

**BEYOND PANELS INTERACTIVE STORYTELLING:  
DEVELOPING A FRAMEWORK FOR HIGHLY EMOTIVE NARRATIVE  
EXPERIENCES ON MOBILE DEVICES**

by

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A thesis submitted in partial fulfillment of the requirements  
for the degree of Master of Fine Arts in Emerging Media  
in the School of Visual Arts and Design  
in the College of Arts and Humanities  
at the University of Central Florida  
Orlando, Florida

Fall Term

2017

Major Professor: Rudy McDaniel and Joseph Fanfarelli

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## **ABSTRACT**

Balancing passive and interactive experiences within a narrative experience is an area of research that has broad applicability to the video game, cinematic, and comic book industries. Each of these media formats has attempted various experiments in interactive experience. The goal of this research was to better understand how to construct an interactive narrative experience that preserves the integrity of the author's story, but allows for inspired interaction by a willing audience. A study was designed to test three different conditions. The two control conditions were examples of passive narrative storytelling: the Comic Book Condition and the Cinematic Condition. The experimental condition was a hybrid format of interactive and passive storytelling, wherein the participant had the opportunity to interact with the story to further engage with the narrative world. Participants used a mobile tablet to experience each format, geared toward minimizing the separation of the participant from the story. Touch / swipe interactions were used for the hybrid format to create as intuitive of an experience as possible. Narrative Transportation, engagement, and flow were the primary evaluators of the narrative's effectiveness for each participant. An analysis of the data showed that, in general, the current Beyond Panels framework was not effective in producing higher levels of reported Narrative Transportation, engagement, or flow. However, of those participants in the Beyond Panels condition, those that interacted more consistently throughout the experience did report higher Narrative Transportation compared to those that had minimal interaction. Data was collected to better understand the relationship that optional interactivity has with these factors. The results of this study will help to further research in the areas of interactive storytelling for mobile platforms. The results will be used to continue to evolve a framework for this hybrid storytelling format called Beyond Panels.

## **ACKNOWLEDGMENTS**

I would like to thank my wife and daughter for all their love, support, and patience throughout my graduate studies. I love you both more than you could possibly imagine. I would like to thank my parents for their support and encouragement. Without you and the lessons you taught me I wouldn't be the person I am today. My family and friends made this possible. Thank you to my committee for the guidance and wisdom you provided. You provided the best undergraduate and graduate education I could have asked for. A special thank you to my committee co-chair Dr. Fanfarelli for mentoring me through this endeavor. Finally, I would like to thank T.T. Faulkner for his generosity in allowing me to use his story for my research.

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## CHAPTER ONE: INTRODUCTION

The rapid evolution of technology, mobile devices specifically, presents an opportunity to examine the potential to improve digital interactive storytelling on mobile platforms. As our culture continues to use mobile devices as a primary way of consuming digital media, both passive and interactive, it is important to explore the possibilities of leveraging the affordances of mobile technology to enhance the interactive narrative experience for the mobile device user. Interactivity, as defined by Jonathan Frome, states,

an artwork is interactive just in case (a) the audience can change the aesthetic structure of the artwork it is engaging with, (b) the audience can change the aesthetic structure of the artwork in a manner intended by the artist, and (c) the audience is aware of both (a) and (b). (Frome, 2009, p. 1)

A survey of the literature recognizes varying levels of interactivity across two types of dimensions: message dimensions (i.e., direction, time, and place) and participant dimensions (i.e., control, responsiveness, and perceived goals) (Downes & McMillan, 2000). Using schema theory, Quiring (2009) surveyed, consolidated, and categorized these two definitions in addition to “interactivity as an attribute of technological systems” and interviewed people for their perception of interactivity. Ryan provides a substantial breakdown of four major forms of interactive text including internal, external, ontological, and exploratory layers (Ryan, 2011). Frameworks such as these, while not exhaustive, provide a foundation for approaching the comparative analysis of the various passive and interactive media reviewed for digital storytelling (Murray, 1997; Ryan, 2001; Juul, 2001; Ryan, 2011; Crawford, 2002; Kioussis, 2002). Examples of these media include motion pictures, comic books, interactive narratives, and video games, all of which have transitioned to mobile devices in some capacity. There is room, however, to consider modifying the way users interface with these media on mobile devices as compared to the respective mediums we are accustomed to using (e.g., movie theaters, televisions, printed books, and game

consoles). Part of the research I will be conducting is targeted at identifying if the new approaches I discuss will meet the desires of the audience using these devices.

Mobile devices such as tablets and smart phones provide convenience, connectivity, and interactive flexibility for digital media. The methods by which the user interfaces with that digital content are constantly being examined under different use cases. Not all media formats work well when directly ported to mobile devices. Various reasons such as screen size, the potential for viewing content in loud or disruptive environments, and the potential for limited attention from the user impact user experience. An example is not sitting in a dedicated viewing environment, such as in front of a TV in a living room or at a desk viewing a computer monitor. For some media, such as the printed novel, commercial companies have been able to captivate and move readers into the digital age. Amazon's Kindle, for example has given readers a unique reading experience by providing more control over the presentation of the content. Font size and color, background color, screen brightness, page layout orientation, and hypertext features are all methods by which the reader can influence the presentation of the content. In addition, the ability to facilitate connectivity while consuming digital text augments the reader's experience by including features such as built-in dictionaries, community-driven notes, and personal notes and bookmarks. These e-reader features represent an evolutionary outcome of the transition from print to digital format.

According to Downes and McMillan (2000), this would be an example of the user perceiving high levels of interactivity in the *participant dimension of control* due to technology allowing the user to affect the flow of the story by jumping around. It is arguable whether this is less or more interactive than reading a print novel, using a dictionary, or having an interpersonal conversation about the topic (Downes & McMillan, 2000). Ryan's (2011) layered approach to interactivity provides a classification system which may frame discussion on *interactivity* such as perceived interactivity compared to that of the designer's intent.

This thesis will employ the concepts of Transportation Theory (Green, 2004; Green & Brock, 2000; Green, Brock, & Kaufman, 2004) as a foundation for identifying and providing an immersive experience to the right audience at the right time. Transportation Theory is a means for understanding the underlying factors of a narrative that lead to enjoyment and immersion (Green, Brock, & Kaufman, 2004). To accomplish this goal, evaluation and analysis of the interactivity employed in the narrative will be designed to improve transportability for the audience. According to the literature, this requires a quality story with a captivating protagonist (Vorderer, Knobloch, & Schramm, 2001; Hand & Varan, 2009) and a balance between passive (author-driven) and interactive (user-driven) media (Green, Brock, & Kaufman, 2004). I will break down each component and discuss how they work together to guide the creation of what I plan to call Beyond Panels *Comics*. There are numerous areas that I believe provide interesting research opportunities in creating immersive, digital, and interactive stories. One of the major topics in this area of research identifies how to properly execute interactivity and coherent storytelling within the proper boundaries for a given application, such as an interactive narrative. For example, beyond Transportation Theory, research in this area has been described as the “narrative guidance of interactivity” (Galyean, 1995, p. 26). In his thesis, Galyean discusses attempts and guidelines to “bring structure to the freedom interactivity gives” to produce a “continuous” interactive experience for the viewer that does not sacrifice the coherence of the story and largely disguises direct interaction with the story from the user by removing elements such as user-interface and conspicuous choices for the user to make (Galyean, 1995, p. 18). In contrast, Juul (2001) states that, “There is an inherent conflict between the now of the interaction and the past or ‘prior’ of the narrative. You can’t have narration and interactivity at the same time; there is no such thing as a continuously interactive story,” citing the temporal issues of the “reader/viewer efforts *now*”. Conflicts such as these throughout the literature are often due to differences of definition and conceptualizations of both narrative/story and interactivity. Several examples of such discussions are found within the context of novels, video games, and general interactive fiction (Murray, 1997; Ryan, 2001; Juul, 2001; Ryan, 2011; Crawford, 2002; Kiouisis, 2002).

Attempts have also been made to improve user-experience while maintaining story comprehension using adaptive narrative systems (Steiner & Tomkins, 2004). Steiner & Tomkins (2004) studied the effects of dynamically supporting adaptive narrative that would change based on users' interaction. They conducted two studies and compared the results of multiple groups experiencing three different types of narrative: adaptive narrative, author-controlled, and user-controlled. Their belief was that balance between author and user control would create a better experience for the user. In the first study, they evaluated story comprehension, pacing, and view control. The author-controlled (movie) had the highest level of comprehension, with the exception that adaptive narrative and user-controlled groups had better comprehension at the scene level though there was additional variation between the two. The adaptive narrative participants reported higher level of enjoyment of the three groups even though the pacing of the narrative was not as well received as the user-controlled and author-controlled groups. The results showed promise for user-controlled and adaptive narrative experiences. Craven's research in non-linear storytelling in virtual worlds also examines the process of/the effects of providing user-controlled experiences through multiple viewpoints, both in virtual and physical space (Craven et al., 2001). Although this research examines the role interactivity plays in telling stories through advanced technologies, currently there is little research on best practices for crafting immersive interactive storytelling experiences due to the complexity of blended advanced interactive technology platforms such as mobile devices and traditional forms of passive media such as film and print. Researching the psychology behind immersive storytelling techniques, the affordances of interactivity versus author-controlled experiences, audience selection, and presentation of narrative will provide a better understanding of how blended methods of interactive and passive storytelling should be constructed to best entertain a wide range of audiences. This thesis will study the strategy for balancing the author and user control throughout an interactive narrative experience that appeals to a hybrid user with interests in motion pictures, comics, and video games.

## CHAPTER TWO: LITERATURE REVIEW

### Transportation Theory

When we watch a movie, play a game, or read a novel, we want to be entertained. The expectation is that the audience will identify with the characters and be whisked away into another world. This sense of immersion into the narrative is referred to as *transportation*, defined as, “an integrative melding of attention, imagery, and feelings, focused on story events” (Green & Brock, 2000). For clarity, I refer to this as Narrative Transportation throughout this thesis. Green’s research in this area is extensive and focuses on understanding how the audience becomes immersed in the narrative world. Transportation Theory has helped us understand the impact immersion has on enjoyment (Green, Brock, & Kaufman, 2004), how narratives might affect our beliefs (Mazzocco, Green, Sasota, & Jones, 2010), or even understand our evaluation of brands and products through narrative processing by imagining ourselves the advertised product (Escalas J. E., 2013). One of the proposed key benefits of Transportation Theory is the ability to guide the creation of enjoyable experiences. To achieve the goal of designing an immersive interactive experience, Transportation Theory can provide a foundation from which to build out/leverage elements such as enjoyment (Green, Brock, & Kaufman, 2004). For example, according to Transportation Theory, factors that influence when enjoyment will / will not occur include the quality of the narrative, a person’s ability to mentally process the narrative, distractions, and the believability of the fictional story (Green, Brock, & Kaufman, 2004). Green, Brock, and Kaufman (2004) has also found that enjoyment is not dependent upon how well a media program reflects what the audience would believe as reality, just that the story is believable. As part of their research, Green and Brock (2000) developed a scale to help evaluate success of Narrative Transportation for interactive fiction.

The Transportation Scale has been validated to assess the extent to which audiences are transported or immersed within a narrative (Green & Brock, 2000). It provides a measure of effectiveness in drawing the audience into the story. This scale has been used to help understand the effects of narrative transportation and how to achieve it (Mazzocco, Green, Sasota, & Jones, 2010). Participants in one study that read a simple, non-interactive story with which they held similar beliefs or had similar personal experiences to those presented reported higher narrative transportation and thought that elements of the story were more believable (Green, 2004). In a separate study using the Transportation Scale, the focus was on the connections between attitudes and narrative transportation (Mazzocco, Green, Sasota, & Jones, 2010). The results of the study found no significant findings regarding preexisting attitudes towards topics and the ability to be transported. Certain factors such as “well-written, emotionally charged, suspense-inducing narratives” were identified as more likely to trigger narrative transportation (Mazzocco, Green, Sasota, & Jones, 2010, p. 6). In summary, Transportation Theory shows promise for the creation of immersive interactive stories as well as providing a means of quantifying the success in reaching the goal. For storytellers that wish to achieve narrative transportation of the audience, we can work to identify other factors that might help achieve it, starting with understanding the audience.

### Audience Selection

Storytelling occurs through a multitude of formats. As mentioned previously, the target of this research is movies, video games, and comics for the purposes of addressing the benefits/challenges that interactivity and passivity present within each medium. It is safe to say that people have varying tastes when it comes to the types of stories they enjoy. To complicate things further, the problem of meeting such a vast range of preferences extends to the way in which they might prefer to consume the media in such a multi-platform era of society (Schroder, 2014). In studying interactivity’s ability to enhance entertainment, Vorderer and colleagues (2001) discovered a link between cognitive capacity, the level of

interactivity, and the enjoyment of the story. They also noted that identification with and empathy towards the protagonist may increase entertainment value, meaning that attention must be paid to the audience's ability to focus on the protagonist. An observation made in prior research is those with lesser cognitive capacity are likely to feel more entertained without interaction, because it allows them to focus on the protagonist without the distraction of interaction (Vorderer, Knobloch, & Schramm, 2001). In contrast, those with higher cognitive capacity are likely to feel more entertained with the inclusion of interactivity because they feel direct connection with the protagonist via influence through choices (Vorderer, Knobloch, & Schramm, 2001). Along these lines, it has been demonstrated that "regardless of the production style or content form, the addition of interactivity to the narrative significantly enhanced the audience's empathy with the main character" (Hand & Varan, 2009). It is challenging to support an audience across a wide range of cognitive capacities if the flexibility of participation is not present. Specifically, forcing interactivity upon those that would be distracted by the stress of making choices, or eliminating participation for those that feel a burning desire to influence the story could result in low Narrative Transportation or negative evaluation of the experience due to the inability to sufficiently connect with the main character. However, providing the audience with the ability to change the plot or narrative structure can damage the link between audience and the ability to empathize with the protagonist (Vorderer, Knobloch, & Schramm, 2001; Hand & Varan, 2009). A model will be presented later in this thesis to address the need to meet the right audience at the right time to facilitate *inspired interaction*.

The ability for the audience to empathize or connect with the protagonist is a key component to immersion within a story. By providing detailed stories, readers more strongly identified with the main character and reported higher levels of Narrative Transportation (Green & Brock, 2000). The result is stronger empathy with the protagonist. Due to the need for empathy, it is important to identify an audience that is more emotional. Connections have been presented regarding personality traits and the receivers' responses to interactive fiction (Soto-Sanfiel, Aymerich-Franch, & Romero, 2014).

Neuroticism, extraversion, openness, agreeableness, and conscientiousness are traits that influence the ability for the person to empathize with the main character (Soto-Sanfiel, Aymerich-Franch, & Romero, 2014). For example, individuals who scored higher for the neuroticism trait had more intense emotional reactions. Individuals who scored lower in this trait demonstrated higher cognitive-emotional empathy with characters. (Soto-Sanfiel, Aymerich-Franch, & Romero, 2014).

So far, to provide the desired enjoyment level for an interactive narrative proposed in this thesis, the audience must be narratively transported, which requires flexibility in audience participation to represent a range of cognitive capacities, an audience capable of empathizing with the main character, and a suspenseful and thrilling story. This simplified approach becomes a much more interesting challenge using interactivity.

### Interactivity/Passivity

It is important to recognize one's weaknesses. It is not often that an expert in one field tells someone in another how to do his or her job. The same principle is applicable to storytelling. Let the expert storytellers do the storytelling, and let the audience be entertained. By continuing to introduce interactivity and choice into the story, such as in a video game, the audience is tasked with responsibility beyond passively experiencing the story. This pressure now being introduced to passive media or increased in through new game design presents challenges of balance between director and viewer, author and reader, and game designers and players. Narrative video game franchises such as *Dragon Age* or *The Elder Scrolls* (Bethesda Softworks LLC, 2011) are examples of games that are considered highly interactive and dependent upon the player having a drive to be heavily involved in the process of exploring and participating in the construction of the story. Video games are frequently recognized for the level of control they provide to the player. Here are some examples from *The Elder Scrolls V: Skyrim*,



“Skyrim reimagines and revolutionizes the open-world fantasy epic, bringing to life a complete virtual world open for you to explore any way you choose.” And, “Play any type of character you can imagine, and do whatever you want; the legendary freedom of choice, storytelling, and adventure of The Elder Scrolls comes to life like never before” (Bethesda Softworks LLC, 2011). What is the cost? When the player (not a storytelling expert) has control of the camera, every action of the character, or even the world influencing the character’s story, how well can the story really be told? The next three sections will examine four major areas of storytelling and breakdown interactive and passive properties that must be balanced to help address the issues of audience and author control. For the purposes of this thesis, interactive properties are defined as any opportunities presented to the audience resulting in influence or participation in the story environment or characters. In addition, passive properties describe the elements of media that do not allow input from the audience, such as a traditional feature length film or television show; regardless of the audiences’ presence, the story never changes. The goal is to better understand the ability to control each medium’s best practices in author and user control to create an engaging experience that leads to Narrative Transportation for the audience and increased enjoyment.

## Film

The narrative experience of motion pictures is a “one-way channel” (Galyean, 1995). In this respect, motion pictures do not provide the viewer direct control over the story. The result is relatively consistent, with some exceptions, such as screen size, viewing environment, etc. The story is told in such a way that the viewer cannot disrupt the structure of the film in terms of cinematography, dialogue, or story structure. When an audience views a film, they are in the hands of the director and production team’s full control over the narrative. Playback controls do fall under the Downes and McMillan’s (2000) interactivity dimension of *control* and some users might perceive this as interactivity. However, this does

not qualify as control over the story itself, and the director of a traditional motion picture retains control over narrative in this medium.

As a mature medium, people have become experts at using films for storytelling to suck us in, educate an audience, move us to tears when the hero falls, or lift us up when the couple stays together in the end. As previously mentioned, Vorderer and colleagues (2001) identified a strong connection between our ability to connect with the protagonist in a story and our level of perceived entertainment. There are numerous factors that contribute to the production of a motion picture that are controlled by the authors of the film to achieve whatever their goal may be. For the purposes of this discussion, authors are considered any person or team that has influence over the visual and auditory presentation of the story (director, editor, sound engineer, etc.). With that understanding, motion pictures give all control into the hands of the experts. In his discussion of the Trust Model as a theory to distinguish film directors from auteurs, van der Pol provides a structured analysis of the audience's relationship with the director through the story (van der Pol, 2015). This explanation serves as an illustration of the impact an expert author-controlled narrative has over the audience in this medium. When the author operates with complete control, the anticipation of consistency allows for the construction of a story that will reach the audience. Critical to the delivery of the story, cinematography, pacing, sound design, transitions, and composition all come together to guide the viewer through the unfolding story in a rigid and passive fashion that depends on the audience having a consistent viewing experience.

Storytelling in such a restricted format, however, results in an untapped connection with the audience. As an audience sitting in a theater there is no means of participation, no influence over the characters, camera, or actions of the characters or worlds with which we become so emotionally connected (connections which van der Pol (2015) describes while applying his Trust Model to the film *The Celebration*). The reality is that we put all faith in the director to take us on a journey that we otherwise are not capable of creating on our own but at the cost of playing a part of the way it unfolds.

