StoryJam: A Multiplayer Narrative Game for Collective Storytelling

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Abstract
StoryJam: A Multiplayer Narrative Game for Collective Storytelling
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StoryJam is an online six-player game for collective storytelling. It provides a virtual world where people collectively and interactively develop stories. The game includes game mechanics that are designed for engaging players in constructing narratives through teamwork. Stories inside the game are developed from regulated human-human collaboration and competition built upon specific game mechanics. The story content consists of multiple players’ text inputs. This thesis document addresses the issue of how to facilitate collective storytelling through game mechanics. Several different aspects and benefits related to the implementation of collective storytelling upon this specific issue have been taken into consideration. The goal is to increase players’ enjoyment and creativity, and encourage participation in collective storytelling activities in the form of online multiplayer games.
1. Introduction

When confronted with unfamiliar objects, narrative assists humans by interpreting received information in a well-organized manner. It structures information in their mind according to individual experience. As they write and read stories, different people get enlightened in various ways [28]. As they introduce the content to other people, different people understand the subject from different perspectives.

It is claimed by some researchers that shared storytelling has been confirmed as an effective way to form organizational groups [5]. The participants share and compare their personal experiences, and express an understanding of what has been shared between them. The traditional collective storytelling activities help humans gain insights from multiple perspectives and eventually achieve one mutually recognized goal. This form of storytelling draws attention from participants, evokes creativity, promotes communication and simultaneously generates shared meaning, which is critical for establishing a collective understanding in groups.

According to research in both collective storytelling [5] and game mechanics design [10], building stories through player interaction and collaboration is not currently an active line of exploration in commercial games. StoryJam is designed to bridge these two concepts. As a collaborative game, it splits players into groups to engage them in the shared construction of narratives.

In order to build shared meaning in collective storytelling activities, four approaches have been proposed by Pondy, Frost, and Morgan [21]. The first approach is originated
from anthropology. It illustrates shared meaning as a dynamic model and insists that shared meaning always represents the status quo. The second approach, rooted in a communication model, assumes that shared meaning is formulated through negotiation and collaboration. In order to construct shared meaning at collective events, people need to spend time together and share experiences in a group. The third approach is an evolutionary model, which advocates building a process of competition in collaborative events. It asks for challenges and user-competitiveness in collaboration. Shared meaning will keep evolving through ongoing participation and will gradually be formulated from either against several rival ideas or in the midst of one strong rival perspective. Based on a field model, the fourth approach claims shared meaning is consciously co-created by all participants. The second and third approaches can be realized in the form of online multiplayer games, because game mechanics are capable of formulating and fostering mutual collaboration with certain designs. Based on research in games, game storyline structure can be used to design interactions that involve multiple players [8, p. 40].

This thesis project assumes that game mechanics could potentially enhance collective storytelling experiences. Collective storytelling becomes the core gameplay so that multiple players are able to construct stories according to their knowledge of the world. StoryJam structures human-human collaboration through game mechanics, which assist players to collectively develop and govern storylines within certain rules, themes and a reward system.

StoryJam is a multiplayer game that fosters collaborative behavior as a foundation for game-based story authoring. The game provides several story development sections focusing on facilitating a collective storytelling experience. It supports both collaboration and
competition with six players split into two teams. Story content will be open to the players’ interpretations and expectations. Players can collectively construct a storyline driven by their self-generated narrative. The game assigns story themes for purposeful storytelling. It keeps players motivated with a switching role feature. Players can inspire the other players by assigning keywords. They are able to read others’ writings, choose a preferable one and continue developing the content from their perspectives. In this form of mutual collaboration, players will gain insights and derive inspiration from each other’s work. Therefore, StoryJam becomes a shared platform for thought experiments. Players receive an opportunity to see how people interpret their ideas and how people further develop their ideas from different perspectives.

This thesis document is organized as follows. Chapter 2 discusses theories behind traditional collective storytelling. It states the advantages of shared storytelling and analyzes key points of organizing shared storytelling events in three case studies. Chapter 3 reviews design principles for building efficient collaboration along with competition. Chapter 4 studies game mechanics relevant to storytelling and collaboration, including storyline structure in games, design features in traditional text-based games, and collaborative designs in multiplayer games. Chapter 5 introduces StoryJam’s game process and its structured game mechanics based on the research from Chapter 2 to Chapter 4. Chapter 6 summarizes the design process of StoryJam, evaluates the existing design, and addresses potential future work for improving the game experience.
2. Traditional Collective Storytelling

This chapter will discuss some theories behind traditional collective storytelling. It starts with introducing the meaning of narrative and story, and then continues reviewing shared storytelling concepts and practical collective storytelling events.

2.1 Narrative and Story

Humans observe the world, and analyze received information through an integration of senses, memories, and knowledge. When people communicate, the associated ideas and memories from both tellers and listeners are conveyed and interpreted through narrative.

Narrative is considered the core pattern for cognition, comprehension and explanation [28]. Traditional narratives tell stories in a linear fashion with a starting setup, and progression towards a satisfying conclusion [3, p. 8]. Narrative contains loosely structured story-like experiences, which are usually similar to the abstract of stories, while stories normally consist of tightly organized plots moving from the beginning to the end [17]. A story is not an isolated fact. It’s a connected system of knowledge with a clean and neat mesh of organized information that assists people in acknowledging complicated and interrelated ideas [8, p. 13]. Some of the stories that have been told and retold for centuries shape human thoughts, religions, philosophies, and the very world itself [15, p. 1]. They help transmit cultural knowledge from one generation to the next in a convincing manner.

Human languages have syntactic constructions for thought experiments. Conditionals, counterfactuals and hypothetical constructions assist people in understanding the context,
and making a conversation. When people tell a story based on experience or memory, languages help explain how things come to be what they are [28]. When people read a story, languages help gather information and generate knowledge [18].

People consciously or unconsciously experience ”narrative sensemaking” [5]. Narrative sensemaking can be defined as taking meaning from one’s life and how people become sensible through embodied interpretations of social life. This concept corresponds to Fisher’s narrative paradigm, which has a long tradition in the social sciences, particularly in sociology, literary theory, psychology and hermeneutic-based philosophy. He believes humans make sense of experience through narrative, stories, or drama. They are the means that connect people with social surroundings through an ongoing process of interpreting, assessing and critiquing. They arouse narrative rationality, which brings critical self-awareness and environmental perceptions to human beings. Through narrative, people are able to make sense of experiences, and interpret actions and intentions [9].

