# The study on the advantages of applying interactive narratives in service prototyping

Keyword: service design thinking, service design prototype, storytelling, interactive narrative, interactive digital narrative

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2023/4/11

# Abstract

This thesis aims to analyze the possibilities and advantages of using interactive narratives as a prototyping method for service design through literature and case studies. Through relevant literature and case studies, we understand the special characteristics of service prototypes and the advantages of traditional storytelling in making service prototypes, sort out several commonly used service prototyping tools, analyze their advantages and limitations, and then analyze the possibilities and advantages of adopting interactive narrative methods to meet these challenges. Storytelling is a common method we use to convey experiences and insights in the design of service prototypes that can help users more easily understand or support new service concepts. Interactive narratives allow users to transform from audience to participant and creator by giving them permission to act in ways that can positively influence the story, and ongoing interactive behavior can also increase the immersion of the storytelling experience. Interactive stories that include a physical scene setting can enhance the persuasiveness and authenticity of the prototype, allowing users to interact with the new service concept in a realistic environment and designers to observe feedback from interactive behaviors that are as close to the real thing as possible. And interactive electronic narratives can leverage the nature of the Internet to amplify the dissemination of feedback and give users the space to comment in real time.

# Introduction

## Personal experience

Because of the intangible nature of services, designers need to visualize abstract service propositions into tangible content that can be discussed to get feedback from organizations or users, a process called co-creation. in the design team, also as a communication tool for co-creation. Validating the feasibility of the current concept or gaining more inspiration leads the project to the next design phase.

“The design process can be viewed as a communication process. Co-designing means involving different people with different backgrounds which might lead to communication problems. ” ((Blomkvist, 2011, P89-90). Humans are born with a need for stories. We use stories to discuss, communicate and convey our perceptions of the world. Storytelling is a form of communication that

is accepted by many people, and people can more easily understand and empathize with the characters and plots that appear in stories, and can avoid the problems caused by inter-professional communication. There are already many visualization tools for service prototyping that take a storytelling approach, such as storyboards, low-cost videos, customers journey map, and service blueprints. These tools visualize service prototypes at a relatively low cost for understanding and communicating design concepts internally (design teams) and externally (stakeholders, service providers and customers). These tools generally convey key information about the context in which the service occurs, information about the target user, the sequence and manner in which the service interaction occurs, the touch points, and the user's emotional response.

Common storyboards will use cartoons, photos with text descriptions, etc. Customer journey maps and service blueprints are often flat as well. The story is presented in a flat format in a single image containing a lot of information, and the designer usually explains the entire story in a verbal manner, while emphasizing the key messages in the image. The audience of a story usually makes comments and emotional feedback during or after the narration. Clear storytelling and narration can help the audience understand the story well, but due to the intangible nature of the service, through this traditional storytelling method, designers cannot observe the immediate feedback (emotions, behaviors, etc.) of the audience using the service in the physical environment.

While traditional storytelling is a powerful way to express yourself, a single narrative does not easily create a powerful impact due to the lack of interaction. In my past project experience, a prototype release sometimes brought together both internal and external people, and some listeners would be more interested in the parts that mattered to them, but service delivery relies on the joint work of multiple departments, potentially including multiple types of users, and it is essential for prototype designers to fully express the entire system and the journeys of all types of different people, and a long one-sided narrative will inevitably distract the audience. As mentioned before, if a prototype launch is encountered in an occasion that includes multiple types of target customers, their journey maps will be significantly different (e.g. have different needs, use different touchpoint, accomplish different purposes, etc.), and in order to clearly display the different customer journeys, a corresponding number of storyboards or customer journey maps need to be created, narrating these models in much the same way, sometimes leading to a distracted audience that is unfamiliar with the design project and may not be able to read it again independently, potentially leading to additional communication costs or affecting the accuracy of their feedback.

Out of my interest in interactive narratives, I try to argue the hypothesis of using interactive narratives as a prototyping tool for service design through text and case studies. Games are the most common vehicle for interactive narratives, where the player changes from an off-screen audience to a participant or creator as they experience the story. Once the audience realizes that they are part of the story, they will have an active desire to explore the story. It is also easier to accept new concepts and unfamiliar information in the process of interaction and exploration. It seems that this advantage can also have an impact on the narrative of service prototypes. I therefore wish to explore the possibilities and advantages of interactive narrative as a prototyping tool in this article.

## Hypothesis: why is it relevant to design? How can design be relevant to the topic?

Storytelling is an important way for humans to convey their experiences and values, making it easier for users to empathize and emotionally link to scenarios, characters, and a particular experience, making complex stories more accessible. At the same time, incorporating storytelling into the process of service design enables designers and organizations to realize that the focus of the service is always on the user, which is a reflection of human-centered design thinking, which means to encourage designers thinking in the users' shoes when storytelling is used as a one of a research methods, it suggest designer to understand users by organize their stories of an certain experience, reveal underlying problems to designers in a more empathetic way. Service prototype also assumed as a communication tool, it could build a vivid and clear visualized concept to stakeholders, reduce the communication cost for both of designers and receivers.

A story usually contains a setting, characters, a plot, and a topic of discussion, and a service prototype has these same elements in it. The participants in the service system are the characters in the story (e.g., users and stakeholders), the actions of the characters occur in a certain order that becomes the plot (what the participants are doing), and the scenario in which the service takes place (which contains the setting and touch points). Service archetypes are combined with traditional storytelling, where conflict and problem solving connect each service phase, building compelling journey stories that communicate new service concepts in an efficient and interesting way.

Today, prototyping tools that employ storytelling logic are widely used, such as storyboards, video stories, customer journey maps, and service blueprints. Each of these models contains the environment, key touch points, characters, character actions, and character emotions and feelings. The plot of the story is that of the protagonist discovering the confusion and the process of using the service. These tools are usually in visual form, and the concept is communicated through the designer's narrative. The users involved in the prototype release process usually understand the whole concept as an audience.

But service systems are complex, and there are many touch points and stakeholders in the system. When it comes to expressing complex systems, one-way narrative tools have their limitations. Some viewers need to wait for the designer's explanation to understand the key parts, and the complex content tends to stress the viewers in terms of visual perception, making them feel confused or distracted in the process of receiving information. While traditional storytelling relies on strong character design, plot rendering, etc., service prototypes need to clearly and explicitly express how the service system works, making it more difficult to focus on the creation of the story itself.

Interactive narratives allow the audience to participate in the story and even give them certain permissions so that their actions can influence the progress or the end of the story. The process of interaction needs to mobilize the audience's initiative and is more likely to keep their attention continuously focused, and when the audience realizes that their actions have an impact on the story, they are cognizant that they are part of the story and are more likely to empathize with it, and thus more likely to understand and pay attention to the new service concepts expressed in the story. At the same time, interactive narratives can effectively use real environments and settings to immerse the audience, not just expressing information and content in visual form, but real environments can also be used in increasing the credibility of the story. Real environments and interactions can reduce verbal narratives and allow participants to interact with the system on their own.

In addition to forms that use the physical environment as the setting for interactive narratives, there are also interactive narrative methods that rely on the Internet and virtual media. The development of technology has given rise to interactive digital storytelling, allowing users to easily experience interactive stories online, feel the impact of their actions on the story through immersive experiences, and experience virtual service systems online. Technology has continued to evolve, and contemporary youth have become accustomed to new narratives and are not satisfied with just

listening to stories as passive viewers; they want to be involved in the story themselves and have a more immersive storytelling experience and feeling. Designers hope to continuously bring better experiences to users through design, so they need to capture the value of trends and utilize them in the design process. Davis and Hunt (2017) argues in the book *Visual Communication Design* that it is the designer's job to anticipate these cultural experiences in the design of tools and systems, in addition to the personal information content, but also includes a focus on how the medium shapes or supports the experience（Davis & Hunt, 2017).

### Research questions

1. Why is important to use prototyping in service design  process?
2. What form is storytelling has been presented in the prototyping stage of service design?
3. How the interactive narrative can enhance the experience of service prototyping?

### Objective

1. By sorting out the service design process, clarify the importance and rules of prototyping in the process.
2. Understand the common manifestations, benefits, and challenges of storytelling in service design prototypes today.
3. Analysis and summary the advantages of using interaction narrative as a service design prototyping tool through case studies.

## The Theoretical Context

### Prototyping in service design process

Services are created though the interactions between a service provider and a customer, it is not tangible or standardized goods that can be stored. Service design focuses on creating thoughtful experiences using a combination of intangible and tangible media. The general design results are expressed in systems and processes aimed at providing a holistic service to the user (Stickdorn & Schneider, 2012, p. 22-23).

