IAT 432 - Field Study of Warioware: Smooth Moves

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1. Introduction

A field study of the game Warioware: Smooth Moves was performed to determine how the controller mapping and screen layout influence enjoyment and fun when playing the game. Four people were chosen to participate in the study and two methods were implemented, the intrinsic motivation inventory/enjoyment questionnaire and cued debrief recall. These methods were chosen because of their differences in approach which assist in confirming findings. The importance of this study is to determine if there are any control mapping issues or screen layout issues in the game and determine some suggestions to help improve the game and its enjoyability.

2. Description of the Study

2.1 Participants

Participants age ranged from 16 to 23. All four participants had prior experience with the Wii console, although not everyone had played the Warioware game before.

2.2 Video game: *Warioware: Smooth Moves*

Warioware: Smooth Moves is a Wii game that has players complete many short 'microgames' in succession. These microgames are generally compiled in groups in a structure akin to a standard game's "levels". As the game progresses, new levels, or collections of microgames, are unlocked, offering new styles of play, thematic elements, and new difficulty. While playing, every microgame is prepended by a simple diagram specifying how the Wii Remote should be held or positioned for playing the activity that is about to begin. The players are then presented with the scene and a verb based prompt that is used to infer the goal and the correct motion to take to win the microgame. Players can continue to play each level's microgames for as long as they have not lost all of their lives, one of which is lost each instance they fail to complete a microgame successfully. The longer you play a level, the more difficult and fast paced the presented microgames become.

2.3 Methodology

For this Field study, participants were invited to a home to play Warioware. They were given five minutes to learn to play the game and familiarize themselves with the controls. Two methods were utilized for this field study, an intrinsic motivation inventory/enjoyment questionnaire and cued debrief recall. These methods were utilized in order to gain an understanding of the enjoyment levels created by playing the game and to recognize areas for improvement in the screen and controller mapping. Participants were given the opportunity to try out the game and play one level before playing the level selected for the study. The screen was recorded while participants played the game for the cued debrief recall. After completing the questionnaire, participants were asked to recall what they were

thinking and how they were feeling when playing the game. They were recorded while they did the cued debrief recall. Excel was used for some of the analysis of the outcomes.

Intrinsic Motivation Inventory (IMI)/Enjoyment Questionnaire

The intrinsic motivation inventory/enjoyment questionnaire was deployed after participants finished playing the game. The purpose of the questionnaire was to determine the levels of participants' interest or enjoyment, perceived choice, perceived competence and pressure or tension when they were playing the game. The questionnaire had 22 questions, participants were asked to respond to each question and rate from 1 (not true) to 7 (very true).

The following questions corresponded to each area.

Interest/enjoyment: 1, 5, 8, 10, 14(R), 17, 20
Perceived competence: 4, 7, 12, 16, 22
Perceived choice: 3, 11(R), 15, 19(R), 21(R)
Pressure/tension: 2(R), 6, 9(R), 13, 18

This method allowed us to assess our participants experience and comfort levels.

Cued Debrief Recall

Participants screens were recorded while they played the game for five minutes. After finishing the questionnaire, they were asked to watch the video of their screen and discuss their experiences, how they felt and thought when they were playing. While they commented on the video, they were recorded for analysis. The video recording was later transcribed and then analyzed by two raters. By transcribing the text, it made it easier to isolate different comments for analysis. Each sentence was analyzed and highlighted, red represented negative comments, yellow neutral and green positive. We also took note of any comments made by participants directly related to the screen and controls mapping. Eight videos in total were created during the process.

## 2.4 Challenges and suggested improvements of methods

Overall the IMI/Enjoyment questionnaire method isn't the strongest on its own, however in conjunction with the cued debrief method it was useful when comparing the data we had collected. We found that there were instances when some of the responses in the questionnaire were contradictory, which made it difficult to interpret. However,

The cued debrief method also had it's own issues as you relied on the text and facial expressions of participants to gauge if the responses were positive or not, which was not always reliable. The ability to see participants expressions could also be considered an advantage of the method. However, some participants had a tendency to laugh when discussing their videos, which made it difficult to determine if they were being truthful in their responses or just were uncomfortable discussing their feelings. Participants also had difficulty talking about their thoughts and had to be reminded to speak.