After watching *The Dark Knight* (Nolan, 2008), the first thing the viewer wants to do was play a *Batman* video game. The desire is to *be Batman*, to be the hero. In virtual worlds and games, this tension is referred to as the balance of writer flexibility vs. user flexibility (Steiner & Tomkins, 2004). Many attempts have been made at introducing interactivity to cinema and television, whether full-length feature films or episodes on the silver screen, but most are clunky and have had very little success for various reasons. A thorough analysis, provided by Rogak (2014) evaluates attempts at adding interactivity to television and video, citing issues of “interactivity as a gimmick,” “poor story quality,” and limitations over the control of the story. He also presents an approach to improve the process for the end-user, though his results state that there is room for further research on the topic (Rogak, 2014).

There are numerous ways in which the audience might potentially interface with an interactive motion picture that go beyond Rogak’s research project. For example, a viewer might have control of the cameras in a scene, allowing the viewer to change perspectives at will. When watching a traditional film, as mentioned, the director controls everything the audience sees. What if there were multiple *acceptable* perspectives, all of which met the standard of storytelling the director intended? There have been instances of films that have incorporated this into a passive film experience. In the suspenseful mystery drama, *Memento*, the director tells the story of a man with short-term memory loss by frequently revisiting memories in a specific order while using different cameras from the same scene to reveal new information (Nolan, 2000). There are multiple viewpoints that the director uses throughout the film to control the audience’s comprehension of the story so as not to reveal plot twists until the opportune moments. If this type of interactivity is introduced to the film, it would change the nature of the experience, for example, providing multiple paths to the same outcome based on the discovery by the audience. This could have a negative effect on the intent of the director to control the order by which the audience makes discoveries that piece together the main character’s memory, thus a story would need to be written with the expectation that any of the available camera choices might be selected. Researchers have experimented with ways to create more personalized experiences for audiences. Multi-viewpoint

immersive cinema provides a unique opportunity to let viewers experience the story from different perspectives which has the potential to facilitate a more personalized experience (Craven et al., 2001). The stories and presentation formats in this study were designed with the expectation that multiple perspectives would help to improve the viewer's understanding of the story, rather than relying on a single, author-driven experience. Participants experienced a story in a variety of formats ranging from non-interactive linear stories to manipulating stories in 3D environments. The results of this research suggest that with proper support from the author, the audience can use systems such as view point selection to enhance their exploration of virtual environments.

### Comics

Printed comic books date back decades and have been a key piece of history as a form of storytelling through iconic super heroes and beyond. The traditional printed comic book for the purposes of this thesis is a static, printed, visual graphic novel issue, and using some form of visual frames around content on the page. Much like film, comics are traditionally a passive form of entertainment, if you don't count the joy of turning pages and navigating the page with your eyes as interactivity – some might. The comic book industry is currently undergoing the same challenges that the rest of the print world is experiencing with the increase in the desire for digital content. However, mobile apps such as *ComiXology* (2015) represent repositories of purchasable digital comics from mainstream publisher like *DC Comics* and *Marvel* as well as independent publishers. There are over 820 *DC Comics* series published to *ComiXology* each with multiple issues up to the hundreds in some cases (ComiXology, 2015), demonstrating a commitment to the mobile/digital platform.

Comic book companies have experimented with the digital conversion of print as well as original content creation for multiple devices such as desktops, handheld game consoles, phones, and tablets. Efforts have ranged from exact replications of the medium in full page form to attempts to add interactivity and add motion to bring comics to digital platforms. Examples of more innovative

approaches include Woodward's *Bottom of the Ninth* (Woodward, 2012), Loyer's *Upgrade Soul* (Loyer, *Upgrade Soul*, n.d.), and *DC Comics' BATMAN: ARKHAM ORIGINS – A DC Comics MultiVerse Graphic Novel* (DC Comics, 2014). On his "Experimental Comics" blog, Scott McCloud's highlights independent comics by linking to their respective sources and commenting on the project (McCloud, 2015). In his book *Reinventing Comics*, he shares his thoughts on authoring comic books with our advanced software tools from the mindset of the traditional approach, "...to choose computers as one's primary art-making tool is to choose an almost *superhuman* pallet of *options* – and to devote it to merely *imitating* their predecessors is a bit like hunting rabbits with a *battleship*" (McCloud, 2000). A book that is scanned page by page and converted into a .PDF file type and called a digital book is representative of this idea. The same can be said about direct ports of print comics to a digital format. Designing graphic novels with the capabilities of mobile devices in mind provides an opportunity for the media to benefit similarly to the way digital novels have (with potentially very different enhancements for the purposes of storytelling).

Storytelling in printed comic books relies heavily on text and visuals. Unlike film and video games, print comics don't use audio or motion as part of the story. Instead, traditional comics use text, frames, and composition to convey the narrative. However, similarly to film, the elements of design are critical to creating a story and they are completely controlled by the authors. Composition, paneling, lighting, etc., is painstakingly covered by graphic novel artist Marcos Mateu-Mestre in his book, *Framed Ink*, as they are vital to presenting a story across multiple static images. His work provides a solid foundation for an approach to understanding the visual storytelling techniques that need to translate from passive to interactive while maintaining traditional panels (Mateu-Mestre, 2010). Comic book readers have a differentiating factor that separates them from the film audience – the ability to see more than one panel at a time. When reading a comic book, multiple panels are viewable at the same time. This presents the challenge of controlling the flow of information to the reader. Unlike pressing fast-forward while watching a movie, the reader is not able to easily avoid seeing the entirety of the comic book page.

Though printed comic books are written as a linear story, they present an opportunity for wandering due to their spatial manner, much like video games (Taylor, 2004). Taylor draws connections between games and comics by describing frames as *thresholds* and specifically identifies the similarities between the fixed camera survival horror game genre where the player triggers various static cameras as they cross seemingly invisible thresholds, all based on the edges of the camera and game environment (Taylor, 2004). Comic book artists must anticipate this possibility as the reader moves around the page from frame to frame, generally reading from left to right and top to bottom.

The reader's ability to openly navigate the comic book in general presents the possibility of disrupting or altering the author's intended story flow, or the order in which information is received. There is only so much the author can do to control for this possibility in printed form. With the digital conversion of graphic novels, however, a secondary level of control is layered on top of the experience as a navigation system. Apps like *ComiXology* have introduced new ways of guiding readers through comic books that help balance this control back towards the author. *ComiXology's* Guided View™ allows readers to “cinematically shift from panel-to-panel” without revealing the next frame (ComiXology, 2015). The reader advances through the frames, each of which has an appropriately sized letter-boxing effect to frame the comic frame. While increasing the direct interactivity with the comic, this feature places more control in the hands of the authors. This feature, however, is not a required one, and readers can choose to disable it. If this reading mode was required for comics on the *ComiXology* platform, similarly to movies, it would give authors the advantage of anticipating when and how their content is seen by the reader, providing tighter control of the way the story unfolds. While the reader does interface with the mobile device, the interaction is limited to navigation. There is no way for the reader to directly influence the story or its outcome.

## Narrative Video Games

Thus far, I have primarily discussed passive types of media. Narrative video games represent a form of media that is considered highly interactive, if not dependent on the perception of some level of interactivity. As with motion pictures and printed comics, video games present their own balance of author control and user control. Video games are typically associated with giving substantial amounts of control over the game world and its characters, but when examined are simply interactive frameworks with traits that support the feeling of control (Tekinbas & Zimmerman, 2003). They strive for immersive experiences and are based on the idea that more interactivity means that the goal will be achieved. In some studies, there have been initial findings that support the claims that “user control, or agency, can strengthen the connection the user has with the character” (Dillman Carpentier, Rogers, & Barnard, 2015). However, according to the author there is more research needed on this topic to fully understand the “causal link between agency and the user-character connection,” noting that “self-efficacy might be a third, confounding variable at work...” (Dillman Carpentier, Rogers, & Barnard, 2015). This is an example of the value interactivity can add to an experience; there is something to be learned from the video game industry regarding the role it plays overall. However, the nature of researching video games by a specific definition and how they compare to other more established storytelling mediums often becomes complicated when considering gameplay and ludic activities (Tekinbas & Zimmerman, 2003).

As with film and comics, to provide a means for comparison, video games need a definition. Video games come in all shapes and sizes, but to compare them to films and comics, there must be a priority on the desire to tell a story and not just gameplay mechanics. The video games targeted in this research or those that fit mostly within the role-playing game (RPG) genre with the following properties: narrative driven/focused, first/third-person camera(s), open or semi-open world environment, control over character actions, and a critical and/or secondary path for progression through the story and/or environment. Examples of this genre of video game are: *The Elder Scrolls V: Skyrim* (Bethesda Softworks

LLC, 2011), *Dragon Age: Inquisition* (EA, 2014), *Mass Effect 3* (BioWare, 2012), *Assassins Creed: Unity* (Ubisoft, 2014), and *Batman: Arkham Origins* (WB Games Montreal, 2013). These games prioritize the narrative experience as heavily as the game mechanics, striving to make the player feel as though they have a direct influence over the story's outcome, while trying to deliver the most immersive experience possible. According to Murray (1997), immersion represents becoming completely enveloped in an alternate reality, such as submersion in the ocean, which requires adapting their familiar sense of reality with the new one. The goal is to have the player become enamored with the game's story and its characters.

Designers of RPGs are challenged with balancing author and player control in how they present story and how the game is played. Marie-Laure Ryan describes the challenge of prioritizing game design and interactivity over story and vice versa claiming that, "There is no recipe for achieving this feat" (Ryan, 2011). Klevjer describes a "paradox of make-believe" in which we can be in control of a predefined story, unable to find harmony between this desire and the "rule-based regime." (Klevjer, 2002). A critique that speaks to this challenge comes from Frasca's review of characters in video games, stating that by giving the player more control over the character, it degrades the ability for that character to have a personality while making an argument for a player-driven character creation process followed by an indirect observational experience to improve the quality of the character (Frasca, 2001).

A key difference in passive and interactive media is the presentation of important information to tell the story. Film, literature, and theatre are intended to display everything the viewer needs in order to process the story, while video games, by their interactive freedom, might allow the audience to miss certain components based on what Eskelinen and others refer to as "ergodic importance," meaning that regardless of the combinations the audience did see, they would still observe an equal representation of the story, which would be critical for making non-trivial decisions dependent upon certain observations by the viewer (Eskelinen, 2001). One way that RPGs attempt to bridge the gap in storytelling weaknesses



(e.g., character development) is through in-game cutscenes. Cutscenes are examples of micro-cinematic experiences where the game designers take back control from the player (Klevjer, 2002) to make sure they see key story segments whether for character development, orientation to the environment, critical dialogue, or other reasons. Cutscenes often also appear at the beginning of a game to set the stage for the player. In their research on pre-game story, Park, Lee, Jin, and Kang (2010) review the literature to understand how this story background correlates with the player's interest and investment while playing a "role" in narrative-based games like the RPGs mentioned earlier. Their review of the literature suggests that a strong story is a predictor of market success, players feel compelled to see the character through to the end, players want to participate, and these games increase our sense of presence within the game world (Park, Lee, Jin, & Kang, 2010). During in-game cutscenes, the player's ability to participate is often revoked and control is restored to the expert storyteller. Cutscenes are not necessarily the solution to incorporating story into a highly interactive RPG. Klevjer, calls to attention the criticisms of cutscenes and other scripted events as a "sign of immaturity, a dependence on film," (Klevjer, 2002). When playing games like *Metal Gear Solid 4: Guns of the Patriots* (Konami, 2008), there is such a high-frequency of lengthy cutscenes that one may wonder if it is trying to be a movie first and a game second. In fact, the game holds a *Guinness World Record* for "Longest Single Cutscene" at 27 minutes (Fox, 2013). This represents a potential imbalance of the player's expectations for the experience and the struggle for control over the author, "a balance between agency of the story-game and the agency of the player," (Klevjer, 2002). Bartle's Dorothy, Alice, and Wendy worlds metaphor elaborates on the three ways in which the author's predefined story and the user's story come to light (Bartle, 2009). The Alice and Wendy worlds exhibit more opportunity for the user to demonstrate control in defining the narrative, which Galyean refers to as "emergent narrative" or narrative that is based on the secondary actions of the player, such as the personal feelings a player might have against a character in the game beyond the author's predefined story (Galyean, 1995).

RPGs often find ways of incorporating story while the player has control to avoid switching between an interactive and passive experience. Gameplay and story battle for the player's attention. In some games, developers attempt to insert key dialogue or plot points into user-controlled gameplay, such as the titles listed previously: *The Elder Scrolls V: Skyrim* (Bethesda Softworks LLC, 2011), *Dragon Age: Inquisition* (EA, 2014), *Mass Effect 3* (Bioware, 2012), *Assassins Creed: Unity* (Ubisoft, 2014), and *Batman: Arkham Origins* (WB Games Montreal, 2013). When this happens, there are several factors that might affect the user's ability to comprehend the story and carry out actions within the game at the same time. If the player is focused on a task that requires cognitive attention as well as dexterity-based input, it could have implications on the success of the player to complete the task at hand. As Bates describes in his book *Game Design*, as a game designer you are challenged with slipping in the storytelling at key points and building it around the game's play style. He further explains in an example that there are multiple paths to get to these key points, each representing the player's sub-narrative, but the important thing is that the player gets there to stay on the critical path to reach the cutscene that can provide the major story updates (Bates, 2004).

### Interactive Narrative and Passive Media

The inclusion of interactivity for passive media is a complex endeavor and many attempts have been made. As mentioned previously, Rogak (2014) provides a thorough review of the interactivity literature in television, movies, and general video. The inclusions of interactivity in traditionally passive media throughout the various projects explored in his research cover both individual and group-based experiences. Most interesting were the examples of community driven productions, *Bar Karma* and *Accidental Lovers*, which used viewer polling to guide the development of the story. This approach resonates with the intention of balancing the author and viewer control from the onset of the production and includes an opportunity for the expert to carry out the vision of the participant audience. For passive

media such as television to change into interactive media certain requirements should be met to reach the audiences' expectations. There is an opportunity to improve the interactive television concept by harnessing the ability to allow the audience to experience this in real-time, which is not feasible in current production settings but are possible with real-time 3D environments. As with television, simply adding interactivity to film is not the solution. Regardless of the digital nature of film today, interactivity in film requires the audience to actively influence the story and become the narrator (Elsaesser, 2014). This direction can have a negative impact on the quality of the narrative if told by an amateur. In fact, this level of direct control for the audience becomes cause for concern regarding the integrity of the story (Vorderer, Knobloch, & Schramm, 2001; Hand & Varan, 2009);. The goal should be to approach interactivity in a way that it becomes intelligently structured around the narrative to prevent damaging the story but remain supportive of participation.

Rogak, however, proposes a project to achieve a real-time user-driven experience using *Adobe Flash* for an interactive video. Many of his choices, such as providing a path through the video regardless of user-input resonate with the proposed vision for an interactive digital narrative experience presented in this thesis. He chose to incorporate on-screen indications of opportunities for the viewer to alter the path of the story, and his intentions were to present the audience with meaningful choices that fit the story and create an interface that was not *intrusive* (Rogak, 2014). Participants in the interactive condition complained about the length of time in which the faintly glowing choices appeared (Rogak, 2014). One of the most critical lessons learned for my research involves the subtleties and timing of the user-interface to make decisions in the story. These insights help guide the creation of opportunities for interactivity for the user when considering the removal of all visual user-interface. My intentions are to leverage cinema techniques to prompt or inspire the viewer to interact, requiring careful attention to composition, not unlike the comic book medium, but with the addition of cinematography and motion to avoid the use of distracting visual UI yet avoid the complications Rogak experienced with the windows of interactivity he provided for participants.

Numerous attempts to bring interactivity to comic books and graphic novels have been released on mobile platforms attempting to achieve various goals; however, during this digital revolution of a print medium there is hesitation to lose sight of the past. In an interview with *Engadget* about digital comics, Alan Moore, from *Electricomics*, states, “Avoiding whistles and bells would be one of the first tenets that digital comics should try to stick to,” claiming that not all affordances of the digital platform are “better” such as animation over still art (Buckley, 2014). Even interactive text-based narrative is trying to understand how it fits into the mainstream, given advancements in technology. La Ronn warns potential authors about stigmas attached to interactive fiction citing the effort thus far as “commercial failures” (La Ronn, 2015). The companies and individuals exploring ways to preserve as well as expand the printed comic book in its transition to a digital platform are focused on adding interactivity, audio, animation, and branching narrative to the medium. *D.C. Comics* recently published *BATMAN: ARKHAM ORIGINS – A DC Comics MultiVerse Graphic Novel* (DC Comics, 2014) for the *Apple iPad*. The comic has background music, sound effects, some animation, frame by frame navigation (similar to the aforementioned *ComiXology* feature), and the ability for the reader to make decisions throughout the story to branch off into different endings and storylines. The experience requires user-input to advance through the story and animates the content via motion comic techniques. Loyer (2009) gives an overview of motion comics such as *BATMAN: ARKHAM ORIGINS – A DC Comics MultiVerse Graphic Novel* and the discourse within the comic book community as the industry shifts from print to digital, portraying them as complimentary and suggesting they bring something new to the table. The comic has predefined paths for each clue in the crime scene that *Batman* needs to investigate to solve the crime. Overall, the experience retains a similar look and feel to a printed version that is augmented with audio, partial animation, and touch screen navigation. Unlike a traditional comic, this app allows the reader to directly influence certain paths for the story. Elsaesser (2014) associates this type of interactivity network, as others have (e.g., Isabelle Raynaud, year), with “creating a better kind of mousetrap”. A project of similar caliber, *Upgrade*

*Soul* (Loyer, n.d.), created by Erik Loyer, is a digital comic for *Apple iPad* that uses touch screen controls to navigate the comic's animated frames with the addition of using the device's accelerometer to create a parallax effect for the otherwise 2D content. The parallax feature creates the sense of depth with 2D images represented on multiple layers that slide around for a 3D look. Loyer briefly describes the use and origin of parallax in a commentary on the website "The Story of Jess and Russ" in which he suggests how it benefits digital storytelling (Loyer, n.d.). The result is a subtle, but more organic experience for the reader as the content is active throughout navigation, such as a character's eyes blinking within frames. Both comics introduce features and presentation styles that provide more control to the reader to improve the story's visual, auditory, and participatory experience. These two examples are visually consistent with a traditional graphic novel in terms of the compositional design of the page and frames.

Jason Shiga's (2014) digital comic, *Meanwhile*, takes digital comics in a different direction by providing a branching narrative, and the ability to navigate a complex web of static comic panels. The story has multiple ending points, which the reader reaches by deciding which panel to choose next. Though the reader can see the entirety of the canvas of possibilities, the reader must systematically navigate the structured story web from panel to panel. The design is based on McCloud's principle of the "infinite canvas," in which he further challenges authors to think about the comic book medium in terms of digital technology rather than lock the medium to its page-based print structure (McCloud, 2009). This exploratory approach to reading a digital comic represents an attempt at leveraging the capabilities of the mobile device to change the way the reader experiences the traditionally printed medium. For all *Meanwhile's* innovation, there are several drawbacks to its design that cause the story to suffer. The presentation focuses on the large network of panels, which are small static images with text. These panels are often difficult to read without zooming in for a closer view. In addition, the view resets for the reader each time a panel is selected, requiring the reader to likely zoom in again. This interactivity is very distracting and is an example of where the ability of the reader to comprehend the story is impacted negatively using superficial levels of interactivity that don't provide any substantial impact to the

narrative (Ryan, 2011). Finding the right mix of interactivity and story is something the gaming industry is still struggling to master.

