What Makes for Successful Game Storytelling?
A Model for Evaluating Game-Adaptability
of Stories in China

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Abstract. Storytelling is important for game flow experience, yet there is no accepted model or theory for game developers or investors to use for evaluating the composition, purchase and adaption of game stories. This paper proposes a concise model, the Game Story model, integrating 12 existing models from the fields of scriptwriting, game playability, and game motivation studies, with empirical findings based on content analysis of over 100 replies from Zhihu on topics related to game storytelling and interviews of 6 experienced game players. Factor extraction conducted afterwards through a survey (N = 516) and exploratory factor analysis (EFA) results in a model of 11 factors, with each factor containing a set of detailed criteria. A validation of the model on stories indicates that GameStory is able to explain the high game-adaptability of stories of many popular video games. This interpretation can be applied to the evaluation, understanding and improvement the game-adaptability of stories.

Keywords: Storytelling · Digital game · Game-adaptability

1 Introduction

The video game industry, as a fast-growing and expanding industry worldwide, has produced spectacular global revenue of 100 billion dollars each year, amounting to approximately three times the revenue of the movie industry. Storytelling in games, meanwhile, is drawing much attention worldwide, not only because of its fundamental role in communicating emotion, conveying values and enhancing immersion but also due to the growing awareness throughout the global game industry to the strategic reservation of IPs (intellectual property). One can take the recent battle for the adaption right of a Chinese online novel as an example. This novel, titled Wu Xing Tian, with only 1% written, was finally sold to a local game company for 8 million RMB (approximately 1.2 million dollars). Another notable trend is the increasing prevalence of gamification projects in companies outside the game industry, where story creation is also of great significance to the project leaders and developers.

However, no comprehensive model has been found to evaluate the quality of stories for the game adaption, which we refer to as the game-adaptability of stories. Some

existing works, which may contribute to such evaluation, lie in three main areas: scriptwriting in the traditional movie industry [1–3], game immersion and playability [4–8], and game motivation studies [16, 17, 21]. However, none of these models are specific to the creation, selection and adaption of game stories. A game story, more specifically, is different from a movie script in terms of interactivity and non-linear characteristics [9], and other game features (e.g., mechanism design, difficulty design). It is also different with regard to spiritual impact – the way in which it conveys values, communicates emotion and influences the understanding of life and humanity.

This paper aims to explore the factors of the stories that influence game adaptability. Three steps were taken in this study: (1) Determine variables based on literature and empirical studies, including content analysis and interviews; (2) Survey construction and distribution to collect players' ratings of the importance of each variable to game playability; and (3) exploratory factor analysis to extract a concise model from the variables. The potential implementation of the study is to provide guidance for game story writing, selection and adaption, not only for game designers but also for the leads of gamification projects in a wider domain.

2 Related Work

2.1 Game Storytelling

The definition of game storytelling is always confused with that of game narrative. Some researchers have referred to game narrative in discussions that are actually about storytelling [10]. To clarify, the core of the story is the description of the process of a character confronting a series of obstacles on the way to obtaining the goal [3]. There is a structure to most stories, which often consists of a beginning, a middle and an ending, according to Aristotle. And the main elements of a story include events (actions and happenings) and existents (characters and setting) [1]. However, narrative is the method and style used to tell the story of the game [9, 11]. The story can be created either by game designers or by players themselves. Therefore, not all games tell stories, but many games do have narratives [12]. For example, fighting games usually do not have storytelling, but may have some narratives. Majewski [10] observed that not all genres of games tell stories, but some genres are mainly dependent on stories, such as first-person shooter games, role-play games and adventure games.

Although previous research regarding screen scriptwriting exists in the film industry [2], these works are not adequate for the analysis of game story writing or selection for two main reasons [9]: film scripts lack interactivity and have a linear structure. According to the famous game designer Chris Crawford, what a computer game really sells is interactivity. A traditional story is entirely created by the author, and the audience rarely interacts with the story. A game story, however, involves users in the story's creation. Actions performed by players may be "listened to" and "considered" by the game engine and may influence the outcome [13]. Non-linearity is another characteristic of a game story. While the structure of a traditional story is completely fixed the moment when the author finishes the story, game stories have a myriad of possibilities for their structure. Meadows [14] summarized three plot

structures in game storytelling. According to these plot structures, each game story may include several main storylines and crossover between the storylines. The elements of storytelling are summarized in Table 1.