In the future, we would consider introducing some additional questions to the questionnaire to provide a more detailed understanding as the questions were a little too general to capture certain aspects of Warioware. Also, as investigators we could have been more forward when asking participants to think aloud as we potentially missed out on some important data by not pushing a little bit more.

3. Results and Analysis

3.1 Intrinsic Motivation Inventory (IMI) /Enjoyment questionnaire
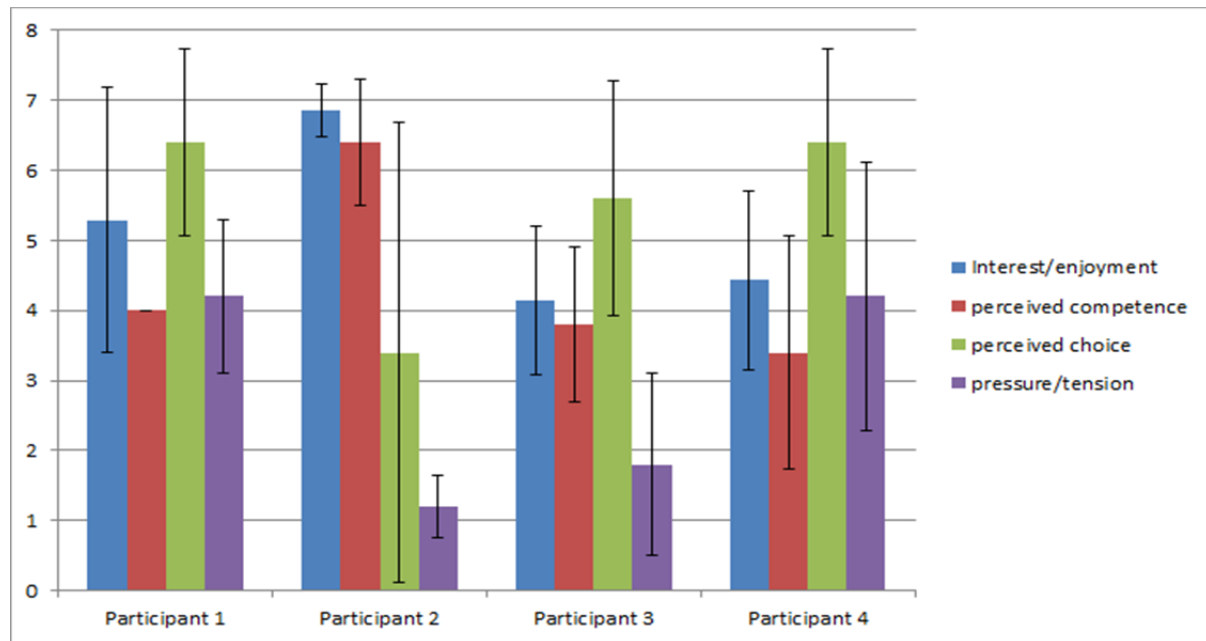
For the most part, interest and enjoyment remained slightly above moderate among all four participants. Similar statistics can be found amongst the perceived confidence of our four participants, which never differ more than one and a half points with the perceived interest and enjoyment. This indicates that the enjoyment any one user experiences may be tied directly to how they feel they can complete the tasks given to them. The better they perform, the more enjoyment they experience. However, this close tie between enjoyment and competence could indicate that control mapping and screen layout, among other factors that can affect gameplay performance, will also have a strong influence on whether or not a user will enjoy the game.

The results among the two subscales, although closely related, follow a pattern of enjoyment scoring higher than competence among all testers. This implies that users may not feel too skilled at the game, they are still having a good time in general, and this could point to other factors at play in game, such as funny aesthetics.

In almost all situations the perceived choice scored high amongst participants. This could be the result of playing a motion based game in which the amount of ways a user can interact with the game system are many, and this perceived control could have resulted in these results. In the case of Participant 2, the inverse seems to be the case. Choice is rated as low, while competence and enjoyment are rated as high. This may indicate recognizing the minigame variety limited and linear, with skill being a larger factor than the freedom to perform.