Game designers have experimented with bringing the gameplay into passive story-based cut-scenes called “Quick Time Events,” (QTEs) (Gallagher, n.d.). In these cutscenes, the player watches an animated story sequence that has moments where the player is required to interface with the game by pressing a button or making a gesture (depending on the method of controlling the game) to progress through the cutscene. For example, the player might be playing as an explorer in an adventure game navigating a treacherous tomb, and suddenly a cutscene sequence begins. The player seemingly relinquishes control of the character and the cinematic experience begins. As the player watches the character traverse the environment, a trap is set off (the player has no influence over whether or not this happens, as they are watching what appears to be a video). As the trap is set off, a button icon appears on screen representing a corresponding button on the player’s controller. This visual slowly begins to shrink over the next 1.5 seconds. If the player hits the button within the time frame, the character dodges the trap and the cutscene continues. However, if the player does not hit the button in time, the character is speared against the tomb wall and the player must start the cutscene over and try to hit the button faster next time. When considering Vorderer’s research concerning the importance of empathy with the main character to increase enjoyment, these types of cutscenes are likely to distract from the protagonist and limit transportability for those that will not be able to process both the interactions and the story unfolding (Vorderer, Knobloch, & Schramm, 2001). The interactions provided by these experiences does nothing to integrate the story with the gameplay in a meaningful way (Gallagher, n.d.). One of the ways in which video games allow players to become immersed is through challenge (Csikszentmihalyi, 1990), which more closely align with the QTE types of interaction. Csikszentmihalyi’s definition of *flow*, the *optimal experience*, is embodied by video games. The ability of games to promote flow through a mixture motivating the player with new challenges and the ability to develop the skills necessary to overcome them allowing players to reach an immersive experience, but not necessarily because of the storytelling

(Csikszentmihalyi, 1990). In their analysis of Ceremony of Innocence, a puzzle game which provides such skill/challenge based mechanics, Bizzocchi & Woodbury (2003) review the application's transformation of the interface and presentation to create an immersive experience, but the effects of the "subversion of interface" are mostly aesthetic and the game remains a *puzzle game* first and a *story* second. In interactive fiction, this challenge extends to the concept of the unfolding narrative or the *puzzle* as it is described, because "The interactor, confronting the riddle of an interactive fiction work, is a reader – and also a writer" (Montfort, 2005). This again brings to light the challenges of putting the end user in charge of making decisions to provide participation, running the risk of derailing the storytelling experience for users that might not want to be challenged with those responsibilities (Hand & Varan, 2009). Research is needed to identify a better structure for presenting interactivity within a story without prioritizing game mechanics, story, or technology features at the cost of one or both of the other elements.

Researchers have described the issue of blending author control with the freedom of video games provided to the player. One strategy involves adapting the narrative to the direction of the player allowing free movement through a virtual world and presenting story based on what areas of a virtual environment the player decides to visit (Steiner & Tomkins, 2004); another is adapting the visual presentation of the story (e.g., camera angles) to the player's actions which provides more cinematic variation based on whatever the player happens to be doing in a scenario (Tomlinson & et al., 2000). These types of strategies attempt to hide their adaptive structure from the player to provide the player with a sense of complete freedom within the game, while maintaining a narrative experience that feels as rich as if it was pre-constructed (e.g., in terms of camera angles and order of narrative events). There have also been numerous attempts to provide adaptive narratives that would support the ideal interactive storytelling experience that Vorderer claims is impossible (Vorderer, Knobloch, & Schramm, 2001). The aim of adaptive narrative researchers is to create the story either from robust databases that ebb and flow with each choice the user makes (Mateas & Sengers, 1999; Pinhanez, Mase, & Bobick, 1997); , or create story on the fly through "generative" techniques that create new content with complex algorithms with the hope

of creating a coherent story (Riedl & Young , 2006; Riedl, Saretto, & Young, 2003). We can trace back these two approaches to Galyean’s work (1995). He breaks narration into three levels of presentation and four “principles for narrative guidance of interactivity,” to define a structure for creating more immersive experiences in game-based storytelling.

Galyean’s research provides a theoretical foundation but the technology available at the time was surely a limiting factor in his studies. Both experiments described in his thesis required cumbersome setup and were influenced by the graphical rendering capabilities of computers at the time. With the advancement of graphics processing power and capabilities of mobile devices, I believe that Galyean’s thesis work can be tailored to the mobile platform, and contribute to expanding the body of knowledge around this idea of striking a balance between narrative / author-driven storytelling and interactive / user-driven gameplay.

### Purpose of Study

The goal was to create a new type of storytelling experience. As outlined above, many attempts have been made to find the proper balance between author and user control, but there is still room for improvement and innovation. The literature points to the importance of *transportability*, quality narrative, supporting a varied audience, and providing meaningful connections to the characters by way of author direction and interactivity. This research focused more on the ways in which storytelling can be improved while maintaining a direct relationship with interactivity, not prioritizing one at the expense of the other, as video games have been known to do. Mobile platforms have reached a point at which this is possible on a personal and scalable level. With the natural tendencies to move towards the latest and greatest, which would likely be the current VR movement for our time, we are leaving something on the table if we ignore the possibilities of a simpler approach.



Through this research, I intended to validate an approach to storytelling that achieves high narrative transportability through effective use of balance between authorship and user participation. The stories created within this framework are called Beyond Panels. This initial research fielded a story in three formats, a non-interactive film, comic, and this hybrid Beyond Panels format interactive narrative. The study gathered qualitative data from the participants about their experiences with the different mediums through a series of questionnaires. The study leveraged the research from Transportation Theory to verify the transportability of the audience and the story as well as the work of Vorderer and Soto-Sanfiel to understand the audiences' capacity for being affected by the storytelling approach (Vorderer, Knobloch, & Schramm, 2001; Soto-Sanfiel, Aymerich-Franch, & Romero, 2014; Westwood & Griffiths, 2010). This initial research involved creating an initial prototype for evaluation with focus groups to identify and refine best practices for creating Beyond Panels stories. Data gathered from this research will inform future designs, stories, and audiences as they relate to successful use of mediums such as films, comics, and video games to create a new digital interactive storytelling experiences that are immersive, enjoyable, and highly emotive. This thesis describes a theoretical model currently in development to support the creation of Beyond Panels stories.

## CHAPTER THREE: EXPERIMENT DESCRIPTION & METHODOLOGY

### Study Overview

The goal of this study was to evaluate a Beyond Panels story experience through comparative analysis against a traditional static comic book format (PDF) and a traditional passive cinematic movie (e.g. short film). Data gathered from the study participants will help shape the framework and guidelines to producing more emotionally effective interactive narrative experiences for future development. For the study, I produced a short story based on a pre-written script (generously donated for use by the author T.T. Faulkner). I chose the prologue / introduction of the story for the episode that I produced for the study. Groups of participants experienced the episode in one of the three aforementioned formats on a Microsoft Surface Pro. There were several pre and post instruments focused on [Narrative Transportation](#), [narrative engagement](#), [story comprehension](#), [attentional focus](#), [presence](#), [emotional engagement](#), [Flow](#), and [general usability](#) to address the following research questions:

1. Does the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported Narrative Transportation for the audience?
2. Does the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported audience engagement?
3. Does the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported audience sympathy / empathy for the protagonist?
4. Does the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher reported audience engagement depending on the participant's personality?
5. Does the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher reported audience Flow?

The goal was to develop a repeatable design framework for producing interactive narrative experiences for mobile devices that meet a broad range of audiences with varying expectations,

preferences, and personalities in the areas of gaming, cinema, and comic book mediums. The hypothesis was that the Beyond Panels format creates a stronger emotional connection and increases in engagement leading to higher enjoyment overall when compared to the other passive formats.

## Hypotheses

### Narrative Transportation

H1: The presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported Narrative Transportation for the audience.

### Engagement

H2: The presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported audience engagement.

H3: The presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported audience sympathy / empathy for the protagonist.

H4: The presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher reported audience sympathy towards the protagonist depending on the participant's personality.

### Flow

H5: The presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher reported audience Flow.

## Participants

Study participants were randomly assigned to one of three conditions using Latin Square randomization and assigned a unique identification number (ID#). The Comic Book Condition (Condition A) used a static, visual comic book presentation of the story. The Beyond Panels (Condition B) Condition was a hybrid interactive / passive experience. The Cinematic Condition (Condition C) was a video (short-film) version. Each condition's media format was digital and experienced on a Microsoft Surface Pro 3. A total of 63 people participated in the study (21 in each condition). The mix of male and female

participants were 68% female and 32% male. Participants were students recruited through UCF's internal solicitation tools and word of mouth.

### Equipment

The experiment required a Microsoft Surface Pro 3 for the participant to complete all pre-and post-surveys and experience the story. The device supports all formats of the story – video, static comic, and interactive hybrid. Construction of the story for each condition was completed in *Unity 3D* (a game engine). This engine allowed for a single production pipeline from which all three formats are assembled. Each format of the story will launch from the respective application on the Microsoft Surface Pro. In addition, the surveys are launched within a web browser through *Qualtrics*.

### Independent Variables

#### Media Format

The narrative for each condition followed the exact same critical path. The story ending and major plot points did not vary as a result of the participant interaction. A selection from the novel *Anya's Ocean* by T.T. Faulkner was adapted for each of the three conditions in the study. Regardless of the condition, the same story unfolded in each medium. The interactive Beyond Panels (Condition B) version was created first. After production concluded, the comic book version for Condition A was created using still frames from the Beyond Panels version. Similarly, the cinematic version for Condition C was produced by recording a video of the Beyond Panels version playing from beginning to end without any interaction taking place. For comparison, if the participant in Condition B chose not to interact with the story at all through accelerometer, touch, or voice, the story would match the cinematic version of the story in the

Condition C. Condition A, the comic book, was essentially comprised of the major frames and dialogue from Condition C, the Cinematic Condition.

## Dependent Variables

### Narrative Transportation

The Narrative Transportation Scale and Perceived Plausibility Subscale of the Perceived Reality Scale (Elliott, Rudd, & Good, 1983) were used to evaluate each condition in the study. Condition B was compared to the two control conditions, Condition A and Condition C. The critical path of the story was consistent across all three conditions, resulting in the same key plot points and ending. Condition B allowed for participant interaction to influence how the story plays out through slight deviations from the critical path, but always comes back to the key plot points. Best practices were used from the literature to provide engaging interactions that were purely optional and inspired to cater to a varied audience. The results of the Narrative Transportation Scale were compared to personality profile questionnaire results to evaluate what affect Condition B had on participants compared to the control conditions.

### Engagement

To evaluate engagement across each medium two engagement measure questionnaires were used after the experience. The Narrative Engagement Scale (Busselle & Bilandzic, 2009) uses a culmination of subscales to evaluate narrative understanding, attentional focus, narrative presence, and emotional engagement. The Engagement Measure was a secondary instrument used to evaluate the perceived effort, interest, and enjoyment of each condition (Jennett, et al., 2008; Charlton & Danforth, 2005).

## Flow

The Flow State Short Scale was used to identify the participant's ability to reach a state of flow in each condition (Jackson, Martin, & Eklund, 2008). The results were compared to Narrative Transportation, engagement, and story comprehension for each condition to assess variations for each medium to evaluate if a state of flow was more prominent in a particular condition. The hypothesis was that a state of flow would be reached more substantially in Condition B due to the direct interaction possibilities that were encouraged through cinematic techniques.

## Questionnaires

This section provides an overview of the questionnaires used in the study. Qualtrics was used for all questionnaires.

### Demographics Questionnaire

The Demographics Questionnaire assessed the participant's age gender, race, education level, familiarity with mobile technology, narrative entertainment preferences, and occupation. The full questionnaire can be found in [Appendix D](#).

### Personality Traits Questionnaire

The Personality Traits Questionnaire is adapted from The Big Five (Soto-Sanfiel, Aymerich-Franch, & Romero, 2014). The 44-item instrument assesses the personality type of the participants for evaluation with Narrative Transportation and engagement for each condition. The full questionnaire can be found in [Appendix E](#).

### Narrative Transportation Scale

This scale was designed to evaluate audience transportation into a narrative experience and show how transportation affects how the audience's story-related beliefs and evaluation of the protagonist are affected (Green & Brock, 2000). This scale was adapted to evaluate a more rich-media format and has some limitation as its original use was meant to assess interactive fiction. This 9-item instrument evaluates the participant's immersion into the story based the story medium condition. The full questionnaire can be found in [Appendix F](#).

### Perceived Realism

Participants completed a modified version of the Perceived Plausibility Subscale of the Perceived Reality Scale (Elliott, Rudd, & Good, 1983). Eight items judged to be most relevant to the narrative were used, including questions about the realism and believability of characters, setting, dialogue, and other aspects of the communication. An example item is, "People in this narrative are like people you or I might actually know." The full questionnaire can be found in [Appendix G](#).

### Narrative Engagement Scale

The Narrative Engagement Scale (Busselle & Bilandzic, 2009) is a 12-question instrument to assess narrative understanding, attentional focus, narrative presence, and emotional engagement. The full questionnaire can be found in [Appendix H](#).

## Engagement Measure

The Engagement Measure is a combination of two questionnaires (Jennett, et al., 2008) (Charlton & Danforth, 2005), which was used by (Fanfarelli, 2014). It was modified to more closely match the mediums for the story and the purpose of this study. In the original study, the participants only viewed a television show, which did not adequately cover all three conditions in this study due to the interactive Beyond Panels condition. The word ‘story’ was substituted whenever the word ‘program’ so that it was consistently referring to an experience that matched all conditions. The full questionnaire can be found in [Appendix I](#).

## Flow State Short Scale

The Flow State Short Scale (Jackson, Martin, & Eklund, 2008) is a nine-item subjective measure that measures flow from nine dimensions: Challenge-skill balance; action-awareness merging; clear goals; unambiguous feedback; concentration on the task at hand; sense of control; loss of self-consciousness; time transformation; and autotelic experience. This scale was used to show the ability of the participant to reach flow in each of the three conditions. Though the participants in Condition A and Condition C did not have direct interaction like Condition B, it has been suggested that building mental models and narrative engagement can result in entering a flow-like state making it relevant to this form of media consumption even though there were no *skill-based* interactions (Busselle & Bilandzic, Measuring Narrative Engagement, 2009). This scale has been adapted from Jackson, Martin, & Eklund (2008) to exclude “performance” questions as there is no measure of performance in any of the three conditions. The full questionnaire can be found in [Appendix J](#).



## Story Comprehension

This questionnaire assessed story comprehension and memory recall across all mediums via a four-item questionnaire that covers the critical narrative themes and character development. It also assessed different paths experienced in hybrid format and their impact on the participant by asking about specific details in events that could have occur depending on interactions. The full questionnaire can be found in [Appendix K](#).

## Open-ended Technology Questions

This questionnaire gathered data on the participants' reaction to the technology experience. The information provided will be used to improve the presentation of the Beyond Panels storytelling format regarding the cinematic techniques, technology platform, and style of interactivity. The full questionnaire can be found in [Appendix L](#).

## Procedure

The between-subjects study was designed to run for several weeks with one participant per session. The anticipated total time to complete a study session was approximately 45 minutes:

- Pre-story instruments (5-10 minutes) – Demographics, Personality Traits Questionnaire
- Story experience (10-15 minutes) – Comic book, Video, or Beyond Panels experience
- Post-story instruments (15-20 minutes) – Narrative Transportation Scale, Narrative Engagement Scale, Engagement Measure, Flow State Short Scale (FSSS), Perceived Realism, Story Comprehension, and Open-ended Technology Questionnaire

Participants were able take longer to complete certain sections of the study if necessary. Each participant only experienced their assigned story format one time. Participants used the tablet provided to

complete all survey instruments. The experimenter launched the pre-story surveys covering demographics, cognitive ability, and personality traits through a *Qualtrics* shortcut on the tablet. The experimenter entered the participant ID number in the form field and instructed the participant to complete the pre-story instruments (informed consent, demographics survey, and personality traits questionnaire). These instruments were needed to establish a baseline for comparison with post-study data. Similarly, to assess sympathy and empathy for the protagonist the personality trait instrument provided insight into the participant's disposition and capacity for empathy, captured during the post-study survey.

Upon survey completion, the experimenter provided the participant with instructions for operating the story based on the format assigned. After the participant acknowledged comprehension, the experimenter launched the specified story format based on the participant ID number on the tablet. In Condition A, a preloaded comic book (.pdf format) launched within the tablet's PDF document viewer. In Condition B, the Beyond Panels comic from the preinstalled Beyond Panels app was launched. Finally, Condition C launched a preloaded video (.mp4 format) launched within the tablet's video app. The tablet had a built-in stand for the participant's preference. The participant was instructed to view the story and let the experimenter know when the experience concluded. The experimenter remained in the same room as the participant but did not disturb the experience by asking questions. An experiment log was used for noting any observations. Participants could ask questions if any technical difficulty was encountered. The experiment journal was used to gather qualitative observations of participant experience with the story and the technology for analysis with collected survey data.

The participant returned the tablet to the experimenter upon the story's completion. The experimenter then launched the post survey question *Qualtrics* shortcut on the tablet containing the Narrative Transportation Scale, protagonist empathy and sympathy, perceived realism, engagement, flow, story comprehension, and technology questionnaires. These instruments informed whether the different story

formats and availability for interaction impacted the participant's experience and whether the hybrid Beyond Panels format adapted to fit the varied participant personas. The analysis of the collected data assisted in the validation / invalidation of the hybrid Beyond Panels proof of concept, influence further development strategies, and provide valuable insight into best practices in the rapidly expanding interactive storytelling area of research for improving an audience's emotional engagement and entertainment on mobile devices.

## CHAPTER FOUR: EXPERIMENT ANALYSIS

One-way analysis of variance (ANOVA) and correlation analysis were used for hypothesis testing.

### Hypothesis 1: Narrative Transportation

Hypothesis 1 predicted that the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported Narrative Transportation for the audience. ANOVA was performed to see if the reported Narrative Transportation differed between conditions. The results indicated no significant difference between any conditions ( $F(2, 60) = 1.365, p = .263$ ). See Table 1 and Table 2. Thus, hypothesis one is not supported and the null hypothesis is not rejected.

Table 1. Descriptive Statistics for Perceived Narrative Transportation

Condition	Minimum	Maximum	Mean	Std. Deviation
Comic Book	23	37	30.00	3.847
Beyond Panels	25	43	31.95	4.410
Cinematic	24	36	31.38	3.500
Total	23	43	31.11	3.960

Table 2. ANOVA for Hypothesis 1

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	42.317	2	21.159	1.365	.263
Within Groups	929.905	60	15.498		
Total	972.222	62			

## Hypothesis 2: Engagement

Hypothesis 2 predicted that the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported audience engagement. ANOVA was performed to see if the reported engagement differed between conditions using both the Narrative Engagement Scale and the Engagement Measure. The results of the Narrative Engagement Scale indicated no significant difference between any conditions ( $F(2, 60) = .249, p = .781$ ). See Table 3 and Table 4.