2.2 Shared Storytelling

Storytelling is an effective form of communication. It can be used for building a collective sense of relationships with deep meanings. Telling stories of experiences in groups can introduce various perspectives, bring light to unsolved dilemmas, and tensions and collectively center a group. For example, when business companies want to enhance teamwork, sometimes they host shared storytelling events. People can gather together to share and compare individual experiences in order to reach a common goal [5].
2.2.1 The Limitation of a Single Story

Humans have the power to construct and interpret stories. However, a critical misunderstanding might occur when people perceive a single story about one particular event, person or country. Nigerian novelist Chimamanda Adichie called it a "stereotype" when she gave a talk in TEDTalks in 2009 [1]. She said an invisible impact of an incomplete impression on real-life would appear while telling and reading a single story over and over again. She gave an example of her early writings about Nigerians’ life. Her stories generally revolved around blue-eyed characters who played in the snow, ate apples, enjoyed talking about the weather, etc. These character elements totally diverged from her cultural background. They were impressionably and vulnerably influenced by the kind of stories she read in her childhood. She named this phenomenon "The Danger of a Single Story." She proclaimed that this phenomenon had a negative effect on achieving authentic voice through different cultures. Since human life and culture consist of many overlapping stories, some single stories have limitations in expressing views from a variety of angles. The following section will discuss the advantage of shared storytelling, such as broadening the scope, bringing diversities, etc.

2.2.2 The Benefit of Shared Storytelling

Collective narratives create shared meaning, which assists individuals in analyzing status quo from multiple perspectives [9]. While writing stories from the writer’s point of view and reading other’s work from the reader’s standpoint, people would gain insights into their hearts, minds and motivations [29]. With a second-person’s insight, they will
learn how one-person’s truth fits into many different meshes of knowledge [22].

Haiku gathering is a great example of shared storytelling. Haiku is a Japanese short poem style with 17 syllables. It is derived from a popular poetry activity called "Ranga", which appeared in the 15th century. In Ranga, poets gathered and took turns to build poems. They started with one short stanza and passed it along to continually compose the content. Stanzas finally evolve into a long linked poem. The first stanza in Ranga is the early form of Haiku. Nowadays in Japan, people still enjoy attending Haiku gatherings in order to share their own poems with others [2, p. 493-494].

In organization studies, shared storytelling has been recognized as a useful vehicle for constructing shared meaning in order to achieve collective sense [5]. Shared meaning may appear as the intersection or overlap of several different perspectives within a group, or one dominant sense advocated by particular individuals.

Four approaches to establishing a shared meaning have been proposed by Pondy, Frost, and Morgan in 1985 [21]. The communication model and the evolutionary model are the two approaches that have been realized in StoryJam. The game contains specific mechanics for forming three-player collaboration and team competition in shared narrative construction.

2.3 Structured Storytelling Events

Purposeful storytelling is used as a means to build shared meaning in a group [5]. Structured storytelling events are regularly being conducted in order to reach a group goal.
2.3.1 Case Study I: Friendship International

Friendship International is a religious organization dedicated to introducing Christianity to international students during their overseas study period [5]. Researchers divided people into different groups according to their age range and working experiences. The storytelling events were implemented through a sequence of processes in each group. These processes were designed to improve the significance of structuring storytelling events.

The event started with an introduction to the collective storytelling study, and moved on to a warm-up storytelling exercise. Individual stories of members’ experiences inside and outside the organization had been shared in the warm-up section. As stories accumulated, researchers identified one organizational touchstone story. It is a story that contains all the basic elements that participants are aware of in the organizational reality. Using this touchstone story as a theme in the shared storytelling activity, participants appeared to be attentive and engaged. As they went through the processes, subjects that revolved around the theme appeared to draw the participants’ attention. According to the interview after the experiment, the interviewees confirmed that the use of a theme helped them understand each other’s story. Therefore, StoryJam contains a function which gives players a story theme in each game. It serves to center the topic in shared narrative construction.
2.3.2 Case Study II: Haiku Gathering

A Haiku contains three lines of five, seven and five syllables respectively [2, p. 493-494]. The context must include a Kigo - a specific word associated with a particular season. For example, when people refer to summer in Haiku, they write fireworks, fireflies, cicadas, etc. In addition, it must use Kireji, which serves to break up the flow of the poem. Kireji cuts the words and builds a sense of beauty with things left unsaid. This poem style is regarded as a way of observing the very nature of existence. It gives participants a clear objective and challenges their skills in composing poetries within limits. With the use of Kigo and Kireji, people compose and share their Haikus with each other to evoke seasonal feelings. Imagination is derived and promoted as they become engaged in the Haiku gathering. Adopting the poem style concept in StoryJam, a gameplay of the keywords’ assignment has been developed as a source of inspiration. Players can send keywords to the other players in order to act as inspiration.

Figure 2.2: A Famous Haiku poem written by Basho Matsuo

English Translation
An old silent pond...
A frog jumps into the pond,
splash! Silence again.
by Basho (1644-1694)
2.3.3 Case Study III: 55 Fiction

55 Fiction is a form of micro-fiction which limits the length of each story to either a maximum of fifty-five words or exactly fifty-five words [7]. It is the result of an annual writing contest initiated by Steve Moss who initially intended to challenge writers’ skills in creating stories with limits. As for the context, it requires a setting, one or more characters, conflicts and a resolution. By setting these rules, Steve aims to test writers’ skills in delivering insightful stories with the most basic elements of storytelling and tightly confined space [24]. This concept became popular when people started sharing and inviting others to write their own 55 Fictions in the blogs.

![Figure 2.3: The published book with short stories from 55Fiction contest](image)

With these rules, there are surprisingly creative short fictions coming out with all elements of good storytelling including mystery, suspense, romance, etc [24]. Based on the submission for the contest, two books have been published: The World’s Shortest Stories (See Figure 2.3) and The World’s Shortest Stories of Love and Death. They are highly recognized by college creative writing professors and high school teachers, who use this genre for in class exercises and recommend it to students for reading.

Learning from the rules in 55 Fiction, StoryJam sets the character limit to a maximum
of 140 characters, and defines one unified story theme per play. This game feature aims to challenge players’ writing skills within limited boundaries.
3. Design Principles for Efficient Collaboration

Even though human beings process information on their own, they still get influenced by multiple groups or communities. They tend to mimic and act as part of a group to shape their identities, values and beliefs. Interpersonal skills such as communication, collaboration and negotiation start taking place as people get immersed in groups [12].

