Dance Dance Revolution Field Study

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Introduction

Dance Dance Revolution (DDR) is a music dance video game. The gameplay is simple. When the arrow scrolls to the top of the screen and overlaps the stationary guide arrow, this is when the player must step on the matching arrow on the mat. Players are judged on the accuracy of their steps and given feedback such as marvelous, perfect, great, good, almost, and miss. The life bar is filled or drained depending on the player's accuracy. If the life bar is completely drained during the game, the player fails the song. Players have to successfully complete a dance to unlock more songs. This game is available in a plethora of titles and platforms: arcade, pc gaming, television game, PlayStation, Nintendo Wii, Xbox, etc. In this study, our team evaluated the series, SuperNova 2 (2007) with the PlayStation 2 platform.

The purpose of this study is to observe and evaluate the participant's affective and emotional experiences. To gather this information, we used the post-play questionnaire called Intrinsic Motivation Inventory (IMI) and Cued Recall Debrief. We used the collected data to guide and support our controller mapping and screen layout redesign. This report documents the process of conducting a field study, methodology, results, and suggested improvements.

Methodology

Participants

Our team conducted a field study with four participants. The participants consisted of one female and three males. All of the participants are students at Simon Fraser University. Three of the four participants have played DDR before, and half of them participate in dance activities.

Location

The laboratory style study was conducted on March 31, 2014 in the SFU Surrey Library Games Room. We found this environment to be suitable and natural for this study because many students gather in this space to play video games by themselves or with friends.

Procedure

Before the experiment was conducted, we set up a field study which included a dance pad as the controller), PlayStation 2 as the game console, and the CRT TV as the screen display. In addition, we had three cameras to record the facial expressions, body movement, and the game interface screen for the gameplay. They were used simultaneously during the game play for video editing purposes as well to be used in cued recall debrief session later on.

The experiments were conducted with each participant individually and lasted approximately half an hour. Moreover, the session contained four sections: three scenarios (difficulty levels), IMI/Enjoyment questionnaire, and cued recall debrief. Overall, we had one facilitator, two observers, and a video recorder present for every session.

At the start of each session, the facilitator introduced herself and the team. We followed a test script to describe the experiment to each participant, and asked them to read and sign a consent form. Then, the facilitator described and demonstrated the control layout of the dance pad. After, we let the participant practice the game for five minutes to become familiar with the dance pad and game. The song used for both the practice and game session was, Temperature by Sean Paul. For the first task, we asked the participant to start the game on basic. We encouraged each participant to express themselves naturally during the gameplay. Furthermore, we asked the participant to call out once they have initiated the game and when they have finished the game. After the participant completed the basic level, we repeated this process with the difficult and expert level.

Subsequently, when the participant finished the game, we asked them to complete the IMI/Enjoyment questionnaire and explained how the rating scale works. The questionnaire was used to measure the participant's interest/enjoyment, competence, effort, value, pressure and tension, and choice. Lastly, we conducted a cued recall debrief to measure the affect of the participants at the end of the field study. During the cued recall debrief, we took the cameras which played the participant's first person point of view and used a script to ask specific questions that allow to prompt effective answers from the participants. We also provided a playback of their body movements as additional footage to help them recall as to why they were making certain actions on the mat. Overall, they were asked to think aloud as to verbalize their thoughts and actions during the session.

Intrinsic Motivation Inventory (IMI)/Enjoyment Questionnaire Results

Participant 1

Overall, participant 1 enjoys working on the task. The enjoyment subscale indicates a consistency of positive rating scales in enjoyment and fun. He also finds the task interesting.

ENJOYMENT SUBSCALE

- **5** – 01. While I was working on the task I was thinking about how much I enjoyed it.
- **4** – 05. I found the task very interesting.
- **5** – 08. Doing the task was fun
- **5** – 10. I enjoyed doing the task very much.
- **2** – 14. I thought the task was very boring.
- **5** – 17. I thought the task was very interesting.
- **5** – 20. I would describe the task as very enjoyable.

Participant 1 has low scores in terms of confidence. In the data, it reflects he does not perceived himself to be good at the task and was not satisfied with his overall performance. But his score in the confidence subscale slightly improved based on the fact he felt competent after working on the task more.

CONFIDENCE SUBSCALE

- **2** – 04. I think I am pretty good at this task.
- **1** – 07. I think I did pretty well at this activity, compared to other students.
- **3** – 12. I am satisfied with my performance at this task.
- **1** – 16. I felt pretty skilled at this task.
- **3** – 22. After working at this task for a while, I felt pretty competent.

Participant 2

Based on the enjoyment subscale, participant 2 found the task very interesting. Although participant 2 felt the task was interesting, the score for enjoyment and fun was not as high compared to the former.

