Development of Instruments to Measure ImmerseAbility of Individuals and ImmersiveNess of Video Games

Kent L. Norman
Department of Psychology, University of Maryland, College Park, MD
Contact: knorman@umd.edu

ABSTRACT
Two instruments were developed to assess the extent to which individuals can become immersed in different activities (IAI, ImmerseAbility of Individuals) and the extent to which video games create a sense of presence (ING, ImmersiveNess of Games). Participants in a laboratory study filled out a demographic questionnaire about themselves and then the first survey on ImmerseAbility of Individuals (IAI). They were then asked to play a video game for about 15 to 30 minutes, after which they filled out the second survey on ImmersiveNess of Games (ING). A wide variety of games were sampled to generate sufficient variability in the ING ratings. Games ranged from Internet flash games and Facebook™ games in computer web browsers to console games on the XBox 360™, Nintendo Wii™, and PlayStation 3™ projected on a 4 by 6 foot display. Factor analyses identified both positive and negative attributes of individuals and of games that correlated with the sense of presence in a video game. In play testing games, the IAI factors can be used to control for individual differences among testers while the ING factors can be used to evaluate the video game.

INTRODUCTION
When we are involved in sustained interactions with computer tasks in general or video games in particular, we often feel a sense of immersion or presence (Barfield & Weghorst, 1993; Brown & Cairns, 2004; McMahan, 2003). The extent to which this happens is a function of both player characteristics (i.e., individual differences) and game characteristics (i.e., stimulus-response factors).

Games vary along a number of factors. One of them has to do with the extent to which the game draws the player into the game space to create a sense of “presence.” The exact definitions of “presence” and “immersion” have been the subject of considerable discussion. The term “presence” was originally used in the context of tele-operations (McMahan, 2003) and consequently relies heavily on the metaphor of transportation between locations. In the context of video games, “immersion” refers more to the mental processes involved in game play. But since game play involves teleportation into and within virtual worlds in which one is thinking, problem solving, and imagining things, either term seems appropriate.

McMahan (2003) lists three conditions necessary to create a sense of immersion in video games. (a) The conventions of the game must match the user’s expectations (b) There must be meaningful things for the player to do. (c) There must be a consistent game world.

There are also perquisites for immersion. One must know the game interface, how to use the controller, and how to interpret the output of the game display (Talyor, 2002). To the extent that these are a problem, immersion will be limited.
It is expected that familiarity and experience will interact with immersion. According to Grodal (2005) a player must have developed certain skills, both motor and cognitive, in order to engage in game play. As the player progresses from unfamiliarity to familiarity the sense of immersion will increase.

In a prior attempt to understand the dimensions of immersion, Ermi & Mäyrä (2003) interviewed Finnish children as they actively played video games with their parents watching. They identified three components that made for attractive games: (a) the audiovisual quality of the game, (b) the level of challenge of the game, and (c) the imaginary world and fantasy of the game. Based on this, Ermi & Mäyrä (2005) developed a three component model of immersion involving (a) sensory immersion relating to the graphic quality, size of screen, three-dimensional visual, and auditory experiences; (b) challenge-based immersion relating to the satisfying balance of challenges and abilities, problem solving, and strategic thinking; and (c) imaginative immersion relating to the fantasy of the game and identification with characters. Starting from a 30-item questionnaire, using an exploratory factor analysis, Ermi and Mäyrä developed an 18-item questionnaire that assessed these three dimensions. They selected 13 different games and had the participants rate one game on their scales. The three factors seemed to vary meaningfully among the games. Unfortunately, almost all of the participants were male and they have not published the scales.

Other factors of immersion have also been discussed such as cognitive immersion being the mental involvement in problem solving, thinking, and fantasy as opposed to visceral immersion being the physical, gut level involvement in the game.

People also vary substantially in their tendency to become immersed in different activities from work to play and from thinking to daydreaming and entertainment such as movies, sports, and video games. People also vary in terms of their abilities to focus attention and to maintain awareness of the real world around them. Witmer and Singer (1998) working in the area of simulator training and simulator fidelity proposed that both individual differences in the tendency to become immersed and the aspects of the simulator environment that create a sense of presence need to be measured.

In the present study, two instruments were developed to assess the ImmerseAbility of Individuals (IAI) and the ImmerseNess of Games (ING). These instruments were adapted from similar instruments developed by Witmer and Singer (1998) for military simulators.