Collaboration can be defined as a situation where multiple people share and co-construct knowledge in either solving a problem or achieving a group goal [30]. According to Roschelle and Teasley’s theory, it is ”...a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem” [23].

Generally, collaboration triggers a significantly high level of motivation. Researchers have experimented with the collective theories behind Haiku gathering in educational study. They plan to enhance collaboration, connection and communication among students. In one of the empirical experiments, teachers asked students to develop one story in a group [19]. They encouraged students to give feedback, review the content, and integrate suggestions collectively. Students’ engagement in this shared storytelling activity reflected substantial learning benefits. They became more focused on the topic and attempted to stay longer in the classroom.

Moreover, fruitful outcomes can be generated from collaboration. An example is ”A Million Penguins Project” [11]. It is an open novel activated by the scholars from Penguin Books and De Montfort University. It allowed cyber citizens to review, edit, and change a writer’s work. The entire project ran online for five weeks. The web page gained nearly
1,500 registrations and over 11,000 edits from 75,000 visitors. The scholars received a 1030 page story in the end. Other examples can be found in anthropology, like hunting in pairs results in obtaining more than twice the amount of food compared to hunting individually [13]. Therefore, people usually state that ”two people know more than one” and ”the whole is more than the sum of its parts” [26, p. 199].

In order to foster collaboration and enhance user-experience in story authoring, there are a few matters that need to be taken into account.

3.1 Five Essential Factors Linked to Cooperative Work

In cooperation, work will be split and distributed to partners. They solve sub-tasks individually and get the final result from assembled individual work [32]. Five approved factors proposed by Johnson and Johnson offer guidelines in collaborative design. These factors are Positive Interdependence, Individual/Personal Accountability, Face-to-face Promotive Interaction, Social Skills and Groups Processing [25].

3.1.1 Positive Interdependence

The important idea and concept learned from Positive Interdependence are that people gain benefits from each other while co-working in a group. Normally, a common goal is set for the whole group. This goal is the one that all the group members are aiming for.

Participants stay connected in a manner that each individual cannot succeed unless the entire team passes as a whole. Therefore, tasks need to be designed in a way that they are solvable only if participants act together. To build this kind of collaborative experience, participants are usually bestowed different abilities or responsibilities so that they need to
rely on each other while carrying out a task. As the activity progresses, group members’ performances will generate mutual influence during his/her turn so that a “group life” system is continually being formed.

When someone carries out an action, the consequence of the action needs to be reflected in the group. Participants should be notified of what progress has been made either by themselves or other partners. In addition, they need to be aware of what the next step is for either them or the group as a unit.

If there is an evaluation section in the end, the result will be conducted on the group rather than on an individual member. Scores are suggested to be split into two categories: individual scores and group scores. This setting raises personal identity and group consciousness. It reflects both individual efforts and group efforts. Participants are able to compare their group with other groups, and also review each participant’s contribution to the group performance [32].

The individual success or failure will affect the group progress. Victory comes from the result of the group actions. Success means success for all participants in the group. As a result, people are aware of connection and reliability from other participants.

StoryJam has realized this factor in game mechanics. It sets varied roles and limited time frame in order to hold and encourage players in teamwork. Players cannot proceed unless their team members finish their roles. Players’ writing topics are influenced by the keywords or the sub-stories written by the other players in the previous round. As players collectively construct the narratives, the game will inform players the chosen sub-stories’ along with their own team’s progress. It takes players’ profiles to differentiate their weights in the evaluation section. Victory belongs to one of the teams (See Figure 3.1).
design features will be discussed in detail in chapter five.

Figure 3.1: Winning as a Team in StoryJam

3.1.2 Individual/Personal Accountability

Individual consciousness in relation to the organization of the group contains four main components: 1) an appreciation of context statement; 2) basic assumptions of organizational goals, agency and human relationship; 3) dilemmas in interpreting perceived obstacles and constraints; and 4) expressed role conceptions [20]. These components establish individuals’ perception of significant issues, influences and events inside the group. They help group members tell the cause of the issue and handle the challenges as a whole.

Clear statements of activity and individual responsibilities enhance participants’ understanding of the group work [31]. Therefore, primary information panels in StoryJam such as headlines, count-down timers, and the descriptions of players’ roles are either designed with more contrasting color or scaled relatively larger in size (See Figure 3.2).
On top of clarification, establishing individual accountability in groups requires mutual access to the group members’ performance. Avoiding selfish decisions and misunderstandings, collaborative tasks require communication and negotiation in the activity. In order to build shared meaning, there is a need for group discussion. In StoryJam, this factor has been achieved by using the built-in chat function. It allows players to send text messages across the network (See Figure 3.3).
Individual tasks must not stand in the way of collective tasks [31]. Making the collective tasks relevant to the common goal is necessary to build a collaborative experience. The common goal in StoryJam is to write stories through teamwork. Associated with this unified objective, the game sets individual challenges along with group challenges. In the beginning of the game, three players brainstorm the intro story based on one theme word. Another group of three design the ending story according to the same theme word. The current game design may not ensure the consistency between the intro story and the ending story, because each team works on the story separately. One team may receive a chance to read another team’s story in a situation where one of them finishes submitting the content.
earlier than the other. From observing players’ actions in the informal testing, inconsistency between the intro story and the ending story seemed to not affect their gameplay in writing sub-stories. Players were capable of bridging the posted intro story and ending story with a variety of plots.

After the discussion on either the intro story or the ending story, one player in each team is in charge of typing the story in depending on the team he/she is on. The other four players are asked to offer keywords. Thus, each team has a shared task and varied individual tasks (See Figure 3.4). All the contents are derived from these tasks will be carried in the next Sub-Story Creation section.

![Figure 3.4: Team 1’s Shared Task and Varied Individual Tasks in StoryJam](image)

### 3.1.3 Face-to-face Promotive Interaction

Group work in real life suggests positive face-to-face communication. It recommends promoting peers’ success by helping, encouraging and praising [33]. In the digital world, this form of interaction can be achieved through chat systems such as voice/video commu-
nication and text-based chat. StoryJam contains a text-based chat function which allows players to collectively build ideas (See Figure 3.3). It provides players with the possibilities to discuss their progress and relationship, and at the same time, help, encourage, or praise others via sending messages. If a player decides to assist his/her fellow group member, their chances of winning significantly improve.