Table 1. Variables derived from storytelling models

Source	Variables derived from storytelling models
Glassner [3]	Character
	Goal
	Obstacle
Chatman [1]	Actions
	Happenings
	Character
	Setting
Aristotle	Starting
	Middle
	End
Mckee [2]	Plot
	Character
	Structure
	Goal
	Logic
	Value
	Profound insight

2.2 Models of Motivation for Game Engagement

A simple and intuitive reason for game play is "because games are fun". However, fun is such an ambiguous expression that it can also be used to describe many other activities, such as watching a movie, singing, or dancing. However, almost none of these forms of entertainment are comparable to games with regard to their appeal, sustained engagement and effect on well-being [15].

Both empirical literature [16, 17] and theoretical research from a psychological perspective [15, 18] noted that games can provide experiences that satisfy universal human needs. In 1996, Bartle first proposed a Player Type model based on an online debate regarding the question, "What do people want out of a multi-user dungeon (MUD)?" Answers from experienced players of MUDs were summarized, and the players were categorized into four main types: Achievers, Explorers, Socializers and Killers. The main motivation for achievers is to accomplish game-related goals, advance to higher levels and gather treasures and points. Explorers are motivated by the quest for knowledge of the internal machinations of the game. They enjoy exploring the out-of-the-way places and have fun discovering interesting features. Socializers are motivated by a desire to maintain inter-player relationships. Killers are fulfilled when they cause massive distress to other players [16]. Based on Bartle's model, Yee conducted a factor analysis study on the motivation for game play. The importance of 39

items (such as "level up as fast as possible") were rated by 3200 respondents. A principal component analysis revealed 10 factors, which fit into 3 categories: Achievement, Social and Immersion. Achievement players seek advancement, want to learn mechanics, and enjoy competition. Social players like to socialize with other players, establish in-game relationships and have fun with teamwork. Immersion players enjoy exploring the virtual world, being immersed in the new world, customizing their characters and escaping from the real world [17].

Other theoretical works [15, 18] on the motivations for game playing are mainly rooted in self-determination theory [18, 19]. According to self-determination theory, both intrinsic motivation (i.e., the fundamental needs of human beings: competence, autonomy and relatedness) and extrinsic motivation (e.g., reward, punishment or self-esteem pressure) are important for understanding what people want out of a game. Intrinsic motivation is especially significant. Competence needs refer to the necessity of challenge and feelings of reflectance. Autonomy needs refer to feelings that the decision making will impact results. Relatedness needs refer to the needs for social interaction. Table 2 lists the variables derived from the motivational models.

Table 2. Variables derived from game motivational models

Source	Variables derived from motivational models
Bartle [16]	Achievement within the game context
	Exploration of the game
	Socialize with others
	Imposition upon others
Yee [17]	Advancement
	Mechanics
	Competition
	Socializing
	Relationship
	Teamwork
	Discovery
	Role-play
	Customization
	Escapism
Deci and Ryan [19]	Competency
	Autotomy
	Relatedness

2.3 Game Design Heuristics

In the last three decades, several video game design and evaluation heuristics for enhancing the immersion, playability, enjoyment, or generally speaking fun of game play have been published [4–8].

The earliest heuristics concerning video games were proposed by Malone [4], in which three features were observed to make the system enjoyable: Challenge, Fantasy

and Curiosity. Several sub-features such as clear goal, uncertain outcome, emotionally appealing fantasies, and metaphors were also mentioned. Clanton [15] developed a list of usability guidelines for computer games based on hundreds of hours of observation, mainly from three perspectives: game interface, game mechanics and game play. Federoff [6] reviewed the existing heuristics and enriched the list of guidelines based on a case study of a game design team. Desurvire et al. [7] introduced a Heuristic Evaluation for Playability (HEP) model which included game story as an evaluation category in the model. Sweetser and Wyeth [8] developed a new evaluation model, GameFlow, which concentrated on player enjoyment in games rather than usability and validated the model with two games. Eight elements were included in the model: Concentration, challenge, skills, control, clear goals, feedback, immersion, and social interaction. The related variables are listed in Table 3.