The study was conducted in the laboratory to allow better control of the tasks, monitoring of the study, and evaluation of the procedures before going online. In addition, it allowed the task administrator to, in most cases, choose from among a wide variety of games that varied on platform (e.g., web browser on a personal computer versus a console game with large display), genre (e.g., first person shooter, sports, racing), and graphic realism (from Mario Kart to Heavy Rain).

METHOD
Participants
Participants (n = 176) were recruited from the undergraduate subject pool in the Department of Psychology at the University of Maryland. The Participants ranged in age from 19 to 31 with a mean of 20.8 and a mode of 19 with 61 percent being male and 39 percent female.

Procedure
After signing a consent form, participants filled out a demographic questionnaire (e.g., age, gender, gaming experience) as shown in Appendix 1 and the 30-item IAI questionnaire about themselves as shown in Appendix 2. Next
they played a video game that lasted from 15 to 30 minutes and then filled out the 31-item ING questionnaire as shown in Appendix 3 about the game that they played. In a number of cases, these were two player games. All questionnaires were completed in a web browser window on a flat panel monitor to the right of an iMac computer used in some cases for game playing. The video games varied widely from simple web browser games displayed on the iMac 17-inch screen, to games played on one of three gaming consoles and projected on a 4x6 foot screen in a dimly lit room. The three gaming consoles used were the XBox 360, the PlayStation 3, and the Nintendo Wii. A task administrator set up the game, recorded the name of the game, and recorded the length of the game play.

RESULTS

Demographic Survey
The majority of participants were Caucasian (69%), followed by Asian (15%) and African American (8%). The most frequently used gaming platform by the participants was the PC (57%), followed by Web browsers (54%), cell phones (53%), the Xbox (41%), the PlayStation (24%), the Nintendo Wii (16%), and the Nintendo DSi (6%). Other platforms were negligible as shown in Figure 1.

Participants played a wide range of genres of games as shown in Figure 2 with action, racing, fighting, and sports leading the pack. Participants also varied greatly in amount of game playing reported. Twenty-five percent reported that they played zero hours a day, 29% a half an hour a day, 26% one hour a day, 12% two hours a day, 7% three hours a day, and 1% over three hours a day. The typical length of a session was between 15 and 60 minutes with one to two sessions a day. Overall, the average length of game play per day can be estimated at one hour. When asked how they would classify themselves, 12% reported that they did not play games, 38% as casual gamers, 22% as moderate gamers, 23% as moderate to heavy gamers, 4% as heavy gamers, and less than 1% as hardcore gamers. When asked about others they knew that might be a moderate to hardcore gamer, the most frequently checked was a close friend (60%), second were siblings (39%), other relatives (24%), roommates (21%), significant others (18%), and parents (6%).

ImmerseAbility Questionnaire
An exploratory factor analysis was used to identify seven factors of ImmerseAbility of Individuals with Cronbach’s Alpha = .75. Four items were problematic and dropped from the
analysis (1, 8, 9, and 24). The seven IAI Factors are shown in Figure 3. Four of the factors had to do with susceptibilities to get immersed in (a) daydreaming, (b) media such as movies and television, (c) video games, and (d) sports. The other three factors had to do with abilities to control immersion by (a) dual tasking, (b) focusing attention, and (c) maintaining alertness to the real world.

**ImmersiveNess Questionnaire**

An exploratory factor analysis was used to identify 6 factors of ImmersiveNess of Games with Cronbach’s Alpha = .93. The six ING Factors are shown in Figure 4. The first four pertain to positive factors of visual presence, audio presence, sensory engagement and sense of control. The last two are negative factors that have to with awareness of the interface and awareness of the world around the game.

**Relationship of Factor Variates with Gamer Demographics**

A MANOVA was conducted on gender using the factor variates as dependent measures. The overall MANOVA was significant (p < .001) as well as the univariate tests for Media involvement (p < .01, Mean for high gamers = -.242; Mean for low gamers = .242), Game involvement (p = .001, for high gamers = .373; Mean for low gamers = -.373), and Sports involvement (p = .01, Mean for high gamers = .192; Mean for low gamers = -.192). These effects are shown in the bottom panel of Figure 5. Interestingly, when gender is covaried
out, only Game involvement was significant (p < .001).