### 3.1.4 Social Skills

The group will meet some situations and challenges in which all the members must react the same. To realize joint consultation, collaboration activity needs to provide group members an environment where they can join and discuss how to achieve the goal from varied perspectives. An effective co-working relationship will be carried out smoothly by taking care of the four dimensions to collaboration design. The dimensions are 1) exchange of information between players; 2) negotiation; 3) leadership; and 4) coordination.

In StoryJam, constant exchange of information, negotiation and coordination are realized through the built-in chat function. Leadership is reflected in the switching role feature. These design elements will be clarified in chapter five.

### 3.1.5 Groups Processing

The group itself must have the ability to tell how well the members achieve the goal, and how effective the working relationship is. It usually requires an assessment system for the self-analysis and promotion of group members’ job abilities. StoryJam gives some players the opportunity to choose superior writings from the submitted stories. Each player evaluates the two final stories from collective storytelling. He/She is able to compare and
tell which one is preferable in his/her opinion. Moreover, he/she is able to see whether his/her writing makes a contribution to the group product.

There are some add-in notions of raising group awareness. For example, participants must know what group they belong to, how to identify their partners, and what progress has been made either by themselves or their partners. Recognizable elements such as having the same colored clothes and symbolic items can effectively show group identity [31]. This has been designed and included in the StoryJam interface. One team’s theme color is blackish green, while the other team’s is yellowish brown (See Figure 3.2).

3.2 Interpersonal Interaction Design

It is acknowledged that the collaboration requires the realization of interpersonal interaction. Human conversation experiences offer useful guidance in interactive design. The overall quality of a conversation depends on the combination and unification of listening, thinking, and speaking. As Chris Crawford defines, "Interactivity is a cyclic process between two or more active agents in which each agent alternately listens, thinks, and speaks." The overall quality of a multiplayer collective game depends on a conjunction of game mechanics and collaborative communication [8, p. 29].

Interpersonal interaction generates competitions, because sometimes people can test their ideas against each other. However, if there are no rules set in the gameplay, it might raise two potential issues: Threadkiller and Loopyboobie [8, p. 282]. Threadkiller means one player throws out an unexpected topic, which impedes others’ progress in shared story creation. Loopyboobie indicates a situation which starts when Player A writes the first story about Jay smacking Sandy. Player B branches it out with a story about Sandy getting angry
and punching back. Player A continues writing Jay punches Sandy. And Player B keeps replying Sandy smacks Jay. As a result, the entire storyline is trapped in a loop without moving forward. Therefore, StoryJam sets rules and assigns players varied roles by means of well-designed game mechanics. In order to normalize players’ performance, the game embeds particular guidance for both individual and collective actions.
4. Applicable Game Mechanics

This chapter reviews game mechanics in commercial games that currently exist. The discussed mechanics include storyline structure in games, design features in traditional text-based games, and collaborative designs in multilayer games. The goal is to sort out some feasible mechanisms that could be applied in enhancing collective storytelling experiences.

4.1 Storyline Structure

Games are built around interactivity and player choices. Whereas some games can be compared to a tree with many branches and choices, a story is normally a line of events that happen one after another. Over time, there’s been a stronger and stronger drive to create games that give players more choices and more control over the story itself [15, p. 9].

4.1.1 Branching Trees

To embed interaction in game stories, designers innovate a Branching Tree module, which divides the storyline into step-by-step events. These events are associated with predictable and critical choices made by protagonists in the game story [8, p. 124]. It gives players the freedom of pursuing interested routines, and offers varied ending scenes according to a combination of decisions they make while traveling in the game. Therefore, players receive a decent amount of control over how the story itself is played out [15, p. 9]. The storyline starts with one beginning story and then extends to several sub-stories
Figure 4.1: A Branching Tree module

based on the given choices. There are two design features behind this type of storyline structure: 1) the degree to which a choice satisfies users' expectation; 2) the amount of choices in relation to the number of possibilities the user could imagine [8, p. 40]. Game designers spend time in experimenting with how to reasonably convert a storyline into linear events with multiple-choice settings.

However, from the player’s perspective, sometimes the preset choice options in a Branching Tree module are either insufficient or overwhelming. Designers realize it is difficult to have one product meet all the participants’ needs, because the degree varies to which a choice satisfies users’ desires, needs, and interests.

In some cases, players stop playing the story of the game, and start tricking the game designers. For example, a player intends to do X, but she thinks designers want her to do Y. She ends up doing Y because she thinks choosing Y will get her to a better spot in the storyline. In such a situation, players start guessing the hidden events based on the offered decisions, and pick up the one that benefits them later in the gameplay. As Eskil states, a player that chooses to say ”No” in a dialog tree may have a vastly different idea
of why she wants to say no than the developer had. This causes players’ characters to do something very different from what they had in mind [22]. Sometimes designers create a part of the storyline with pathos, but players react to the scenario with anger [8, p. 32]. Sometimes one branch module leads in a direction the player doesn’t agree with [22]. The divergence between the players thinking and the designers original intentions causes many design issues in this module.

4.1.2 Foldback Schemes

Building upon a linear storyline, designers later generated a Foldback scheme. It offered players some freedom of walking and fighting in a few scenes during a certain period of time. Then, the storyline was folded back to a predetermined path. In general, it resembles a journey structure that keeps players moving along an intended plot line. At the same time, it provides plenty of features to explore in each stage.

However, the inevitable outcome of the storyline makes the players powerless. There is nothing that they can do to change their characters’ fate [8, p. 126].

The storyline structure in StoryJam is a combination of Branching Tree Module and Foldback scheme. The user-generated story starts with one shared intro story and folds back to one written ending story. While creating sub-stories, two players branch out plots from the previous writing. They offer two possible scenarios for one player to review (See
Different from the original storyline design in research, step-by-step events and predetermined background stories are no longer innovated by game designers. StoryJam gives players the total freedom in creating their own contents.

Figure 4.3: Storyline Structure in StoryJam

4.2 Game Mechanics in Traditional Text-based Games

Research on digitized storytelling goes back to 1985, when Brenda Laurel addressed the notion in her doctoral thesis. In the early 1990s a group of graduate students at MIT began exploring the relationship between traditional narrative and computer science [8, p. 307]. Later on, interactive fictions were innovated in a way where players use text commands to manipulate characters actions and influence environment. The same kind of text-only controls had been developed by Infocom, a software company in Cambridge, Massachusetts in producing text adventure games.