Service design has processes that can be defined, The first study of design thinking was an exploration of design methodology. Since then multiple models of design thinking have emerged, drawn from theoretical models of design methodology, psychology, and education, and are broad, different ways of looking at design (Dorst, 2011). Designers use certain mindsets and design tools to help organizations meet the challenges. IDEO used “design thinking” and “human-centered design” to describe their process. This way of thinking follow a divergent and convergent thinking (*IDEO Design Thinking*, n.d.), which can encourages design to collect relevant data in a broader dimension, stimulate creativity, and then make choices to filter out solutions that can be continuously improved.

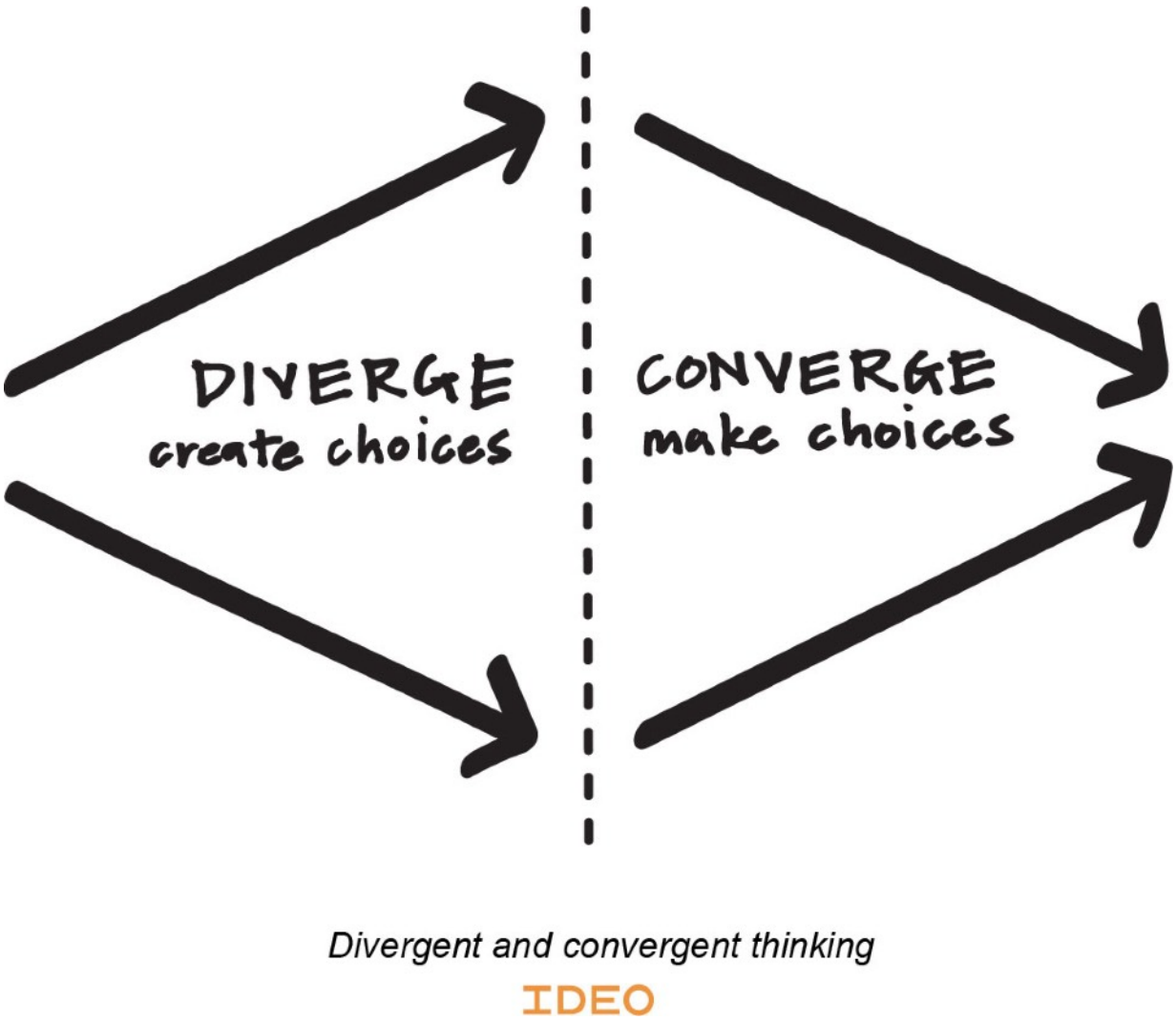


**FIGURE 1. DIVERGENT AND CONVERGENT THINKING (HTTPS://DESIGNTHINKING.IDEO.COM/)**

When tackling a given design problem, designers think through a large collection of data that includes interviews with stakeholders and users, market research, cultural trends, and projections. However, not all of the data collected is relevant to the topic, so designers sift through the data

collected in the convergence process to determine what is most important to solve the problem at hand (Kolko, 2010). The same processes of information gathering and analysis, solution conception, solution development and evaluation apply to service design. The process of service design is in reality non-linear, but can be elaborated as a structure which is methodologically iterative (Stickdorn & Schneider, 2012, p. 116). Tim Brown, the the founder of IDEO, believes that the design process initially requires dealing with a large amount of intangible assets, then analyzing this knowledge, concepts, information and data, which subsequently needs to be combined with creativity to make rational judgments and move quickly into the process of product creation (Brown, 2009).

Open and convergent thinking is also present in the models of other design approaches. The British Design Council released a new system design framework in April 2021, it "has been developed to help designers working on major complex challenges that involve people across different disciplines and sectors. It places our people and our planet at the heart of design." (*Beyond Net Zero,* 2022) This framework describes four important roles that designers should play, explaining the key elements of the design process that can help a project run successfully (*Beyond Net Zero,* 2022, p. 42). "Orientation and vision setting needs to happen first; continuing the journey comes at the end. The four stages in the middle: explore, reframe, create, catalyse can happen in a linear fashion, but also are likely to loop back and forth." (*Beyond Net Zero,* 2022, p. 47)

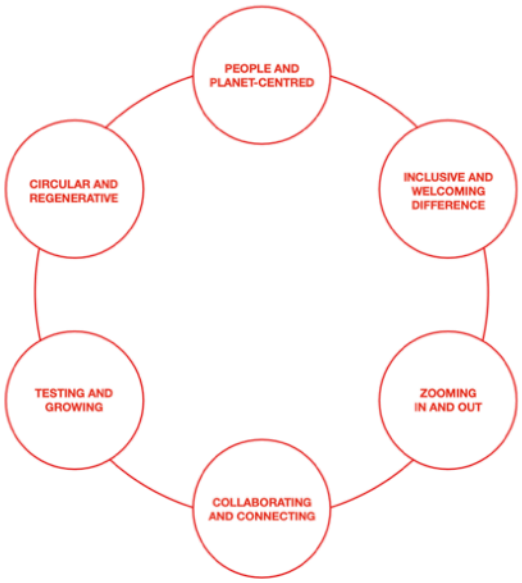


**FIGURE 2. SIX PRINCIPLES FOR SYSTEMIC DESIGN (*BEYOND NET ZERO,* 2022)**

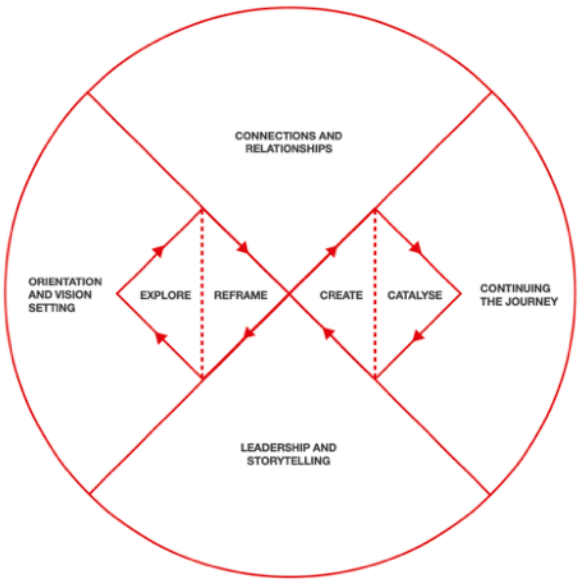


**FIGURE 3. A SYSTEMATIC DESIGN APPROACH (*BEYOND NET ZERO,* 2022)**

This model follows the six design principles (Figure 2), i.e., People and planet centered，Zooming in and out，Testing and Growing Ideas，Inclusive and welcoming difference，Collaborating and connecting，Circular and regenerative. “Testing and growing ideas” illustrates the importance of testing ideas that “Making things to see how they work and help more things emerge.” (*Beyond Net Zero,* 2022, p. 43) Testing helps designers to observe the actual operating status of existing solutions and to identify new problems and results at each stage in order to avoid greater risks，and generate more ideas and guide the design process to continue. It can be seen that in the design process, concepts are not generated to implementation overnight; an idea or concept needs to be validated and modified several times after it is generated, a process known as iteration. Iterative design is a cyclical design approach based on prototyping, testing, analyzing and refining existing concepts. Iteration helps to integrate the test results of a concept product into the next version of the system. Both conceptual and iterative design approaches are important steps in the service design process (Stickdorn & Schneider, 2012, p. 55). Prototyping is an important tool in iteration and testing.

