Players' Emotional Experience to Sporty Somatic Game

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Abstract: In recent years, somatic-interaction technology is developed rapidly and much applied to some healthcare and entertaining facilities. The somatic games such as Wii, Xbox Kinect games are getting popular for home entertainment. Most somatic games are destined to interest and entertain players and audiences. Thus, it is essential to explore the intriguing factors and players' emotional experience toward the somatic games. The research methods are comprised of interview, observation and questionnaire. 50 participants were recruited to play two kinds of sporty somatic games: "Kinect ADVENTURES" and "Kinect SPORTS". First, they played at least two-round game. Second, one-by-one interview was proceeded to inquire their feel. The qualitative analysis of their verbal responses was used to identify emotional factors and design factors. Then, they were asked to assess on an affective measuremment. The conclusion yields it induced four emotional factors and one game factor for somatic games. In the quantitative analysis, the Kinect brings consumers the most satisfaction in the degree of pleasure. The results provided suggestions can be more topics to follow-up researchers.

Key word: Emotion Experience, Somatic Game, Kinect.

1. Introduction

In 2006, Nintendo launched the Wii remote control and unprecedentedly changed the manipulation of video games. With its unique and innovative design, Wii swept the globe, and its concept of fun and suiting all ages quickly descended into each family. Therefore, Wii turned out to be a best-seller. After that, Microsoft also launched the Kinect at 2010 E3 Game Show. The manipulation of video games was taken to another realm—the players can use their own body movements to control the game without any physical remote control. The popularity of Kinect immediately was much contributed to the sales volume of the Xbox.

What are the attractive factors of somatic games? How players feel about the somatic games? In this study, "Kinect ADVENTURES" and "Kinect SPORTS." were taken as the examples to explore the intriguing factors and players' emotional experience toward the somatic games. After experiencing the two games, subjects are

interviewed and asked to evaluate the quality satisfaction. The qualitative analysis through open coding, the axial coding, and the quantitative analysis by PASW statistical software are used to identify the most attractive factors and players' emotional experience.

2. Literature Review

2-1 Somatic Game

Somatic game originated from the dynamic simulation technology was one aviators' flight training tool in the aerospace defense industry. Since it has applied to the entertainment industry in the mid of 1980, it become video games mainstream (Lin Min-Yi, Hong Wei-Qin & Cheng Ho-Jeng, 2010). For example, the Nintendo released the second generation game console "Wii" with 3D acceleration sensors at the end of 2006. It professed the "point positioning", "motion sensing" and "somatosensory operation" (Yan Shih-Hua, 2007). Since Wii created an innovative way to play games, the game industry has been revolutionarily improved. Somatic games have become a widespread cultural trend. Afterwards, Microsoft Co. released the XBox-360 games with the Kinect remote control. Kinect remote control is a combination of RGB camera, depth sensor and microphone. Because XBox Kinect could recognize players' gesture state to advance game effect, people play XBox games without holding any controller. For example, when players play the pedal dancing game, they could intuitively move their bodies like real dancers' swing. Players complete the task demand and get the accomplishment from the game situation. Thus, they are involved in a more immersive experience.Wii and XBox Kinect result easier interaction and challenge to somatic games. Somatic games become popular because it is suitable to most people.

2-2 Emotional Experience

Emotions contain the emotions, mood, emotional, that are every feeling, thinking and behavior which been performed by human. This is a comprehensive state about psychological and physiological, is a psychological change in individuals by certain stimulation behavioral responses, and not easily controlled by an individual (Fu Ann-Chiou, 2006). Brave & Nass (2002) defined for the emotions of two trends: the emotional reaction generated by the individual's needs, goals and concerns things. Emotions contain the physical, emotional, behavioral and cognitive elements. For the classification of emotions, Ekman (1972) that in any culture under no through learning can firmly emotions in people being called basic emotions is divided into six categories: joy, distress, anger, fear, surprised, disgust. Ekman and Freisen believe that people regardless of culture, background, age and gender, it can show a total of seven core emotions: surprise, fear, anger, sadness, loathing, contempt and happiness (Paul Ekman, 2004).

General Psychology thought emotions are associated with the process of cognition and consciousness of the

attitude of the outside world things, the relationship between objective things and the main demand of the reaction. Based on the desire of the individual and the need for medical education network collected more intermediary a mental activity. Emotions contain emotional experience, emotional behavior, emotional arousal and irritants cognitive complex component. Emotion is a personal, subjective experience and feelings, often associated with mood, temperament, personality and temperament.