4.2.1 Case Study I: MUD

MUD is an abbreviation of Multi-User Dungeon series games, which was the first online text-based multiplayer role-playing game. MUD1 was produced in 1979. It later expanded two variants called Multi-User Dimension and Multi-User Domain. The typical MUD will start with introducing some details of the area where the player is. Information
includes environmental objects, connected players, non-player controlled characters in the area and all the exits leading to the outside world. Players use text commands such as "go north" or "attack dragon" to control characters actions. Both text commands that resemble a natural language and arrow keys on the keyboard were compatible in MUD. Players were able to interact with both game components and other players on network through typing. Their input text commands determine the flow and outcome of the story.
Game Settings

i. Background Story: A fantasy world comprises fictional races and monsters. Players pick up classes such as archers, swordsmen, wizards, etc. and equip with skills or power relatively.

ii. Multi-player: Multiple players form a team, exploring the world, slaying monsters, and completing quests in adventures.

iii. Player versus Player: It refers to a type of gameplay, which includes interactive conflicts between two or more live players.

iv. Goals: 1) User-generated characters get leveled up along the journey. 2) A story will be scripted as player-controlled characters perform in the fictional world.

Special Features

i. Dice-rolling rules: Inspired by dice-rolling design in Dungeons and Dragons games, events and quests are triggered randomly.

Table 4.1: Game Mechanics in MUD

Even though keyboard typing is the primary gameplay in MUD, the game story is fairly equal to information of players’ action and corresponding in-game events. The main storyline remains unchanged. Text-driven behavior is programmed and predetermined into the system. While playing these games, most players focus on leveling up characters, collect-
ing items and solving puzzles. Thus, writing stories is never the major gameplay in this text-based adventure games.

With the increase of information storage and the development of graphics technology, context in text-based adventure games was gradually replaced by visually intensive assets. Game environments began to be visualized in 2D/3D arts. Background stories were expressed in the form of cut-scenes. Game designers treated stories as an embellishment that they could tack onto their basic design, but not a fundamental component of their products. Stories have little effect on winning or losing.

4.3 Design Disciplines for Multiplayer Games

Multiplayer games offer players a chance to work with or sometimes against their friends in a variety of different tasks. With current networking technology, the web has provided an open space where people come and have fun together. In the meantime, they bounce ideas off each other in collaboration [27, p. 12-29].

Games normally have clear goals for winning. As for collaborative games, the success is gained from a succession of tasks achieved by teamwork [31]. Therefore, game mechanics need to be designed in a way that encourages active participation in collaboration. Many games designers find out Johnson and Johnson’s collaborative design guidelines offer a steady way to bring together multiplayer gameplay with focused, group-driven team-building [25]. The closer the guidelines are adhered to, the more collaborative advantages multiplayer games will gain.
4.3.1 Case Study I: Draw Something

"DrawSomething" is a social drawing and guessing game available in both Apple iOS and Android devices. In each round, it asks one player to draw a picture based on the word he/she picks. By observing the drawing, the other player tries to guess what that word is. If the word is answered correctly, both players are rewarded with virtual coins. In the next round, players switch their roles. The player who was guessing is drawing and vice versa. The game doesn’t require special skills. The simplicity of the gameplay allows players to pick it up and put it down at their leisure.

The whole game is collaborative and social. It doesn’t have scores or leaderboards, and the players in the game are working together in a cooperative manner. Instead of competing against each other, players team up to try to get as far as possible while earning coins. The
game wraps the gameplay in the framework of communication so that players can share experiences and play together.

Integrated with Facebook accounts, players can see a list of friends available to play with when they sign in. With a single click, they can invite a friend to play and easily share their drawings from the game gallery. "It’s more of a social communications app masquerading as a game”, said OMGPOP CEO and DrawSomething game designer Dan Porter [14]. He says that his game emphasizes social interaction over game mechanics. DrawSomething is designed as a virtual environment where players can build mutual understanding and maintain friendship.

| **Game Settings** | i. Two-player: Players take turns between expressing a word through painting and guessing the word from observing the painting. The big challenge of creating a one player versus one player game is usually one player’s success is associated with another player’s failure. To build collaboration rather than competition, DrawSomething solves this problem by rewarding players with points only if they both accomplish their tasks in the turn. As a result, players become dependent on each other and the success comes from teamwork. This design shares the same concept with Positive Interdependence in Johnson and Johnson’s collaborative design guidelines [25]. |
ii. Different Roles: As a guesser, he/she is able to see the painting of a picture played in real time, and figure out his/her partner’s ideas as it unfolds. The drawer can experience a thrill of seeing how long it takes his/her partner to grasp the idea from the picture.

iii. Turn-based: The game keeps switching two players’ roles between guesser and drawer as they succeed in turns. Players stay connected and focused as they view their actions in real time.

<table>
<thead>
<tr>
<th>Special Features</th>
<th>i. Rewards: 1) As the guess is correct, both players get rewarded corns which could either used to buy more colors or bombs. 2) The bomb eliminates letters which are not part of the answer for the guessers. As a drawer, the bomb gives a new selection of the words to draw.</th>
</tr>
</thead>
</table>

Table 4.3: Game Mechanics in Draw Something

The popularity of this type of social games comes from people’s needs to interact with other people. As ideas get conveyed through drawings and the drawings get successfully interpreted by others, players feel their actions become validated and accepted by other participants [16]. Features like switching roles and chat make it more fun for players to engage with each other. Both features have been implemented in StoryJam. The switching roles feature is designed to synchronize players’ actions so that players will keep being
involved in the gameplay. The chat function allows them to communicate and collectively build ideas. In considering the future development, StoryJam can take advantages of social networking communities. Players are able to write and share stories with friends, or even tag friends in the stories.

4.3.2 Case Study II: Massive Multiplayer Online Games (MMOGs)

Massive Multiplayer Online Games introduce a new game concept with increased interactivity and a large scale of participation [10]. They generally contain fantastic themes, which fulfill players’ imagination. Group tasks and duties call for interactivity among players. Conquering game challenges require teamwork skills.

Figure 4.6: Game Interface of World of Warcraft
Game Settings

1. Massive Multi-player: Players carry different styles, goals and temperaments to their gaming. Their personalities influence their behavior and the experiences of other players. The classification of players’ roles helps game designers understand the players’ motivations. The motivations affect the game design with regard to building collaboration.