**Relationship of Factor Variates with Game Characteristics**

MANOVA’s were conducted on gender and gamer type using the ING factor variates as dependent measures, but neither was significant (p > .05), indicating that game characteristics were not affected by player characteristics. However, a MANOVA on screen size (computer games on a 17 inch screen versus console games on a 4x6 foot projected display) on the ING Factor Variates was significant (p < .01) as well as the univariate tests for Visual Presence (p < .01, Mean for console = -.142, Mean for monitor = .487) and for Sensory Engagement (p = .05, Mean for console = .096, Mean for monitor = -.300).

Familiarity with the game was correlated with liking of the game (r = .66, p < .001). Familiarity was also correlated with the Factor Variate of Control (r = .20, p = .02).

Participants tended to be less familiar with the console games than with the games on the computer (r = -.280, p < .001). Participants

---

**Figure 5** – Factor Variate Means as a Function of Gender and Gamer Type.
tended to like games that were easier ($r = .473, p < .001$).

**Analysis of Two Games**

A number of the games played had multiple data points. Averages of the ING factors were calculated for datasets with $n > 4$. Mean values of ING factors appeared to correspond to the game characteristics. Two video games had sufficient data to evaluate them in terms of the ING factors. Wii Sports ($n = 22$) is shown in the top panel of Figure 6 and Call of Duty: Modern Warfare ($n = 18$) is shown in the bottom. These results will be further discussed below.

**DISCUSSION**

Starting from the surveys on immersion and presence developed by Witmer and Singer (1998) for military simulators, the present study investigated both the personality factors of ImmerseAbility of Individuals (IAI) and the video game factors of ImmersiveNess of Games (ING). Both the IAI and ING instruments

---

**Figure 6** – Factor Variate Means for Wii Sports (Top Panel) and for Call of Duty: Modern Warfare (Bottom Panel).
appeared to be reliable and to have external validity.

As anticipated from previous theory and research, the positive IAI factors had to do with involvement in daydreaming and different forms of entertainment.

**Daydreaming.** The tendency to drift off into daydreaming makes one susceptible to immersion in video games. This factor could be related particularly to involvement in fantasy games, role playing games, and identification with video game characters. While males and moderate gamers tended to be higher on daydreaming than females and casual gamers, the difference was not significant.

**Media Involvement.** The tendency to become absorbed in watching a movie or a television show makes one susceptible to video game immersion. Many video games today are like films, they include animated cut-scenes and have a graphic rendering with HDTV quality.

**Video Game Involvement.** While somewhat circular, the tendency to like and play video games predicts the extent to which someone will again become immersed in a video game. Past tendencies are highly predictive of future behavior.

**Sports Involvement.** The tendency to become immersed as a spectator or player of sports makes one susceptible to video game immersion. Many video games involve both watching sports and playing sports such as Madden, Fifa, and Grid.

Three of the IAI factors were negative in that they tended to mitigate immersion in video games.

**Ability to Dual-Task.** People who can or at least think that they can dual task are less likely to become immersed in video games. Males tended to be higher on this factor than females and high gamers than low gamers although the latter difference was not significant.

**Ability to Focus Attention.** The ability to focus or control one’s attention makes one less susceptible to video game immersion. There was no difference between males and females on this factor or between low and high gamers.

**Ability to Maintain Alertness.** The ability to stay alert and aware of one’s physical surrounds reduces one’s susceptibility to video game immersion.

It is interesting that these last three factors are positive in terms of cognitive abilities, but negative in terms of video game immersion.

Game designers have no control over these factors of the ImmerseAbility of Individuals (IAI) other than targeting different games to different markets of individuals. Obviously, one would target sports games to individuals high on the Sports Involvement factor and narrative games to those high on Media Involvement. But it is not clear what to do with the negative factors.

On the other hand, game designers have direct control over the factors of ImmersiveNess of Games (ING). These factors pertain to aspects of the game.

**Visual Presence.** Games that convey a sense of visual presence tend to be immersive. Graphic realism, 3-d rendering, and animation of characters help a game to be immersive. Needless to say, the game industry knows this and has invested heavily in making games that convey visual presence.

**Auditory Presence.** The auditory environment in a game is much more than beeps and gunshots today. Game developers worked hard to create realistic, 3-d surround sound output for their games. The auditory presence includes the feedback and responsiveness of sound. Games can be surprisingly immersive with high quality sound systems and faithful audio rendering.

**Sensory Engagement.** This factor pertains to the unique way in which the senses work together to
engage a person in the game and to interconnectedness of the visual and auditory feedback from the game.

**Sense of Control.** This factor has to do with the feeling that one is in control of views and actions in the game. What the player intends to do is conveyed through the game interface and results in the expected outcomes.