Table 3. Variables derived from game design heuristics

Source	Variables
Malone [4]	Challenge
	Goal
	Uncertain outcome
	Fantasy
	Emotions
	Metaphor
	Curiosity
Clanton [5]	Establish goals quickly discovered and easily stated
	Gentle on-ramp
	Spread clues, tolls, obstacles out but not too much
	Pressure can be fun
	Avoid linear, monotonous pacing
Federoff [6]	Immediate feedback
	Quickly and easily involved
	Clear overriding goal presented early
	Variable difficult level
	Multiple goals
	Easy to learn
	Challenge
	Unexpected outcome
	No definite way to win
	Illusion of win-ability
	Fairness
	Allow players to build content
	Create great storyline

(*continued*)

Table 3. (*continued*)

Source	Variables
Desurvire et al. (HEP model) [7]	Consistency
	Clear goals
	Interesting storyline
	Uncertain outcome
	Fairness of outcome
	Transport the player into a level of personal involvement emotionally
	Character
	Shorten the learning curve
Sweetser and Wyeth (GameFlow model) [8]	Concentration
	Challenge
	Player skills
	Control
	Clear goals
	Feedback
	Immersion
	Social interaction

3 Methodology

This research adopts a three-step methodology: variable derivation, questionnaire construction and exploratory factor analysis. The goal of the first step is to derive related variables from both theories and empirical findings, while the next two steps
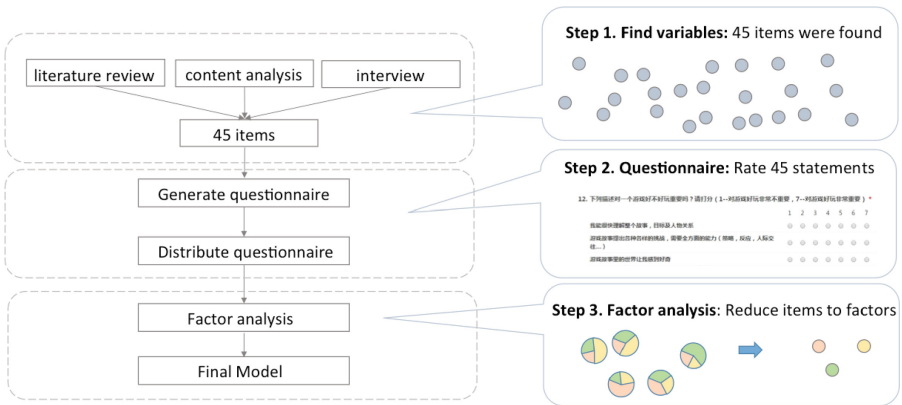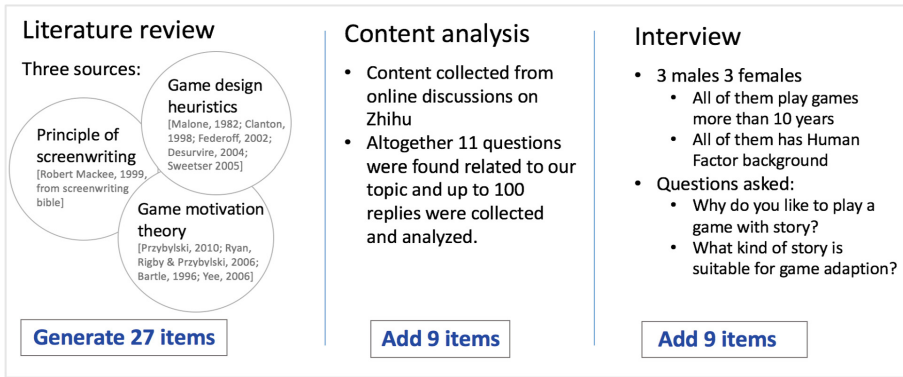

Fig. 1. Research framework

Fig. 2. Procedure for finding variables

aim to reduce the dimension of the model. The research framework is shown in Figs. 1 and 2.