In other design processes, prototyping is also presented as a separate step. IDEO’s design project consists of five steps: observation, brainstorming, rapid prototyping, refining, implementation (Brown, 2009). Rapid prototyping refers to the use of models to help each person visualize and initially validate possible solutions(Kamil, 2008). Prototypes as representations, implementations or manifestations, which are described as hypotheses or assumptions about the future, are represented by what is often referred to as an idea, and the idea represented by the prototype must be testable, i.e. the degree to which the prototype successfully meets specific criteria is assessed (Blomkvist & Holmlid 2011). Considering that anything tangible that can help to explore an idea, evaluate it, and push it forward is a prototype, ‘I have seen sophisticated insulin injection devices that began life as Legos.’ The same rule applies when the challenge is a service, a virtual experience, or even an organizational system (Brown, 2009, p. 54).

With the emergence of new disciplines that challenge the boundaries and scope of design, there is a greater focus on experience, context and social interaction (Blomkvist & Holmlid 2011). Service design is done with the same iterative testing and re-evaluation approach, however the challenge is that services are intangible in nature and mere description is not enough to create a clear vision. Therefore the application of prototyping techniques in service development is different from the implementation approach in product design (Stickdorn & Schneider, 2012). A service prototype is a

representation of a service before the final output, allowing the complete service experience to be explored, evaluated or communicated through (Abdel Razek et al. 2017).

When service is used as a design object, intangible, heterogeneity, non-separability and perishability are the four characteristics of service. Intangibility is one of the most frequently mentioned service design features. Service is intangible and cannot be perceived. Heterogeneity means that the variability of service delivery is related to different personal behaviors, emotions and preferences. Inseparability means that the service does not exist before delivery, and the service delivery method will change according to the customer's identity and delivery method, because the service requires people's participation, so that each delivery and service experience are different. Unlike products, services cannot be stored or pre-produced and consumed, resulting in perishability of services (Blomkvist, 2011).

Thus prototyping can not just help designers to iterate the idea and ahead the way of design, it also can be a powerful communication approach toward co-creation with stakeholders and users. It can represent an abstract and complex service concept in a more comprehensive way to non-designers. A holistic service system involves various customer groups, different employees such as front-line staff, back-office employees, managers and non-human interfaces such as vending machines or websites, during a service process, the customers and all other stakeholders are involved in (Stickdorn & Schneider, 2012, p. 22-40). Both internal and external personnel involved in the prototype testing needed to understand how the system worked and clarify their respective levels of involvement and forms of interaction with other participants. This process helps them clarify the responsibilities of the agents in the system and provides recommendations for further improvements. Because prototype testing is also iterative, designers need to continually communicate with a variety of stakeholders and consciously involve different stakeholder groups in generating and evaluating ideas.

Therefore, when testing service prototypes, it is necessary not only to consider how to visualize the service system, but also to clarify the target audience (with regard to their basic information, social context, preferences, needs, etc.), and how and where the interaction takes place. Further more, participants in the test will include multiple stakeholders, so the prototype of the service needs to consider how to communicate complex systems to people from different backgrounds in a relatively easy-to-understand manner while retaining as much complete information as possible, and also how

to observe and collect feedback from participants, specifically on behaviors, emotional reactions, and thoughts. The British Design Council links leadership and storytelling in a new system design process that they believe "leaders must stick to and embody their values and encourage these values in others…their stories are heavily evidence-based, and they introduce new approaches to monitor and quantify outcomes…these storytellers need to negotiate the disparate values of multiple stakeholders to find common values to work toward. They also need to determine the means of measuring and demonstrating the impact of their work in order to engage others " (*Beyond Net Zero,* 2022, p. 32) Thus designers can communicate design solutions through storytelling, in which people feel understood and thus more likely to understand and support new design solutions. Designers can use storytelling to cross the professional divide and communicate concepts or propositions to more people from different backgrounds in inter-professional collaborations.

## Service prototyping with storytelling method

Storytelling is a very common way to convey information and complex issues. "Story is the language of experience, whether it's ours, someone else's, or that of fictional characters. Other people's stories are as important as the stories we tell ourselves. " (Cron, 2012, p. 14) The use of stories to convey experiences and experiences is a commonly accepted way of expressing service propositions as well. "Storytelling is a method for sharing insights and new service concepts. Compelling narratives can be constructed for all aspects of a company's service, from the lives of its customers, to staff experiences and the service experience it provides. "(Stickdorn & Schneider, 2012, p. 198).

"A story is how what happens affects someone who is trying to achieve what turns out to be a difficult goal, and how he or she changes as a result." (Cron, 2012, p. 17) When a service prototype uses storytelling as a design approach, the characters in the story correspond to the target users of the design concept, usually represented by persona, and embody a specific group of people with specific characteristics, including basic information about their age, occupation, and social environment, as well as a description of the problem they are facing and the goal they want to achieve. The story usually begins with the character realizing the problem he or she is facing and follows the character through key interactions with the service system to achieve a purpose and ultimately solve the problem presented in the opening paragraph. Service systems are complex to operate, but they become easy to understand through storytelling. When real audiences understand

the story and empathize with the characters themselves and the issues they face, they are more likely to understand the service proposition embodied in the story and capture the key messages they need.

“When situated within effective and accessible narratives, by contrast, they are able to maintain their relevance, even when presented to people unfamiliar with how the project was conducted. Indeed, presenting the project itself in a narrative context allows people to follow much more closely the processes, which can help companies re-orientate their business and organization around service design principles.” (Stickdorn & Schneider, 2012, p. 199). Narrative can help people easily understand interdisciplinary content. When unfamiliar content is connected to things, settings and people that people are familiar with themselves, it is easier for people to understand the message the new concept is trying to convey, and assuming that the content of the story is deeply connected to the audience's lives, the audience will develop an emotional link with the story and more easily understand and support the new concept and story.

Stories can make people go back to the past or reach the future. By creating a story that contains actors, context, plots, scripts, etc., people can imagine the current situation of things or the possible way things, and allow others to participate in the story and understand the vision of others. A complete service experience is composed of successive moments in a certain order, and the narrative of this experience needs to reflect the chronological order as well as the coherence of the interaction. Livework (London-based service design studio) describes service design as "touching people's experience design through many different contact points and occurs over time" (Sangiorgi, 2009). As Ryan (1922) defines one of the basic principles of narrative “The narrative world must undergo changes of state that are caused by physical events: either accidents or deli berate human action,. These changes create a temporal dimension and place ,the narrative world in the flux of history.” (Ryan, 1922, p. 371) Presenting the project in a narrative way allows people to pay closer attention to the project process, which can help the company reposition its business and organization around the principle of service design (Stickdorn & Schneider, 2012, p. 198).

One of the most commonly mentioned characteristic of services in service design is intangibility, the fact that services are immaterial and cannot be perceived" (Blomkvist & Holmlid, 2011, p. 20). Therefore it is very important to visualize the service design in the production of service prototypes. The service concept can be conveyed to the audience by storytelling methods, but it needs to have

visual material as a carrier to give the audience a relatively definite and tangible reference. Customer journey map and service blueprints are tools often used in prototyping to illustrate the complete design concept through the description of successive scenarios. “The journey metaphor is one of the most important theoretical concepts in service design, since it offers a way to describe and summarise services.