ENJOYMENT SUBSCALE

- **5** – 01. While I was working on the task I was thinking about how much I enjoyed it.
- **6** – 05. I found the task very interesting.
- **5** – 08. Doing the task was fun.
- **4** – 10. I enjoyed doing the task very much.
- **3** – 14. I thought the task was very boring.
- **6** – 17. I thought the task was very interesting.
- **4** – 20. I would describe the task as very enjoyable.

Participant 2 perceived his competence to be very skilled and was satisfied with his performance level. In the data shown, participant 2 felt more competent after working on his task. However, he felt it was somewhat true that he did pretty well compared to other students.

CONFIDENCE SUBSCALE

- **6** – 04. I think I am pretty good at this task.
- **4** – 07. I think I did pretty well at this activity, compared to other students.
- **5** – 12. I am satisfied with my performance at this task.
- **5** – 16. I felt pretty skilled at this task.
- **5** – 22. After working at this task for a while, I felt pretty competent.

Participant 3

For participant 3, he had varied scores in finding the task enjoyable, interesting, and fun. For example, on question 5, participant found the task very interesting, yet he also mentioned the task was boring. Based on the restriction of the enjoyment subscale, it cannot determine specific areas for which the participant felt about the tasks.

ENJOYMENT SUBSCALE

- **1 –** 01. While I was working on the task I was thinking about how much I enjoyed it.
- **6 –** 05. I found the task very interesting.
- **4 –** 08. Doing the task was fun
- **4 –** 10. I enjoyed doing the task very much.
- **6 –** 14. I thought the task was very boring.
- **5** – 17. I thought the task was very interesting.
- **5** – 20. I would describe the task as very enjoyable.

There was a sharp decrease in the confidence subscale for participant 3. Overall, he was strongly dissatisfied with his skill level in performing the tasks. Even though he was satisfied with his performance level, he perceived himself to be less skilled than other students and did not find improvement working at the task.

CONFIDENCE SUBSCALE

- **1** – 04. I think I am pretty good at this task.
- **1** – 07. I think I did pretty well at this activity, compared to other students.
- **6** – 12. I am satisfied with my performance at this task.
- **1** – 16. I felt pretty skilled at this task.
- **1** – 22. After working at this task for a while, I felt pretty competent.

Participant 4

Overall, participant 4 found the game somewhat fun, enjoyable, and interesting. The enjoyment subscale supports this claim by displaying a consistent scale rating of 3 and 4 amongst the interest, fun, and enjoyment level.

ENJOYMENT SUBSCALE

- 3 – 01. While I was working on the task I was thinking about how much I enjoyed it.
- 4 – 05. I found the task very interesting.
- 3 – 08. Doing the task was fun
- 4 – 10. I enjoyed doing the task very much.
- 3 – 14. I thought the task was very boring.
- 4 – 17. I thought the task was very interesting.
- 3 – 20. I would describe the task as very enjoyable.

In the confidence subscale, participant felt dissatisfied with her performance and skill level for the task. However, her confidence improved derived from the data that she felt more competent with her skills compared to others and after working on the task.

CONFIDENCE SUBSCALE

- **3** – 04. I think I am pretty good at this task.
- **4** – 07. I think I did pretty well at this activity, compared to other students.
- **3** – 12. I am satisfied with my performance at this task.
- **2** – 16. I felt pretty skilled at this task.
- **4** – 22. After working at this task for a while, I felt pretty competent.

Cued Recall Debriefing Results

Participant 1

He had no positive effects towards his gaming experience. He was indifferent with the song choice and graphics. He suggested his experience can be improved by gaming with a controller rather than a mat, since he mentioned the mat was difficult to play due to its material. He felt his enjoyment could be better if there was a balance between his skill and difficulty level. In terms of screen layout, the participant did not comment his concern for this specific area. These are the direct quotations found during the debriefing in terms of controller mapping and screen layout.

CONTROL MAPPING:

- "I'm more used to gaming with a controller, definitely, or a keyboard and a mouse."
- "The game is a bit hard when the mat is a little slippery… but I don't dance in general so."

SCREEN LAYOUT:

- "Graphics aren't bad, since this kind of game doesn't really need it. I'm more concerned about the music and whatnot."

Participant 2

The participant felt enjoyment and confidence through his successful results. He is indifferent with the music and the graphics, although he prefers music that is steady and upbeat. When it comes to the screen layout, the participant felt tensed and very concentrated when following the arrows on the screen. He also noted that he does not pay attention in having fun when it comes to overcoming his task. Even though the participant said he enjoys moving his feet and replicating real dancing on the mat, he still felt restricted by the control mapping of the dance pad because it offers step-by-step instructions in following arrows. These are the direct quotations found during the debriefing in terms of controller mapping and screen layout.

