Interaction as Storytelling: A Framework for Structuring Stories From the Perspective of Quantum Theory

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Abstract
This research is based on teaching practices and proposes a framework for considering storytelling as a creative method for art students. Inspired by *trans-disciplinary* thinking, I compare some aspects of quantum theories as an analogy with my interpretation of interaction. In the practices of art and design, creativity is the most vital ingredient as its appearance is unpredictable, just like quantum leaps. Referring to the quantum theory, the eleven dimensions of space-time might show similar patterns with information exchanges. By designing interaction, it is intended to help analyze storytelling and offer interactive information for the further oriented design. How to inform, set up or maintain entanglement, the quantized storytelling might bring insights into the meanings of the art and why it matters. The coincidence between certain quantum rules and the interactive characteristics, might give a new perspective to philosophy, humanities & social sciences improvements.

Keywords: Interaction, Quantum Theory, Hyper-Dimension, Storytelling, Art Education, Creativity

Introduction

From my own experience as a game designer in the professional industry and then a lecturer of animation in higher education, there are many students and practitioners facing the challenges of producing creativity. By identifying the problems, I am trying to develop a teaching tool and also a way of thinking by constructing storytelling to seek more possibilities for art and design. “The sudden appearance of idea has been explained as quantum leap” by Koyama and Niwase(2017, p.3) has enlightened me by posing creative ideas with quantum theory.

In this research, I try to apply *trans-disciplinary* thinking to creative industries starting with “interaction design”. It is of vital importance to realize the relationship between the artwork and the audience, the people and people, the physical feelings and mental cognition. In the practice of interactive art and design, I am drawn to the fascination of how to set up and maintain certain entanglement. In the early research, some concepts from quantum mechanics are referred into the interaction design. And the experimental framework of “Interaction Hyperspace” is used as a creative method for generating narratives and innovative ideas. In this article, I will introduce the background of my research, the theoretical framework, intended practical approaches and examples.

Beginning with “what is interaction”, my initial plan of interactive design has evolved into a sort of meta-design which takes into account all inter-relationships within art and design area and offers a potential solution. In stimulating creativity, the method I am trying to develop is based on the ability of storytelling, so that it might benefit the core of design and psychological and philosophical perspectives behind all art and design.

Problems (Motivations)

From the carving figures in the ancient caves to the graffiti on the modern streets, the images are something people keep trying to comprehend and seeking the stories behind them. In my opinion, it is the nature of humans, consciously or unconsciously, to be keen on unscrambling what they see and feel. Especially in art and design industries, the works are made to interact with the audience by specific storytelling methods.

My early career in professional creative industries requires young practitioners to provide effective and unique innovations. My past experience reminds me of the importance of creativity. In the teaching practices for university art students, especially for the major of animation, I am facing the challenges of helping students to generate their own creative ideas and storytelling skills. There is a common situation that college students often face the lack of originality and their storytelling skills are pale and unempathetic. One of the possible reasons might be that the students’ growing environment is simple and relatively isolated and their observation of life towards the various materials is replaced by the pressure of college entrance examination. Apart from their similar daily routines, their channels of acquiring information mainly rely on social networks. The current personalized push systems of the internet are based on big data and accurate delivery, which brings more pleasant customized service experiences as well as more narrow horizons of other possible information. It is the so-called interest that drives people to stay in their comfort zones and immerse in psychological alcohol. Sometimes, people are lucky enough to realize that their lives lack of creativity and fresh ideas. However, there are no better options to show them how to improve

this situation. Being one of them myself, I have been working on keeping the introspection and setting off some sparks from time to time.

The aims of my research are based on this phenomenon and trying to propose a creative method for people to design, think and maybe live.

Research Questions

The purpose of this practice-based research aims to build up a creative framework of storytelling to benefit the practices of art and design. Notably, this framework is based on "Interaction as Storytelling" combining some aspects of quantum theories. By outlining an eleven dimensional framework of *Interaction Hyperspace*, it might stimulate the creative process in producing innovations and analyzing the storytelling within artworks.

There are the Research questions:
1. What is *interaction* from the perspective of quantum theory?
2. How do the quantum theories relate to storytelling which builds the foundation of art and design?
3. How does the framework *Interaction Hyperspace* work for increasing creativity?