3.1 Variable Derivation

Originally, 27 variables were derived from a literature review with the following principles: (1) items that do not change with stories were removed (e.g., the "reward" item from Clanton [5] and the "Use visual and audio effects to arouse interest" item from Federoff [6]); (2) similar items were combined into a single item (e.g., "uncertain outcomes", "no definite way to win", and "ending" were combined into "Ending" - "The ending of the story can be changed"); and (3) keep as many variables as possible when ambiguity occurs.

To include the opinions of game experts or professionals, we chose to conduct a content analysis based on online discussions on Zhihu, a Chinese community question answering system known for professional answers, over interviews after evaluating the content quantity as well as quality and time efficiency. Altogether 11 questions were found related to our topic and up to 83 replies and 18,538 Chinese characters were collected and analyzed. The conventional approach to content analysis was employed without making pre-assumptions on the category of results. The purpose of this is to allow the categories to flow from the data. Following the process described in Hsieh and Shannon [20], 9 clusters were found and added to the item pool.

Finally, 6 students from the HCI laboratory of Tsinghua University with experience in questionnaire design and more than 10 years of game-playing experience were invited to the pretest. The interview has three purposes: (1) further explore potential factors; (2) check if they can understand the statements of each variable (The statements were carefully phrased to describe the factors. They are composed of original sentences from the literature, which are translated into Chinese, and brief quotes from the interview and answers from zhihu.com; and (3) minimize redundant questions. Nine items were added, of which 5 items were expanded from the original 27 items. The final 45 variables are listed in Table 4.

Table 4. Items list

Storytelling	Game design	Game motivation	Others
Main plot	Comprehension	Advancement	Power (i)
Subplot (c)	Challenge & skills	Competition	Heroism (i)
Character personality	Curiosity	Discover	Rival camp (c)
Character preference (i)	Concentration	Role-play	Counter strike (i)
Structure	Control	Socializing	Strategy (c)
Logic	Empathy	Teamwork	Romance (i)
Ending	Empathy 2 (i)	Customization	Attractive female character (c)
World conception (c)	Familiar events	Escape	Attractive male character (c)
Goal	Familiar conception of world (i)	Autonomy	
Profound insight	Familiar character (i)	Relatedness	
Values	Adapt from famous history (c)	Relatedness 2 (i)	
	Adapt from famous literature, films, TV (c)	Competency	
	Adapted into films, literature, films, TV (c)	Violence	

(c): Items added based on content analysis; (i): Items added based on the interview

3.2   Construct Questionnaire

The questionnaire contained the following parts: demographic information (age, gender, and education), game preference (type), game experience (maximum game-playing frequency, current game-playing frequency, subjective ratings on expertise), overall rating on the importance of storytelling in game play, and ratings on the importance of each variable with a statement. All of the statements were checked by interviewees to ensure correct understanding and minimal redundancy. For each question requiring a rating of attitude, a 7-point Likert scale was adopted in which 7 represented strongly agree and 1 represented strongly disagree.

3.3   Procedure

The questionnaire was posted on websites in December 2014. The links were spread over social media platforms (WeChat and Renren.com) and a game forum (Baidu Tieba "Steam" - the forum of a large game distribution platform). Approximately four-fifths of the participants were from the game forum. Experienced game players were targeted as participants. To prevent inexperienced game players from participating, the following pre-screening question was added: Do you satisfy the following conditions: Love games; Spend much time playing games; Have played at least one game with a story. Participants who failed to meet the requirements were filtered out. The questionnaire was introduced as an "investigation of game preferences in China", without informing participants of the actual purpose of the study. We rewarded each participant with a 10-yuan mobile phone bill credit.

3.4   Participants

Overall, 516 questionnaires were collected. 84% of the participants were male. The ages of over 90% participants ranged from 15 to 3. Additionally, 74% of the

participants had a bachelor's degree or higher. 94% had no working experience in the game industry. On average, the participants had played computer games for 9.48 years (SD = 4.11). The maximum duration of their game-playing career is on average 1.22 h per day (SD = 5.127). However, currently, over 80% of them play games for less than 5 h per day. The top five game types preferred by the participants were shooting games (51.68%), action games (40%), role-playing games (39.6%), strategy games (29.31%) and adventure games (2.99%). Finally, 72% of the participants claimed that they played many types of games, and 56% of the participants regarded themselves as experts in game playing.