CONTROL MAPPING:

- "I feel like it's a lot of fun when you're on the mat, you're able to move your feet and replicate real dancing!"
- "Dancing on the mat feels a little more restricting. There's a lot of following the arrows and following specific steps, which kind of restricts my enjoyment and fun a bit."

SCREEN LAYOUT:

- "I was getting the song into my head and just really following it according to what the arrows were telling me."
- "The graphics were decent for a game of its kind on the platform that is."
- "I don't really pay attention to how much fun I have here, I was more into getting whatever I needed done."

Participant 3

The participant had very little enjoyment in the game, which only referred to the basic level he completed. He had no feelings in regards to the songs and graphics; however, he felt frustrated with the constraint of the mat and the difficulty levels. In pertinence to control mapping, the participant was indifferent in using the dance pad, since he felt he didn't need to step on too many things. But in the cued recall debriefing session, he preferred the controller. For the screen layout, he felt frustrated with too many arrows appearing on the screen. These are the direct quotations found during the debriefing in terms of controller mapping and screen layout.

CONTROL MAPPING:

- "I didn't have to step on too many things."
- "I'm just pressing here…"
- "The mat felt really weird, I like controller more."

SCREEN LAYOUT:

- "The graphics were really old…"
- "Too many things are coming up altogether!" <- this only happen when the game is getting really hard that ola wants to give up. Shouldn't take it too serious either.

Participant 4

Participant 4 enjoys dancing to upbeat music in general, but feels enjoyment through succeeding and beating the basic level. She felt the graphics were not bothersome and prefers more body movements. Her experience with the screen layout was proven to have a negative effect, she comments on being anxious of the various arrows that are coming onto the screen as well as to questioning where to start. For control mapping, she only thought the mat was restricting her freedom of movement. These are the direct quotations found during the debriefing in terms of controller mapping and screen layout.

CONTROL MAPPING:

- "It's a very constrained mat."

SCREEN LAYOUT:

- "The graphic is not bothering."
- "I didn't know where to start!"
- "I am so anxious… always up on my toes! Literally."
- (not sure about if this one belong here. as there is no direct indication about the screen layout <- True but I added these in since it refers to screen layout

Evaluation Method Comparison

Participant 1

Evaluator 1 and 2 found participant 1's highest number of affective experiences to be negative (7), followed by neutral (6 and 5), and no positive comments. From these findings, we can speculate that he did not enjoy playing the game. These negative responses are similar to the results of his IMI Questionnaire. In the questionnaire, he indicated that he did not feel he was good, skilled, or satisfied with his game performance. He experienced a sense of nervousness, tension, and anxiety.

Participant 2

Evaluator 1 and 2 found participant 2's highest number of affective experiences to be positive (6), followed by neutral (3), and negative (2 and 3). From these findings, we can speculate that he enjoyed playing the game. These positive responses are similar to the results of his IMI Questionnaire. In the questionnaire, he felt skilled, satisfied with his performance, and that he performed well. During the game session, we observed that he was just balancing on one foot on the easy level, which indicated that he did not find the easy level to be challenging.

Participant 3

Evaluator 3 and 4 found participant 3's highest number of affective experiences to be negative (7), followed by neutral (4), and positive (2). From these findings, we can speculate that he did not enjoy playing the game. These negative responses are similar to the results of his IMI Questionnaire. In the questionnaire, he strongly felt that he was not good at this game, did not perform well, and did not feel skilled with the game.

Participant 4

Evaluator 3 and 4 found participant 4's highest number of affective experiences to be negative (7 and 8), followed by positive (3 and 5), and neutral (2 and 1). From these findings, we can speculate that she did not enjoy playing the game. In the questionnaire, participant 3 felt very anxious while doing the task. During the cued-recall debrief, she mentioned that she felt anxious because she is always up on her toes. But felt more relieved when she succeeded in the game.

Questionnaire Issues

The issues with the questionnaire are that it only gathers general and surface-level data about the participant's interest/enjoyment on the task. The questionnaire is quite lengthy with twenty-two questions, and some of the questions are redundant and repetitive. For example:

04. I think I am pretty good at this task, and
07. I think I did pretty well at this activity, compared to other students.

10. I enjoyed doing the task very much, and
20. I would describe the task as very enjoyable.

The questionnaires do not contain any reasoning behind the participant's answers, which is hard for the evaluators to know why a participant felt the way they did. Out of the twenty-two statements, there were only six reverse scoring items. To make the results more reliable, there could be a balance between the positive and negative-keyed items.

Control Mapping Suggested Improvements

What works?