Literature Review

As John Polkinghorne (2002, p.26) once claimed, "Classical physics describes a world that is clear and determinate. Quantum physics describes a world that is cloudy and fitful". When narratology meets with quantum physics, the multiple interpretations of narrativity could be seen as the possibilities within the multiverse by its readers' or observers' view.

Boje(2014, p.201) also proposed *Quantum Storytelling* "by outlining a three-part model of the storytelling process: Empiric Stories, Epistemic Narratives, and Ontological Living Stories, each as connected to one-another through the antenarrative process." He looked at the processes of turning subjective experience into narrativized understanding and brought his 11D's approach of ontology to the surface.

In Tang Li's(2013,p.11) view, "the transdisiplinary quantum narrative brings fresh vigor to post-classical narratology and also offers a new method and cognitive pattern to the creation and explanation of literature". The moment when the story's ending is spotted, is like the opening of the box containing *Schrodinger's Cat*. It is not the moment when the universe breaks apart, but the moment when the observer becomes aware of the universe in which the story is set.

Referring to some aspects of quantum theories, *Interaction as Storytelling,* as my working definition, might show similar patterns with information exchanges. Therefore, I compare the *quantum entanglement* to the information loop of interaction, like making phone calls, online chatting or eye contact, etc. Also, A photon, as an elementary particle, is a quantum of the electromagnetic field, is like the BIT from the theory of information which is the smallest unit consisting a story. In the practices of art and design, interaction is usually unpredictable just like *quantum leaps*. The latest research indicates that there is signals detected before *quantum leaps*. I would imagine it is like some sort of signals before certain interaction. For example, the ringing before we pick up the phone. Then, the intervention to reverse the

quantum leaps might be seen as cutting off the interaction or hanging up the phone. The comparison of terms is shown on below (Table 1).

Quantum terms	Interaction terms
Quantum entanglement	Information loop of interaction
Photon	BIT (information)
Quantum leaps	Interaction
Signals before quantum leaps	Signals before certain interaction
Reverse quantum leaps	Cut off interaction

Table 1: Comparison of Terms

The Framework

By designing the storytelling, it is vital to realize the relationship between the artwork and the audience, the people and people, the physical feelings and mental cognition. In the practice of interactive art and design, I am fascinated with setting up and maintaining certain entanglements.

Therefore, I am proposing a framework of storytelling: eleven is the maximum space-time dimension in which one can formulate a consistent supersymmetric theory, as was first recognized by Nahm (1999, p.7). Referring to the theory, this framework presents eleven dimensions of interaction and uses "Interaction Hyperspace" (Figure 1) as my early working title. The eleven dimensions (11Ds) are Location, Action, State, Time, Interaction, Entangled Results, Time of Interaction, Possibilities, Intensity, Result to the outside and Memory. Notably, there is also considered to contain a zero dimension, which is the nomination of a certain main object to conduct interaction.

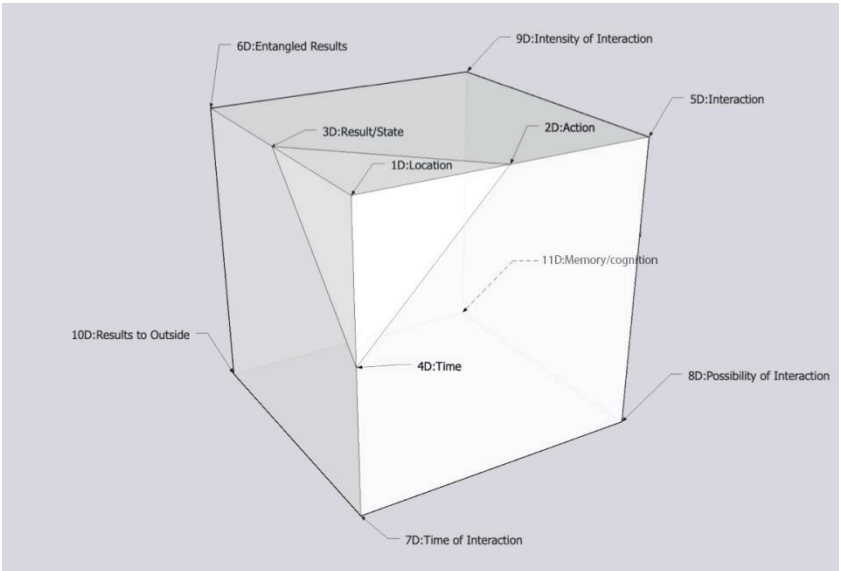

Figure 1: The Model of Interaction Hyperspace

As shown in this model, a tetrahedron is included in this model, which carries the most vital elements, the first four dimensions (4Ds). By changing the first 4Ds, the model would be

altered into different stories. It is set to be encouraging possibilities and risks than seeking the one and only answer.