According to Bartle’s analysis of player behaviours in MMORPGs, players with similar motivations can be categorized into four groups [4]: 1) Achiever: players who are high on need for achievement within the game context; 2) Explorers: players who enjoy exploring the game world and collecting items; 3) Socializers: players who join the game to make fit for companionship with others; 4) Killers: players who seek for power and control upon other players. Some players’ motivations can be reflected by the type of characters they create in the game.
To balance different players’ personalities in order to build teamwork, Bartle suggests to group players according to two dimensions: 1) acting versus interacting; 2) orientation towards players versus towards the world. Of those oriented towards other players, killers act and socializers interact. Of those oriented toward the virtual world, achievers act and explorers interact. When explores team up with achievers, explorers will indefatigably search for new items in the fantasy world. In the meanwhile, achievers can ensure the quality of the achievements along the journey.

ii. Rules: By introducing collaborative activities, the set of rules need to cover relations between group members. This relation relies on dependencies between the group members. The dependencies must be translated into a set of rules.

iii. Shared Objectives: The specific objectives for each milestone must be designed in a way that it must be solved by the group members together. In other words, the group must decide on how to solve the problem, share out the tasks, plan strategies and so on.
iv. Victory Condition: The individual victory depends on the result of the team or group in the actions. The individual success or failure can provoke the success or failure of the group. The victory becomes the group victory.

Special Features

i. User-generated Content: Customized attributes and content can please players. User-created and user-generated game elements make players become co-developers with other players. Their personal game experiences get intersected through collaboration.

ii. Rewards: It gives a ”big” reward for the team success, whereas ”little” individual rewards for individual success.

iii. Rhythm: The actions of the game need to be balanced on the basis of individual progresses and team experience.

Table 4.5: Game Mechanics in Massive Multiplayer Online Games

A few points in Massive Multiplayer Online Games’ design are relevant to Johnson and Johnson’s collaborative design guideline [25]. For example, differentiating roles and responsibilities between individuals and groups realize Positive Interdependence and Individual/Personal Accountability. Setting common goals and shared objectives has been suggested as a way of facilitating teamwork in Positive Interdependence. StoryJam has
experimented with varied roles and responsibilities in designing variations and balance. Collectively developing sub-stories in teamwork with the same intro story, ending story and four keywords is the common goal for both teams. Additionally, since user-generated content appeals to players, stories and keywords in StoryJam are intended to be set as user-created assets.
5. StoryJam

StoryJam is an online multiplayer game built with Unity, a game creator/engine. Game mechanics in StoryJam aim to forge collective storytelling and entertainment into a single unified whole.

5.1 Game Process

The process of collective storytelling in StoryJam revolves around four steps: 1) Intro Story, Ending Story and Keywords Creation; 2) Sub-Story Creation; 3) Assessment; and 4) Scoreboard.

Player 1, Player 2 and Player 3 are in Team 1. Player 4, Player 5 and Player 6 are in Team 2. Team 1 has blackish green as its theme color, while Team 2 has yellowish brown
(See Figure 3.2). Each player’s user profile is shown at the bottom of the screen as he/she logs in the game.

In the Intro Story, End Story and Keywords Creation section, different players will be assigned different tasks (See Figure 5.2). Player 1 is in charge of typing the Intro Story. Player 4 is in charge of typing the End Story. The rest of the players need to offer keywords for the later story creation. Each team can discuss their ideas in the team chat panel on the right side of the game interface (See Figure 3.3). After the submission, players will be notified that the content has been successfully uploaded. The finished content of Intro Story and Ending story will be sent across the network and shown on the left side storyboard.

StoryJam sets the character limit to a maximum of 140 characters for each user-generated story. This idea is borrowed from 55 Fiction contest and Twitter’s message constraints. The moderate typing speed of average computer users is 175 characters per minute [6]. Thus, the game gives players 1 minute to brainstorm the story and 1 more minute to type in the content. In this section, six players have 2 minutes to finish their roles.
When all six players finish their tasks, the game will move to the Sub-Story Creation section (See Figure 5.3). Player 1 and Player 4 will be chosen as Judge for the first round. Player 2, Player 3, Player 5 and Player 6 are titled as ”StoryCreator”. As Judge, the player starts with assigning keywords to StoryCreators. The keywords are the ones created by Player 2, Player 3, Player 5 and Player 6 in the Intro Story, Ending Story and Keywords Creation section. StoryCreators can decide whether to use or not to use them in their writings. Each StoryCreator has 1 minute and a half to work on his/her story. He/She can spend half a minute in designing the sub-story, and finish typing in one minute. Working in parallel with StoryCreators, Judges have 2 minutes to go through the process of assign-
ing keywords, reviewing stories from StoryCreators, and choosing a preferable one. The chosen content will be filled in the left-side storyboard. The author of the selected writing will become the Judge in the next round. For example, if Player 1 picks Player 3’s writing in the first round, the game will switch their roles in the next round. Player 3 becomes the Judge while Player 1 becomes the StoryCreator. This turn-based design ensures no one will stay as the Judge for two consecutive rounds. In addition, the switching role feature can keep players being involved in the gameplay. In summary, a round in each team is generated according to the following steps: 1) Judge assigns Keywords to two StoryCreators; 2) StoryCreators develop stories and submit them to Judge; 3) Judge chooses his/her preferable one from the submitted two stories from the StoryCreators; and 4) The game switches players’ roles between Judge and StoryCreator. This type of gameplay will run three rounds in each team. Two teams work in parallel and each team develops sub-stories individually. The moving bar behind the storyboard panels is used for notifying the player of his/her own progress, as well as the progress of the team he/she belongs to. Each team will spend 6 minutes at most on finishing all three sub-stories.
Figure 5.3: Six Players’ Game Interfaces in Sub-Story Creation section