There are two ING factors that are negative and work against video game immersion.

**Awareness of the Interface.** If one has to think about the interface, what buttons to press, what commands to select, what icons and displays mean what, immersion is lost. Game designers have to carefully craft the use of the game controller and information displays on the screen. Of course, with more and more practice and familiarity with a game, these can be well learned and immersion will increase. However, the challenge for game designers is to use interfaces that are intuitive and easy to learn.

**Awareness of the Real World.** This last factor has more to do with the gaming environment than the game itself. If one can shut out outside distractions, immersion can be increased. Uninterruptible times and rooms without distractions are necessary to guarantee immersion.

The relationship of IAI factors with gender and gamer type helped to validate the meaningfulness of some of the factors and the relationship of some ING factors with size of display helped to validate those. Furthermore, the analysis of particular video games further supported the validity of the factors. For example, Figure 6 shows the results for two games.

For Wii Sports, Sensory Presence, Sensory Engagement, and Sense of Control were low. Players tend to complain about the animation and the initial difficulty using the Wii Remotes to control their movements. Audio Presence is somewhat positive but also Awareness of the Interface and particularly Awareness of the Real World. The latter was very high, probably owing to the fact that other players are in the room, and one has to be conscious of hitting other players or objects.

For Call of Duty, Visual Presence was low. While surprising, this could be because the visual environment of the game is hostile, uninviting, and distracting. Sense of Control was somewhat low, probably due to riskiness of the combat situation and the difficulty of aiming and firing in a first person shooter game. On the other hand, Audio Presence and Sensory Engagement were high. Awareness of the Interface was fairly low probably because most of the players of this game were fairly experienced. Like other multiplayer games, Awareness of the Real World was positive again due to the fact that typically there were other players in the room interacting with each other.

**Future Work**

A second study is currently underway to collect a larger sample on the Internet. This sample will no doubt have a larger range of age, gaming experience, and variety of video games played and rated. In this case, a confirmatory factor analysis will be used.

Finally, it is anticipated that the ING instrument will be used to assess the immersiveness of video games and virtual environments. The IAI will be used to covary out individual differences among gamers. The idea is that some individuals will be susceptible to video game immersion and others will not. Knowing who is and who is not susceptible will help in forming the panel of gamers used to evaluate any particular game in the future.

**ACKNOWLEDGEMENTS**

This study was partially funded through a teaching grant from the Center for Teaching Excellence, University of Maryland. Special thanks are given to the students in Psyc 445,
“The Psychology of Video Games and Entertainment” for their assistance in this study.

REFERENCES


Appendix A: Demographics Survey

Survey on Video Games

Section 1: Demographic Information

1. In what year were you born: (yyyy)

2. Gender: Female Male

3. Racial/Ethnic Identity (Check all that apply):
   - African American
   - Asian American
   - Caucasian
   - Hispanic
   - Native American
   - Other:

4. Current Situation:
   - Student:
     - College Undergraduate
     - Graduate Student
   - Employed:
     - Job Title/Position:
     - Other:

5. On average, how many hours a day do you spend on a web browser (e.g., Firefox, Internet Explorer, Safari)?
   - 0-1
   - 1-2
   - 2-4
   - 4-8
   - 8-12
   - More than 12 hours per day

6. Check which gaming platforms you use on a regular basis:
   - Play Station (2 or 3)
   - Nintendo Wii
   - Nintendo Game Cube
   - XBox
   - GameBoy Advance/SP
   - Nintendo DS/i
   - PSP
   - Cellphones, Smartphones, iPhones
   - PC (Windows or Mac)
   - Web browsers (e.g. Flash Games, Facebook)
7. Check which types of games you generally like to play:

☐ Action/First Person Shooter (e.g., Halo-3, Call of Duty)
☐ Fighting (e.g., Moral Combat, Super Smash Brothers)
☐ Adventure (e.g., Colossal Caves, Cyan World, Myst, Monkey Island)
☐ RPG (Role Playing Game) (e.g., Final Fantasy, Batman)
☐ MMORPG (Massively Multiplayer Online Role Playing Game) (e.g., World of Warcraft)
☐ Sports (Football, Golf, Baseball, Boxing, etc.)
☐ Racing (e.g., Need for Speed, Mario Kart)
☐ Simulation (e.g., The Sims)
☐ Strategy
☐ Puzzles