Pressure and tension between participants seems to fluctuate heavily between two different experiences, participants one and four report moderate levels of stress or tension, whilst participants two and three report low levels of stress. This may indicate a relationship between experience within similar games, and the amount of stress experienced by the user. For example, Participant 2 reports the highest level of competence among users, as well as the least amount of stress.

3.2 Cued recall debriefing

Universally, the majority of complaints that occurred in our recall debriefing sessions referred to the controls. The controls were either found to be too difficult, or required an excess amount of effort to perform, or was considered generally uninteresting by the user. The dumbbell and mohawk controls were seen as the most difficult amongst the users, specifically in the case of the dumbbell control. We speculate this may be caused by the Wii sensor bar possibly losing track of the participants during the minigames.

The complaints related to controls often related to awkward positioning of the controls during a particular action that may not exactly map in the expected way to a particular task. For example, in one mini game, the player had to hold the Wii Remote as a dumbbell, and use it to place a platter top over a moving target. The motion was unfamiliar however, and the instructions were mentioned to be too vague, so many participants ended up initially struggling with this task.

The controls with the highest amount of positive remarks, janitor and mohawk, were of remarked as "simple" and "fun" respectively. The users also found the mini games related to janitor to be amusing, or cute, which could have affected the score. Although the users found the Mohawk to be awkward sometimes, the activities involved with them were often fun.
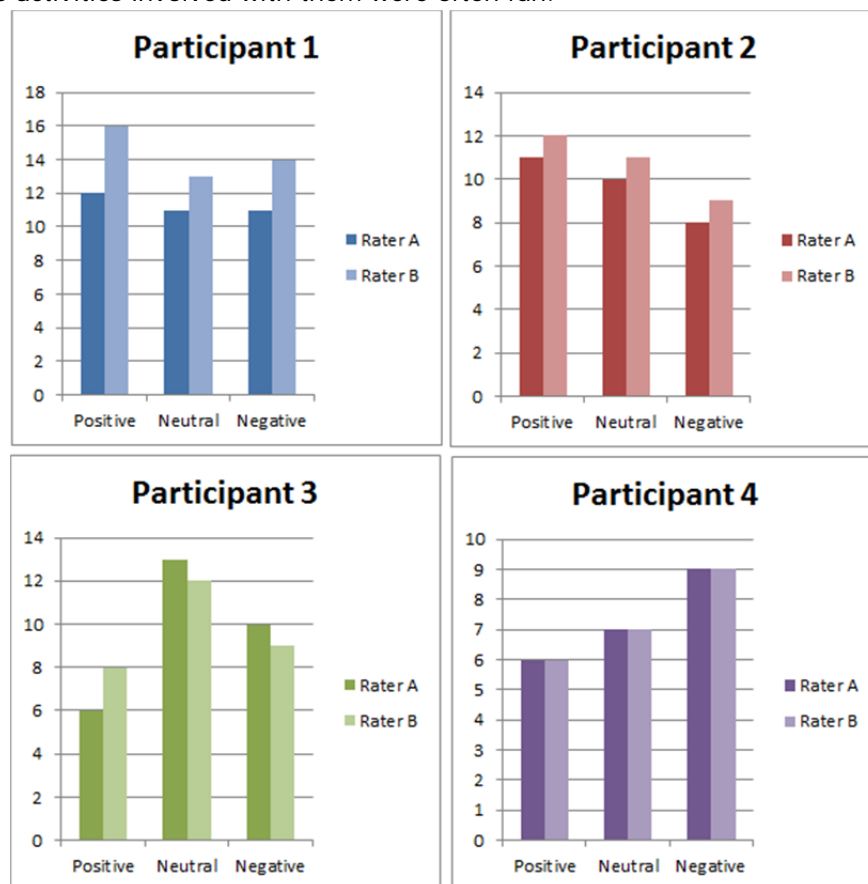

Ratings of participant feedback during cued debrief sessions.
Correlation between evaluators all had R values of > 0.9