4   Results

Among the 516 answers, 11 unqualified participants (who did not satisfy the pre-screen conditions) and 51 invalid answers (answers with nulls, all-7 answers, 1 vs 7 in highly correlated questions) were eliminated, resulting in 454 valid answers.
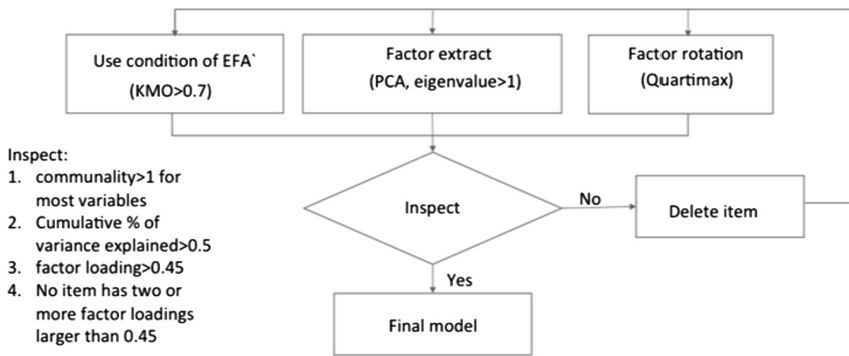

Fig. 3. EFA procedure

An exploratory factor analysis (EFA) was conducted to find the structural characteristics of the questionnaire. The Kaiser-Meyer-Olkin test (KMO = .876) revealed significant correlation between items, which means that the items have enough common information. The EFA enabled the reduction of the items into factors that are comparatively less correlated.

The procedure of EFA is shown in Fig. 3. First, factors with an eigenvalue larger than 1 were extracted. A component matrix was calculated and rotated relative to orthogonal rotation for further interpretation. Quartimax rotation was adopted in this study to get factors with lower correlation. After the calculation, the following conditions were imposed: (1) the communality should be larger than 1 for most variables; (2) the total variance should be larger than .5; (3) The factor loading of each item should be larger than .45; and (4) there should be no items with two factor loadings larger than .45. If these conditions were not satisfied, the items violating the conditions were deleted one by one until all of the conditions were met.

Following the procedure, 2 items were eliminated: Teamwork and Concentration. The communality of these items was less than .5, indicating that less than half of the variance in measured variables is reproduced by the latent constructs. All of the conditions were met after the elimination. As a result, 11 factors were extracted from 43 items, explaining 63.24% of the total variance. The results of EFA were shown in Tables 5 and 6.

Table 5. Total variance explained

Compo-nent	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of Var	Cumu-lative %	Total	% of Var	Cumulative %	Total	% of Var	Cumulative %
1	1.049	23.37	23.370	1.049	23.37	23.37	4.73	11.001	11.001
2	3.57	8.303	31.673	3.57	8.303	31.673	3.759	8.743	19.744
3	2.185	5.081	36.754	2.185	5.081	36.754	2.789	6.485	26.229
4	2.06	4.791	41.545	2.06	4.791	41.545	2.579	5.997	32.226
5	1.878	4.368	45.913	1.878	4.368	45.913	2.514	5.847	38.073
6	1.732	4.028	49.941	1.732	4.028	49.941	2.247	5.227	43.3
7	1.299	3.021	52.962	1.299	3.021	52.962	2.223	5.17	48.47
8	1.228	2.857	55.819	1.228	2.857	55.819	1.655	3.849	52.319
9	1.119	2.601	58.421	1.119	2.601	58.421	1.605	3.732	56.051
10	1.041	2.421	6.842	1.041	2.421	6.842	1.59	3.697	59.748
11	1.032	2.400	63.241	1.032	2.400	63.241	1.502	3.493	63.241
12	.949	2.207	65.449						
13	.900	2.094	67.542						
14	.844	1.964	69.506						
15	.78	1.814	71.320						
16	.748	1.739	73.059						
17	.73	1.697	74.756						
18	.703	1.635	76.391						
19	.685	1.593	77.984						
20	.649	1.508	79.492						
21	.610	1.418	8.910						
22	.597	1.389	82.299						
23	.573	1.332	83.631						
24	.556	1.294	84.925						
25	.514	1.196	86.121						
26	.507	1.18	87.301						
27	.481	1.118	88.419						
28	.470	1.093	89.511						
29	.446	1.038	9.550						
30	.428	.995	91.545						
31	.399	.927	92.472						
32	.383	.891	93.362						
33	.369	.859	94.221						
34	.360	.838	95.059						
35	.347	.807	95.866						
36	.317	.737	96.603						
37	.282	.657	97.259						
38	.270	.628	97.887						
39	.254	.591	98.478						
40	.218	.508	98.986						
41	.180	.419	99.405						
42	.134	.313	99.717						
43	.122	.283	100						