Table 3. Descriptive Statistics for Perceived Narrative Engagement

<b>Condition</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Comic Book	46	75	58.52	6.112
Beyond Panels	46	76	58.62	8.429
Cinematic	46	69	57.29	5.632
Total	46	76	58.14	6.751

Table 4. ANOVA for Hypothesis 2

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig</b>
Between Groups	23.238	2	11.619	.249	.781
Within Groups	2802.476	60	46.708		
Total	2825.714	62			

The results of the Engagement Measure indicated a significant difference between conditions ( $F(2, 60) = 3.310, p = .043$ ). See Table 5 and Table 6.

Table 5. Descriptive Statistics for Perceived Engagement

Condition	Minimum	Maximum	Mean	Std. Deviation
Comic Book	30	51	41.52	5.144
Beyond Panels	23	45	37.05	6.982
Cinematic	30	51	40.24	5.088
Total	23	51	39.60	6.018

Table 6. ANOVA for Hypothesis 2

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	223.079	2	111.540	3.310	.043
Within Groups	2022.000	60	33.700		
Total	2245.079	62			

A Tukey post hoc test shows that the level of engagement during the Comic Book Condition was significantly higher when compared to the Beyond Panels Condition ( $41.52 \pm 5.144, p = .043$ ). See

Table 7. Hypothesis 2 predicted a higher level of reported engagement in the Beyond Panels Condition compared to others, but the results showed a significantly higher level of engagement for the Comic Book Condition compared to the Beyond Panels Condition. Thus, hypothesis 2 is not supported and the null hypothesis is not rejected.

Table 7. Multiple Comparisons Engagement Measure

		95% Confidence Interval				
(I) Con	(J) Con	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Comic Book	Beyond Panels	4.476*	1.792	.040	.17	8.78
	Cinematic	1.286	1.792	.754	-3.02	5.59
Beyond Panels	Comic Book	-4.476*	1.792	.040	-8.78	-.17
	Cinematic	-3.190	1.792	.185	-7.50	1.11
Cinematic	Comic Book	-1.286	1.792	.754	-5.59	3.02
	Beyond Panels	3.190	1.792	.185	-1.11	7.50

### Hypothesis 3: Emotional Engagement

Hypothesis 3 predicted that the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher levels of reported audience sympathy / empathy for the protagonist. ANOVA was performed to see if the reported sympathy / empathy for the protagonist differed between conditions ( $F(2, 60) = .800, p = .454$ ). See



Table 8 and Table 9. The results of the Emotional Engagement Sub-Scale indicated no significant difference between conditions. Thus hypothesis 3 is not supported and the null hypothesis is not rejected.

Table 8. Descriptive Statistics for Narrative Engagement Sub-Scales

<b>Sub-Scale</b>		<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Narrative Understanding	Comic Book	10	21	16.19	3.219
	Beyond Panels	8	21	16.29	4.314
	Cinematic	10	21	16.62	3.542
	Total	8	21	16.37	3.665
Attentional Focus	Comic Book	10	21	18.67	3.411
	Beyond Panels	10	21	17.29	3.289
	Cinematic	10	21	17.38	3.383
	Total	10	21	17.78	3.367
Narrative Presence	Comic Book	4	18	12.00	4.062
	Beyond Panels	3	21	12.48	4.400
	Cinematic	5	20	12.33	4.520
	Total	3	21	12.27	4.266
Emotional Engagement	Comic Book	6	21	11.67	4.476
	Beyond Panels	5	21	12.57	4.915
	Cinematic	6	19	10.95	2.765
	Total	5	21	11.73	4.143

Table 9. ANOVA for Hypothesis 3

Sub-Scale		Sum of Squares	df	Mean Square	F	Sig
Narrative Understanding	Between Groups	2.127	2	1.063	.077	.926
	Within Groups	830.476	60	13.841		
	Total	832.603	62			
Attentional Focus	Between Groups	24.984	2	12.492	1.106	.338
	Within Groups	677.905	60	11.298		
	Total	702.889	62			
Narrative Presence	Between Groups	2.508	2	1.254	.067	.935
	Within Groups	1125.905	60	18.765		
	Total	1128.413	62			
Emotional Engagement	Between Groups	27.651	2	13.825	.800	.454
	Within Groups	1036.762	60	17.279		
	Total	1064.413	62			

#### Hypothesis 4: Engagement and Personalities

Hypothesis 4 predicted that the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher reported audience sympathy towards the protagonist depending on the participant's personality. Personality traits were assessed using the Big Five Inventory. No significant differences were identified in audience sympathy between conditions. See Table 10 and Table 11.

Table 10. Descriptive Statistics for Big Five personality traits

		<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Extraversion	Comic Book	10	34	23.38	6.576
	Beyond Panels	7	34	23.10	6.347
	Cinematic	14	31	23.38	5.518
	Total	7	34	23.29	6.065
Agreeableness	Comic Book	16	34	28.57	4.534
	Beyond Panels	23	35	28.29	3.379
	Cinematic	19	34	27.38	4.353
	Total	16	35	28.08	4.085
Conscientiousness	Comic Book	12	34	24.43	6.705
	Beyond Panels	15	34	24.33	4.768
	Cinematic	19	32	25.33	3.307
	Total	12	34	24.70	5.057
Neuroticism	Comic Book	10	26	16.62	5.599
	Beyond Panels	8	25	16.33	4.789
	Cinematic	11	26	18.76	4.158
	Total	8	26	17.24	4.928
Openness	Comic Book	20	38	28.00	4.539
	Beyond Panels	20	35	28.71	3.901
	Cinematic	24	36	30.19	3.250
	Total	20	38	28.97	3.976

Table 11. ANOVA Hypothesis 4

<b>Sub-Scale</b>		<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig</b>
Extraversion	Between Groups	1.143	2	.571	.015	.985
	Within Groups	2279.714	60	37.995		
	Total	2280.857	62			
Agreeableness	Between Groups	16.222	2	8.111	.478	.622
	Within Groups	1018.381	60	16.973		
	Total	1034.603	62			
Conscientiousness	Between Groups	12.794	2	6.397	.244	.784
	Within Groups	1572.476	60	26.208		
	Total	1585.270	62			
Neuroticism	Between Groups	74.000	2	37.000	1.551	.220
	Within Groups	1431.429	60	23.857		
	Total	1505.429	62			
Openness	Between Groups	52.413	2	26.206	1.695	.192
	Within Groups	927.524	60	15.459		
	Total	979.937	62			

A Pearson product-moment correlation coefficient was used to assess the relationship between engagement and personality traits (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness) for each condition. Engagement was positively correlated with Extraversion in the Beyond Panels Condition with moderate effect size (Cohen, 1988), however it was not significant ( $r(19) = .347, p = .123$ ). See Table 13 and Figure 1. Additionally, engagement was positively correlated with Agreeableness in the Cinematic Condition with a moderate effect size (Cohen, 1988), and it was significant at  $p = .05$  ( $r(19) = .513, p = .017$ ). See Table 14 and Figure 2. Lastly, engagement was negatively correlated with Neuroticism in the Cinematic Condition with moderate effect size (Cohen, 1988), however it was not significant ( $r(19) = -.406, p = .068$ ). See Table 14 and Figure 3. No significant differences were found between conditions for these correlations.

Table 12. Correlations - Engagement and Personality Traits (Comic Book Condition)

		<b>Extraversion</b>	<b>Agreeableness</b>	<b>Conscientiousness</b>	<b>Neuroticism</b>	<b>Openness</b>
Engagement	Pearson Correlation	.054	.137	.218	.092	-.039
	Sig (2-tailed)	.815	.555	.343	.691	.868
	N	21	21	21	21	21

Table 13. Correlations - Engagement and Personality Traits (Beyond Panels Condition)

		<b>Extraversion</b>	<b>Agreeableness</b>	<b>Conscientiousness</b>	<b>Neuroticism</b>	<b>Openness</b>
Engagement	Pearson Correlation	.347	-.054	.129	-.223	.113
	Sig (2-tailed)	.123	.818	.578	.331	.627
	N	21	21	21	21	21

Table 14. Correlations - Engagement and Personality Traits (Cinematic Condition)

		<b>Extraversion</b>	<b>Agreeableness</b>	<b>Conscientiousness</b>	<b>Neuroticism</b>	<b>Openness</b>
Engagement	Pearson Correlation	.032	.513*	.167	-.406	-.290
	Sig (2-tailed)	.890	.017	.468	.068	.202
	N	21	21	21	21	21

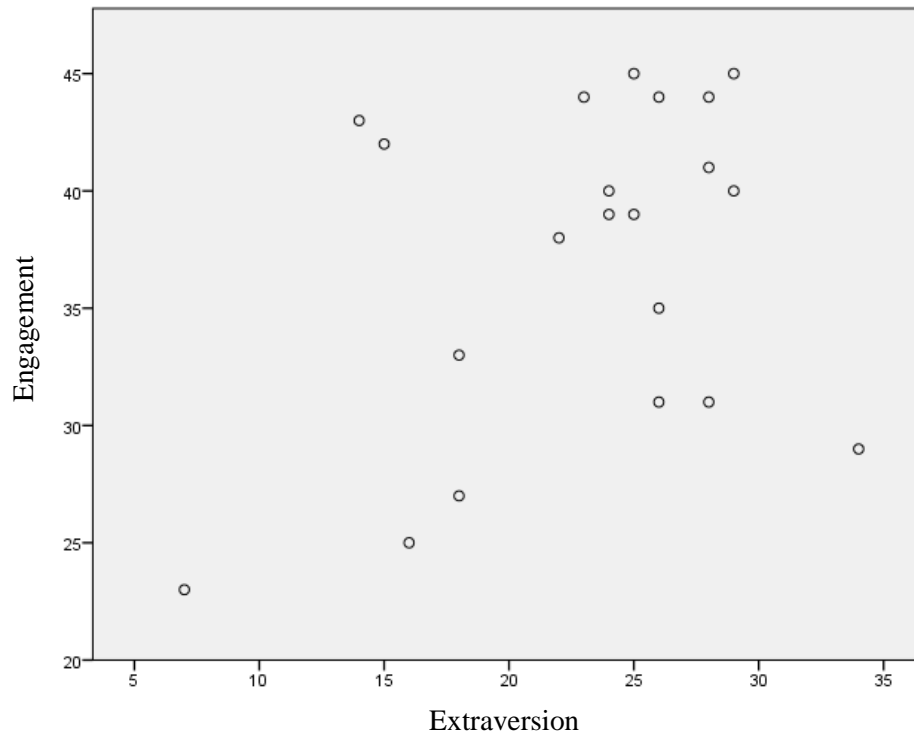


Figure 1. Scatterplot for Engagement and Extraversion (Beyond Panels)

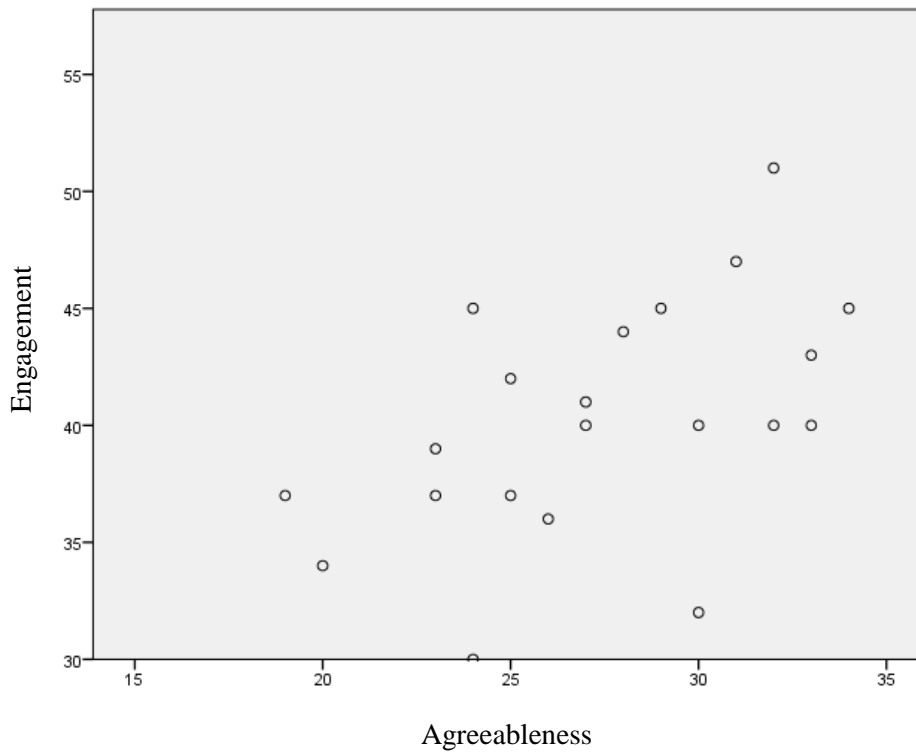


Figure 2. Scatterplot for Engagement and Agreeableness (Cinematic)



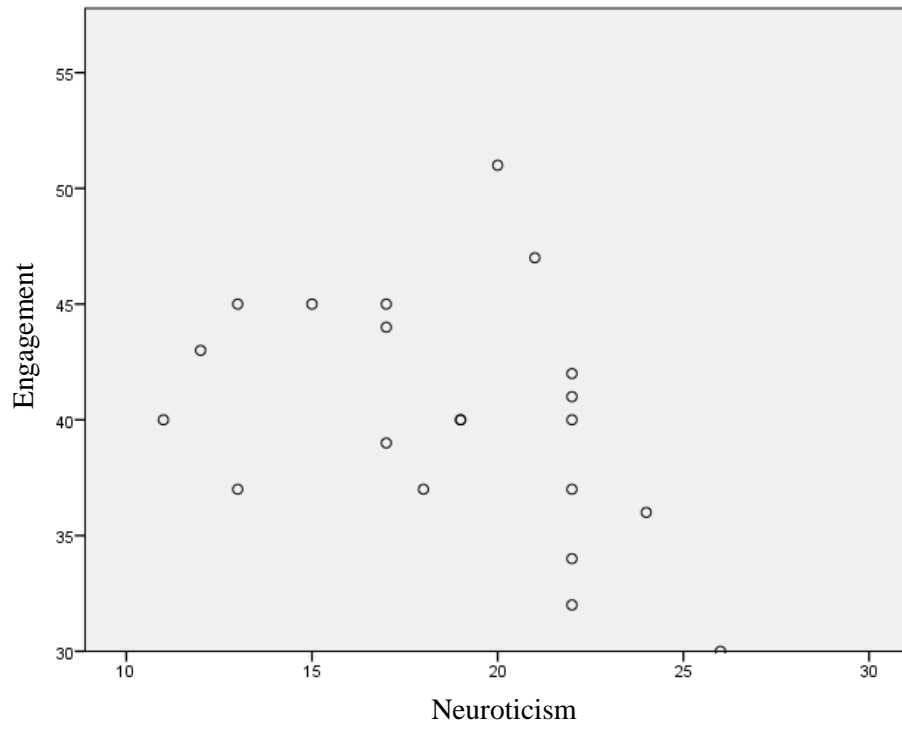


Figure 3. Scatterplot for Engagement and Neuroticism (Cinematic)

### Hypothesis 5: Flow

Hypothesis 5 predicted that the presence of optional opportunities for interaction in the Beyond Panels Design Framework results in higher reported audience flow. ANOVA was performed to see if the reported flow was higher between conditions ( $F(2, 60) = .3.591, p = .034$ ). See Table 15 and Table 16.

Table 15. Descriptive Statistics for Flow State Short Scale

<b>Condition</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
Comic Book	71	98	85.62	7.710
Beyond Panels	48	101	77.00	14.484
Cinematic	62	94	80.05	8.115
Total	48	101	80.89	11.002

Table 16. ANOVA for Hypothesis 5

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig</b>
Between Groups	802.317	2	401.159	3.591	.034
Within Groups	6701.905	60	111.698		
Total	7504.222	62			

The results of the Flow State Short Scale indicated a significant difference between conditions. A Tukey post hoc test shows that the level of reported flow during the Comic Book Condition was significantly higher when compared to the Beyond Panels Condition ( $85.62 \pm 7.710, p = .034$ ). See Table 17.

Hypothesis 5 predicted a higher level of reported flow in the Beyond Panels Condition compared to

others, however, the results indicated a higher level of flow in the Comic Book Condition over the Beyond Panels Condition. Thus hypothesis 5 is not supported and the null hypothesis is not rejected.

Table 17 Multiple Comparisons - Flow State Short Scale

		95% Confidence Interval				
(I) Con	(J) Con	Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
Comic Book	Beyond Panels	8.619 <sup>*</sup>	3.262	.028	.78	16.46
	Cinematic	5.571	3.262	.211	-2.27	13.41
Beyond Panels	Comic Book	-8.619 <sup>*</sup>	3.262	.028	-16.46	-.78
	Cinematic	-3.048	3.262	.621	-10.89	4.79
Cinematic	Comic Book	-5.571	3.262	.211	-13.41	2.27
	Beyond Panels	3.048	3.262	.621	-4.79	10.89

## CHAPTER FIVE: EXPERIMENT DISCUSSION

This study evaluated the effects of a hybrid narrative experience that introduced novel ways of encouraging interactions to balance both author control over presentation and inclusiveness of the audience on Narrative Transportation, engagement, and flow.

The study results show that the story presented in the Beyond Panels format did not prove to be a better experience for the participants in terms of Narrative Transportation, engagement, or flow. There were no significant differences in reported Narrative Transportation between conditions. This could be the result of multiple factors. A key observation made during the study was the extremely low amount of interactions made by the participants in the Beyond Panels Condition. For example, most participants who did interact only made one interaction, which was the first potential opportunity when the car dashboard was displayed. After that scene, most participants in the Beyond Panels Condition watched the story unfold. The story is designed to adapt to the audience's preferences. In this case, the overwhelming majority of participants reported that they preferred movies over video games, novels, and comic books. In this way, the Beyond Panels Condition may have been playing out exactly how the participants preferred. This experimental format performed on par with both the Comic Book and Cinematic formats in reported Narrative Transportation.

Unsurprisingly, the means for Narrative Transportation between the Beyond Panels Condition and Cinematic Conditions vary by very little due to the low amount of recorded interactions that took place in the Beyond Panels Condition which result in the story playing out more similarly to the Cinematic Condition. While some of the lack of interaction may be attributed to the subversion of an interface or obvious feedback related to audience interaction, out of the five participants that reported a media preference of video games, only three consistently tried to interact throughout the experience and were at least somewhat successful with completing interactions. The reported means for Narrative Transportation in these three participants was higher than those that interacted less throughout the

experience, however there was not a large enough sample size for statistical significance testing. This suggests that there is potential to increase Narrative Transportation if the participants frequently interact with the story.