**FIGURE 4. JOURNEY MAPPING IN A GLOBAL JAPANESE ELECTRONICS CORPORATION HTTPS:// SERVICEDESIGNTOOLS.ORG/TOOLS/JOURNEY-MAP)**

A customer journey is both a metaphor for how a customer navigates the touchpoints of a services, and a service design technique. ” (Blomkvist, 2014, p. 47). "A customer journey map provides a vivid but structured visualisation of a service user’s experience. The touchpoints where users interact with the service are often used in order to construct a ‘journey’ – an engaging story based upon their experience. This story details their service interactions and accompanying emotions in a highly accessible manner.” (Stickdorn & Schneider, 2012, p. 151). The customer journey map is a visual representation of the customer journey and contains the process of customer interaction with the service system at multiple points in time. These experience moments include the physical environment, user behavior, touch points and system feedback, showing the entire process from the user entering the system to the completion of the experience. These touchpoints are not only under the management of the service provider, but also sometimes associated with the external environment and other stakeholders, only some of which are fully controlled by the service provider. Through customer journey mapping, service providers can identify the range of touchpoints they can manage and control, as well as the user feedback (including emotions, behaviors, thoughts, etc.) within their own sphere of influence, and thus improve service quality. The customer journey can help designers and organizations better understand users, as well as the

relationship and recognition of the services they provide, the improvement of the customer journey helps to improve the experience quality.

“The service blueprint describes all the processes, the customer journey describes all touchpoints and system maps describe all relevant connections between e.g. stakeholders” (Blomkvist, 2014, p. 56). While customer journey maps describe in more detail how customers interact with touchpoints in their experience, service blueprints emphasize the service process, showing how the entire service works from start to finish, including not only user behavior, touchpoints, and feedback on their thoughts and emotions, but also how the service provider completes the work in the background and around the touchpoints. The entire process is usually divided into several phases, which are used to represent the three stages of the service. And it clearly indicates the contact between the user and the service provider, as well as the areas of the entire process that are visible and invisible to the user. “The ‘line of interaction’ represents the touch points between the user and the service provider. The ‘line of visibility’ represents the distinction between visible front-office staff (or systems), and the back-office workers and processes that are invisible to the user. ” (Stickdorn & Schneider, 2012, p. 203)

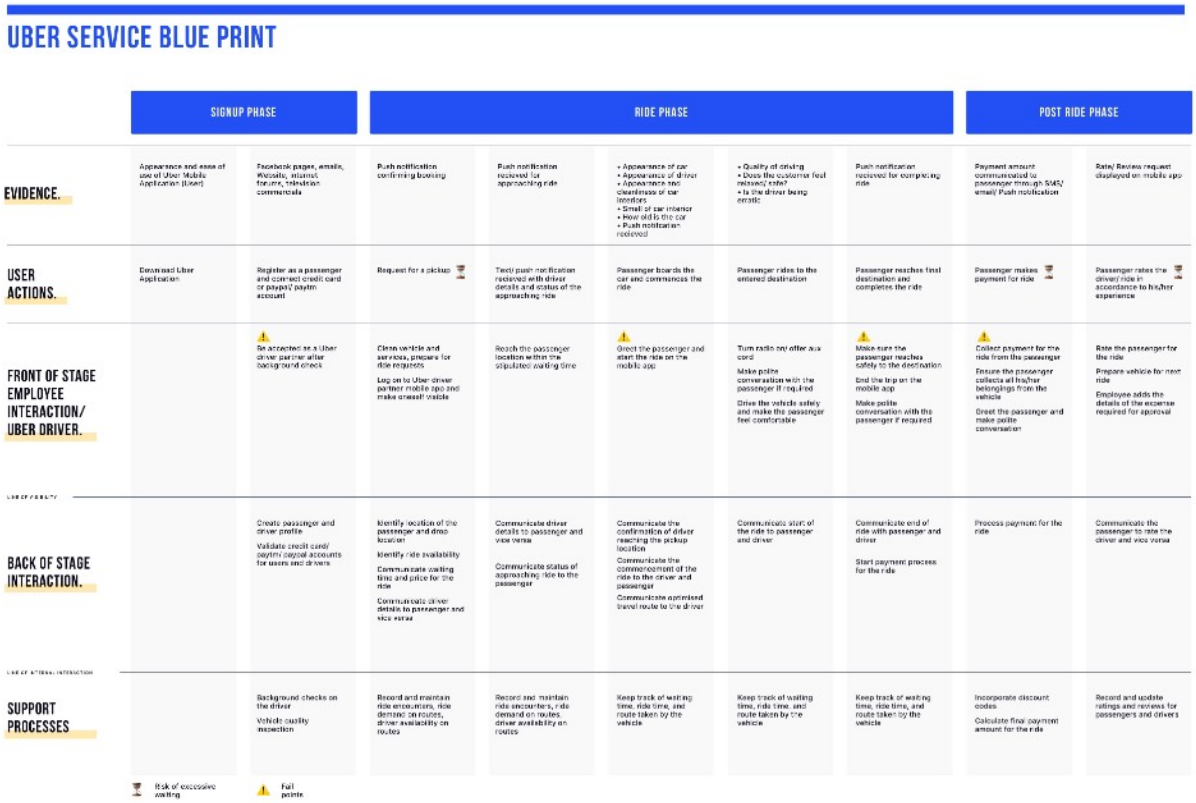


**FIGURE 5. UBER SERVICE BLUEPRINT (HTTPS://SERVICEDESIGNTOOLS.ORG/TOOLS/SERVICE-BLUEPRINT)**

Viewers can see the chain of events at each key node of the entire system in the service blueprint. By creating and analyzing the service blueprint, designers, stakeholders and customers can gain a better understanding of the entire service system. However, reading and understanding service blueprints takes more time than user journey diagrams and can be a challenge for viewers who do not understand the process and context of the project.

Many designers or teams also choose to use storyboards to make prototype presentations and deliver concepts and solutions. Storyboards are a common visual tool for expressing services, usually in the form of comic strips to convey a story or message. “A storyboard is a series of drawings or pictures that visualize a particular sequence of events. This might include a common situation where a service is used, or the hypothetical implementation of a new service prototype.” (Stickdorn & Schneider, 2012, p.183). Like a comic strip, multiple pictures and text are arranged in a certain order and coherently become a complete story. It also contains the main characters, plot, conflict and purpose.

**FIGURE 6. UBER SERVICE BLUEPRINT (STICKDORN & SCHNEIDER, 2012, P.183)**

The limited space prompted the designers to consider which were the most critical plot points and images, and it was very easy to adjust the position and order of these key images, adding and

removing content. The logic between the scenes is also clear to all when considering the linking of all scenes into a complete story. This approach also allows the designer to determine the accuracy of the rendering of the images and how they are presented based on other factors such as time, cost, and who is being displayed. This continuous visual content can be pictures and text posted on the wall, static or dynamic cartoons, or even created as video media.

Concept videos are also a very common way to share new concepts. For example, Microsoft released a concept video for a mixed reality application in 2021, showing how its concept responds to the needs of different users through several different vignettes. “Microsoft Mesh enables presence and shared experiences from anywhere – on any device – through mixed reality applications.” (Microsoft, 2021)

**FIGURE 7. INTRODUCING MICROSOFT MESH (HTTPS://WWW.YOUTUBE.COM/WATCH?V=JD2GK0QDTRG)**

The video begins by showing different types of users and the scenarios they are in, followed by the concept product "Mesh", which helps different types of users communicate and collaborate across space, completing work that would otherwise be done face-to-face in reality, or bringing virtual experiences into reality to enhance the reality experience. With the excellent virtual animation and smooth narrative, as well as the rich user types, it is easy for the audience to understand the concept and working of "Mesh", and the audience will associate with their own related experiences, think and imagine the application of "Mesh" in real life.

However, in the form of communication such as storyboard, customer journey and video, stakeholders and users are mainly listeners of the story. The audience's reactions and behaviors may not affect the established concepts， They are unable to interact with the system in a real way, and the designer is unable to capture the behavioral feedback they exhibit in real interactions.

## The challenge of traditional storytelling adapted in service prototyping

As society changes and progresses, service design thinking is seen as a way of thinking that can help enhance the benefits of organizations and companies. “service design thinking – an interdisciplinary approach that offers great value for entrepreneurs and innovators in the field of services.”(Stickdorn & Schneider, 2012, p. 4) Today's society is rich in collaborative approaches, and as service design thinking becomes more widely known and used, more stakeholders will be involved in a service design project. “Inconsistency and time are different sides of the same problem in a sense. They both are results of the dynamic and complex nature of services. To deal with these challenges, designers need to employ a holistic approach to service prototyping that involve many stakeholders and try to capture whole service experiences that take place over time and is distributed over a lot of different individuals. ”(Blomkvist & Holmlid, 2011).

Service design is ultimately designed for human experience, thus when using service prototype to communicate different kinds of audiences, To note that the service is diversified, it is necessary to incorporate different types of audiences into the prototype practice, and observe their prototype experience to get more high-quality experience feedback. A service not only includes an experience, a product, or several interfaces. The service is an overall system. The audience of the service prototype needs to understand the whole picture of the service, the background of the interaction. “Providing a conceivable story through a comic strip, storyboards, videos or photo sequences helps generate the necessary emotional engagement but still lacks meaningful user interaction. ” (Stickdorn & Schneider, 2012, p. 125). A more realistic interactive experience can enable the audience to have a deeper understanding of design ideas and design projects, and arouse more real resonance and thinking, which may reduce the problems caused by intangibleness to a certain extent.