As we know, "the Five W's" of Communication helps create information in the context of meeting an audience's needs (Hart,1996,p.139). There are Who, What, When, Where, and Why, which are often used to direct storytelling as the basic structure. Compared with this classic strategy of structuring stories, my proposed 11Ds model emphasizes the relationships and impacts between objects instead of the main characters. The model could be deconstructed every single binary relationship including people with people, people with things, things with things, people with environments or even people with their own minds.

In my current understanding and demarcation of interaction, the definition of interaction might be generalized, including more species and types. In that sense, I intend to release the limits of imagination in storytelling behind designs and encourage more people to challenge the rules and themselves. The research will be based on practical applications, including university teachings, industrial designs and even trans-disciplinary communications. As the method is a creative stimulation, it might show people from not classical creative areas with a brand new idea of out-of-the-box thinking.

Deconstruction and Construction

As Jim Jarmusch(2013) announced, "Nothing is original. Steal from anywhere that resonates with inspiration or fuels your imagination." "Always remember what Jean-Luc Godard said: “It's not where you take things from - it’s where you take them to." I believe that corresponds to all methods involved with deconstruction and construction. In my working framework, it doesn't deviate from the track of the golden rules for creative combinations. The break-up and reestablishment process is based on the perspectives of interactions and focuses on the entanglement of relationships and results.

By identifying the 11Ds of interaction, it is intended to help people analyze a certain interrelation between the focused ones. To some extent, it aims to deconstruct a story, a product or an event to expose its potential problems with innovations.

The first 4Ds (tetrahedron) presenting Location, Action, State and Time will establish a new story for design or re-construct the original structure and bring new perspectives into the initial ones. By altering one or several parameters, the following dimensions of interaction will change into a new 11Ds system.

The deconstruction and construction process could be evolved over multiple iterations until the storytelling structure is creative and satisfying to the designers or artists. As a tool of creative minds, the being within the interaction could be replaced in different situations. For example, the design of table could be seen as an interaction between a table and people (consumer, producer or seller), the environment where it is placed, or even the material the table made from. All kinds of situations result in various interactions leading to different designs.

The Practices

My research focuses on the possibilities of the development of professional practice of art and design and creative solutions through action research. It’s trying to conduct several

practices of teachers' or designers' action research. In one practice, I plan to develop a mobile application(Figure 2) to explain my framework and collect data from individual or group works.

In the university teaching practice, this creative method is intended to be a teaching tool conducted by the researcher or by other lecturers with the researcher doing observations as an outsider. It might be easier for the interaction between the lecturer and the students and the digital process of producing creativity enhances efficiency.