Future research should continue to analyze this potential connection with a larger sample size. In addition, future studies should look at ways to increase the number of interactions attempted within Beyond Panels experiences while still providing a comparable passive experience for those that choose not to interact. One participant in the Beyond Panels Condition (reporting a video game media preference) that only interacted with the GPS opportunity mentioned after the study had concluded that she wasn't sure if she had caused the crash event to occur. It is possible that this type of thinking, which is desirable for this storytelling medium, contributed to her lack of interaction throughout the remainder of the story, as she may have been unsure of how it would impact the story, especially after such a significant event. Future experiments should ask why participants chose to interact or not.

Additionally, a post-experiment interview would provide useful information on this topic to achieve a deeper understanding of participants' feelings about the storytelling experience. None of the participants in the Beyond Panels Condition were told how much their interactions would impact the outcome of the story. This may have contributed to some of the confusion about when and how to interact with the narrative. Though by design, the format of the study may have prevented a proper assessment of whether the Beyond Panels framework was appropriate. Ideally the opportunities for interaction are inspired and easily recognizable at certain points. Others that are more obscure may be identified during additional playthroughs. The study format did not allow for this and each participant only went through the story a single time.

Interaction design, placement, timing, cinematic framing, and limitation to only tap and swipe may have significantly impacted some participants' ability to interact with the Beyond Panels Condition. The scene that stands out most, is when the waiter is offering Anya a drink on the cruise line. The cueing

through the left audio channel was likely effective as multiple participants recognized the perceived need to respond to his clearing of the throat. However, almost anyone that tried, except for one person, failed to swipe the screen from right to left to trigger the camera animation that resulted in the alternate scene. The person that was successful unintentionally swiped back which negated the entirety of the scene. A few people tried to tap on that side of the screen where they could see part of the waiter which does not trigger the scene. One individual triggered the scene, accidentally swiped back which canceled the scene. A future version of this story would include this as a mechanic in addition to the swipe to avoid this issue.

The very last scene with an opportunity for interaction was accessed by only two people. After Anya regains consciousness from the explosion, she reaches for the railing with the camera positioned in first-person perspective. If the participant taps the railing, an additional scene showing the pirates attacking the ship plays. If the participant doesn't interact, Anya passes out and the story ends. All but two of the 21 people in the Beyond Panels Condition made no attempt to interact with the story during this scene. This is one of the critical examples of a technical design flaw that may have contributed to a negative or unexpected experience. However, the remaining lack of interaction was either due to disinterest, which is somewhat expected, or a result of poorly presented opportunities for interaction.

When asked if they would enjoy experiencing more stories in this format, the average response for the Beyond Panels Condition participants was 4.9 out of 7, with 7 being "Strongly Agree." This response suggests that while there was not a significantly higher sense of Narrative Transportation, the Beyond Panels format was still enjoyable overall.

In two cases, engagement and flow, the Comic Book Condition was significantly more effective in eliciting these factors. There were no situations in which the Beyond Panels or Cinematic Conditions differed in a significant way. One reason for this this is likely because the two formats are so similar. The Cinematic Condition was created by capturing the Beyond Panels condition as if no interaction took place. In fact, at least one participant asked if she was supposed to be interacting with the story in the

Cinematic Condition even though no instruction for interaction was given beyond pause, play, and scrubbing the timeline. One of the key design decisions for the Beyond Panels condition was not providing a user-interface or indicators for interaction. Only certain cinematic techniques (e.g., framing, audio cueing), were used to create a more cinematic experience. This trades the potential for an uninterrupted experience at the risk that the audience may not be aware of potential interaction points. To some extent this is expected and the idea of replay-ability and exploration was intended, however, in this study, participants only went through the story a single time. In future experiments, additional playthroughs should be provided to more accurately mimic a more authentic setting where the end-user can explore the story's optional interactions. Hypothesis 5 evaluated reported flow by participants and is likely one of the main measures affected by this observation.

The Comic Book Condition provided a substantially different method of experiencing the story from the other two formats and was a self-paced experience rather than author-driven. It is possible that this is one of the reasons that any significant differences only occurred between the Comic Book Condition and one other, never between Beyond Panels and Cinematic. This may be one of the contributing factors in the higher levels of reported flow in the Comic Book Condition as the participant would have felt as if he / she had more control over the experience. Even though the other conditions provided a means to “control” the narrative (Beyond Panels with interactivity and Cinematic with pause, play, and time scrubbing), participants in the Beyond Panels Condition expressed confusion about when interactivity is possible, and none of the Cinematic Condition participants chose to pause or scrub through the video at any point. Allowing for multiple playthroughs and instruction that there will be subtle opportunities for interaction to manage expectations, may provide for a decrease in confusion as opposed to exploration. The Comic Book Condition presented the most consistent and familiar experience regarding moving through the story which could have contributed to stronger flow for participants. This self-paced experience may have also had an impact on engagement, as many of the comments requested a longer story or that the story went by very fast. This may not have allowed enough time for flow to take

place in the Beyond Panels or Cinematic Conditions as each was approximately eight minutes in length. The next iteration of a Beyond Panels story should take the speed at which the story unfolds into consideration. It is recommended that future Beyond Panels stories take time to establish potential interaction mechanics to familiarize the participants with the story so they better understand how and when they can influence the story.

When asked about level of enjoyment and interest, participants in the Comic Book Condition reported a significantly higher level of engagement as compared to each of the other two conditions. When asked how the story could be improved numerous participants expressed a desire for a longer story, additional character building, a slower-paced story, and a non-cliff hanger ending. The story content chosen was adopted from a novel. The length of the story was meant to mimic that of a single-issue comic book and this specific section of the story was chosen because it had all the requirements of story arc and was meant to leave the participant wanting more. There are a significant number of smaller chunks of plot in the section of the story chosen as it is the exposition of the novel and meant to provide a brief and mysterious background for the main character Anya. It is possible that participants, not knowing this information, evaluated the experience poorly due to the fast-paced nature, lighter exposition details, and limited dialogue from the main character. The timeline in the story covers 16 years of life in only seven minutes of narrative and understandably would seem fast to participants. Though there were numerous requests for a lengthier story, more robust character development, and an ending to the story, these comments also contribute to a perception of interest, if not also enjoyment. Due to this being only a couple chapters of a much larger novel, this may not have been the most appropriate strategy for story adaptation. The goal was to avoid a story that participants already knew to avoid any bias from other versions of the same story they have heard. Instead, a story that was not mainstream, yet was of professional quality was chosen. Future Beyond Panels stories should consider working with pre-established characters, stories that are familiar to the participants, or producing longer and more detailed



stories that spend time developing characters and the world more thoroughly, even if it is meant to be a chapter of a larger story.

In general, participants reported strong desires to understand how the story progressed and reported enjoying exploring the story. It is possible that participants felt that this was significantly more so for those in the Comic Book Condition for several reasons. There were multiple complaints about the quality of the graphics, animation, and sometimes confusion as to which person was talking (due to lack of facial lip syncing for characters) in the Beyond Panels and Cinematic Conditions. This was not as common in the Comic Book Condition, likely because the characters and narration speech text was easily connected to the respective character. While there were a couple comments about an imbalance in text versus visuals (leaning in favor of visuals), a request to make the comic book a video, and some confusion in panel / page format, the Comic Book Condition received a more positive response. In some ways, there is less for the participant to critique in this format due to it lacking animation, camera movement, cuts, and audio which could have resulted in the higher reported engagement regarding interest and enjoyment. Future Beyond Panels stories should consider full lip-synced animation, adjustments to camera framing to focus on characters in a way that more clearly demonstrates who is talking, or an alternate artistic style that also displays speech-bubbles above characters to clearly show who is speaking. Additionally, improvements to the visual fidelity including, animations, textures, lighting, and character design may prove less distracting to participants and should be factored into production on future Beyond Panels stories.

Another contributing factor may be a mistake made in the inclusion of the “alternate” ending scene in which Anya observes pirate ships attacking the cruise liner. In the Beyond Panels Condition, this is only seen if the participant taps on a railing at a specific point at the end of the story. Due to this, the Cinematic Condition, which is meant to represent a passive version of the Beyond Panels version, does not show this scene. The Comic Book Condition should have followed this format and not included this

content, as it too should have represented an experience in which no interaction by the participant occurred. However, by mistake this content was included in the Comic Book Condition, and resulted in the participants seeing this scene play out. Though it does not conclude the story in any way, it still provides an interesting plot point that the other conditions may or may not have scene. In fact, only a couple of people in the Beyond Panels Condition ever saw the scene and no one in the Cinematic Condition saw it. This may have contributed to the stronger engagement regarding interest and enjoyment. Future Beyond Panels research should verify that all conditions accurately represent the exact same passive experience.

This study attempted to identify any correlations between engagement (enjoyment and interest) with personality traits of the participants to identify if an audience might be more inclined to find the Beyond Panels style of interactive storytelling more enjoyable than the other two passive conditions. While the results did find a significantly higher reported engagement for the Comic Book Condition over the Beyond Panels Condition, a positive correlation was identified between engagement and Extraversion for participants in the Beyond Panels condition. Extraversion is associated with individuals that exhibit warmth, gregariousness, assertiveness, activity, excitement seeking, and positive emotions (Costa & McCrae, 1992). Thus, it is possible that participants that scored higher in Extraversion may have found the opportunity for optional interactions in the new and unfamiliar Beyond Panels Condition more enjoyable, interesting, or exciting, whereas those scoring lower in Extraversion would be less adventurous and more resistant to a new form of storytelling. In a way, this is indicative of how a Beyond Panels experience might unfold. This format for storytelling is meant to adapt to the audience and provide flexibility for enjoyment. If someone is interested in interacting with a Beyond Panels story and it is in their nature to do so, the opportunity is there. However, if someone is more inclined to enjoy a passive version of the same story, that option also exists.

An interesting note from observations, however, is that the number of interactions taken by participants in the Beyond Panels Condition was extremely low. Very few people interacted more than a couple time. Almost everyone interacted with the very first opportunity in which a car dashboard is presented with multiple buttons with which the participant could interact. Almost every participant interacted with the very first button (GPS). Only a couple chose to or tried to tap the other available buttons (Audio and Off). This first interaction was meant to be a setup for getting the participant to interact with the story in one of the most direct ways possible. Besides presenting the dashboard for interaction, the characters even reference the GPS in dialogue seconds before the dashboard is displayed. This was such a strong hint at interaction that even one participant in the Cinematic Condition asked aloud if she was supposed to tap one of the buttons. However, after this instance, most people did not interact with the story. A couple tried tapping around on various parts of scenes, only a couple were actively pursuing interactions throughout the story. Most participants proceeded to watch the story unfold after this first interaction. It is not likely that those that failed to find other interactions gave up on the effort as they were unaware of what the expected outcome might be. This was by design for certain instances and not others, but regardless, some participants simply showed no interest in investigating the possible interaction opportunities in the story and simply seemed to content to watch it unfold. One contributing factor to this might be the overwhelming preference for movies captured in the demographics questionnaire. Another perspective is that the initial interaction opportunity was so obvious that the other less obvious presentations of optional interactivity were overlooked. Managing participant expectation and providing a simple tutorial may mitigate this issue and lead to an increase in interaction attempts with the Beyond Panels story.

Another noteworthy correlation, positive and with moderate effect size, was identified between engagement and Agreeableness for participants in the Cinematic Condition. A possible explanation for this is that these participants were more likely to accept the passive experience as told by the author / director without the desire to try and impact the story. An individual that is more agreeable would likely

be more accepting of the story as it was told. This is not to say that participants would not change anything about the story when asked, however, they may be more accepting of the author's presentation of the story as a passive experience compared to one in which the participants felt they had more control over. Additional research should be conducted to expand on this relationship and how it might impact design choices for Beyond Panels stories, specifically concerning participants' thoughts on how they believed they may have impacted the story, for better or worse.

A final noteworthy correlation, negative and with similar moderate effect size, was identified between engagement and Neuroticism for participants in the Cinematic Condition. One line of thinking for this result could be that participants with lower levels of reported Neuroticism may have been able to enjoy the Cinematic Condition more than those with higher levels due to having less control over the experience. Anxiety and self-consciousness are associated psychometric properties of neuroticism (Costa & McCrae, 1992). These properties may have better aligned with a passive experience that did not present an expectation of interaction with the story leading to higher engagement. Even though the Comic Book Condition is considered passive compared to the Beyond Panels Condition, it could be argued that the Cinematic Condition is the most passive of the three conditions due to the fact no interaction of any kind is required to even navigate the story. Even the Comic Book Condition required swiping to change the page. Therefore, it is possible that the unknowns of the media, not knowing what to expect from the narrative, and having no expectation of control could be cause for this negative correlation. Neither of these correlations proved to be significant, however. A larger study with an increased sample size should be conducted to evaluate this trend further. Ideally, the Beyond Panels version should accommodate this desire for a passive experience. In this study, it did provide an identical experience to the cinematic if no action was taken. Future experiments should continue to evaluate the methods that are used to make participants aware of the optional interactivity and better understand whether there is still a sense of expectation to interact even when told the interactions are optional.

The following table represents a summary of lessons learned for Beyond Panels storytelling production. There are many factors that should continue to be researched to produce guidelines and best practices for authors wishing to use this mobile interactive storytelling framework. See Table 18.

Table 18. Beyond Panels Lessons Learned

Observation	Recommendation
No significant difference in Narrative Transportation compared to other conditions	<ul style="list-style-type: none"> <li>• Increase interaction rate in participants</li> </ul>
Low number of interaction attempts	<ul style="list-style-type: none"> <li>• Consider a tutorial demonstrating potential interaction mechanics</li> </ul>
Limited number of successful interactions	<ul style="list-style-type: none"> <li>• Consider making some interactions more obvious</li> <li>• Improve range of interaction inputs (tap, swipe, and accelerometer gestures combined in case one of the two is unsuccessful)</li> </ul>
Story seemed too fast	<ul style="list-style-type: none"> <li>• Use a longer section of story</li> <li>• Provide more detail throughout the experience (character development)</li> <li>• Draw out scenes and provide more secondary information about the world and its characters</li> <li>• Provide a more complete ending that is less of a cliff hanger</li> </ul>
Distracting visuals and audio	<ul style="list-style-type: none"> <li>• Consider story with more character dialogue</li> <li>• Lip-syncing animations for any speaking characters or other means of clearly representing which character is speaking</li> <li>• Improved visuals (lighting, character design, animations, textures, and framerate)</li> <li>• Inclusion of music throughout the story</li> </ul>

## CHAPTER SIX: CONCLUSION

This thesis investigated the effects of a novel storytelling mobile format with optional interactions and a subverted interface on reported Narrative Transportation, engagement, and flow. The Beyond Panels format did not prove to be effective in increasing these reported factors compared to a comic book or video presentation of the same story. Several potential factors were discussed that may have contributed to these results including increasing the length of the story, providing a more in-depth story arc, improving the visual quality of the presentation, and adjusting the design choices for interaction opportunities. Future researchers should consider altering these elements of narrative and design and consider repeat exposure to a Beyond Panels story to better understand how participants respond to the opportunities for interaction on multiple playthroughs.

Though the Beyond Panels format was ineffective at increasing Narrative Transportation, when compared to the comic book and cinematic counterparts, it generally performed the same, suggesting that if the goal were to meet the participant's expectations, it might be viable framework for storytelling. However, the amount of effort involved in creating such an experience as compared to comics and video formats is substantial and may not result in a worthwhile return on investment. Future research should be conducted to continue identifying best practices for the type, location, frequency, and significance of these optional interactions. Additionally, a larger sample size should be considered for future studies to better evaluate the potential connection the frequency of interactions made by the participant and reported Narrative Transportation. Further research with a larger sample size is also needed to evaluate the relationship between personality traits and engagement. This data could prove valuable in better understanding the audience and which personality types may be more inclined to enjoy Beyond Panels stories. In addition to the suggestions for improving the Beyond Panels framework, there were numerous positive comments and participants generally reported an enjoyable experience and said that they would

like to see more stories in this format. This is encouraging and continued research and iteration will help to outline best practices for future stories.

Creating Beyond Panels stories which effectively balance interactive and passive storytelling is a complex process that will require additional research to solidify the framework so that it can reach its full potential. The dynamic nature and constant iteration in the gaming world is pushing interactive storytelling in numerous directions. However, there is still something to be said for the phrase “all things in moderation.” Balancing the control the author has over the presentation of a story and allowing the audience to become part of the experience is an area of research that should continuously be examined as the platform of interactive storytelling continues to evolve with technological advancement in augmented and virtual reality, in addition to the already mainstream formats of cinematography, PC / console gaming, novels, and comic books.

## **APPENDIX A: STORY SCRIPT**



**NARRATION:**

*Legend: the moment where things go wrong. It's not a real word, but what does it matter? Real words aren't real until someone says them out loud.*

A car drives down an empty, quiet city street. It's dusk. Cars passing through intersections. The radio fades in. It's difficult to make out the audio feed. Camera starts tracking small blue car. Various views from building windows and traffic lights.

The view changes to the center console looking back at a small child in a car seat. The child's parents are driving the vehicle and the camera shows two hands clasped resting on the center console. The woman in the car is seen wearing a red jacket. Rack focus on the child.

**MOM:**

*I don't know where the turn is.*

**DAD:**

*I'm sure we'll find it. Just keep looking.*

The camera changes to the back seat positioned in the seat to the right of and facing the child. She is holding a small stuffed bear and making it fly through the air. The woman in the passenger seat turns around and mouths words to the backseat passenger.

**DAD:**

*I think...yeah it's here...*

**MOM:**

*No, wait I think it's one mo...*

**CRASH!**

Camera shows a first car crash and a close up of a smoke stained bear (rack focus on bear, background fire becomes blurred). A hand reaches out for the bear.

#### **NARRATION:**

*Anya Ward became famous that day. She survived. Even when she shouldn't have. Not a scratch. Everyone heard the story. The word "lucky," you might be surprised to know, was never used to describe little Anya.*

*After a brief stay at the Reparata Children's Orphanage, it wasn't long before she was adopted.*

*The story of the "Child that Cheated Death" spread far and wide and hundreds of couples rushed at the chance to adopt her.*

*She soon became Anya Harrison, daughter of an extremely wealthy couple. Pampered, praised, and spoiled adequately described the next year and nine months for Anya.*

It is a cold night. Anya is asleep. The large windows in the living room are open and the wind is blowing. The drapes are flowing in the breeze. She stirs and makes her way down the hallways. She wanders to the kennel on the other side of the estate and snuggles up with her father's racing dog and her new puppies.

A candle falls over in the living room. The house goes up in flames. Dogs can be heard barking.

The fire brigade discovers her before they are able to do the same for her parents and the help around the mansion.

#### **NARRATION:**

*She had an affinity for dogs ever since that night.*

*Now, Anya was alone. Again.*

*And now people started to wonder...*

*She was adopted into the family of a traveling circus after spending some more time at Reparata's. "The girl that cheated death" would help draw the crowd. At least, that was the plan. No one ever got a chance to find out.*

Under the big top, a large crowd watches an elephant walk into the ring where a little girl in pink stands ready for the final act. The lights surrounding the ring are bright and the crowd is electric. Camera angles cycle among crowd, elephant, reporter, and Anya. As the show is about to begin the camera is placed in the perspective of a spot light worker. The light is adjusted to shine into the elephant's eyes and it goes wild. Anya doesn't move from her spot as the circus family is trampled around her while trying to calm the beast.

Scene set in a near-1<sup>st</sup> person perspective, looking at a car steering wheel with radio controls prominently placed in-view. The car is making its way through city streets, midday.