After all, service does not occur in a vacuum, and the service environment is an important factor in building a convincing service proposition. “It is important to prototype service concepts in reality or

circumstances close to reality. ” (Stickdorn & Schneider, 2012, p. 125). Due to the evolution of the service environment, service design and innovation are becoming more and more complex, and service interaction and service ecosystem should be paid more attention (Sangiorgi et al., 2017). “… elements of physical evidence such as noise level, odors, temperature, colors, textures, and comfort of furnishings may influence perceived performance in the service encounter ”(Bitner, 1990, p. 72)

"Environment" includes the physical, social and other settings around the service. The service physical environment is called the service landscape. The surrounding conditions, spatial layout and functions, signs, symbols and artifacts, as well as service typology and environmental dimensions, affect cognition, behavior and experience (Bitner, 1992, p. 72). The environment will also have an impact when creating prototypes. When it comes to expressing a new service proposition in a prototype, a more realistic environment can bring the experience in the prototype closer to the real thing, improving the credibility of the prototype experience while helping designers better capture user behavioral feedback and immediate emotional feedback.

Commonly used visual representation tools treat users as viewers of the story and provide them with a one-way narrative to convey information. Designers often use images and videos to show viewers real scenarios that are presented as part of the narrative, but viewers cannot interact with the picture constructed by the designer. For viewers, they can only imagine the service taking place in the scenario and use their own experience to understand the process, and the lack of real interaction can also make it difficult for viewers to give feedback that gives behavioral interaction.Furthermore, service delivery organizations have many organizational members who need to be involved in the service system, and the visual presentation may increase their learning costs, and the lack of real interaction experience perhaps leaving them with a lack of assessment of the real situation. All of these situations increase the cost of communication for designers in the feedback gathering and co-creation process.

## Absorb Interactive narrative as a service prototyping method

The traditional narrative has limitation to explain complex circumstances, it always leave it up to the creator to determine the content and sequence, and therefore cannot overcome the limitations of a fixed print and the final cut of the film. Viewers cannot influence the story lines and execute plans then get the results of the action (Koenitz et al., 2023). “Due to the evolution of social

interconnections through digital technologies, with a consequential blurring of boundaries between public and virtual space ” (Ciancia et al., 2021, p. 20).The boundaries of stories have always existed, but in our era, narratives are not limited to printing. Young people browse through a wide range of different media channels to obtain information and sort out their ideas for stories. The materials prepared for the youngest readers are becoming more and more complex (Mackey, 2003). Contemporary audiences are not content to be spectators of stories but tend to cross the boundaries of linear narratives and media (Murray, 1997). In the contemporary media landscape, the audience is more aware of its key role as a consumer and producer (Ciancia et al., 2021, p. 21).

In today's interactive experience, the experience of breaking the "fourth wall" is “the metaphorical barrier between the audience and the action that unfolds on stage (or on screen), keeping reality separate from the fictional world. This dramatic convention allows the viewers to enjoy those narrative universes even though they don’t correspond to reality’s logic (*suspension of disbelief*)” (Ciancia et al., 2021, p. 20). The break in the "fourth wall" creates a link between the audience and the world of the story, allowing the audience to become part of the stage, to play a role in the story, to have a positive impact. Interactive theatre is a typical way of breaking the fourth wall, where the audience no longer sits under the stage and watches the actors perform, the theatre itself is the stage, the audience becomes part of the play, and when the audience enters the theatre, they enter the stage and become part of the story.

"No More Sleep" is the most famous interactive play in New York. There is no obstacle between the actor and the audience. The audience can watch all the performances next to the actor's plate, and even participate in the plot at some nodes designed in advance. The theater audience was welcomed to the "McKittrick Hotel", a converted Chelsea warehouse, where the space was grouped according to the story that is “one part *Macbeth*, one part Hitchcock, one part interpretive dance, and one part escape room”. The audience wearing a white Venetian mask, they can freely wander independently and follow the actors as they want. The actors tell their stories in different positions in the whole space at the same time. The stories of different scenes may be related to each other, but because the scene is too large and there are different story lines, the audience can't do it all at once. See all the stories, so everyone's experience is unique (Becky, 2020).

**FIGURE 8. STAGE PHOTO OF SLEEP NO MORE (HTTPS://WWW.NEWYORKTHEATREGUIDE.COM/SHOW/2138-SLEEP-NO-MORE-TICKETS)**

There is almost no dialogue in normal performances. All performances are completed by the cooperation of the actors' limbs and music. The audience wearing masks is like "ghosts" and can explore at will in the space. All props and the audience are zero distance, and the only requirement is not to speak. In the New York performance, there will be a one-to-one interactive plot, and some characters will choose an audience to take off the mask at a fixed time and perform one-on-one in the scene. The immersive theater brings the audience directly into the plot scene. The audience and the actors stand together, and even become part of the performance at some moments. The breaking of the "fourth wall" creates a more immersive experience for the audience.

The goal of an interactive narrative is to immerse users in the virtual world, cognizant that their actions have meaningful consequences and are an integral part of the unfolding story (Riedl & Bulitko, 2013). The spread of stories and engagement practices through multiple media leading to “consumption becomes production; reading becomes writing; spectator culture becomes participatory culture.” Allow the audience to experience new forms of narrative and change the relationship between the top-down mainstream media and the bottom-up or grassroots participatory culture (Ciancia et al., 2014).

Case *Plug Social TV* is an educational and research activity program that promotes social innovation in the form of supporting dialogue between local communities and stakeholders (Ciancia et al., 2018; Piredda et al., 201,5). The plan has established many recognizable landmarks in the city, hoping to eventually build a story world based on the city, that is, fictional and non-fictional stories based on the local environment. Characters and residents spread meaningful contact points throughout the urban landscape, and allow citizens to interact with stories in a distributed manner and create them together with participants. All kinds of shared images and collected stories are distributed in similar media and digital content. Local communities and stakeholders began to share a common image, treating narrative elements as part of daily life (Serbanescu et al., 2021).

The interactive narrative gives the audience of the service prototype the opportunity to become actors and play a positive role in the story.The word "actor" comes from the Latin word "actor". In this case, it refers to people who participate in the service process and take action in some way. These "actors" can be entities, customers, organizations and other elements. Other researchers also call them roles or audiences. They are involved in the service prototype and delivery process (Razek et al., 2017).

**Interactive digital narrative (IDN)**

Changes in technology redefine the information experience, where the essence of information is the same but the experience is different, and Henry Jenkins describes the most creative period in any technology as the period immediately after the technology is proposed when designers and users discover the benefits of the technology and how to overcome its perceived limitations (Thorburn & Jenkins, 2003). Technological change drives the development of new skills in the human gate, and the associated experiences are subsequently influenced by the fact that viewers can choose to experience laughter and crying with others in a darkened cinema, or they can open a movie on a computer and they experience it differently.

Fictional games have made it common for the younger generation to move back across the boundaries of the story world (Mackey, 2003). People are now in an experience space with the opportunity to cross the boundaries of single-line stories. The new non-linear communication system can form a complex narrative through multiple access points (Lévy 1996). Reality interaction technology is becoming more and more digitized. People can join participatory

networks, inspire new stories together, and tell, listen to and experience them without the movement of physical space (Mariani, 2012).

Interactive digital narratives are digital interactive experiences in which users influence or create storylines through actions in which they either play characters in a fictional virtual world, issue commands to computer-controlled characters, or directly manipulate the state of the fictional world. The most common form of interactive narrative is one in which the user plays a character in an unfolding storyline, or can be an observer who can change the world and talk to the character.

Computers, especially digital games, also affect the current narrative form. Many contemporary narrative experiences are organized on the basis of similar games. The audience obtains the story itself by understanding and interpreting the rules. Although the story relies on the understanding of relevant narrative conventions, the game method highlights the rules (Mackey, 2003). Information in the interaction circulates between the player and the story, and similar to games, this information is often referred to as feedback, and the quality of the feedback can have a powerful impact on the player's understanding and enjoyment of what is happening in the game (Schell, J. 2019). Gadamer argues that people are immersed in works of art as both an experience of the work and a personal expression and that the duality of subject and object disappears in the process of play-mediated interaction (Sun, Y. 2020). The difference between interactive narrative and other forms of digital entertainment is that interactive narrative systems enable players' actions to fundamentally change the direction or outcome of how the storyline unfolds (Mark, 2013).