When both teams finish the Sub-Story Creation section, players will move to the Assessment section. Each player gains a chance to read two team-built stories with the same intro and ending stories. The used keywords in the final writing are shown underneath the context panel (See Figure 5.4).
People are able to read at 900 characters per minute on a monitor [34]. The maximum amount of characters in the two final stories is 1400. However, players have worked on one in the game. In this section, they only need to read another team-built story, which consists of 700 characters at most. Therefore, the game gives players one minute to choose their favorite piece. Until all decisions have been made, the game will go to the Scoreboard section, which reveals the winning team. Players can hit the "Download" button to save the winning story (See Figure 5.5).
In order to show how StoryJam facilitates collective storytelling in the playtesting, two flowcharts with user-generated stories written by one group of testers have been made (See Figure 5.7, Figure 5.8 and Figure 5.9). StoryJam contains six story themes: Romance, Adventure, Comedy, Fantasy, Mystery, and Horror. The game randomly picks one when a group of six players join in. In this playtesting, players received “Adventures” as the theme word. Figure 5.7 lists the intro Story, ending Story, and four keywords generated by the players. Two teams’ actions in the Sub-Story Creation section are shown in Figure 5.8 and Figure 5.9. Stories flowed from one player to another with the switching role feature. In Team 1, as Player 1 chose Player 3’s writing in the first round, he/she would continue designing a sub-story based on this chosen story in the next round. As both teams finished developing sub-stories, players entered the Assessment section (See Figure 5.9). Player 1, Player 3 and Player 5 voted for Team 1’s story, whereas Player 2, Player 4 and Player 6 voted for Team 2’s story. After evaluating both received votes from six players and the

Figure 5.5: Download Winning Story
amount of keywords used in the final writing, StoryJam revealed the winner is Team 1’s writing.

Figure 5.6: Six Players’ Actions in Intro Story, Ending Story and Keywords Creation section
Figure 5.7: Six Players’ Actions in the first two rounds in Sub-Story Creation section
Figure 5.8: Six Players’ Actions in the third round in Sub-Story Creation section, Assessment section and Scoreboard section
5.2 Approach/Method

To concretely demonstrate how game mechanics in StoryJam are designed for fostering collective storytelling, the major game features are listed in the table (See Table 5.1). The purpose of each individual design along with related theories will be explained in this section.

<table>
<thead>
<tr>
<th>Game Mechanics</th>
<th>Players</th>
<th>Variations and Balance</th>
</tr>
</thead>
</table>
|                | Two teams, three players per team: The game allows two teams to compete and encourages players inside each team to collaborate. It builds both competition and collaboration to facilitate players in collective storytelling. | i. Random-generated Story Theme: The game generates a randomized topic every time when a group of six players join in the game. In addition, this feature provides constraints and helps the players to focus on their creativity.  
ii. Varied Roles and Responsibilities: The game assigns different roles to players in order to build group working experiences. |
| Rules and Boundaries | i. Time Limits: The time constraints keep multiple players spending time and sharing experience together. At the same time, they balance individual/group progresses in order to provide a better team game experience.  
ii. Character Limits: The character constraints add a secondary challenge to writers’ skills.  
iii. Turn-based Rounds: Players will be assigned different roles as the game continues. The winner of the previous round is rewarded with a larger responsibility for the current round. This feature ensures that no one will stay as the judge for two consecutive rounds. It is intended to keep players motivated and engaged. |
| Resources | User Profile: Each player has his/her own profile data stored in the game. It keeps each player’s personal information, including log-in times, the amount of stories written in games, and the number of votes received from other players in the network. |
| User Generated Assets | Stories and Keywords: They are shared and constantly updated through network. The related keywords functions serve as both the seeds of creative writing and obstacles/rewards for the gameplay. |
Stories developed by teams: Each final story consists of one intro story, one ending story and three sub-stories.

Table 5.2: Game Mechanics in StoryJam

5.2.1 Players

StoryJam supports a six-player online gameplay. Players are split into two teams, so that three players form a team. Setting the number of players as three instead of two per team is to avoid Threadkiller and Loopyboobie situations in interpersonal interaction design. The game aims to generate competition between two teams and build collaboration inside each team.

In the first section of StoryJam, team tasks are varied. Team 1 needs to come up with one Intro story. Team 2 is asked to give an Ending story. Players are able to discuss their ideas with teammates through the built-in chat. The chat function facilitates Individual/Personal Accountability and Social Skills in the gameplay. While playtesting StoryJam, players were inclined to ask for ideas and suggestions in the chat panel. Activities in this phase appear to be more collaborative than competitive.

Starting from the second section, teams rival each other in developing scenarios from the posted Intro Story to the determined Ending Story along with four user-generated keywords. The competitive phenomenon stays until the Assessment section, which gathers six players to evaluate the final stories. Groups Processing is achieved in this section, with
50

players analyzing how well both teams accomplish the story and reviewing their own contributions to the team-work writings.

5.2.2 Variations and Balance

Learning from the first case study in structured storytelling events, setting themes can help center the topic in group discussion. StoryJam contains a function that generates a randomized topic each time a group of six people join in the game. The topic is selected from six story theme words. They are Romance, Adventure, Comedy, Fantasy, Mystery, and Horror. This feature first imposes constraints upon the brainstorming topics, preventing them from being too wide-open. Thus, players are able to focus their creativity upon the selected theme. Secondly, it creates a unique experience that every time a group of players join the game, the theme word will not stay the same.

In the Intro Story, End Story and Keywords Creation section, one player is in charge of submitting either the Intro Story or the Ending Story depending on which team he/she is on. The rest of the players are responsible for offering keywords.

Sub-Story Creation section introduces the switching role concept inspired by Draw-Something. Players steadily create sub-stories in three rounds. In each team per round, one player acts as Judge and the other two players are StoryCreators. The Judge’s role is to assign keywords to StoryCreators and determine whose writing is superior from the two submissions. He/She is rewarded a larger responsibility and acts like a leader, evaluating the performance of the other two players in the team activity. Hence, leadership in Social Skills factor has been realized through this Judge’s role. StoryCreators decide where to use the assigned keyword in their writings, and at the same time, strive to develop a solid
Sub-Story.

As the StoryCreator becomes Judge in the next round, he/she can get ideas of how people develop their writings from other perspectives. While a writer is writing from his/her own point of view, he/she is also reading the other players’ work from a reader’s point of view. The players gain insights from multiple players’ stories. In the meantime, players will always be aware of working in a teams.

Therefore, this kind of switching role feature arouses group awareness, facilitates situated thinking and understanding, and establishes shared meaning of community. By mingling different roles in group working experience, StoryJam encourages players to collectively sketch out the setting and constraints of the potential stories, and keep them motivated and engaged.