**REPORTER 1 (OVER HEARD ON RADIO STATION 1):**

*The Girl Who Cheated Death has survived yet another tragedy during this evening's...*

**REPORTER 1 (OVER HEARD ON RADIO STATION 2):**

*...yet another couple has been met with tragic end...*

**REPORTER 1 (OVER HEARD ON RADIO STATION 3):**

*...really not sure what to make of this, Tom. Apparently she is being sent back to the Reparata Orphanage Home today.*

**REPORTER 1 (OVER HEARD ON RADIO STATION 3):**

*That's right, Tina. This has to be a difficult situation... three sets of parents...*

The view changes to the back seat where Anya, holding a red jacket looks longingly out the window. Silent and emotionless. The car arrives at Reparata's. She pulls the jacket in closer.

**NARRATION:**

*Anya's third stint at Saint Reparata was by far the worst... People were afraid of her now. Even though she had been cleared of any wrong doing, no one seemed willing to adopt, The Daughter of Death – a not so clever name thought up by a sleazy tabloid that also reported on Big Foot sightings and alien abductions.*

*The other children only made it worse. Making friends at 7 should be easy. But not for someone with a bad track record and a circus background.*

Anya is sitting alone near the wall of room reading a book while children around her point and talk. The camera cuts an over the shoulder shot so her picture book becomes viewable. It is a story about a lonely animal.

**NARRATION:**

*After several months, Anya found herself waiting in the Saint Reparata front office to meet her new parents, Mark and Henry McCoy.*

Camera shows Anya sitting in a chair reading a book, legs dangling. Afternoon turns to evening, people shuffle in and out of the office. Voices are heard throughout the afternoon.

**UNAMED MALE 1:**

*...something about robbery. No, I don't know.*

**UNAMED FEMALE 1:**

*Well the papers were supposed to be signed yesterday... Right, and there was a delay with the*

*county so they were supposed to come today... I know, it's insane... Poor thing...*

**NARRATION:**

*They never showed.*

Headlines on papers: “State Declares Anya Ward Unadoptable,” “What’s Next for Anya Ward, The Survivor?” “New Halloween Thriller Sees Record Opening Weekend” (article shows images that look like Anya as a child clutching a large butcher knife).

**NARRATION:**

*Anya never let it bother her. In fact, Anya made the most of it. She turned the tragedy of her childhood and turned it into a campaign of positivity.*

Several images of Anya giving speeches in school auditoriums, in talk show interviews, and volunteering in the community, and caring for dogs. Growing older in each setting.

**NARRATION:**

*By the time she was 13 the public had completely changed the way they looked at Anya. She became more than just a tragic tale. The community came to think of her as a daughter. She became Anya, Ward of the State.*

Anya is at a small political gathering in her honor. She is presented with a certificate. People cheer and clap.

The scene changes to a park setting. Anya is turning 16 and sitting in the gazebo surrounded by people. It’s windy and the camera moves in close to frame the cake and lit candles while keeping Anya in the frame as well. Wide nervously smiling and big eyes.

**NARRATION:**

*On her 16<sup>th</sup> birthday, Anya celebrated with thousands of people. They had all pitched in to reward her for all the good she had done in the community.*

*They sent her on a cruise.*

The camera shows Anya boarding the cruise ship. She is seen off by more thousands of people. She turns away from the crowd.

**ANYA (THOUGHT):**

*It's going to be great. It's fine. You could use a tan. Look at you. There is a reason you were able to pull off trick-or-treating all these years as Snow White.*

She turns and waves again. Camera looking out at the crowd.

-----

The camera is looking at Anya. Close up. Eyes closed, dark eyeliner and squinted a little tight (bright out). As the camera pulls out it reveals a red bow in her hair, then a v-neck t-shirt, then finally some old blue jeans. She is lounging in a pool side chair. Several people walk by and glance at her, trying to be inconspicuous.

The scene changes to show her playing shuffle board by herself, eating ice-cream, and watching movies in an empty theater.

The camera fades to black. Waves can be heard crashing. It's peaceful.

**POOL-SIDE WAITER:**

*Ahem... AHem...*

Eyes still slightly squinted shut. Anya opens her eyes cautiously, one before the other... it's blinding. She locates the Pool-side waiter. He is holding a fruit-filled drink and smiling widely.

**ANYA:**

*Yikes... (thought)*

*No, thank you. I, um, don't have any cash on me.*

She tries to brush him off.

**POOL-SIDE WAITER:**

*But it's on the house, Ms. Ward.*

He places the glass on the small side table gently. Flashes a bright white smile, winks, and departs.

**ANYA:**

*Scoff...*

She makes a disgusted expression as she sits up and reaches for a drink. While she is playing with the little umbrella she parodies the waiter by winking, flashing a sarcastic doofy smile, and muttering to herself under her breath.

**ANYA:**

*But it's on the house, Ms. Ward... (mockingly)*

She shakes her head and sips on her drink. She scrunches up her face at the taste of the strong citrus flavor and sets the drink down. She sinks back into her lounge chair. She closes her eyes and the sound of the waves comes back into focus. She falls asleep.

-----

## **SIRENS BLARING!**

Anya is startled and leaps out of her chair, knocking her glass to the ground, shattering it. The noise of the siren is deafening.

**ANYA:**

*You've **got** to be kidding me.*

An explosion rocks the deck and sends Anya flying. A bright light flashes and only a ringing can be heard. The camera shows Anya face down against the deck. The boat rocks and rolls her over. The camera moves in close to her face as she struggles to come back to consciousness. The camera switches back to her perspective, showing her eyes adjusting to the light and focus. Nearby she sees a man dragging himself across the deck, a trail of blood behind him. He is visibly screaming something but she can't hear anything but ringing in her ears.

She reaches for the railing next to her and pulls herself up. She coughs up blood on the back of her hand. As she pulls herself up she looks over the railing to the ocean. She sees scores of ships of every shape and size. The boats (with flying flags and graffiti along their hulls start to pull up next to the ship. Ropes with hooks fly up on to the cruise liner and attach on the railings.

Anya sprints heavily toward the stairs, pushing through the crowd gathered around the elevator.

**ANYA:**

*Pirates?! Since when are there still pirates?*

*I can't leave it behind. I have to get it. I'm not leaving without it!*

Anya flies through the ship on instinct, working her way down from floor 11.



**APPENDIX B: PRODUCTION JOURNAL, CONCEPT EXAMPLES, AND  
PRE-PRODUCTION**

## Production Journal

### **Software:**

- Autodesk Maya
- Adobe Photoshop
- Adobe Audition

### **Game Engine:**

- Unity 3D

### **Resources:**

- Adobe Mixamo
- Voices.com
- Unity Asset Store

### **Production Journal:**

- Microsoft Sway

Initial Concept

**NEXT COMIC** Additional Info

Visit  
[www.serafayt.wix.com/nextcomic](http://www.serafayt.wix.com/nextcomic)  
 for

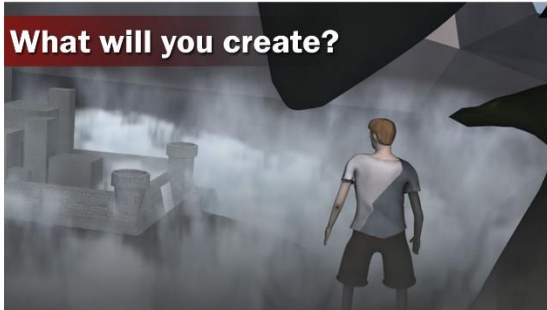
The Prototype:  
 "Next Comic Developer Demo"  
 Concept Art  
 The PRD  
 and more

The **Next Comic** waits for no one...  
**Coming Soon**

© Michael Eakins 2012

**NEXT COMIC** Michael Eakins  
 eakins.michael@gmail.com  
 www.serafayt.wix.com/nextcomic

What will you create?



A new form of interactive narrative

The authoring tool  
 for the **Next**  
 generation of  
 comics

© Michael Eakins 2012

**What is Next Comic?**

The goal of **Next Comic** is to provide an engaging form of comic book style storytelling that blends full animation within traditional comic panels, and moments of inspired interaction, all of which are only to be used as guides for the story.

**How will you do it?**

The **Next Comic** Authoring Suite is a set of plugins developed for the Unity 3D engine that gives the author control over all aspects of their story in regards to:

- Page/Panel Layout (composition)
- Camera Control (pacing and viewable content)
- Moments of Inspired Action (interactive components of the story)

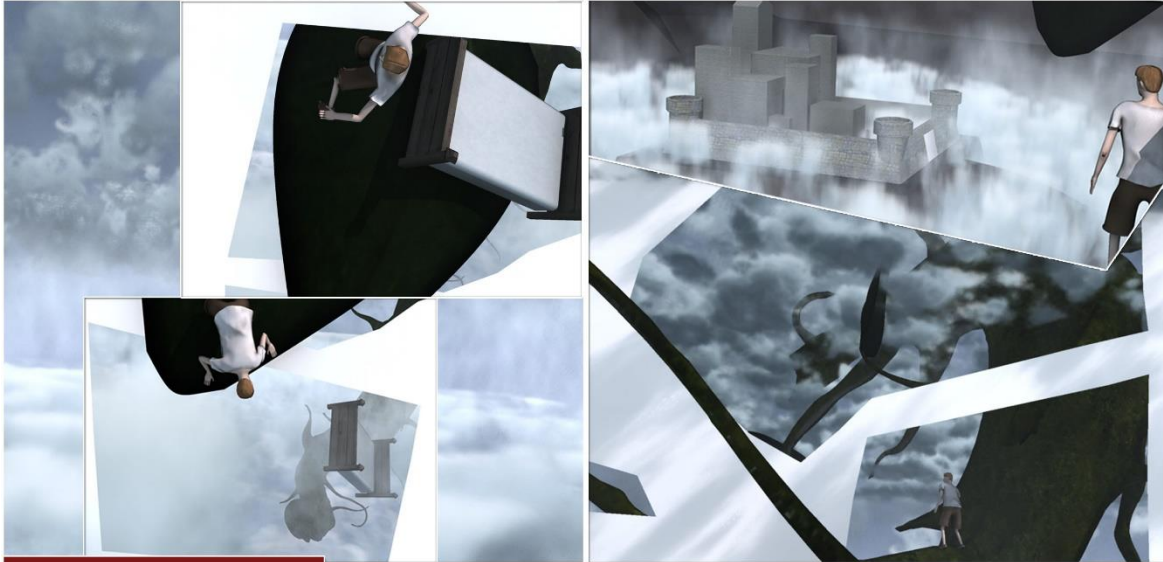
By providing efficient ways of producing **Next Comic** style narratives, authors will easily be empowered to develop immersive content.

**Who will use it?**

Authors!  
 The **Next Comic** Authoring Suite is hybrid approach to storytelling targeted at gamers, movie goers, and comic book lovers. To truly harness this style of narrative delivery, included with the authoring suite, is a best practices guide to aid the developer in the theory behind producing a **Next Comic** style experience.

Here are just a few key elements:  
 A **Next Comic** is interactive, but it isn't a game...  
 A **Next Comic** should guide the viewer through the story, but it isn't a film...  
 A **Next Comic** should frame content, but it isn't a comic...





## Features Overview

### Pages, Panels, & Cameras

**Goal:** To promote creativity, unique story telling, and cinematography

Framework for blocking scenes much like traditional comics

**Panels** offer a window into the world of the story and authors are encouraged to blend those windows and lead the viewer through the story.

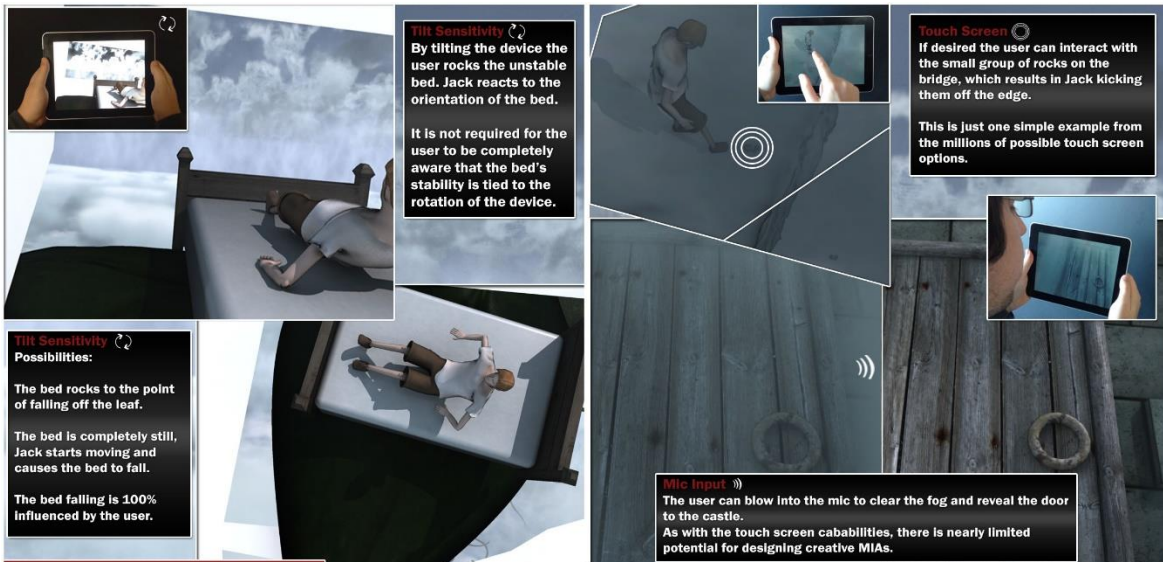
**Pages and Panels** are offered to authors as a way to take control over the ability to selectively reveal or merge content across the **Page**.

**Camera** features of the **Next Comic Authoring Suite** allow the author to efficiently animate one or multiple cameras along paths and control a variety of cinematic settings, from focal length to masking.

Use the template features or add your own custom scripts for more a more personalized visual experience.

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## Features Overview

### Moments of Inspired Action

**Goal:** Empower creation of voluntary interactive moments resulting from reaction, curiosity, or exploratory behavior.

A tool set that creates the interactive components of a Next Comic. Authors have the ability to easily make any object interactive by way of the following inputs:

**Tilt Sensitivity**  
Tap into the capabilities of a gyroscope enabled device for orientation based altering of the user's experience.

**Touch Screen**  
Create a variety of interactive moments by activating touch sensitive objects that affect visuals, audio, and/or narrative.

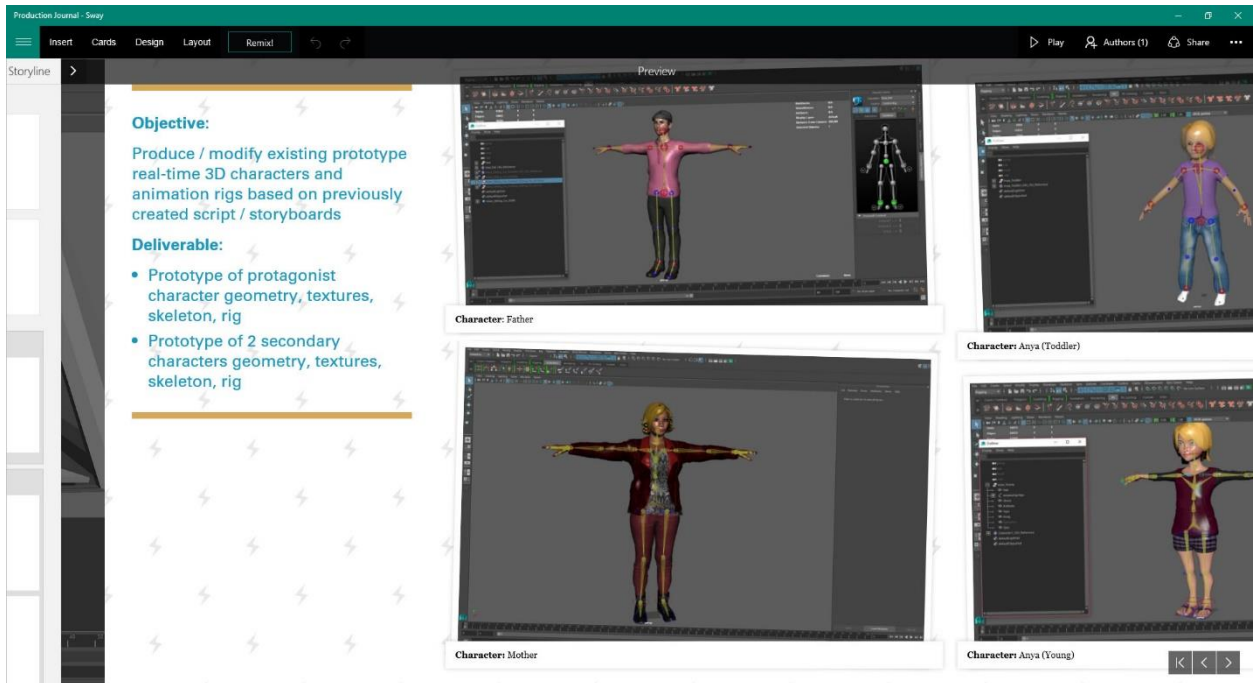
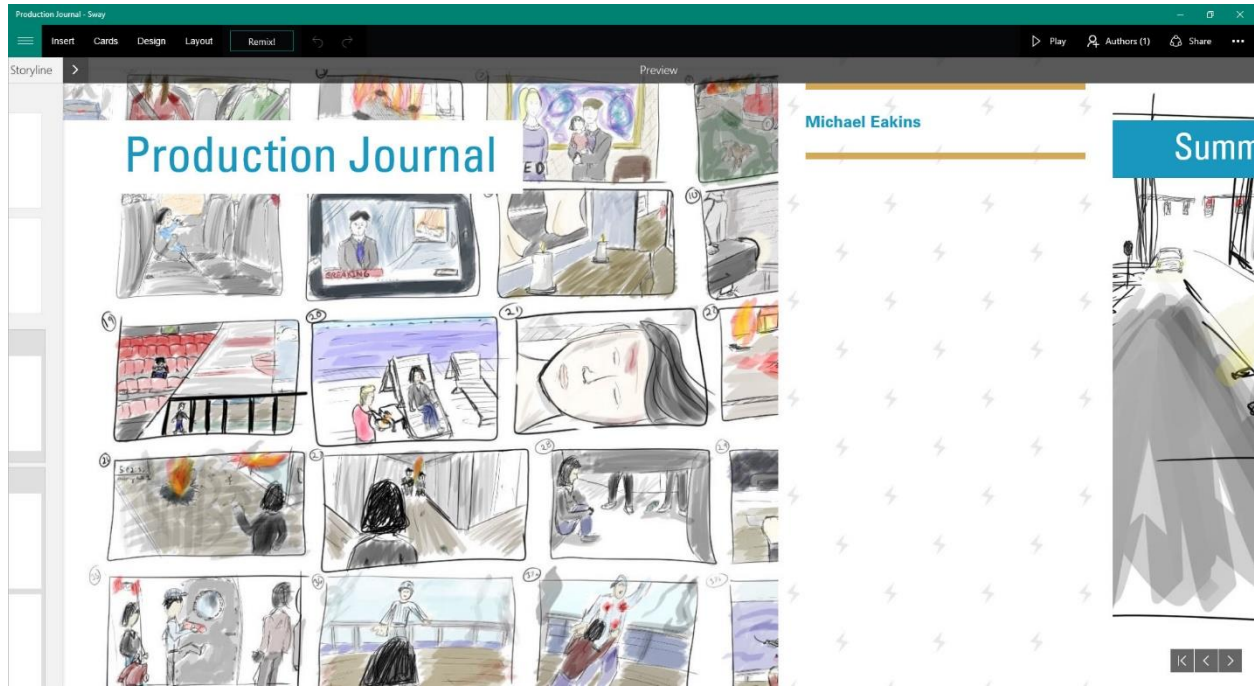
**Mic Input**  
Use a device's **mic** input to detect noise level, breathing, or silence to bring the story to life through reactions from the characters in the story or even the user.