Reduplicating Dance Steps as a Workout

The usage of a mat as a game controller has increased the participant's “full body” engagement as the game’s spirit, which encourages them to move along with the display screen to achieve the replication of dancing steps. In the debrief session, when Participant 2 watched himself dance on the basic level, he mentioned that the mat helped him imitate real dancing experience. On the other hand, Participant 4 preferred the mat than a controller for physical exercising purposes because the dance pad simulates a work-out scenario when she dances to game.

What needs to be improved?

Limit the restriction brought by the existing dancing mat

Though the mat controller helps recreate the sense of dance steps, it does not create the sense of dancing. During the cued recall debrief, Participant 2 found dancing on the mat while following the arrows on the screen too restrictive. Especially on the more difficult levels, the restriction of the mats affected Participant 2’s enjoyment of the game.

The feet-eye coordination between the dance mat and the display screen is another challenge in DDR. During the play session, Participant 3 mentioned that he had to keep shifting his attention between the mat and the screen to ensure he was placing his foot on the correct step. For inexperienced DDR players, Participant 1 and 3 often missed the correct step or stepped outside of the mat. Because of this, both participants missed a lot of the arrows and felt defeated by the game as they failed to complete the level. For more experienced DDR players like Participant 2 and 4, they had to look at the mat before starting the game to recall where each of the steps were located. Thus, the adjustment of the feet-eye coordination between the dance mat and the screen would improve player’s enjoyment.

Materiality

In both Participant’s 3 and 4 debrief sessions, they stated how the material of the mat was distracting them from concentrating on the game. Participant 1 felt it was ‘hard’ to dance due to the mat being slippery as Participant 3 also felt the mat was ‘weird’ and somehow distracting. During the game play session, Participant 3 swiped his feet even though there was no move to be required on the screen.

To improve the controller mapping experience, creating a larger mat controller or using other tracking technology might be better for an immersive experience rather than the current design provides. If the dance pad is larger in size, it could provide the player more room to replicate the dance moves on the screen. Whereas, if the other motion tracking technology was used such as Kinect for Xbox One by Microsoft, it can bridge a gap in feedback between the participant and the game. Otherwise, when redesigning the mat controller, the choice of materials needs to be essential. The possible materials should be fabricated mats that are used for yoga and gymnastic equipment to provide non-slippery properties. Furthermore, the dance pad can be designed with elevated and grooved textures on the arrow keys to indicate feedback when they are pushed and to allow traction for participants to step on.

Screen Layout Suggested Improvements

What works?

Gameplay Atmosphere

Dance Dance Revolution (DDR) screen layout contains four parts: a health bar, arrows that indicate dancing steps, system comments and background animation. It successfully creates an immersive game environment for players and draws their full attention during the play. Refer to our participant debrief session, all players acknowledged that they were completely concentrating playing the game.

What needs to be improved?

Simplify the screen design layout and provide better visual feedback

Although the screen layout helps to create an immersive experience for the players, the complex layout causes confusion and delays players' reaction. Recalling participant comments during the play session, participant 4 missed a few steps at the beginning of the game because she did not know when to begin stepping on the keys. Participant 3 mentioned that there were too many prompts showing on the screen at the same time, which caused confusion.

Graphic Simplification

The arrows are located on the left side of the screen during the single player game. The player's attention shifts to the left of the screen, which makes it difficult for them to focus while completing dance steps. As well, all of the participants mentioned in the debriefing that they were fully concentrated on the arrows and their dancing steps. However, as mentioned before, Participant 4 had trouble at the beginning of the game due to her confusion of when to start the game.

Centering the arrows on the screen would help increase players' interest and allow them to concentrate during the gameplay and improve their performance. Arrows can be easier to recognize by making all of the arrows have the same colour and adding more space between each arrow. This would help the player to better recognize the symbols and reduce their frustration. In addition, making the arrows glow read when players are about to die would increase the player's awareness of their health value.

Visual feedback on comments and health bar

System comments (marvelous and boo!) are directly displayed on the top of the arrow keys. They cause distraction to players by covering the current playing arrows and blocking the upcoming arrows. Also, the health bar is not distinct, as it is blended into the background and most of our participants did not realize their health value.

System comments could be displayed on the side of the screen to reduce distraction. Designing the health bar with a glowing effect would make it more explicit on the screen. It helps the player to recognize and become aware of their health value during the play.

Conclusion

As a team, we examined four participant's emotional and affective experiences by evaluating Dance Dance Revolution (DDR), a "full body" immersion game used in our field study. According to our experiment, we can draw a conclusion based on our intrinsic motivation inventory/enjoyment questionnaire and the cued recall debrief. Players' emotional and affective responses were directly affected to the controller mapping and were less affected by the screen layout.