Rooted in text based games in the early 1980s, MUD and MOOs1 allow players to create characters and extend virtual environments. Typically, algorithms control story rendering or automate objects and characters as "proxies.". Players interact through construction and social interaction, often generating narratives that become part of the virtual domain culture. Another typical strategy is to develop a story with several possible endings and ask the audience to choose one (Strohecker, 1997). Next, this thesis will analyze the possibilities and advantages of using interactive digital narratives as a service prototype tool through case studies.

In the interactive narrative project named Tired of Giving In(TOGI), which designed by Carol Strohecker, Strohecker (1997) advocated that different characters view and interpret events in different ways. The audience interacts through the idea of interviewing the characters. "Thought

images" play an important role in the portrayal of character images. This experiment maintains specific storyline and structural interactions through character development. TOGI recounts the events that led to the Montgomery bus boycott, a crucial moment in the American civil rights movement. The audience learns about the event through the "characters" and "chorus members" who tell the story. These roles include mayors and leaders of the local Association for the Advancement of Colored People. When they talk to each other, they reveal roles, attitudes, and events. According to the chorus model of ancient Greek theaters, members of the choir filled in gaps in the narrative and added perspective through commentary. Chorus members talk to each other, to characters, and to the audience. In the purest interpretation of the model, the audience of TOGI interacts through a chorus, and the audience can query the roles and chorus members.

**FIGURE 9. CONVERSATION BETWEEN CHARACTERS (STROHECKER, 1997)**

During the interactive experience, viewers can dive in the story from different angle related through character development. Different characters will reveal roles, attitudes and plots though dialogues and chorus in the purest narration model, like in ancient Greek theater, the gaps in the narrative will be filled with the members' chorus. When the audience want to engage more, they can activate the chorus members as they speak, those activated members will intersperse comments within the dialog as an opportune moment. Viewers can get more information of the story line as the characters developing (Strohecker, 1997). The audience's actions affect the rhythm of the story and can decide how much information is available. This filtering mechanism helps the audience purposefully obtain the information they need or are interested in.

With the development of web technology, there is now a way for people to design a software to carry interactive systems. Website technology has provided us with more ways to tell stories, and storytelling websites are a new approach that has emerged in recent years. Storytelling websites are usually in the form of web pages, where authors can take advantage of web technology and design to guide readers through the story. These sites not only attract story creators, but also many companies to enter these sites to promote their companies, products or services (Raffia, 2018). Most of these narrative works contain a large number of animations, images or graphics, as well as a certain amount of textual narrative.

The BBC-designed storytelling website takes readers through the historical events between India and Pakistan over the past 70 years. The website uses a simple interactive format to guide readers through the content, scrolling the mouse or sliding the trackpad to continuously read subsequent chapters, or click to view extended content or skip parts of content. The website places all images, videos, text content in chronological order.


**FIGURE 10. SCREENSHOT (BBC NEWS, 2017. NEWS. HTTPS://WWW.BBC.CO.UK/NEWS/RESOURCES/IDT-D88680D1-26F2-4863-BE95-83298FD01E02)**

Users can control the speed and progress of reading through the sliding action, which allows the user to grasp a certain initiative, interactive pages also add interest to the reading process. This

allows the originally complex historical content to be clearly displayed in front of people step by step. The web page function allows the audience to jump to any page they are interested in, and the audience can repeatedly watch and read the content of the website. When two key people appear in the same period, the audience can choose the priority to know or skip the page.

The Chinese video site Bilibili announced in July 2019 the launch of an interactive video feature that allows creators to create interactive videos containing options that allow viewers to make choices through the player as if they were playing an interactive game to depart multiple plots and endings (Yuyi, 2019). It's an easier way to make, distribute, and watch interactive video stories.

The "Plot Tree" feature supports creators in creating jump nodes for interactive videos. After uploading the video content in segments, the creator can edit the jump logic of the segmented video through the webpage. This feature can satisfy five types of narrative forms: linear straight narrative (no branching plot after the option), multi-branch narrative (different lines lead to different endings), scoring answer type (after setting, the system will automatically score according to the user's choice and lead to different endings according to the accumulated hidden values), and Embedded hidden branches (viewers need to reach a certain condition in the last segmented episode in order to open the corresponding episode), looped episodes (with settings, users will jump to a certain initial node and get a new storyline or ending after completing a certain number of jumps). This provides great technical convenience to the creators, and all the storyline-building operations can be done through the web.

“You are stuck on October 25, 2019, how do you escape from this day?” is an interactive storytelling video based on the expansion of "Cruise of Terror" (GoldenEggs, 2019). The material in the video was shot through Minecraft (a sandbox game produced by Mojang AB in 2009). Since its release, the video has received 12.824 million views and 772,000 pop-ups ("pop-ups" are one of the main features of the Bilibili video site, allowing viewers to send comments in real-time as they watch the video, which floats above the screen. This feature promotes viewers' desire to express themselves and interact with each other), and 27,325 comments.

This work emphasizes the circular form of the plot, without too much plot description, almost no lines and dialogue, relying on music and transport mirrors to complete the atmosphere rendering. The bottom of the video shows the audience's current number of cycles, clearly informing the

audience of their position in the overall plot. These data eliminate the audience's uneasiness in the face of the unknown number of cycles and become the hook to induce the player to continue to advance the plot.

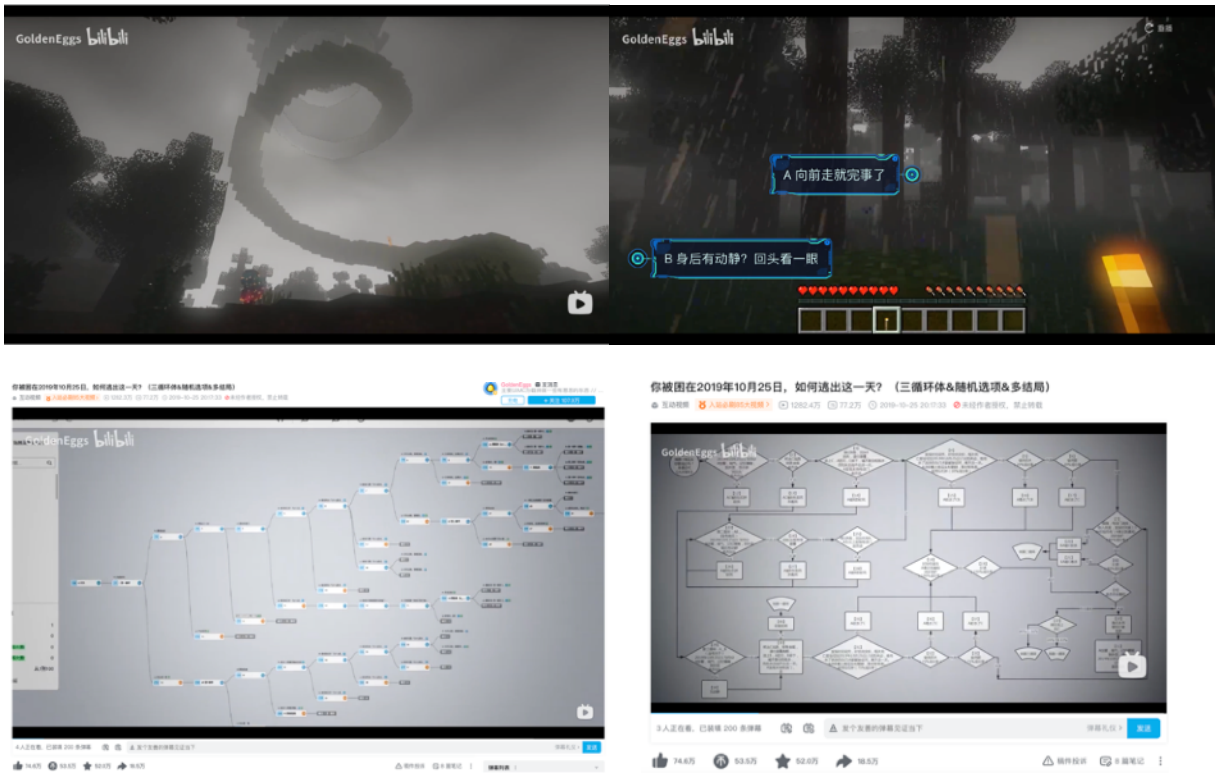


**FIGURE 11. SCREENSHOT (HTTPS://WWW.BILIBILI.COM/VIDEO/BV1UE411Y7WY/?SPM_ID_FROM=333.337.SEARCH-CARD.ALL.CLICK)**

The ability to change or influence or even create the world is the hallmark of the sandbox game Minecraft, which offers users a high degree of openness in the scene in which they can build or destroy different kinds of cubes, and many users take advantage of this feature to build exquisite buildings and artworks. GoldenEggs used Minecraft as the material carrier to complete all the scenes of this interactive video building and filming action, without the need to hire real actors, the complexity of the script is not reflected in the subtlety of the text, the creators put the focus on the rendering of the atmosphere of the scene and the logical expression of the plot, presenting a highly interactive plot line, allowing many viewers to watch it repeatedly, eager to get the complete plot ending.