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# Pre-production




Production Journal - Sway


Insert Cards Design Layout Remind

Play Authors (1) Share

Storyboard



Car Animation Set (Page 01: Panels 01-05)



is for production development. Starting points for modification.

Preview

**Additional Info:**

**Models:**

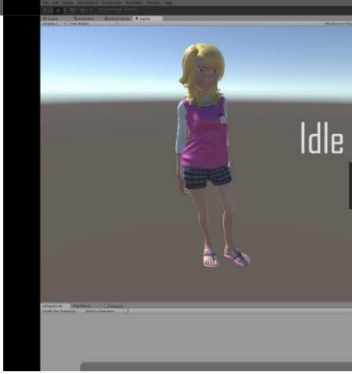
- Purchased toon city from Unity Asset Store for modification and world creation for prototype scenes

**Animations:**

- Downloaded dozens of animations from Mixamo libraries for use with Mixamo-originated characters and others
- Created custom animations for characters in intro scene

**SFX:**

- Purchased 4,200+ sfx through Unity Asset Store



A couple of base animations from Mixamo that I plan to use/edit as needed.

⏪ ⏩

Production Journal - Sway

Insert Cards Design Layout Remind

Play Authors (1) Share

Storyboard


**Objective:**

Produce / modify existing prototype real-time 3D environment based on previously created script / storyboard


**Deliverable:**

- Prototype of 1 environment from previously created script / storyboard
- Should include up to 10 props (cars, furniture, etc.)

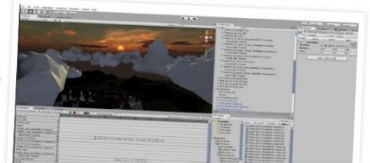
Environment: City



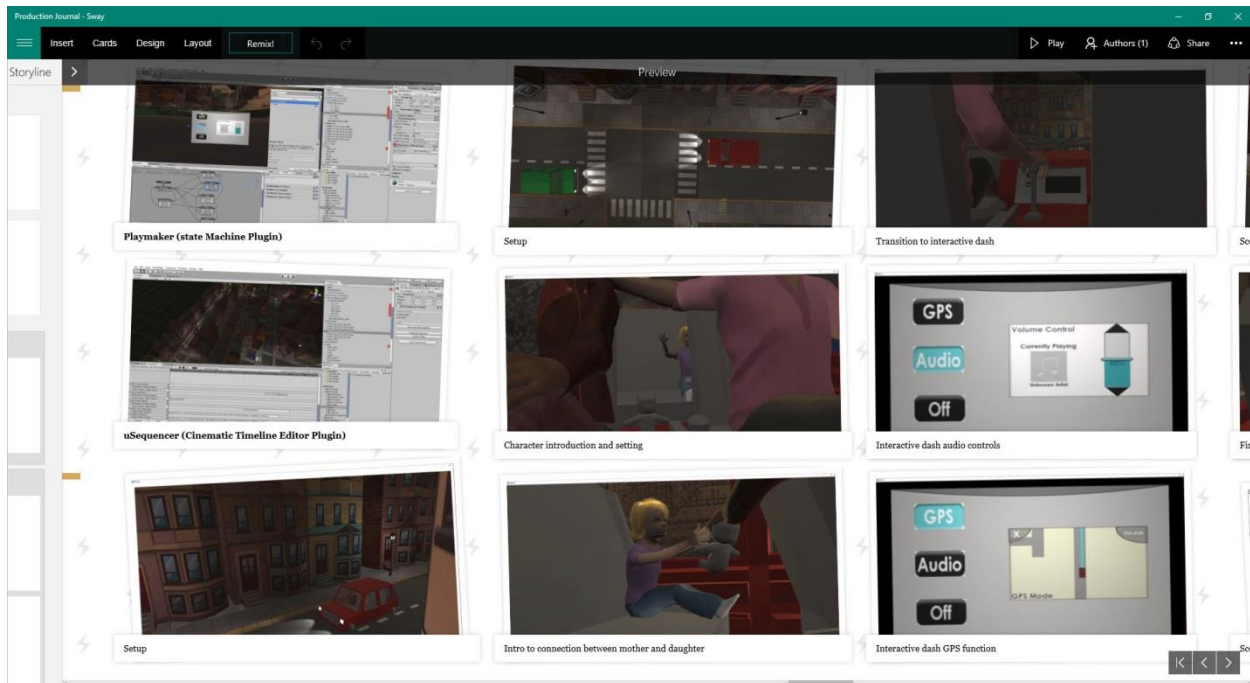
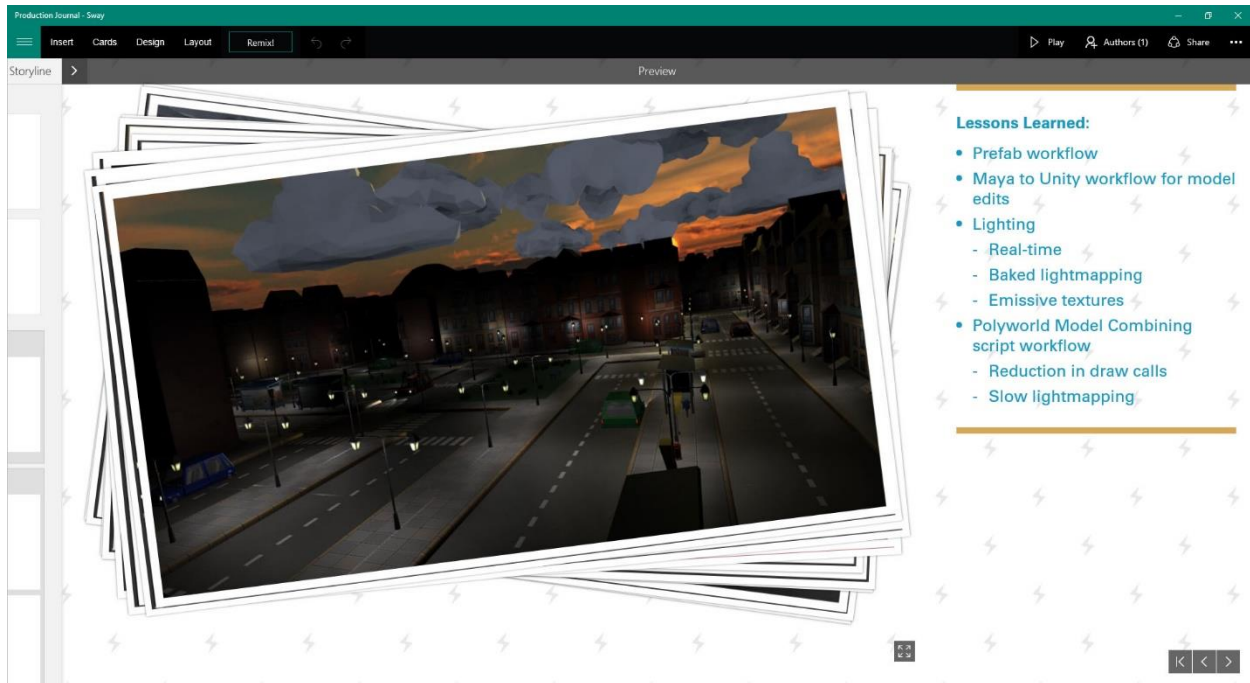
Environment: Sky Box



Environment: Clouds



⏪ ⏩



## **APPENDIX C: STORY SCREENSHOTS**



Belegend: [bej-uh nd]:

The moment where things go wrong.

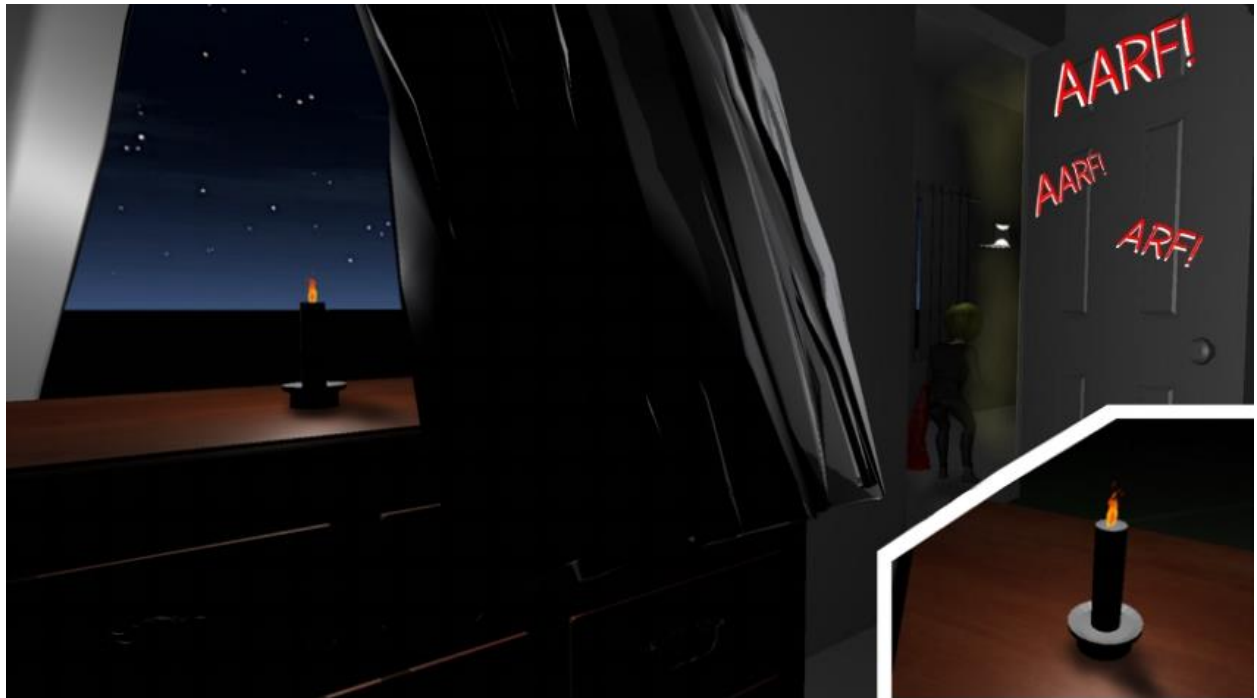
It's not a real word.

But what does it matter?

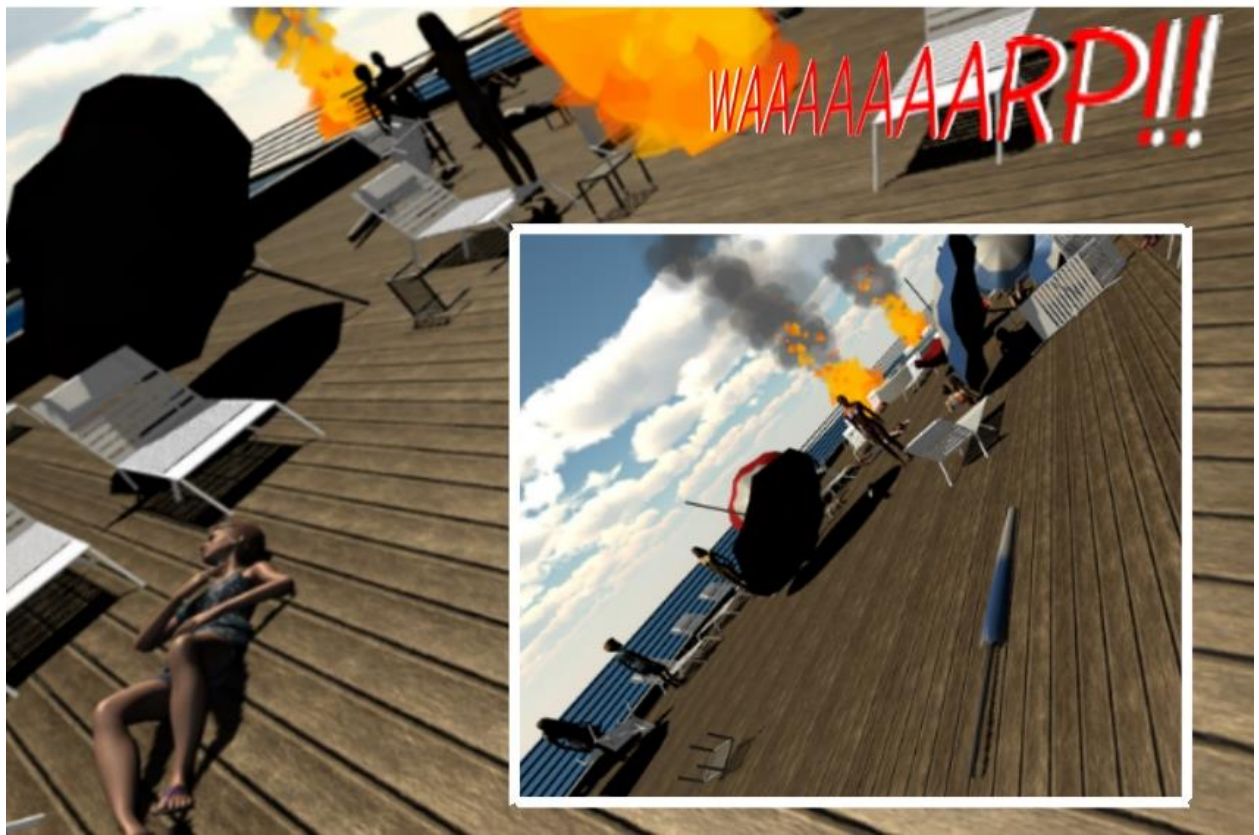
Real words aren't real...

until someone says them out loud.





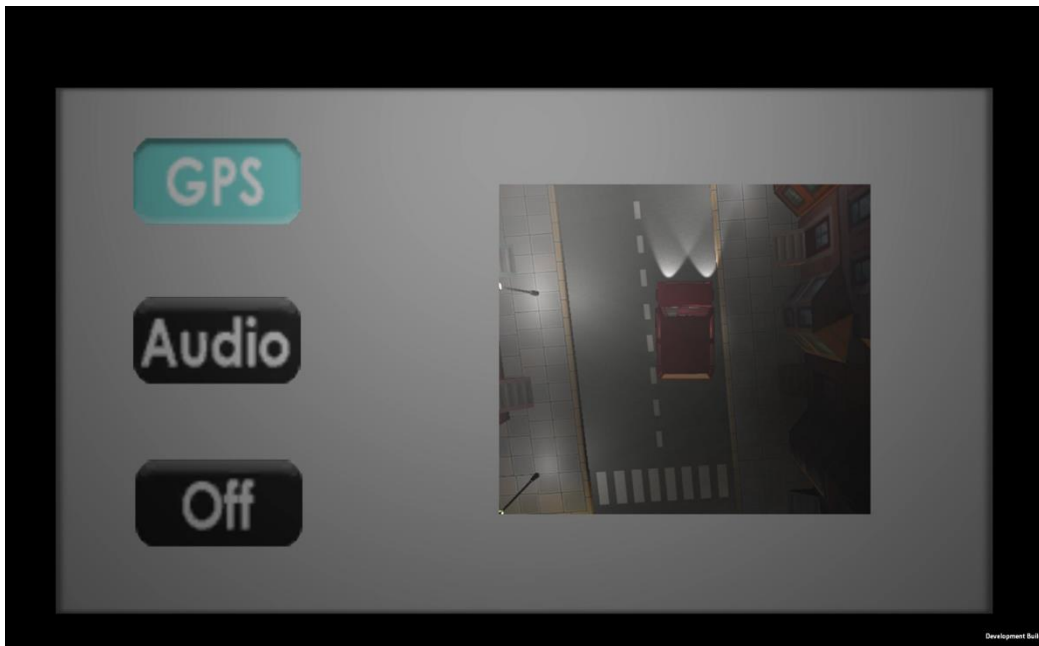






Screenshot 1. Example of shot identical to Cinematic Condition  
(No interaction possible)

Beyond Panels



Screenshot 2. Example of interactive opportunity (Tap GPS button)

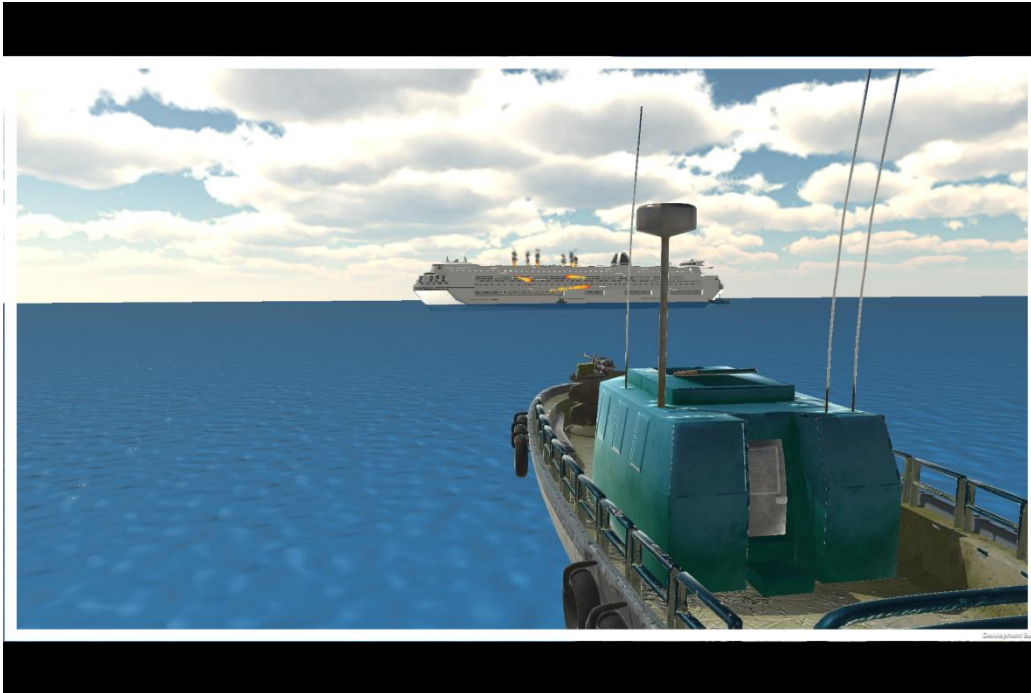


Screenshot 3. Example of interactive opportunity  
(Tap to see what Anya is reading)



Screenshot 4. Example of interactive opportunity  
(Swipe left to see waiter that is trying to get Anya's attention)