5.2.3 Rules and Boundaries

To offer a better team game experience, the individual gameplay and team gameplay need to be balanced along the progress. Learned from the Rhythm feature (See Table 4.4) in Massive Multiplayer Online Game Design, StoryJam sets up time limitations in order to synchronize individual players’ action along with teams’ actions. Every activity is given a limited time frame so that players must accomplish their tasks by a certain period of time. Once the time limit is up, the game should drive the entire team to the next activity. However, due to the very limited production time, the time-out function has not been well implemented in StoryJam. Currently, it ideally assumes that players will all finish their roles within the time frame. The game lacks a scene about what would happen if the team runs out of the time as a whole. This topic needs to be further explored in the future work.
StoryJam attempts to use time limits in managing the rhythm and pacing of the game. The goal is to ensure that neither individual players nor the entire team has to wait long for certain players to finish their roles.

Along with the time limits, StoryJam sets the character limit to a maximum of 140 characters. This concept is inspired by 55 Fiction contest and character constraints in Tweeter. It is intended to add a secondary challenge to writers’ skills in designing good stories within limits.

In Sub-Story Creation section, each team will continually develop stories in three rounds. Some players might switch either from Judge to StoryCreator or from StoryCreator to Judge as they move to the next round. Some players might stay as StoryCreators from the beginning to the end of the game. However, since Judge has larger responsibility in each round, this turn-based design ensures no one will stay as the Judge for two consecutive rounds.

### 5.2.4 Resources

Each player has his/her own profile shown in the game. It includes log-in times, the number of selected sub-stories in the Sub-Story Creation section, and the number of received votes from other players in the Assessment section. The information motivates players to join in the game in order to post more stories or gain more votes. The system should keep storing the latter two types of the information as players play through the game. The winner team’s players’ data will be multiplied by two. Therefore, the game grants a bigger reward for the team success. This concept is inspired by Massive Multiplayer Online Games’ Rewards design.

Unfortunately, since StoryJam doesn’t contain a database to save user information, this
feature has not been fully implemented. Currently, the user profile is only used to differentiate players’ weight in the Assessment section. The detailed calculation algorithm for the final result will be explained in the Outcome section.

5.2.5 User Generated Assets

In StoryJam, stories and keywords are all produced by players. It only restricts story theme, time frame and the number of characters to challenge players’ writing skills within limits. It gives players total freedom in writing.

Efficient information exchanges enhance the effectiveness of collaboration. Therefore, stories are constantly updated through the network. Players can see the uploaded content on the left side storyboard all the time.

The keywords assignment function acts as the seeds of creative writing. The use of keywords are similar to the use of Kigo and Kireji in Haiku Gathering. It serves to evoke StoryCreators’ imagination. Furthermore, the amount of used keywords in the final team-built story has been implemented as extra points in the team score.

5.2.6 Outcome

The team score is calculated based on voters’ user profiles and the amount of used keywords in the final story. The formula is: Score = voters’ log-in times + the number of voters’ selected sub-stories + the number of voters’ received votes + 2 * the amount of used keywords. It counts each players’ user information in the final evaluation. The vote from the player with a higher sum of log-in times, the amount of selected sub-stories and the number of votes have bigger impact on the final result. The use of keywords adds bonus
points to the score.

StoryJam doesn’t have a solid design for the tie situation because the game is designed to promote competition between the two teams. When the score ties, both teams become the winner. Players are able to save both team-built stories in one text file.

Each player contributes to the final piece in one way or another, because he/she participates in designing either the Intro Story or the Ending Story. Some parts of the story may be directly written by him/her. His/Her offered keywords influences the subject of the story. Both winning and losing story are a product from collective storytelling. However, in current StoryJam, players are only able to save one winning story unless they meet the tie situation.
6. Conclusion and Future Work

In this thesis document, an approach to designing an online collective storytelling game has been put into practice. Based on research in traditional collective storytelling and collaboration activity, game mechanics in StoryJam are designed to not only realize but also enhance collective storytelling experiences. It contains in-team collaboration and two-teams competition. Collective storytelling activity is structured with particular game rules.

On the basis of research and the informal testing, the concept was implemented in the game - StoryJam. After realizing the design features in a 3D game engine, an informal user test with two groups of players was hosted. Each group played StoryJam three or four times.

According to the observation of players’ reaction while playtesting, it seemed like they were enjoying this collective storytelling game. Even though players were sitting in the same room, they shared ideas and asked for opinions in the team chat. They confirmed that the game caught their attentions in shared writing and reading activities. They became aware of developing narratives in teams while working on varied tasks in both Intro Story, Ending Story, and Keywords Creation section and the Sub-Story Creation section. They felt engaged and motivated as the game switched their roles in turns. Thus, in some degree, the idea of using game mechanics to facilitate collective storytelling is feasible and practical.

As far as future work is concerned, the next step will demand a formal user centered study for the evaluation of the user experience. It is necessary to have a full experimentation running for a month with at least fifty players. Therefore, StoryJam can be further evaluated
as a game for enhancing collective storytelling experiences. After taking feedback along this user testing, the current game mechanics in StoryJam will be polished once again.

There are a few valuable lessons learned from the feedback gathered during the informal user testing. Firstly, players tend to have different opinions on the length of time set in the tasks in the Sub-Story Creation section. Most of them think it is too short to think over the story and finish typing the content. Therefore, for the future testing, the game should contain some options with varied length of time in order to find the most suitable time range. Secondly, the current version of StoryJam requires six players to remain on a network at the same time. If anyone loses his/her connection, all six players have to restart. In the future development, the game should include a design for the poor networking situation. For example, when one player loses his/her connection, the other players will pause and wait for 10 seconds. If he/she connects back within 10 seconds, the game continues. If he/she still fails to connect, the system will search for someone available on the network and replace him/her with this new player. Players also suggest that StoryJam should support a gameplay mode with less than six players, because sometimes it is hard to keep six players connected to a game at the same time.

Due to very limited research time and production time, there are two more research topics awaiting further exploration and contemplation. The first one is how to solve the situation where any team or individual fails to finish the story on time. The second one is whether this game needs a tie situation.

The potentially extended gameplay could be the display of two progress bars for notifying both teams’ progress in each player’s interface, a database to support user profiles, in-game help/feedback system, a trading system, gradually increased difficulties or ran-
domized obstacles, etc. In addition, StoryJam can be combined and used in conjunction with social networking communities such as Facebook, Twitter, Google+, in order be expanded as an application on hand-held devices, shooting for a bigger community.
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