Table 6. Rotation matrix

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Familiar event	.852										
Familiar world conception	.849										
Adapted from famous history	.823										
Adapted into films, literature, TVs	.820										
Adapted from films, literature, TVs	.795										
Familiar character	.790										
Relatedness 2		.75									
Relatedness		.71									
Empathy		.679									
Romance		.581									
Empathy 2		.546									
Profound insight		.509									
Structure			.703								
Character personality			.691								
Main plot			.678								
Logic			.576								
Counter attack				.652							
Violence				.641							
Competition				.638							
Rival camp				.572							
Strategy				.493							
Advancement				.454							
Autonomy					.694						
Control					.663						
Customization					.631						
Escape					.542						
Ending					.486						
Discover						.720					
Role-play						.626					
Socializing						.554					
Power							.857				
Heroism							.824				
Competence							.581				
Comprehension								.586			
Goal								.566			
Curiosity								.505			
Conception of world								.452			

(*continued*)

Table 6. (*continued*)

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Attractive female character									.68		
Attractive male character									.515		
Values										.754	
Character preference										.482	
Challenge & skill											.612
Subplot											.483

5 Discussion

To measure the game-adaptability of stories, this study proposes an evaluation model with 11 factors (as shown in Fig. 4) based on players' ratings: engage & explore, scriptwriting, distance from reality, autonomy, empathy, values, competition, power, multi-challenge, physical attractiveness, and familiarity. Here is the further explanation of these factors: (Detailed items see Table 7).
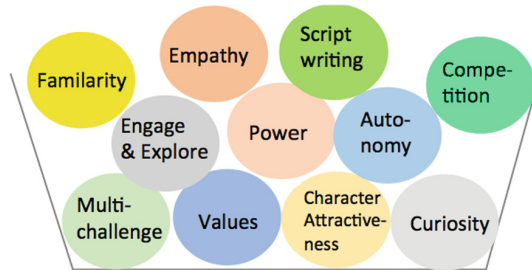

Fig. 4. Final model of game-adaptability evaluation

Engage and explore refer to the attraction on the players that arouses their desire to explore the world in games. Game design is not just about the design of the gameplay and stories. Game design is also about the creation of a lively world, a world that contains many interesting places and stories. Scriptwriting is about how to tell a story in a game, which includes design of a main plot, design of the story structure, depiction of characters and logical correctness. Most of the games are very far from reality, which calls into full play the players' imagination. Dungeons & Dragons, a famous game category originating from a tabletop role-playing game, is a good example of distance from reality. This type of game creates a world with history and culture which is quite different from the real world. The species in this world are quite different and have their own unique abilities. And the world is mysterious for the player, which arouses their curiosity. Power is one of the most important concepts in most games. Players solve

problems and accomplish tasks in the game to improve their abilities. And the more power they acquire, the more tasks they are able to fulfill. This positive feedback will motivate players to move forward in the games. Many games require players to accomplish various challenges and achievements. Attractive characters contribute a great deal to the story telling of a game.

