a participant commented that she did not want to sing the whole time, but did not want to force the microphone on someone else either.

### Coordination

Between songs, Rock Band players may negotiate several aspects of gameplay for the next song: individual skill levels, instrument choice, and song choice.

**Skill Levels:** Each player selects their skill level before the start of a song, which determines individual difficulty. To avoid embarrassment, players generally stay within their comfort zone and choose a skill level that is challenging enough to provide a sense of accomplishment, but not so challenging that failure becomes likely. When players consider taking on a greater challenge, they often seek out encouragement from the group or want to judge how they may react to failure. Players will discourage others from maintaining a skill level that has caused group failure or advancing to a challenge that might lead to group failure.

**Instruments:** People most often play Rock Band at parties or large social gatherings. The game accommodates up to four people per song, requiring individuals to rotate in and out of play, transitioning between active players and spectators. Regardless of the size of the

group, switching instruments may be decided on a number of factors: instrument preference, duration of play on the current instrument, and observers waiting to play.

**Songs:** The primary factor that influences song choice is familiarity among group players. Players gravitate toward the songs they generally enjoy and away from the learning curve associated with new songs. Other factors that influence song choice include its length, whether they have played it before, and difficulty or fairness.

### **Learning and Teaching**

The contexts in which learning and teaching occur in Rock Band are varied, including saving and situations of near failure.

**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, a participant who had never played Rock Band before initially said: “This is supposed to be fun? It’s complicated!” Although she later said the game was fun, 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.

**Novice and Expert Interactions:** At the observation study with friends of mixed skills, the novice would ask questions about gameplay between songs, 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 a group we observed of friends with mixed skills 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.

**Interaction Increases when Failure Potential is Increased:** As noted before, players in our observation sessions seldom interacted mid-song unless certain stimuli arose. 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 a 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.”

**Saving:** Player interaction during game play is typically limited by high attention demands. When a player fails, the group has a limited amount of time to “save” the other

player before the group fails. A remaining player must have, or within a limited time acquire, enough “overdrive power” to bring the other player back into the game. This is accomplished by making a gesture with the microphone or guitar peripheral. The interface notifies players when this is possible. Saving allows individuals experiencing a learning curve to acclimate to new challenges, by providing a buffer against group failure.

### **Leveling the Playing Field**

When playing Rock Band in a group of varying experience levels, there are several ways that the interface and the players themselves can support an interesting gaming session.

**Skill Levels Help to Balance Play:** 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 interface allows] 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.”*

However, according to some of our participants, the ability for different people to play together at different skill levels may introduce a power differential.

**Potential Power Differential:** One expert participant from a session of players of mixed skills 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. She had experience playing drums prior to trying drums in Rock Band and suspected some of her experience and rhythm carried over. In another instance, one participant who was to play the drums right after another participant had been playing excellently on hard and expert, commented apologetically that he played the drums on easy. Another participant then responded that she played the drums on easy too. We observed that singing was often least preferred over playing the drums, bass or lead guitar. This was mainly because people were uncomfortable with singing in public, but at times also because people found it difficult to sing unfamiliar songs. Allowing the singer to choose the song is one way in which cooperation as a team is upheld. This allows the least desired role of play to gain more control over the situation. In one observation session, a participant who had been doing the vocals for the major part of the session expressed that she felt she took over.

Players tended to encourage each other often. For instance, in a session with players of mixed skills, an experienced player told the novice that she had done well on her first try. Encouragement of teammates and the built-in ability to modify the difficulty of the game using skill levels help to balance differing backgrounds, including musical experience, innate rhythm and musical ability, and amount of previous experience with the game.

**Skill Levels Balance Play, but Goals Differ Based on Experience:** People with different levels of experience and ability may also have different goals or criteria for “success” when they play. For beginners and intermediate player groups, the group success is mainly about passing the song, and having fun. While expert players may also play for the social nature of the activity, “success” is also about being able to pass particularly 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 “tough” songs gave him “an incentive to get through them.” The other mentioned that she tried to “play Metallica songs and pass on hard.”