Screenshot 5. Example of alternate ending sequence  
(Reveals additional details about pirate attack)



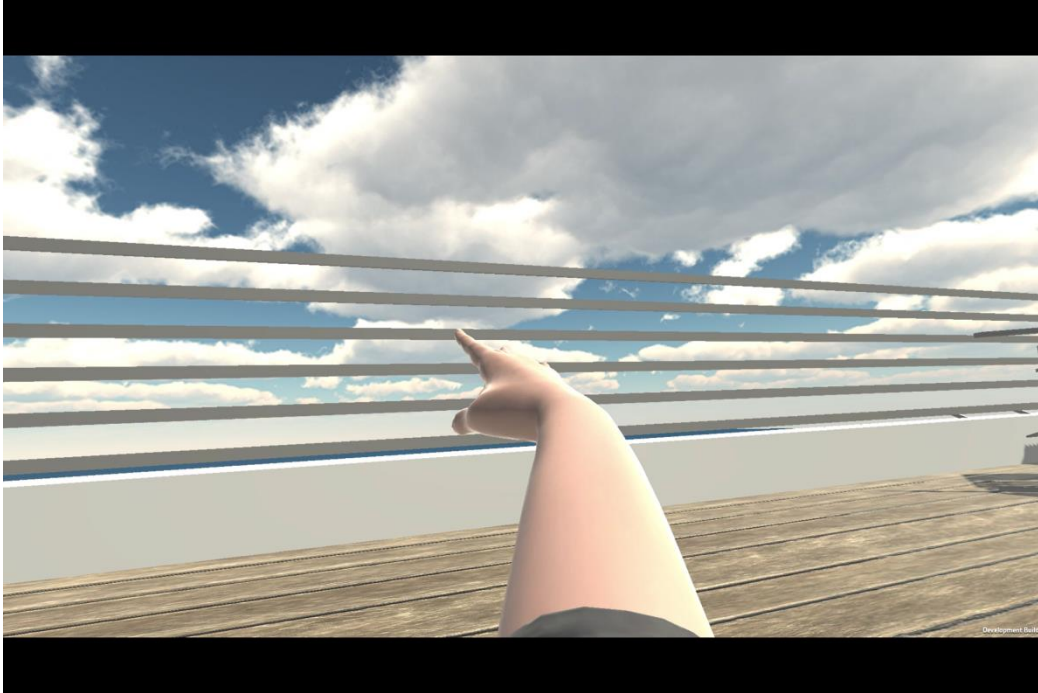
Cinematic



Screenshot 6. Example of shot identical to Beyond Panels Condition  
(No interaction possible)



Screenshot 7 Example of shot identical to Beyond Panels Condition  
(Channel does not change, same result as no interaction in Beyond Panels Condition)



Screenshot 8. Example of shot identical to Beyond Panels Condition  
(Alternate ending sequence does not play, same result as no interaction in  
Beyond Panels Condition)

## **APPENDIX D: DEMOGRAPHICS QUESTIONNAIRE**

Demographics Questionnaire

Participant # \_\_\_\_\_ Age \_\_\_\_\_ Major \_\_\_\_\_ Date \_\_\_\_\_ Gender \_\_\_\_\_

Ethnicity \_\_\_\_\_

1. What is the highest level of education you have had?

High school \_\_\_\_\_ Some college \_\_\_\_\_ Completed 4 yrs of college \_\_\_\_\_ Other (please explain) \_\_\_\_\_

2. How many hours per day do you use a computer? \_\_\_\_\_

3. How many hours per day do you use a tablet or smart phone? \_\_\_\_\_

4. For each of the following questions, circle the response that best describes you.

How often do you:

Play role-playing games (RPGs) or narrative-heavy games (Final Fantasy, Skyrim, etc.)?

Daily	Weekly	Monthly	Once every few months	Rarely	Never
-------	--------	---------	-----------------------	--------	-------

Read printed comic books (single issues, graphic novels, etc.)?

Daily	Weekly	Monthly	Once every few months	Rarely	Never
-------	--------	---------	-----------------------	--------	-------

Read digital comic books (single issues, graphic novels, etc.)?

Daily	Weekly	Monthly	Once every few months	Rarely	Never
-------	--------	---------	-----------------------	--------	-------

Play handheld games, tablet, or smartphone games?

Daily	Weekly	Monthly	Once every few months	Rarely	Never
-------	--------	---------	-----------------------	--------	-------

Read books for entertainment?

Daily	Weekly	Monthly	Once every few months	Rarely	Never
-------	--------	---------	-----------------------	--------	-------

Watch movies for entertainment?

Daily	Weekly	Monthly	Once every few months	Rarely	Never
-------	--------	---------	-----------------------	--------	-------

5. What genre(s) of computer/video games do you most often play if you play at least once every few months? (Select One)

\_\_\_\_ First-person shooter

\_\_\_\_ Role-playing (RPG)

- Adventure
- Puzzle
- Platforming
- Sports
- Other (please explain) \_\_\_\_\_

6. What genre(s) of television/movies do you most often watch if you watch at least once every few months? (Select One)

- Drama
- Comedy
- Documentary
- Romantic Comedy
- Romance
- Thriller/Suspense
- Horror
- Other (please explain) \_\_\_\_\_

7. How much experience do you have with video games? (Circle One)

0	1	2	3	4	5
None at all	Low		Average		High

8. How much experience do you have with interactive stories (choose your own adventure, visual novel video games, etc.)? (Circle One)

0                      1                      2                      3                      4                      5

None at all                      Low                      Average                      High

9. Please rate your enjoyment with experimental games such as Kentucky Route Zero, The Stanley Parable, Fire Watch.

0	1	2	3	4	5
I've never heard of these games	Did not enjoy		Neutral		Enjoyed very much

10. Please rank the following media types in the order that best matches your interests?

- Movies
- Video games
- Novels
- Comic books

11. Please rank the following movies in the order that best matches your interests?

- Titanic
- Run Lola Run
- The Avengers
- Dumb and Dumber
- Halloween

\_\_\_ I've never hear of these movies (Skip)

12. Please rank the following games in the order that best matches your interests?

\_\_\_ Telltale's Batman

\_\_\_ Halo

\_\_\_ The Stanley Parable

\_\_\_ God of War

\_\_\_ Flappy Birds

\_\_\_ Myst

\_\_\_ Elder Scrolls V: Skyrim

\_\_\_ I've never heard of these games (Skip)

13. What is your occupation?\_\_\_\_\_

## **APPENDIX E: PERSONALITY TRAITS QUESTIONNAIRE**

## Personality Traits Questionnaire

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree Strongly	Disagree a little	Neither agree or disagree	Agree a little	Agree Strongly
1	2	3	4	5

I see myself as someone who. . .

- 1. is talkative
- 2. tends to find fault with others
- 3. does a thorough job
- 4. is depressed, blue
- 5. is original, comes up with new ideas
- 6. is reserved
- 7. is helpful and unselfish with others
- 8. can be somewhat careless
- 9. is relaxed, handles stress well
- 10. is curious about many different things
- 11. is full of energy
- 12. starts quarrels with others
- 13. is a reliable worker
- 14. can be tense
- 15. is ingenious, a deep thinker
- 16. generates a lot of enthusiasm
- 17. has a forgiving nature
- 18. tends to be disorganized
- 19. worries a lot
- 20. has an active imagination
- 21. tends to be quiet
- 22. is generally trusting
- 23. tends to be lazy
- 24. is emotionally stable, not easily upset
- 25. is inventive
- 26. has an assertive personality
- 27. can be cold and aloof
- 28. perseveres until the task is finished
- 29. can be moody
- 30. values artistic, aesthetic experiences
- 31. is sometimes shy, inhibited
- 32. is considerate and kind to almost everyone
- 33. does things efficiently
- 34. remains calm in tense situations
- 35. prefers work that is routine
- 36. is outgoing, sociable
- 37. is sometimes rude to others
- 38. makes plans and follows through with them



- 39. gets nervous easily
- 40. likes to reflect, play with ideas
- 41. has few artistic interests
- 42. likes to cooperate with others
- 43. is easily distracted
- 44. is sophisticated in art, music, or literature

Please check: Did you write a number in front of each statement?

**APPENDIX F: NARRATIVE TRANSPORTATION SCALE**

Narrative Transportation Scale

**Instructions:** Read each question and circle the number to indicate the degree of your response.

1. While I was experiencing the narrative, activity going on in the room around me was on my mind.

1	2	3	4	5	6	7
Not at all			Neutral			Very much

2. I was mentally involved in the narrative while experiencing it.

1	2	3	4	5	6	7
Not at all responsive			Neutral			Very responsive

3. After the narrative ended, I found it easy to put it out of my mind.

1	2	3	4	5	6	7
Not at all natural			Neutral			Very natural

4. I wanted to learn how the narrative ended.

1	2	3	4	5	6	7
Not at all			Neutral			Very much

5. The narrative affected me emotionally.

1	2	3	4	5	6	7
Not at all natural			Neutral			Very natural

6. I found myself thinking of ways the narrative could have turned out differently.

1	2	3	4	5	6	7
Not at all compelling			Neutral			Very compelling

7. I found my mind wandering while experiencing the narrative.

1	2	3	4	5	6	7
Not at all			Neutral			Very much

8. The events in the narrative are relevant to my everyday life.

1	2	3	4	5	6	7
Not at all			Neutral			Very much

9. The events in the narrative have changed my life.

1	2	3	4	5	6	7
Not at all			Neutral			Very much

## **APPENDIX G: PERCEIVED REALISM**

Perceived realism

For the story you just experienced, please rate how much you agree or disagree with each of the following statements.

1. The dialogue in the story is realistic and believable.

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree
  
2. The setting for the story just doesn't seem real.

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree
  
3. People in this story are like people you or I might actually know.

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree
  
4. The way people really live their everyday lives is not portrayed very accurately in this story.

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree
  
5. Events that actually have happened or could happen are discussed in this story.

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree
  
6. This story shows that people have both good and bad sides.

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree
  
7. I have a hard time believing the people in this story are real because the basic situation is so far-fetched.

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree
  
8. This story deals with the kind of very difficult choices people in real life have to make.

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

## **APPENDIX H: NARRATIVE ENGAGEMENT SCALE**

## Narrative Engagement Scale

### KEY

Note: Items #1 - #6 are reverse scored.

### Narrative Understanding Subscale

1. At points, I had a hard time making sense of what was going on in the program. **This item is reverse scored.**

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

2. My understanding of the characters is unclear. **This item is reverse scored.**

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

3. I had a hard time recognizing the thread of the story. **This item is reverse scored.**

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

### Attentional Focus Subscale

4. I found my mind wandering while the program was on. **This item is reverse scored.**

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

5. While the program was on I found myself thinking about other things. **This item is reverse scored.**

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

6. I had a hard time keeping my mind on the program. **This item is reverse scored.**

1	2	3	4	5	6	7
Strongly disagree			Neutral			Strongly agree

### Narrative Presence Subscale

7. During the program, my body was in the room, but my mind was inside the world created by the story.

1                      2                      3                      4                      5                      6                      7  
Strongly disagree                      Neutral                      Strongly agree

8. The program created a new world, and then that world suddenly disappeared when the program ended.

1                      2                      3                      4                      5                      6                      7  
Strongly disagree                      Neutral                      Strongly agree

9. At times during the program, the story world was closer to me than the real world.

1                      2                      3                      4                      5                      6                      7  
Strongly disagree                      Neutral                      Strongly agree

### Emotional Engagement Subscale

10. The story affected me emotionally.

1                      2                      3                      4                      5                      6                      7  
Strongly disagree                      Neutral                      Strongly agree

11. During the program, when a main character succeeded, I felt happy, and when they suffered in some way, I felt sad.

1                      2                      3                      4                      5                      6                      7  
Strongly disagree                      Neutral                      Strongly agree

12. I felt sorry for some of the characters in the program.

1                      2                      3                      4                      5                      6                      7  
Strongly disagree                      Neutral                      Strongly agree



## **APPENDIX I: ENGAGEMENT MEASURE**

Engagement Measure

**KEY**

Enter the number circled for each item.

Note: Items #1 and #3 are reverse scored.

**Instructions:** For each statement, circle the number that indicates how much you agree or disagree with the statement.

1. It would not matter to me if I never experienced a story like this again. **This item is reverse scored.**

1=5	2=4	3=3	4=2	5=1
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

2. I felt happy at the thought of experiencing this story.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

3. The less I have to do with this story, the better. **This item is reverse scored.**

1=5	2=4	3=3	4=2	5=1
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

4. I would like to spend more time experiencing stories like this one.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

5. It was important to me to understand the story.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

6. I experienced a “buzz of excitement” while experiencing this story.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

7. I like the complexity that the story medium provided.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly Agree

8. I was interested in seeing how this story would progress.

1                      2                      3                      4                      5  
Strongly disagree    Disagree            Neutral              Agree                Strongly Agree

9. I experienced suspense while the story was unfolding.

1                      2                      3                      4                      5  
Strongly disagree    Disagree            Neutral              Agree                Strongly Agree

10. I enjoyed exploring the story.

1                      2                      3                      4                      5  
Strongly disagree    Disagree            Neutral              Agree                Strongly Agree

11. I feel that I experienced all the story had to offer.

1                      2                      3                      4                      5  
Strongly disagree    Disagree            Neutral              Agree                Strongly Agree

12. The story was challenging to comprehend.

1                      2                      3                      4                      5  
Strongly disagree    Disagree            Neutral              Agree                Strongly Agree

## **APPENDIX J: FLOW STATE SHORT SCALE (FSSS)**

Flow State Short Scale (FSSS)

<b>During the scenario:</b>	<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neither Agree nor Disagree</b>	<b>Agree</b>	<b>Strongly Agree</b>
I made the correct movements without thinking about trying to do so.	1	2	3	4	5
I knew clearly what I wanted to do.	1	2	3	4	5
My attention was focused entirely on what I was doing.	1	2	3	4	5
I felt in total control of what I was doing.	1	2	3	4	5
I was not concerned with what others may have been thinking of me.	1	2	3	4	5
Time seemed to alter (either slowed down or speeded up).	1	2	3	4	5
I really enjoyed the experience.	1	2	3	4	5
Things just seemed to be happening automatically.	1	2	3	4	5
I had a strong sense of what I wanted to do.	1	2	3	4	5
It was no effort to keep my mind on what was	1	2	3	4	5

happening.					
I felt like I could control what I was doing.	1	2	3	4	5
The way time passed seemed to be different from normal.	1	2	3	4	5
I had total concentration.	1	2	3	4	5
I had a feeling of total control.	1	2	3	4	5
I was not concerned with how I was presenting myself.	1	2	3	4	5
The experience left me feeling great.	1	2	3	4	5
I did things spontaneously and automatically without having to think.	1	2	3	4	5
My goals were clearly defined.	1	2	3	4	5
I was completely focused on the task at hand.	1	2	3	4	5
I felt in total control of my body.	1	2	3	4	5
I was not worried about what others may have been thinking of me.	1	2	3	4	5
At times, it almost seemed like things were happening in slow motion.	1	2	3	4	5
I found the experience extremely	1	2	3	4	5

rewarding.					
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## **APPENDIX K: STORY COMPREHENSION**



## Story Comprehension

Please answer the following questions regarding the story to the best of your understanding.

1. Which of the following personality types best describes the main character?
  - a. Outgoing
  - b. Cautious
  - c. Carefree
  - d. Optimistic
  - e. Not sure
2. How many sets of foster parents did Anya have throughout the story?
  - a. 1
  - b. 2
  - c. 3
  - d. 4
  - e. Not sure
3. What was the name of the boy Anya met on the cruise ship?
  - a. Jake
  - b. Tom
  - c. Mitch
  - d. Steven
  - e. Not sure
4. What was Anya's treasured possession?
  - a. A red jacket
  - b. A teddy bear
  - c. A dog
  - d. Her father's hat
  - e. Not sure

## **APPENDIX L: OPEN-ENDED TECHNOLOGY QUESTIONS**

Open-ended Technology Questions:

Instructions: Please choose the response that most accurately describes your alignment with the following statements.

5. I enjoyed the format in which the story was presented.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

6. I found the format in which the story was presented easy to use.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

7. The story was easy to follow in the format it was presented.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

8. The story and characters motivated me to comprehend the story.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

9. The user-interface was easy to use.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

10. I enjoyed the interactions that existed within the story.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

11. I would enjoy experiencing more stories in this format.

1	2	3	4	5	6	7
Strongly Disagree			Neutral			Strongly Agree

12. How could the story have been improved?

13. In what ways could the technology be changed to improve user experience?

**APPENDIX M: UCF IRB APPROVAL LETTER**



University of Central Florida Institutional Review Board  
Office of Research & Commercialization  
12201 Research Parkway, Suite 501  
Orlando, Florida 32826-3246  
Telephone: 407-823-2901 or 407-882-2276  
[www.research.ucf.edu/compliance/irb.html](http://www.research.ucf.edu/compliance/irb.html)

## Approval of Human Research

From: **UCF Institutional Review Board #1**  
**FWA00000351, IRB00001138**

To: **Michael J. Eakins**

Date: **July 13, 2017**

Dear Researcher:

On 07/13/2017 the IRB approved the following minor modifications to human participant research until 06/08/2018 inclusive:

Type of Review: IRB Addendum and Modification Request Form  
Expedited Review

Modification Type: Age range changed to 18yrs or older. Revisions to Pre and Post questionnaires. A revised Protocol and questionnaires were uploaded and a revised informed consent was approved for use.

Project Title: Beyond panels interactive storytelling: Developing a framework for highly emotive narrative experiences on mobile devices

Investigator: Michael J. Eakins

IRB Number: SBE-17-13143

Funding Agency:  
Grant Title:

Research ID: N/A

The scientific merit of the research was considered during the IRB review. The Continuing Review Application must be submitted 30 days prior to the expiration date for studies that were previously expedited, and 60 days prior to the expiration date for research that was previously reviewed at a convened meeting. Do not make changes to the study (i.e., protocol, methodology, consent form, personnel, site, etc.) before obtaining IRB approval. A Modification Form **cannot** be used to extend the approval period of a study. All forms may be completed and submitted online at <https://iris.research.ucf.edu>.

If continuing review approval is not granted before the expiration date of 06/08/2018, approval of this research expires on that date. When you have completed your research, please submit a Study Closure request in IRIS so that IRB records will be accurate.

Use of the approved, stamped consent document(s) is required. The new form supersedes all previous versions, which are now invalid for further use. Only approved investigators (or other approved key study personnel) may solicit consent for research participation. Participants or their representatives must receive a copy of the consent form(s).

All data, including signed consent forms if applicable, must be retained and secured per protocol for a minimum of five years (six if HIPAA applies) past the completion of this research. Any links to the identification of participants should be maintained and secured per protocol. Additional requirements may be imposed by your funding agency, your department, or other entities. Access to data is limited to authorized individuals listed as key study personnel.

In the conduct of this research, you are responsible to follow the requirements of the [Investigator Manual](#).

On behalf of Sophia Dziegielewski, Ph.D., L.C.S.W., UCF IRB Chair, this letter is signed by:

*Kamille Chaparro*

Signature applied by Kamille Chaparro on 07/13/2017 04:48:53 PM EDT

IRB Coordinator

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