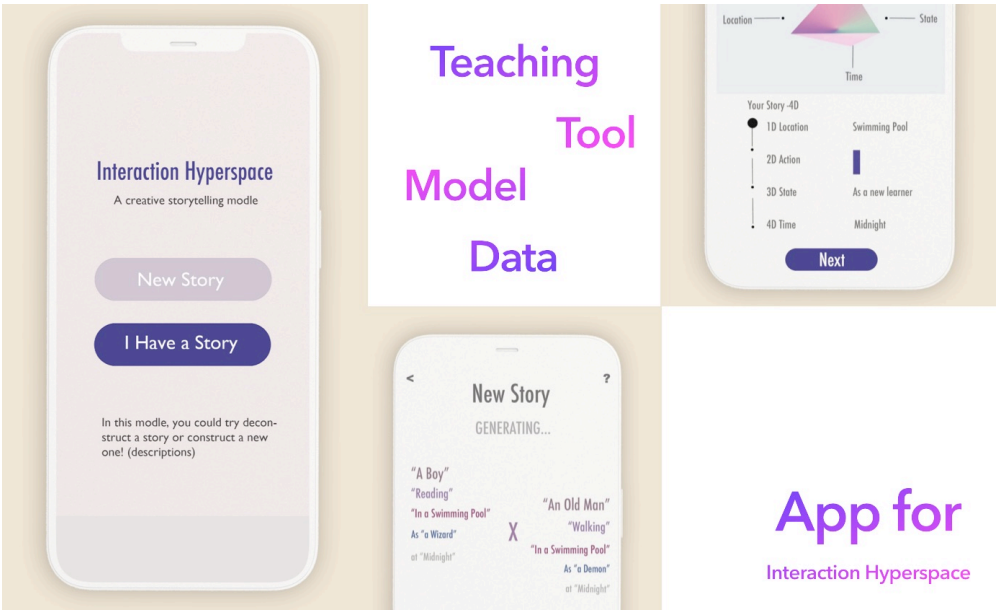

Figure 2: App Design for the Framework

Examples

When a story is described as " To search for the true meaning of oneself, a kid set foot on the adventures and eventually has grown up as a new self", this classic film theme suggests many possibilities and combinations of characters.

Firstly, to try to deconstruct a story from this theme, a successful example might be Harry Porter's series by J.K.Rowling. It tells a story of a magic world from a boy wearing his glasses. The 11Ds could be derived from the main story in the following table (Table 2).

0D	Object	A gifted boy, Harry Porter	Lord Voldemort
1D	Location	Hogwarts, school of magic	Hogwarts and the magic world
2D	Action	Go to school to learn magic	Revenge and reborn
3D	Result(State)	A famous boy in the wizard world but grew up miserably as orphan in non-magic world	Coming back from "dead"
4D	Time	When Harry turned 11 years old	In 1981, after attempting to kill Harry Potter
5D	Interaction	Harry's forehead left a scar by Voldemort instead of death, and he tried to protect himself and others from Voldemort.	
6D	Entangle Result (to selves)	Harry got his own life lesson's to defeat the evil in the world and of himself.	
7D	Time of Interaction	18 years.	
8D	Possibilities of Interaction	Very surprising and unlikely (1/10)	
9D	Intensity of Interaction	Strong and highly influential (9/10)	
10D	Result to the outside	World-changing result: save the world from Voldemort.	
11D	Memory/Cognition	The whole experience affects many people's life and souls.	

Table 2: Story Structure of *Harry Porter*

The first interaction between Harry Porter and Voldemort happened when Harry was one year and three months old. The notorious dark load Voldemort encountered his first downfall and was ripped from his body. The boy became a legend in the wizarding world but was raised by his aunt's family and was brutalized as a cursed orphan. They came across each other again when Harry went to Hogwarts and was entangled with friends, tutors, and enemies. The figure (Figure 3) below briefly indicates the track of interactions between Harry and Voldemort: the two individuals intersect from different start points and then develop tangled relations and finally are doomed in one's extermination.