In the modern study of emotional, the first emotional psychological theory is the James-Lange Theory proposed by James, stressed the feedback sent from the organ, pointed out that emotional stimuli trigger emotional feelings, emotional behavior and emotional experience the relationship. The emotional experience indicates the individual's subjective feelings evaluation. The emotion evokes compared through environmental stimulate induced physiological changes of the body. The emotional behavior expressed as external the emotional response status, and should be conspicuous performance and behavior. The emotional stimulate for the emotional experience, the emotions evoke emotional behavior of environmental stimulate characteristics (K. T. Strongman, 2003).

3. Methods

The research methods of interview, observation and questionnaire are adopted. 50 participants were recruited to play two kinds of sporty somatic games: “Kinect ADVENTURES” and “Kinect SPORTS”.

3.1 Research Procedure

First, participants played at least two rounds for each game in the way of single player and double players. Second, interviews are proceeded to inquire their feel. Their verbal responses are recorded words by words. The qualitative analysis is used to classify players’ emotional factors and design factors of sporty somatic games. Third, they are asked to a on an affective usability scale. Forth, the classified factors acquired from step two are used to develop the further quality evaluation questionnaire. After a week, the same participants are recruited again to evaluate the quality degree of the design factors of sporty somatic games

3.2 Game Selection

The aim of the study is to explore players’ emotional experience toward the somatic sporty game. The most popular somatic games- “*Kinect Adventures!*” and “*Kinect Sports*” - were chosen in this study. *Kinect Adventures!* is a 2010 sports video game for the Xbox 360, which utilizes the Kinect motion camera and is included as a pack-in game with the device. The game is a collection of five adventure and sports minigames and was developed by Good Science Studio, a subsidiary of Microsoft Game Studios. “Kinect Adventures!” uses full body motion to allow the player to engage in a variety of minigames, all of which feature jump-in, jump-out

multiplayer play. River Rush, one of the minigames in “Kinect Adventures!”, was the main target for this study. In River Rush, one or two players stand in a raft and work together to pick up the adventure pins scattered throughout the winding rapids. The raft is controlled by stepping left or right to steer, and by jumping to jump the raft. There are many secret places that you can get to by taking ramps. There are considerably more adventure points there than on the river. Crashing into barrels, wood, markers, or rapid markers, cause the player to lose points.

Kinect Sports is a sports video game developed by Rareand published by Microsoft Game Studios for the Xbox 360. The game is a collection of six sports simulations and eight mini-games, designed to demonstrate the motion-sensing capabilities of Kinect. The six sports included are: Bowling, Boxing, Track & Field,Table Tennis, Beach Volleyball and Football (Soccer in North America). Standing in front of the Kinect sensor, players compete by mimicking actions performed in real-life sports, such as throwing a javelin or kicking a football.

Figure 1 “*Kinect Adventures!*”
(http://www.video-game-wallpapers.com/)

Figure 2 “*Kinect Sports*”
(http://www.gametactics.com/)

3.3 Sample

45 participants come from various departments in National Taichung University of Science and Technology. They comprise 11 boys and 34 girls and their age is between 18 to 22 years old. The basic information of the participants is shown as the Table 1.

Table 1 The information of the participants

Gender	Number	Experience of Somatic Game	
Male	11	experienced	6
		first-time	5
Female	34	experienced	23
		first-time	11

3.4 Measurements (Questionnaires)

The semi-structure questionnaire comprising the fifteen-question measurements was applied. The measurements including 5 agreement degrees of Likert-scales, focuses on players' feel, affect and experiences while they are playing the somatic games. The questions were designed to evaluate players' emotional experiences: Q1 to Q5 mainly investigating players' feelings, Q6 to Q10 for players' attention, and Q11~Q15 for the degree of players' satisfaction. The results were statistically analyzed by PASW Statistics software. The fifteen questions are shown in Table 2.

Table 2 The Question items of the affective measurement

Question items		Question items	
1	I feel pleasure when playing the game.	9	I try hard to focus on this game.
2	This game is interesting.	10	I concern my appearance when playing the game.
3	This game is boring.	11	I don't hesitate to react correctly when playing the game.
4	I like the game and hope play it frequently.	12	I feel frustration.
5	This game makes me happy	13	I know how to handle it properly
6	I have to pay attention to this game.	14	I can't control my reaction and action.
7	I easily think other things beyond the game.	15	I do well when playing the game.
8	I aware to be distracted in the game.		