The Palace Incident is a highly-played video in the Interactive stories category, and this one has received 3.502 million plays since its release. Its author, Danni, started producing interactive videos in September 2019 and is committed to producing interactive videos with high-quality episodes,

releasing 70 interactive story pieces so far. The story of "The Palace Incident" is recreated based on the famous fairy tale "Snow White", using the audience's familiar characters as the opening, adding elements of deduction and suspense, where the audience will play the role of a writer being involved in a suspenseful case. The story contains four normal endings and one final ending, 20 available options, and users can also jump directly to any node through the backtracking feature provided by the website.

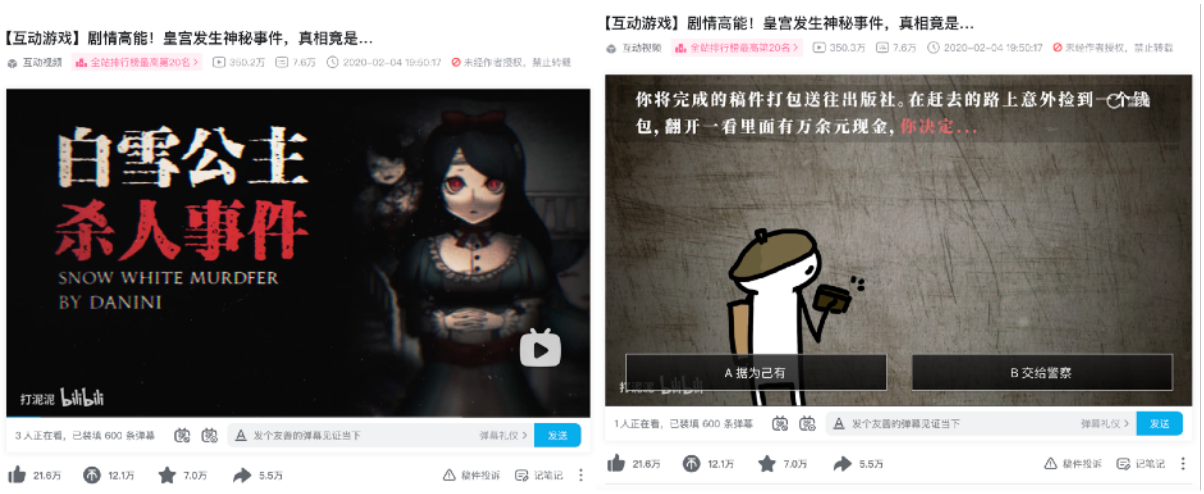


**FIGURE 12. SCREENSHOT (HTTPS://WWW.BILIBILI.COM/VIDEO/BV1F7411P7ZC/?SPM_ID_FROM=333.999.0.0)**

This work has no actors and no complicated filming and production process. The author narrates the story from the point of view of a bystander, reads the lines with AI voiceover, completes the aural rendering with sound effects and music, and finishes the visual expression with simple hand drawing and animation. The episodes between each choice are as short as 10-20 seconds and as long as 1-2 minutes, which makes the plot very fast-paced and the audience's attention less likely to be distracted. This type of work is weaker in plot and less precise in production than Black Mirror: Pandasnaki, but the interactive design is interesting and the production costs are lower. For the viewer, these videos are free to enter, the monetary cost is lower, while the time cost of the experience is lower, without having to spend a lot of time to experience the full plot.

The open-source web-based interactive video production technology allows creators to combine a variety of vehicles (comics, animation, text, game graphics, etc.) to create interactive stories that are ultimately presented as streaming video. This makes creators to present interactive story design at a lower cost. At the same time, viewers do not need to download any additional software or enter the cinema and can experience interactive stories anytime and anywhere. This reduces the download burden of the audience and increases the speed of dissemination of interactive works. The open

community format that comes with the Web also increases the communication and interaction between players, and in the process of discussing the plot and the way of interaction, it is easier to generate a new understanding of the story and be stimulated to experience it again.

Interactive digital narratives can include a large number of images, symbols, text, and audio materials to set off the atmosphere, express the environment, and shape characters, greatly enriching the audience's sensory experience when experiencing the story. At the same time, the development of network technology has made it easier to create interactive video stories with branching options, and it is also easier to spread. The characteristics of the Internet can also allow viewers to leave comments and feedback when they are old. For designers, when it is necessary to explain a system to different stakeholders and user groups, it will be a good choice for viewers to choose to play corresponding roles and experience specific service processes.

The service prototype produced by mixed media has an advantage in the setting of the physical environment. The physical environment carried out with the actual scene existing in reality as the prototype experience can increase the user's sense of substitution. The physical contact point in the service can be verified in the real scene or problems can be found in the real scene. In the electronic media interaction It expands the information channels that users can access and increases the number of users in the system. At the same time, instant users can temporarily leave the prototype physical environment, and can also continuously obtain information through the media interface to increase attention to the system. However, because each user's experience journey is unique, as the physical environment area involved in the prototype expands, it will not be easy to observe and track the real journey and get real-time feedback. At the same time, when the prototype accommodates stakeholders and consumers at the same time, the overall planning and management system will become difficult. How to coordinate the beginning and end of the service journey, and the moving lines of people entering and leaving the system will be new challenges.

Within the interactive digtial narrative cases, It can be seen that web page digital technology reduces the cost of making interactive electronic narrative works. Designers can use the characteristics of web page storage to adjust the plot order or delete materials during the iteration process. The audience can choose their own role at the beginning of the story and get instant feedback through different actions and choices. At the same time, the Internet gathers a large number of users, which can stimulate the creation and feedback of stories. Users can post real-time

experience feedback online, and the first emotion of the experience can be captured. At the same time, digital media content is easier to disseminate and obtain, which greatly increases the number of users participating in the test, but also brings challenges for collecting and analyzing feedback and obtaining effective data to promote subsequent design. At the same time, the digital narrative has lost the authenticity of the physical environment settings to a certain extent, and the prototype designer needs to use the existing resources to try to shape the virtual environment so that it can increase the user's sense of substitution.

# Conclusions

## Objectives Achievement

In conclusion, I would list in this chapter the main characteristics of interactive narratives that could be useful in prototyping service design.

Prototyping is a very important step in the service design process, helping designers to organize new service concepts or ideas into a visual and shareable form. A good prototype not only helps the design team to validate concepts and ideas internally, but also helps the organization and the client to reason and communicate with the designer, serving as a way and bridge of communication during the co-creation process. Users who participate in prototype testing can give feedback and comments on the prototype, which can facilitate the generation of more ideas while validating existing ideas, serve as a guide for the subsequent design process, and provide soil for iterative design. Through multiple prototype iterations, designers can continuously improve the service concept to better solve problems and provide value to the target users.

The users who participated in the prototype testing included many different people across disciplines, each with a different role and responsibility in the service concept. As a result of the study, it is clear that storytelling has many advantages in service design prototyping. Stories trigger associations with people's own experiences and therefore help make unfamiliar information easier to understand; clear characterizations also resonate with people who feel understood or can easily understand others; service prototyping tools that employ a storytelling approach present the intangible service design in a visual form, giving the participating A service prototype tool that

employs a storytelling approach presents the intangible service design in a visual form, providing a clearer outline and room for association to the users involved in the test.

But as times and technology have evolved, people are no longer content to be the audience of a story and participate in it from the perspective of a spectator; it has become common for the audience to be part of or create the story. At the same time, service is not only intangible, but also closely linked to the individual experience; the actual experience is different for everyone, and the journey varies between different types of customers. After all, service cannot happen in a vacuum, and real interactions contain a lot of critical information. It has also been found through research that the service environment also has a huge impact on the user. A real environment increases the credibility of the prototype and enhances the user's desire to explore in the environment, and when the user enters a familiar environment, he or she can more quickly understand the background information of the service concept and the physical environment in which the service takes place, and more intuitively feel how the service concept operates.