Number of Related Complaints per Control Type
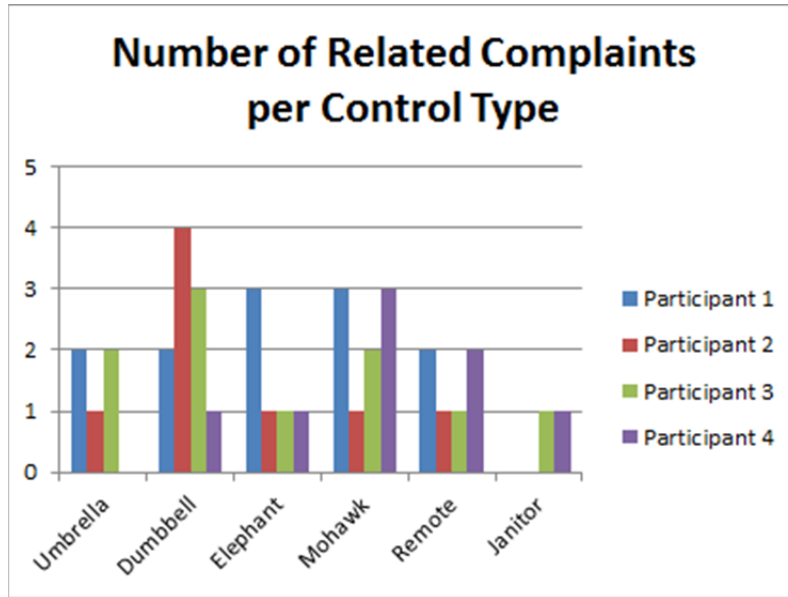
Note: Only participant 1 encountered the elephant control style more than once. All other control styles were approximately evenly encountered among participants.
Nearly all complaints by participants related to confusion about the controls, controls that were difficult or required excess effort, or an uninteresting control.

Number of Related Positive Comments per Control Type
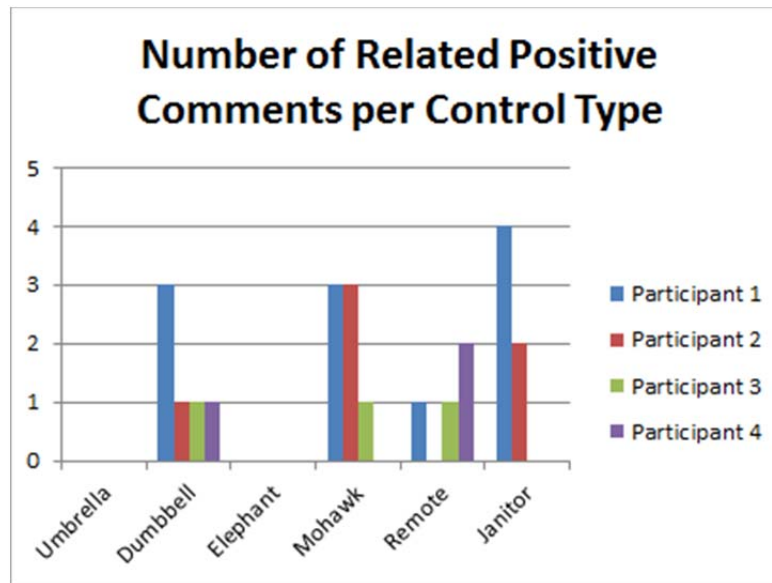
The majority of positive comments from participants 2,3, and 4 focused on game aesthetics and concepts rather than on satisfying or enjoyable control.

3.3 Method outcome comparison

There is a correlation between the amount of perceived competence and the amount of negative responses found in the cued recall debrief videos. Participants with lower amounts of perceived competence often had more negative things to say about the game. Normally such comments ranging from "I'm not quite sure what I need to do" to "these controls are too difficult". Of course the reverse was true in regards to participants with a higher level of competence. As mentioned earlier, the

relationship between enjoyment and competence directly relates to each other, and consequently higher reports of enjoyment and competence results in more positive comments during debrief.