Besides, in order to broadly explore the affective factors of somatic games, interviewed participants and asked them two open-ended questions. The questions are as follows:

1. In your opinion, what are the playful and attractive factors of the somatic games? Why?
2. What are your feelings while you are playing the somatic games? Why?

The two open-ended questions are mainly applied to explore players' affective and the attractive factors of the somatic games. Participants' verbal responds provides the initial exploration of their emotional experience toward the somatic games. The collected verbal data were typed word by word and coded by the qualitative analysis method.

3.5 Analysis Methods

The analysis methods include quantitative and qualitative analysis. Qualitative analysis is used for the categorization of the verbal data form the results of the two open-ended questions. The data from interviews and think-aloud transcripts were analyzed using grounded analysis. Open coding, the first part of the analysis, is concerned with identifying, naming, categorizing, and describing phenomena found in the text of subjects'

responses. Axial coding is the process of relating codes (categories and properties) to each other via a combination of inductive and deductive thinking. Selective coding is the process of ascribing certain categories to be core categories. The code results lead to a conclusion and a collection of several properties that interest and attract subjects. In addition, the descriptive statistical analyses of the fifteen questions are proceed by Predictive Analytics Software (PASW 18).

4. Results

4.1 Qualitative analysis results

Three coders analyzed the qualitative data at different time and places. Further discussion following the results of open coding and axial coding , it induced four emotional factors and one game factor for somatic games： Physiological factors, social factors, psychological factors, usability factors and game factors. The results are shown as the Table 3.

Physiological feel generated from kinaesthesia, wholesome and entertaining factors are critical to players after they use their physical movement to control somatic games. The somatic games usually provide various play modes such as player' cooperation or competition, thus the social factors coded from intercommunity and partenership will influence players' affect. The psychological factors, including the feel of depressurization, challenge, safe, fun, presence, engagement and pleasure, mainly concern about payers' positive experience. The usability factors are related with the operability, understandability, universality and convenience. In addition, the critical game factors comprising regulation, audio and visual elements are coded from the qualitative analysis results.

Additionally, the frequency of the opening coding shown on Figure 3 yields the factor importantance of somatic games. For example, since their fast body movements are necessary to control somatic games, players are impressed with the kinaesthesia and exercising feel. Besides, "fun" with higher frequency is surly the main concern in games. It is interesting that players like to establish the fellowship and partnership when they pay the multi-players games. Moreover, because players' gestures could freely manipulate the characters in games, it brings them the presence and virture reality. The easy and universal usability factors are also influential to payers' happiness and enjoyment. However, "accomplishment", "depressurize", "score mechanisms" and "diversification" apparently are mentioned less. The reason might be that these features are similar to those in other TV games. They all are basic and critical factors in games. The audio and visual factors of somatic games include more open codings which always affect players' perception and feel.

Table 3 Opening Coding and Axial Coding

Axial Coding	Category	Opening Coding
Physiological factors	Kinaesthesia	kinaesthesia, enhance flexibility, reaction training, harmony
	Wholesome	healthy, slim
	Entertaining	killing time, recreational
Social factors	Intercommunity	Happy together, intimate players' relationship
	Partnership	interactive, cooperative, competitive
Psychological factors	Depressurization	depressurized, relax
	Challenge	exciting, freshness, adventure, challenge
	Safe	sense of security, non-dangerousness
	Fun	make me happy, enjoyment, delight, interaction, fun
	Presence	virtual reality, experience the most realistic vision, motion detection, truly, positive, surrounding
	Engagement	concentrate, participation, controllable, playable, addictive, attractive, accomplishment
	Pleasure	pleasure, easy to play
Usability factors	Operability, Clarity, Understandability	friendly UI, Clearly illustration, understandability, easy-control, special, attractive UI, easy to understand
	Universality, Convenience, Economy	appearance-careless, suitable for all ages, convenient, without limitation, economical, approachable
Game factors	Regulation	level design, score mechanisms, photo shooting, single game, multiplayer, competition, battle, diversification, option, skill, dynamic, sensitive
	Audio	lively, great, cute, active, exciting, make people happy, sound effect, attractive
	Visual	brightness, attractive, vivid, freshness, living, colorful, characters and scenes are fantasy cute, funny characters, entertaining, lovable, easy to understand, refinement, visual effects