And continuous interaction brings a more interesting storytelling experience and better immersion. As the depth of audience interaction with the story increases, when viewers realize they become part of the story, their behavior can effectively and positively influence the development of the story and changes in the environment, and even other people's journey, which is likely to increase the audience's interest and attention to the new service proposition. At the same time, authentic experiences do not require a lot of textual explanations; the physical environment can contain a lot of basic information, such as logos, sounds, brand symbols, and guidance messages, and users can identify key faculty information on their own and follow the guidance to complete the service experience. At some stages, designers can leave the role of oral narrator and convey the story more vividly through stage design.

Thanks to highly developed application and web platforms, designers can also use the hardware capabilities of smartphones and streaming technology to design prototype display solutions more easily than costly video shoots and special effects like Microsoft Mesh. On some sites that offer interactive system support, designers do not need to have programming skills to edit video footage or images into interactive video stories through web technology. Some existing storytelling prototyping tools can also be combined with these technologies, such as storyboards through which interactive videos can be programmed to engage viewers in the story. Vivid images and sound have

a natural advantage in consistently capturing the viewer's attention. At the same time, contemporary media content has the advantage of faster online distribution and more information. Better work and richer experiences for viewers, and longer stays on the site. Because information can be distributed more quickly among users, users receive more direct feedback and generate more discussion. New media tools can also be easily integrated into social properties. As people become accustomed to accessing information on the Internet, online communities can provide readers with the opportunity to express their opinions. The opinions of others will deepen readers' understanding of the content and lead them to explore it again. The advantages of rapid and wide dissemination brought by the development of the Internet for interactive digital narratives have also brought convenience to designers. Compared with holding small-scale prototype tests and large-scale offline set-ups, the Internet can help designers collect feedback more widely, which may help designers understand the discussion that new service concepts generate on a larger scale and stimulate more ideas.

## Project Limitations

Based on the analysis of literature and case studies, this paper attempts to suggest the feasibility of using interactive narratives as a service prototyping approach. Interactive narratives that combine multimedia and real physical scenarios can help users better immerse themselves in the story, but controlling the length and complexity of the content to observe the user's journey and how to organize the interactions between stakeholders and users in the system is a challenge. While digital interactive narrative adds the advantage of communication and real-time feedback, it loses the help of the real environment. However, more exploration and practice is needed to choose design approaches based on real-world situations and to control the proportion and extent of the use of different technologies.

## Reference


Ball, J. (2019, October 1). The Double Diamond: A Universally Accepted Depiction of the Design Process. Design Council. https://www.designcouncil.org.uk/our-work/news-opinion/double-diamond-universally-accepted-depiction-design-process/

BBC News. (2017, August 4). *India Partition: Roots and legacy - BBC News*. News. https://www.bbc.co.uk/news/resources/idt-d88680d1-26f2-4863-be95-83298fd01e02

Becky. (2020, February 17). Sleep No More Explained: A Look at Interactive Theater. *SightDOING*. https://sightdoing.net/sleep-no-more-explained/

*Beyond Net Zero: A Systemic Design Approach*. (2022, June 8). Design Council. https://www.designcouncil.org.uk/our-work/skills-learning/tools-frameworks/beyond-net-zero-a-systemic-design-approach/

Bitner, M. J. (1990). Evaluating Service Encounters: The Effects of Physical Surroundings and Employee Responses. The Journal of Marketing , 54 (2), 69-82.

Blomkvist, J., & Holmlid, S. (2011). Existing Prototyping Perspectives: Considerations for Service Design. Nordic Design Research Conference 2011. https://doi.org/10.21606/nordes.2011.012

Blomkvist, J. (2010). Conceptualising Prototypes in Service Design. *Faculty of Arts and Sciences Thesis*, *101*.

Blomkvist, Johan. (2014). Representing Future Situations of Service: Prototyping in Service Design. 10.3384/diss.diva-105499.

Brown, T. (2009). Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation. Harper Collins.

Ciancia, M., Mariani, I. (2012). The urban space as a narrative and ludic playground. An interdisciplinary approach to communication design system.

Ciancia, M., Piredda, F., & Venditti, S. (2021). Shaping and Sharing Imagination: Designers and the Transformative Power of Stories. *Interactive Film and Media Journal*, *1*(1), 19–40. https://journals.library.ryerson.ca/index.php/InteractiveFilmMedia/article/view/1492

Cron, L. (2012). Wired for Story: The Writer's Guide to Using Brain Science to Hook Readers from the Very First Sentence. Ten Speed Press.

Cross, N. (2011). Design Thinking. Berg Publishers. https://www.amazon.com/-/zh/dp/B006FUVF3A/ref=monarch_sidesheet

Danini. (2020). *The Palace Incident.* [Video]. Bilibili. https://www.bilibili.com/video/BV1f7411p7Zc/?spm_id_from=333.999.0.0

Dorst, K. (2011). The Core of 'Design Thinking' and Its Application. Design Studies, 32(6), 521–532. https://doi.org/10.1016/j.destud.2011.07.006

Elmansy, R. (2018, September 24). The Role of Storytelling in the Design Process. Designorate. https://www.designorate.com/the-role-of-storytelling-in-the-design-process/#:~:text=During the design process%2C storytelling is used to,the solution which is tested by the consumers.

GoldenEggs. (2019). You're stuck on October 25, 2019, how do you escape the day? [Video]. Bilibili. https://www.bilibili.com/video/BV1UE411y7Wy/?spm_id_from=333.337.search-card.all.click&vd_source=8e83eea382c8bd540b89c260e55caac6

*IDEO Design Thinking*. (n.d.). IDEO | Design Thinking. https://designthinking.ideo.com/

Koenitz, H., Barbara, J., & Eladhari, M. P. (2023). Interactive digital narrative (IDN)—new ways to represent complexity and facilitate digitally empowered citizens. *The New Review of Hypermedia and Multimedia*, 1–21. https://doi.org/10.1080/13614568.2023.2181503

Kolko, Jon (2010), "Abductive Thinking and Sensemaking: The Drivers of Design Synthesis". In MIT's Design Issues: Volume 26, Number 1 Winter 2010.

Kroll, Tobias & Siemon, Dominik & Wilms, Konstantin & Möser, Sascha & Hellmann, Marco & Stieglitz, Stefan & Robra-Bissantz, Susanne. (2018). Collaborative Service Blueprinting for Design Thinking: Evaluation of a Digital Prototype.

Mackey, Margaret. (2003). At Play on the Borders of the Diegetic: Story Boundaries and Narrative Interpretation. Journal of Literacy Research - J LIT RES. 35. 591-632. 10.1207/s15548430jlr3501_3.

Microsoft. (2021c, March 2). *Introducing Microsoft Mesh* [Video]. YouTube. https://www.youtube.com/watch?v=Jd2GK0qDtRg

Razek, abdul Rahman mohsen abdel, Husen, C. V., & Raban, martin. (2017, September). Service Prototyping Design Dimensions. ResearchGate. https://www.researchgate.net/publication/317688946_Service_Prototyping_Design_Dimensions

Riedl, M. O., & Bulitko, V. (2012). Interactive Narrative: An Intelligent Systems Approach. AI Magazine, 34(1), 67. https://doi.org/10.1609/aimag.v34i1.2449

Sangiorgi, D. (2009). Building Up a Framework for Service Design Research. 8th European Academy Of Design Conference, (pp. 415-420). Aberdeen, Scotland.

Serbanescu, A., Ciancia, M., Piredda, F.,and Bertolo, M.(2021) Narrative-based human–artificial collaboration: A reflection on narratives as a framework for enhancing human–machine social relations, in Leitão, R.M., Men, I., Noel, L-A., Lima, J., Meninato, T. (eds.), Pivot 2021: Dismantling/Reassembling, 22-23 July, Toronto, Canada.https://doi.org/10.21606/pluriversal.2021.0038

Service Design Tools | Communication methods supporting design processes. (n.d.). https://servicedesigntools.org/

Stickdorn, M., & Schneider, J. (2012). This is Service Design Thinking: Basics, Tools, Cases. John Wiley & Sons.

Strohecker, C. (1997). A Case Study in Interactive Narrative Design. Designing Interactive Systems: Processes, Practices, Methods, and Techniques, 377–380. https://dl.acm.org/doi/pdf/10.1145/263552.263647

Sun, Y. (2020). Interactive Reading Construction of Three-Dimensional Books : Narrative-Play-Space. CHINA PUBLISHING JOURNAL, 20, 38–41. www.cnki.net

Yuyi. (2019, July 10). B Site Can “Play” Video Now! The “Interactive Video” Function Is Online! Bilibili. https://www.bilibili.com/read/cv3045160/