Table 7. Important factors for creating, choosing and adapting high game-adaptable stories

Factor	Item	Statement: is it important to the playability of games if …
Engage & explore	Discover	There is a lot for me to discover in the game world
	Role-play	After reading the story, I want to be personally on the scene and experience what happens to the character
	Socializing	I can talk with other players about the plot and character
Scriptwriting	Main plot	The main plot is attractive
	Structure	The structure is delicate
	Character personality	The characters are distinctive
	Logic	The story is logically correct
Distance from reality	World conception	The conception of the world (including ages, domain, history etc.) is attractive
	Curiosity	I am curious about the world in the story
	Comprehension	I can quickly understand the whole story, the relationship of the characters and their goals
	Goal	The goal of the main character is attractive to me
Autonomy	Autonomy	I can explore how my operation leads to different endings
	Escape	I can accomplish what I cannot do in the real world
	Customization	I can customize characters/choose from different characters
	Ending	The ending of the story can be changed
	Control	I can control the progress of the story
Values	Character preference	I like the character of the story
	Values	I agree with the personal values and attitudes possessed by the character
Empathy	Relatedness 2	How the characters are related is touching
	Relatedness	I feel warmth of the world after reading the story
	Profound insight	The story has profound insights to humanity and society
	Romance	There is romance between characters
	Empathy 2	After reading the story, I wish to help the character to achieve his/her goal
	Empathy	I am always influenced by the emotion of the characters

Table 7. (*continued*)

Factor	Item	Statement: is it important to the playability of games if …
Competition	Strategy	Strategy, tactics, scheme should be used to achieve the goal in the story
	Rival camp	There are several rival camps entangling with each other, but we cannot determine right and wrong, good or evil
	Competition	In the story, the character needs to compete with others
	Advancement	The character grows with my operation
	Violence	There are fight scenes in the story
	Counter strike	The character comes back with a fantastic counter strike
Multi-challenge	Challenge & skills	Many types of talents are needed for the challenge in the story (strategy, quick reaction, socializing…)
	Subplot	The subplot is attractive (conversation with non-player characters, subtasks…)
Power	Competence	I feel I can exploit my talents in this virtual world
	Heroism	I can become a hero in the game
	Power	I can experience the sense of power in the game
Physical attractiveness	Attractive female character	There are many attractive female characters in the story
	Attractive male character	There are many attractive male characters in the story
Familiarity	Familiar event	I can experience events which I am familiar with in the game (e.g., famous events in the history, in other games, novels, or films
	Familiar world conception	The conception of the world in the game is familiar to me
	Familiar character	I can encounter familiar characters in the game (e.g., eminent person in the history, in other games, novels, or films)
	Adapted from famous history	This game is adapted from famous history
	Adapted from famous films, literature, TV	This game is adapted from famous films, novels or TV series
	Adapted into films, literature, films, TV	This game is adapted from famous films, novels or TV series

The Witcher 3, the winner of The Game Awards 2015, provides players with great autonomy. It adapted from a famous Polish novel, which promises high quality and high completion of the game story. The plot is well organized, and the characters are well portrayed. Those who have read the story are likely to be familiar with the plot and

characters when playing this game. Players can slaughter monsters, collect materials and make their own armor and sword. Additionally, the storyline has various choices. Players are able to change the fate of some other characters by choosing some action or conversations. And due to the different choice, the ending will be different. The main character of The Witcher, Geralt of Rivia, has many friends and enemies. The relationships between characters are complex and touching, which offer profound insights. The presence of many difficult choices in The Witcher 3 arouses players' empathy. No decision is easy for players because they have to consider morals and interests. Players sometimes have to judge what is right and what is wrong. Sometimes, helping some people in the game means you have to damage interests of other people. Most of these choices are ambiguous, depending on players' own values, which is a reflection of the real world.

6   Conclusion

In this research, a model for measuring the game-adaptability of stories was established with 11 factors (sorted by significance): engage & explore, scriptwriting, distance from reality, autonomy, empathy, values, competition, power, multi-challenge, physical attractiveness, and familiarity. Among these factors, engage & explore and scriptwriting are the most important factors in a game storytelling. A story with higher potential in these factors is more likely to be welcomed by players when adapted to a game. If a story was extraordinary in some respects, it is also likely to succeed when adapted to a game.

There are three main limitations of this study. Firstly, the study was based on the views of players. And players tend to focus on their own experience of the games. They are not concerned about commercial prospects and technological difficulty, which also play important parts in game development for developers or investors. Secondly, most of the participants of the survey were steam players, which is different from the players who play console games. Thirdly, the survey was conducted in China, and the results of this study might be influenced by culture differences. In addition, the game industry in China is quite different from the game industries in other countries, which might also have some influence on the result. Thus, it will be very interesting to explore the cultural differences in game storytelling in future work.

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