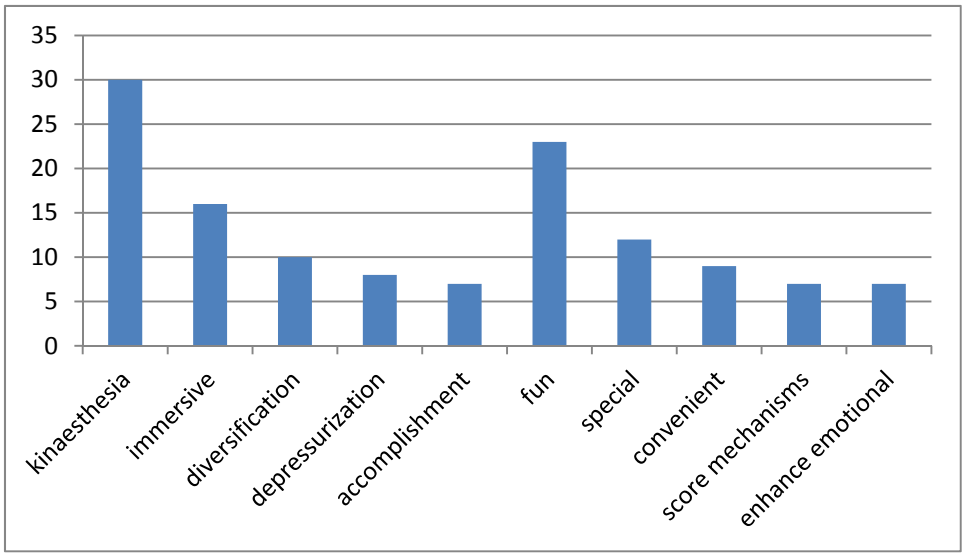

Figure 3 the Frequency of the Opening Coding

4.2 Quantitative analysis

The descriptive statistics result of the affective mesurement is shown at Table 4. The measurement reliability coefficient is 0.844. The results show that the mean is 3.84 and the standard deviation is 0.844. The mean for experienced players and no experienced players is respectively 3.88 and 3.76. It yields that the experienced players show higher affective responds than no experienced players. T- test analysis results that it is significant for Q1 (I feel pleasure in this game) and Q2 (This game is interesting.). Q1 and Q2 have higher mean and lower standard deviations. The experienced players have higher affective respondance than no experienced players except Q7, Q8, Q9 and Q10. The experienced players are much pleased and satisfied to somatic games because they are easily immersed in somatic games and quickly versed in controlling movements in the games. However, on experienced players have higher mean than experienced players in Q7 (I easily think other things beyond the game.), Q8 (I aware to be distracted in the game.), Q9 (I try hard to focus on this game.) and Q10 (I concern my appearance when playing the game.). It indicates that because they are unfamiliar with the game regulation they have to pay more attention on gmes, easily engaged in games and less care about thise appearance when playing .

Table 4 The satisfaction questionnaire statistics scale of Somatic Game

Question items	Mean		Mean (all players)	SD	Rank	t	Significant	$< \alpha$
	Experienced Participants	no experienced players						
Q1	4.59	4.25	4.47	0.505	2	-2.24	0.02	*
Q2	4.66	4.38	4.56	0.546	1	-1.73	0.05	*
Q3	4.17	3.81	4.04	0.796	6	-1.43	0.08	

Q4	4.21	3.94	4.11	0.745	5	-1.21	0.12	
Q5	4.38	4.06	4.27	0.654	3	-1.58	0.06	
Q6	4.21	4.13	4.18	0.684	4	-0.38	0.35	
Q7	3.69	3.75	3.71	0.920	9	0.21	0.42	
Q8	3.55	3.75	3.62	1.007	11	0.63	0.27	
Q9	3.07	3.25	3.13	1.179	15	0.48	0.32	
Q10	3.38	3.44	3.40	1.136	13	0.18	0.43	
Q11	3.97	3.69	3.87	0.757	7	-1.22	0.12	
Q12	3.45	3.44	3.44	1.078	12	-0.03	0.49	
Q13	3.86	3.69	3.80	0.694	8	-0.86	0.20	
Q14	3.34	3.31	3.33	1.000	14	-0.11	0.46	
Q15	3.69	3.56	3.64	0.957	10	-0.41	0.34	
Total	3.88	3.76	3.84	0.844				

"*" $p<0.05$

The highest and second highest percentage of the 5 agreement degrees are shown as Table 5. It reveals participants's positive respondance is 68%. The questionnaire analysis results as follows:

Q1：The 100% subjects feel pleasure in this game.