☐ Other: ____________________________

8. On average, how many hours do you play video games per day?

☐ 0 ☐ 1/2 ☐ 1 ☐ 2 ☐ 3 ☐ More than 3 hours per day

9. A typical gaming session will last how many minutes?

☐ 0 ☐ 1-5 ☐ 6-15 ☐ 16-30 ☐ 31-60 ☐ 61-120 ☐ more than 120 minutes

10. In general, how many times per day do you play a video game?

☐ 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ More than 4 times per day

11. How would you characterize yourself as a gamer?

☐ Do not play video games
☐ Casual, once in while
☐ Moderate, every other day or so
☐ Moderate, fairly often
☐ Heavy, every day
☐ Hardcore, major part of my life

12. Have there been others in your past or current living situation that you would classify as a moderate to hardcore gamer? (Check all that apply)

☐ Siblings (Brothers or Sisters)
☐ Parents (Mother or Father)
☐ Children (Sons or Daughters)
☐ Other Relatives (Cousins, Aunts, and Uncles)
☐ Close Friends
☐ Roommate(s)
☐ Significant Other (Spouse, Boy Friend, or Girl Friend)
Appendix B: ImmerseAbility Questionnaire

Video Game Experience Study

Section 2:

1. How often do you get so involved in class assignments that you exclude other things you should be doing?
   - Never 1 2 3 4 5 6 7 8 Very Often

2. How often do you get so involved in playing video games that you exclude other things you should be doing?
   - Never 1 2 3 4 5 6 7 8 Very Often

3. How easily can you switch your attention from one task to another?
   - Not easily 1 2 3 4 5 6 7 Very easily

4. How easily do you become deeply involved in movies or TV dramas?
   - Not easily 1 2 3 4 5 6 7 Very easily

5. How easily involved do you get in a television program or book that people have a hard time getting your attention?
   - Not easily 1 2 3 4 5 6 7 Very easily

6. How easily can you text and drive at the same time?
   - Not easily 1 2 3 4 5 6 7 Very easily

7. How easily can you walk and play a portable gaming device at the same time?
   - Not easily 1 2 3 4 5 6 7 Very easily

8. How happy are you with your life right now?
   - Not happy 1 2 3 4 5 6 7 Very happy

9. How are you feeling today?
   - Very bad 1 2 3 4 5 6 7 Very good

10. How easily do you become deeply involved in the stories of video games, movies, or TV shows?
11. How easily distracted are you by outside events while playing video games?

Not easily 1  2  3  4  5  6  7  Very easily

12. How alert are you to your surroundings at this moment?

Not alert 1  2  3  4  5  6  7  Very alert

13. How alert could you be to your actual surroundings while watching an exciting movie?

Not very alert 1  2  3  4  5  6  7  Very alert

14. How easily can you play a video game and hold a conversation with a friend or significant other?

Not easily 1  2  3  4  5  6  7  Very easily

15. How able are you to feel closely related to a character in the movie or video game while talking to a friend or significant other?

Not able 1  2  3  4  5  6  7  Very able

16. How frequently have you found yourself becoming so involved in a game that you feel that it is actually what is happening in your life at the moment?

Not frequently 1  2  3  4  5  6  7  Very frequently

17. How often do you get lost in the moment?

Never 1  2  3  4  5  6  7  Very often

18. How often do you daydream?

Not often 1  2  3  4  5  6  7  Very often

19. How often do you become so involved in a daydream that you are not aware of things happening around you?

Not often 1  2  3  4  5  6  7  Very often

20. How often do you have dreams that seem so real that you feel disoriented when you awake?

Not often 1  2  3  4  5  6  7  Very often

21. How good are you at blocking out external distractions when you are involved in something?
Not good 1 2 3 4 5 6 7  Very good

22. When watching sports, how often do you become so involved in the game that you react as if you were one of the players?

Not often 1 2 3 4 5 6 7  Very often

23. When playing sports, how often do you become so involved that you lose track of time?

Not often 1 2 3 4 5 6 7  Very often

24. How easily are you distracted when working on a boring task?

Not easily 1 2 3 4 5 6 7  Very easily

25. How difficult do you find it to concentrate on activities you enjoy?

Not difficult 1 2 3 4 5 6 7  Very difficult

26. How well do you focus on disagreeable tasks?

Not well 1 2 3 4 5 6 7  Very well

27. How much do you let your feelings bottle up inside?

Not much 1 2 3 4 5 6 7  Very much

28. How often are you scared or excited by a scene in a movie that you are watching?

Not often 1 2 3 4 5 6 7  Very often

29. For how long do you feel a great sense of accomplishment after completing a video game?

Not long 1 2 3 4 5 6 7  Very long

30. How often do you become so involved something that you lose all track of time?

Not often 1 2 3 4 5 6 7  Very often

Section 3: Comments

If there anything else that you would like to share about these topics, please type in the box below:
Appendix C: Post Game and ImmersiveNess Questionnaire