Despite varying levels of competence and stress experienced by the participants, the controls remained a constant complaint. Being either too difficult, or unresponsive, or just enjoyable. However despite this, Mohawk, despite being the second most complained about control layout, also resulted in being the control scheme with the second highest amount of positive comments; often times in equal measure from the same participant. This suggests that although the controller may seem awkward to some participants, they find the activities they are using it in to be enjoyable.

Another inconsistency would be the amount of stress and tension reported by the participants in relation to the amount of positive versus negative experiences reported by the users. Despite two users in particular reporting higher amounts of stress or tension, the amount of negative comments remains unaffected, as well as the amount of complaints in relation to controls.

The amount of perceived choice reported by the participants seemed to correlate with how positive the controls were perceived. For example, in the case of Participant 2, who reported markedly less perceived choice than the other participants, described her experience with the controls for the most part negatively, rather than positively. This could be caused by a perceived limitation in controls being caused by poor controller mapping. Other participants that reported much higher amounts of perceived choice were more likely to respond positively to the controls, indicating that the more well designed a control scheme is, the more the user feels free to act within a digital environment.

4. Discussion

4.1 Controller-Mapping

Areas for improvement

The controller mapping for the latter half of the boss minigame was criticized by all 4 participants. While participants 2, 3, and 4 had a greater number of negative complaints on other control formats, the fact that they all complained about the one instance of the 'elephant' style control scheme they encountered suggests it is one of the weaker controls in the game. Complaints seemed to center around difficulty in aiming and in receiving feedback on whether they were in fact performing the control correctly. Some complaints on the 'remote control' style also focused on aiming feedback difficulty. Ways to improve this would likely require more responsive hardware that did not as easily lose track of screen position, but simply giving a longer adjustment time with calibration feedback when changing to this control style would likely help significantly.

The dumbbell style control was unique in that although it received the greatest number of complaints, it was also the control style in use during in a large number of neutral comments and positive aesthetic feedback. Looking at the specific instances, the control seemed best suited to being manipulated upwards like an actual dumbbell, while most complaints arose when requiring rotation of the controller in this position. To improve this control style, microgames could be adjusted to focus on the former motion when possible.

The mohawk received the second highest number of complaints, although the majority of these related to participants not being willing to put in the effort or feeling awkward holding the controller in this position, rather than any difficulties in functionality. This could be adjusted, but as a party game, it was witnessed in the field study (although unfortunately not formally recorded) that participants

found such control styles quite enjoyable to watch other players perform. This suggests to us that as the control is technically quite functional, it is not a problem to leave as is, as it still produces enjoyment.

Positive aspects of control mapping

Although, there were many controls that may have been criticized, many microgames were found to be simple and participants completed them with ease. Suggesting there may be a good variety to even out some of the more difficult microgames. Also, some of the control issues may have been a result of the console set up and the positioning of participants in relation to the sensor bar in the room.

The control styles that received the least complaints were the Janitor and Umbrella positions. These positions were relatively simple and had consistent motions across microgames. Neither required an awkward bodily position nor the ability to aim at specific locations on the screen. This simplicity likely led to their status as the controls least likely to interfere with enjoyment and in some cases created situations of positive reinforcement.

Another element of the control mapping design that works well is the use of the A button to perform actions when required, although rare. Most users were able to grasp the concept of using the prominent button on the controller to perform an action, such as shooting in the boss minigame, to complement a motion based aiming or positioning, regardless of how effective their aiming capacity happened to be.