Q2：The 97.8% subjects feel interesting in this game.

Q3：The 71.1% subjects feel the game isn't bored.

Q4：The 82.2% subjects like this feel with the game, and hope to can play it frequently.

Q5：This game makes 93.4% subjects happy.

Q6：The 84.4% subjects are very attentive in the game.

Q7：The 64.2% subjects think of nothings during the game.

Q8：The 60% subjects know they have not a distraction in the game.

Q9：The 35.6% subjects don't need to work hard in order to focus on the game.

Q10：The 51.2% subjects won't pay attention to them appearance in the game.

Q11：The 68.9% subjects can make the appropriate response action without hesitation during the game.

Q12：The 44.4% subjects don't feel frustration in the game

Q13：The 68.9% subjects know how to handle it properly.

Q14：The 42.2% subjects can control my reaction and action in the game.

Q14：The 57.8% subjects know to do well clearly during the game.

Table 5　Particeipants' affective responds percentage to Somatic Game

Question	Every percentage of the 5 agreement degrees	*P%*

items	Strongly Disagree	Disagree	Contingent	Agree	Strongly Agree	
Q1	0	0	0	53.3	46.7	100
Q2	0	0	2.2	40	57.8	97.8
Q3	0	0	28.9	37.8	33.3	71.1
Q4	0	2.2	15.6	51.1	31.1	82.2
Q5	0	2.2	4.4	57.8	35.6	93.4
Q6	0	0	15.6	51.1	33.3	84.4
Q7	0	11.1	26.7	42.2	20.0	62.2
Q8	0	17.8	22.2	40	20	60
Q9	8.9	20	35.6	20	15.6	35.6
Q10	8.9	8.9	31.1	35.6	15.6	51.2
Q11	0	2.2	28.9	48.9	20	68.9
Q12	4.4	11.1	40	24.4	20	44.4
Q13	0	2.2	28.9	55.6	13.3	68.9
Q14	2.2	17.8	37.8	28.9	13.3	42.2
Q15	4.4	2.2	35.6	40	17.8	57.8
All	1.9	6.5	23.6	41.8	26.2	68.0

(P=Agree+Strongly Agree)

5. Conclusion

5.1 Emotional Factors of Somatic Games

Four emotional factors - physiological factors, social factors, psychological factors, usability factors and game factors are induced. Players concern about physiological factors because they could exercise their body movements, train their physical response, sense of harmony, and reach the effect of weight loss. Furthermore, co-play in somatic games could enhance the social relationships which are related with intercommunity and partnership. It indicated the importance of the social issues in games. The psychological factors mainly concern about payers' positive experience. Since Kinect provides natural and intutive manipulation, the usability could enhance players' interests and fewer their burdens when playing somatic games.

5.2 Design Factors of Somatic Games

The critical game factors comprising regulation, audio and visual elements are coded from the qualitative analysis results. Various game regulations such as photo shooting, co-play, competition make players more fun

and challenge. The audio and visual factors affect players' perception in accordance with the individual's character .

5.3 Affective Responds

Higher emotional responds revealed somatic games with Kinect bring players more satisfied and pleased. Players could freely control games induce their positive responds. According the results of the affective investigation, players respond positive feeling on Q1 to Q5. No experienced players are easily immersed in games. To sum up, somatic games could provide good interface between games and players. However, players don't express higher satisfication degree in this study; the limited time of the experiment might be the reason to affect players' emotion.

5.4 Suggestion

The study applied qualitative analysis method to identify the somatic game design and emotional factor, providing the following suggestions to follow-up researchers. The study samples were obtained only focus on 50 college students; in regard of game selection, that used two games, "The Kinect ADVENTURES" and "The Kinect SPORTS", and these two games tend to be sports type and can be for double players. In the future, the follow-up researches can stress on different ages of subjects, that their experience of playing the Kinect, and can be made based on different types or single-player games in order to obtain different analysis results from the game types in this study.Screen size, circumstances of playing, changes of sound, using body movements can be the topics for follow-up researches. The open coding in this study can be a reference for the Kano Model two-way questionnaire, to explore the Kinect attractiveness factor.

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