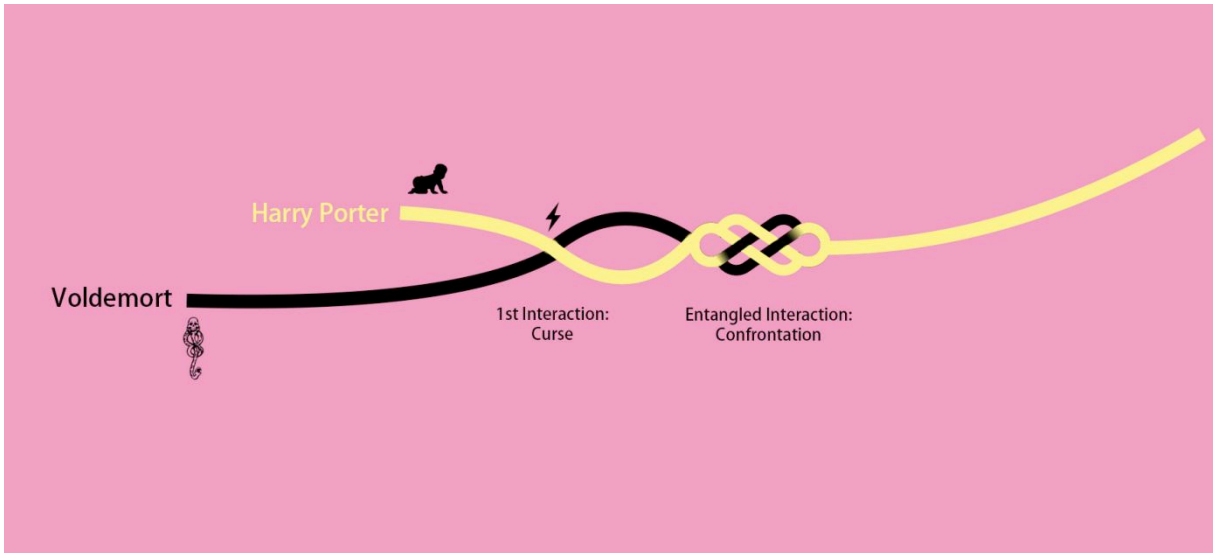

Figure 3: The Visual Narrative of Harry Porter

What made this story so-called successful and interesting, might lie in the character's state. A boy carrying a special mission departs from other normal kids against the biggest antagonist.

The narrative design follows the key information in the 4Ds and eventually formulates memorable interactions.

What are the other possibilities for designing this theme? By altering the location,action, state and time, the model of interaction could be developed into a different new story(Table 3). Especially, when the location becomes a critical setting, the story's world might fulfill unexpected plots.

0D	Object	A girl- Chihiro Ogino	Rival- Yubaba
1D	Location	The spirit world	The spirit world
2D	Action	Was traveling to her new home	Runs a bathhouse
3D	Result(State)	A normal and effeminate kid	Strong witch
4D	Time	At 10 year's old	When she serves customers
5D	Interaction	Chihiro and her parents accidentally run into the spirit world, and she had to work for Yubaba for getting out.	
6D	Entangle Result (to selves)	Chihiro grew up and learn that what is important to her.	
7D	Time of Interaction	For several days	
8D	Possibilities of Interaction	Less likely- Chihiro was not supposed to enter the spirit's world(2/10).	
9D	Intensity of Interaction	Very strong- Chihiro fought for her own destiny and free her parents and Haku.	
10D	Result to the outside	Haku and many people around Chiriro affected by her and feel love and meaning of lives.	
11D	Memory/Cognition	"Once you do something, you never forget. Even if you can't remember."	

Table 3: Story Structure of *Spirited Away*

The uninvited human family of Chihiro went to the spirit world and the parents were cursed into pigs by their greed, while the 10-year-old Chihiro had to work in a bathhouse for witch Yubaba to save her family. Yubaba took Chihiro's name in exchange for her staying and put up innumerable obstacles deliberately. That interaction between themselves makes up the conflict and epitasis of the narrative leading to later plots' development.

These two examples are trying to present similar plots and theme that might end up as totally different storytelling in which the core idea is prominent for an unique innovation: a paradoxical behavior, an unexpected scenario, a surprising time perspective or state transforming. In creative writings, the interactions set the vision of the dramatic narratives while influencing the user interfaces and experience in general art and design. Hence, to deliver the appropriate information to the audience and to design the design of it are the current vital tasks in this research.

Conclusion

The framework for structuring stories, "Interaction Hyperspace", is still an early working structure and is proposed to be developed into a new method helping people from the creative industry to analyze their art and design and adjust it along with perspectives of sociology and psychology. At the present stage, I have used this framework in script writing and animation planning teaching practices. It has shown its advantages in encouraging students to produce more design concepts and providing diverse possibilities in design thinking. In the case study practices, my next stage of the research work might focus on the students responses based on various backgrounds and how the framework works in multi-culture classrooms.

References

Boje, D. M., & Saylors, R. (2014) An ontological perspective on process. *Language and communication at work: Discourse, narrativity, and organizing*, pp.197-218.

Hart, G. (1996) The five W's: An old tool for the new task of task analysis. *Technical communication*, 43(2), 139-145.

Jarmusch,J. (2013) Things I've Learned: Jim Jarmusch, *MOVIEMAKER*, https://www.moviemaker.com/jim-jarmusch-5-golden-rules-of-moviemaking/

Koyama, K. and Niwase, K. (2017) 'A Linear Approximate Model of Creativity in Quantum and Chaos Theory', *NeuroQuantology*, 15(4). Available at: https://doi.org/10.14704/nq.2017.15.4.1038

Nahm, W. (1999) Supersymmetries and their representations. *In The World in Eleven Dimensions: Supergravity, Supermembranes and M-theory,* pp. 7-24.

Polkinghorne, J. (2002) *Quantum theory: A very short introduction*. New York: Oxford University Press Inc.

汤黎. (2013) 量子叙事: 一种全新叙事模式. *国外文学*(4), pp.11-18.