Section 4: Part 1

1. How familiar were you with the game you just played?
   Not at all 1 2 3 4 5 6 7 Very Much

2. How do you familiar do you feel with the game now after just playing it?
   Not at all 1 2 3 4 5 6 7 Very Much

3. How much did you like or dislike the game?
   Disliked very much 1 2 3 4 5 6 7 Liked very much

4. How hard was this game for you?
   Very hard 1 2 3 4 5 6 7 Very easy

What else would you like to say about this game?

Section 4: Part 2

1. How much were you able to control events in the game?
   Not at all 1 2 3 4 5 6 7 Completely

2. How responsive was the game to actions that you initiated (or performed)?
   Not responsive 1 2 3 4 5 6 7 Completely responsive

3. How natural did your interactions with the game seem?
   Extremely artificial 1 2 3 4 5 6 7 Completely natural

4. How completely were all of your senses engaged?
   Not at all 1 2 3 4 5 6 7 Completely

5. How much did the visual aspects of the game involve you?
6. How much did the auditory aspects of the game involve you?

Not at all 1  2  3  4  5  6  7  Completely

7. How naturally could you control movement through the game?

Not natural at all 1  2  3  4  5  6  7  Completely natural

8. How aware were you of events occurring in the real world around you?

Not at all aware 1  2  3  4  5  6  7  Completely aware

9. How aware were you of your game display and controllers?

Not at all aware 1  2  3  4  5  6  7  Completely aware

10. How compelling was your sense of objects moving through (virtual) space?

Not at all 1  2  3  4  5  6  7  Very compelling

11. How consistent or connected was the information coming from your various senses?

Not consistent 1  2  3  4  5  6  7  Very consistent

12. How much did your experiences in the game seem consistent with your real-world experiences?

Not consistent 1  2  3  4  5  6  7  Very consistent

13. How well were you able to anticipate what would happen next in response to the actions that you performed?

Not at all 1  2  3  4  5  6  7  Completely

14. How completely were you able to actively survey or search the game environment using vision?

Not at all 1  2  3  4  5  6  7  Completely

15. How well could you identify sounds in the game?

Not at all 1  2  3  4  5  6  7  Completely

16. How well could you localize sounds in the game?

Not at all 1  2  3  4  5  6  7  Completely
17. How well could you actively survey or search the game environment using touch?

   Not at all 1 2 3 4 5 6 7  Completely

18. How compelling was your sense of motion and exploration inside the game?

   Not compelling 1 2 3 4 5 6 7  Very compelling

19. How closely were you able to examine objects in the game?

   Not at all 1 2 3 4 5 6 7  Very closely

20. How well could you examine game objects from multiple viewpoints?

   Not at all 1 2 3 4 5 6 7  Extensively

21. How well could you move or manipulate objects in the game?

   Not at all 1 2 3 4 5 6 7  Extensively

22. To what degree did you feel confused or disoriented when you finished playing the game?

   Not at all 1 2 3 4 5 6 7  Completely

23. How involved were you in the experience of playing the game?

   Not at all 1 2 3 4 5 6 7  Completely involved

24. How distracting was the controller?

   Not at all 1 2 3 4 5 6 7  Completely distracting

25. How much delay did you experience between your actions and your virtual actions?

   No delay 1 2 3 4 5 6 7  Long delay

26. How quickly did you adjust to the game experience?

   Not at all adjusted 1 2 3 4 5 6 7  Less than one minute

27. How proficient in moving and interacting within the game did you feel by the end of playing?

   Not proficient 1 2 3 4 5 6 7  Very proficient

28. How much did the visual display quality interfere or distract you from playing the game?

   Not at all 1 2 3 4 5 6 7  Interfered greatly
29. How much did the controller interfere with playing the game?
   Not at all ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ Interfered greatly

30. How well could you concentrate on game play rather than on the controller?
   Not at all ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ Completely

31. Were you so involved in the game that you lost track of time?
   Not at all ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ Completely

Section 4: Comments

If there anything else that you would like to share about these topics, please type in the box below:

[Blank space for comments]

(Continue -->)