These differing goals also lead to different approaches to play: while novice players are focused on hitting the right notes at the right time, expert players often develop strategies for how to score more, based on the way the game proceeds, and on how well (or badly) others in the group are playing. They learn to pay attention to various cues in the interface; this includes watching to see when they can enter overdrive mode and to see 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.”

So even though players may have different goals and definitions of “success,” these goals generally tend to be aligned in the same direction.

## DISCUSSION

Throughout our observation studies, interviews, and research we found that player response to Rock Band was overwhelmingly positive. Two frequently used words by participants about why they like the game are “fun” and “unique.” In sum, Rock Band offers players a collaborative and visceral task that facilitates common ground and interaction outside of gameplay.

### **Collaborative, Not Primarily Competitive**

Rock Band is not the first multiplayer game to offer a collaborative mode—first person shooter, sports, and real-time strategy games have long provided team objectives. However, in contrast with these games, the primary objective of Rock Band is to pass a song.

### **Different Skill Levels, Same Game**

Individual skill level choice allows novices and experts to play together at the same time. Conventional multiplayer games effectively punish advanced players for teaming up with novice players. For example, in a first-person shooter with a collaborative mode, everyone competes on the same playing field. The expert shoulders the burden of the novice player's skill deficit.

### **Fast-Paced but Non-Violent**

The game does not depict violent behavior, but requires intense attention demanded by violent games, leaving little cognitive space for conversation. Between songs, the intensity of gameplay carries over into lively discussion.

### **Popular Music, Fantasy**

The use of popular songs bootstraps players into the game. Experts, novices, and spectators use songs as topics for discussion and to establish common ground. Many songs in Rock Band (the set list) are 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 they have heard before.

### **Short Play Installments**

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 not prompted to initiate another play installment.

## DESIGN IDEAS

We now share some design ideas and areas for improvement in the interface and interaction design of Rock Band.

### **Centralized Task Control**

One cause of individual confusion and intra-group friction results from the game's decentralized task control. Any individual player can scroll through the game's set list and select a song. Players often press random guitar fret buttons and hit the drum pads because it's a "fun" thing to do. This leads to accidental song selections and back-tracking in menus. The avatar selection screen is often stumbled upon by accident because it is the screen prior to the set list.

### **Interactive Fantasy**

Many people want 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 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 does not give players the opportunity to directly interact with this fantasy life off-stage (outside of playing the songs).

### **Missed Opportunities for Discussion**

The less players know each other, the more they tend to seek common ground by discussing what is displayed on screen. Sometimes players react to the "wild" appearance of avatars, while other times they chat about the "fun facts" served up on lengthy loading screens. We believe these 10-20 second loading screens, can be designed to encourage discussion with music trivia or by directly engaging players with talking points. 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." Players may pause to interpret and discuss their performance, feeling satisfaction or embarrassment about how they played. Labels that denote unique impact tend to confuse players—especially novices.

### **Spectator Participation**

Rock Band is typically played at parties or social gatherings. The game accommodates four players at a time and the viewing experience attracts spectators. While players and spectators rotate in and out of gameplay, Rock Band does not actively engage spectators to interact with the game.

### **Usability**

Players experienced some difficulty learning the software and hardware interface, especially novices. Switching to and from left-handed play confused left-handed players and their right-handed friends who received an instrument on a left-handed setting. Players have no indication of a song's duration before selection or their progress within a song toward its completion. 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.

## **CONCLUSION**

Our observation study participants and interviewees universally commented that the game offered a way to "bring people together" and "have fun." Overall, we found that Rock Band is perceived as a very enjoyable game, particularly in social settings where the number of people who want to play outnumber the number of peripherals the game accommodates. Since 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 that immerse players in a rock band fantasy life.

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

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