4.2 Screen Layout

Instruction visibility
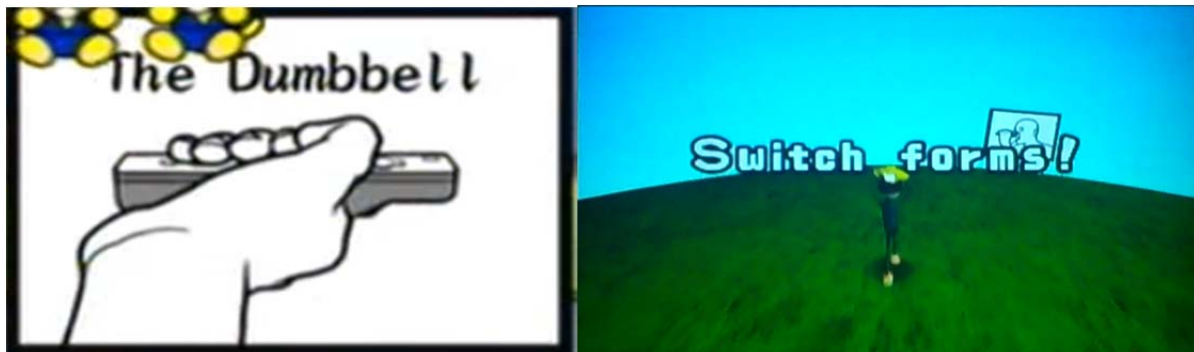
Each microgame would have an infographic with a descriptive word, demonstrating the controls needed to successfully complete the microgame. Participants often noted that the instructions were visible, which is a positive of the screens layout. However, some infographics and instructions were not as indepth and the actions associated with them were not communicated, most notable was the transition between two actions in the boss portion of the level. Participant 1 commented that "the form switch [], in this one, made it very difficult" to successfully shoot which indicates that even though participants were aware of the switch they found it challenging to adjust to the next task of shooting bananas. Many participants commented negatively on this particular portion of the level saying it was unexpected.

The visuals were stimulating. However, in the boss portion of the level, unlike the other micro games, the information graphic was not as visible and instead there was emphasis on the text, "switch forms!" It is recommended, by emphasizing the information graphic it might improve players comfort with the transition while retaining some of the challenge needed to have a successful boss event as well as being consistent with the rest of the game as some participants commented they had missed the instruction for the action.

Connection between screen and controls

The animation in some microgames affected the success and outcome of the game. Many of the animations were enjoyed by participants resulting in laughing, smiling and positive comments however, there were times that some participants did not associate the animation with a control even though they had successfully completed a similar microgame before. For example, there was a UFO game that had a shadow in which participants needed to capture a tv, they didn't make the connection and often commented that they didn't know what to do in the microgame. This is unlike the umbrella game where they figured out that the shadow of the umbrella protected the girl, with one participant even commenting "I'm curious what would happen if she got in the sun *laughs*." Participant 2 also noted that they made the connection after failing the UFO microgame, but that they took too long to complete it.

This confusion may also arise from the same control scheme being implemented in different ways across microgames. While the activities using the 'remote control' style that displayed a 2-dimensional cursor were generally well received, the UFO activity that incorporated a third depth dimension with the same control style was not immediately apparent.

It is suggested that similar microgames be re-tested and check that the associated information graphics, text and gestures work well with mini-games animation and visuals.

5. Conclusion

Overall, the study was successful when determining if the game was enjoyable and locating any issues in controller mapping and screen layout. By utilizing the two methods, IMI/Enjoyment questionnaire and the cued recall debriefing, we were able to determine some of the main concerns with the game and positive aspects of the game, they also allowed us to compare the outcomes in regards to enjoyment. Our main findings included issues with feedback from the controls, that the instructions, although usually well displayed, at times were inconsistent creating confusion, and animations or controls not always working effectively with the action description associated. However, even with some issues in screen layout and controls, participants still had a generally positive enjoyment rating often overlooking the fact that some of the microgames did not work that well, this also was likely due

in part to the variety of different microgames difficulty levels, as well as enjoyment from the game's aesthetics. From the IMI questionnaire we noted that the sole participant whose net debrief ranked negative also showed the highest self reported levels of pressure and low competence. This suggests that extraneous factors such as general video game ability or experience may be partially responsible for the disparity in enjoyment with the other users. In future studies, we hope to analyse the how experienced gamers interact and respond to the control layout and screen layout as opposed to novice players, and their positive and negative reactions. This was an area that was not explored much during the testing, and could have possibly affected the results; we feel that learning more about such differences can only result in more useful information.

Appendix 1: Raw Data

-All raw data is attached in separate files with this submission.

Appendix 2: Video

Available at http://youtu.be/kNR5OtmsYdk
Source recordings will be available here
https://www.dropbox.com/sh/x0kwqt3ddvxj3e8/bRHGisJLWb/432