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A study of the use of Augmented Reality in storytelling

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A STUDY OF THE USE OF AUGMENTED REALITY IN STORYTELLING

University of Witwatersrand

Creative Practice

Masters in Digital Arts by Creative Practice
Course Code WSOA8000

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Augmented Reality; Storytelling; Visual Storytelling; Comics; Digital Art; Narratives; Space; Communication

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Declaration

I declare that this report/dissertation is my own work. The Comic that accompanies this dissertation as a proof of concept and research basis was illustrated and compiled by me. All external sources have been cited and accurately acknowledged in the bibliography. This work is being submitted for the Masters in Digital Arts by Dissertation at the University of Witwatersrand, Johannesburg. It has not been submitted previously to this or any other university for qualification purposes.

15th March 2020

Athenkosi Musoke

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Abstract

This dissertation is meant to function as a technical report as well as an academic thesis. As a thesis, its core existence is to examine how the technology of Augmented Reality (AR) can be used to enhance storytelling in sequential narratives. As a technical report, it analyses the design process and design decisions that went into creating a proof of concept (herein refered to as *Awakening* (Musoke, Awakening, 2020)) that sits as the cornerstone of this research; exemplifiying the theory as a phyiscal Comic that uses an Augmented Reality (AR) smartphone application to enhance the storytelling experience throught a unique combination of digital and traditional art media. This research culminated in a proof of concept called *Awakening*, an 8 page Comic created for this research with the purpose of exploring exposition, pace, rhythm and other key factors of visual storytelling while introducing interactivity and movement as possible areas of augmentation to enhance the story. Special note was taken to maintain relevance in the use of augmentation and explore different types of augmented reality applications within each page of the proof of concept (*Awakening*).

The aim of the AR add on to the visual narrative was not to be a fancy visual gimmick but a relevant aspect that would enhance the story, or introduce information that would create an altered expereince to the traditional visual storytelling experience explored so far. Initially, prototpyes were made to be examined critically and used to develop a final proof of concept to answer the major research question of *how can augmented reality be used to enhance the experience of storytelling?* The prototypes aimed to explore various methods of storytelling and experiment with different uses of AR to enhance this storytelling

Participants gave an overall positive review of the experience, with over 80% of participants agreeing that the AR technology enhanced the storytelling experience. Some compatibility issues were noted amongst participants, with some participants struggling to get the AR application working on their smartphone and instead. Despite this all participants managed to use the AR app on a device provided for by the assistant researcher as a backup in case compatibility issues like this arose.

The entire video of *Awakening* Comic shall accompany this MA dissertation on the CD accompanying this paper as well as an online video on this YouTube link:

Augmented Reality (AR) Masters Comic 2019/20 - YouTube

Introduction

Most of us are familiar with Films like *Minority Report* (Spielberg, 2002) and *Iron Man* (Toub, 2008) where fictional characters use their computer in the space around them, or as a holographic extension that they can touch or interact with. For those of you that aren't familiar with the above mentioned, extended reality is defined as a technology simulation that allows users to either be inside the virtual world and interact in a seemingly real way (VR), or technology that allows one to overlay virtual information into the physical world (AR). This Extended Reality (XR) media like Virtual Reality (VR) and Augmented Reality (AR) has existed for close to a century now, however these fictional Films somewhat exaggerate the technology. For example, social media applications like *WhatsApp* and *Snapchat* (*Figure 1* below) use a smartphone's camera to overlay effects and photography filters on real time recordings. The technology has become publicly accessible in recent years due to technological and cost constraints being mitigated through technological advancement (Statista, 2019). This advancement is allowing a wider audience to develop and experience this technology with modern technology providing a growing platform of developers,



Figure 1: Snapchat, the future of AR? An Article on Medium.com (Racette, 2015)

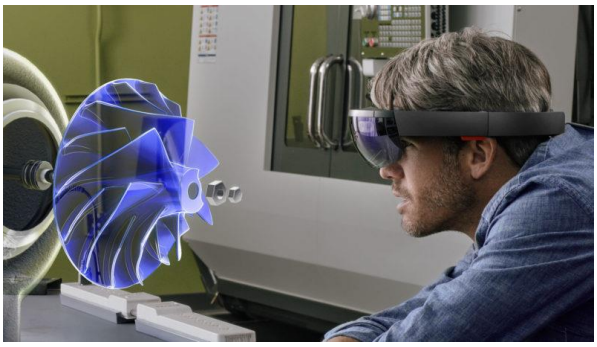


Figure 2: Microsoft Hololens used for viewing simulations (Landyshev, n.d.)

corporates and individuals to use XR to infuse reality with new levels of perception.

These XR media have been adopted for multiple industries already, from medicine, built environments, education and art. For example, the *Microsoft HoloLens* (2016) (*Figure 2*)

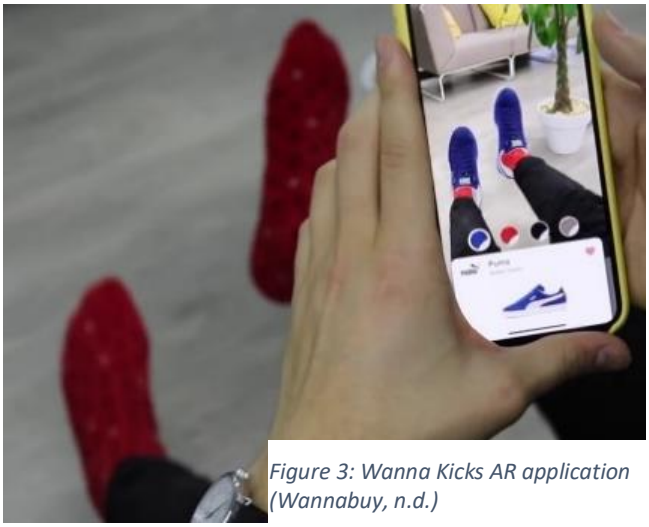


Figure 3: Wanna Kicks AR application (Wannabuy, n.d.)

allows virtual info to encompass physical spaces, overlaying sound and visual stimuli over the physical world for interaction, understanding and simulations. The potential for these 2 examples alone can change the face of media, entertainment and the lived experience forever, allowing technology to fill the lived experience actively rather than passively (Racette, 2015). Another example is the use of AR in marketing, with *Figure 3* showing how it uses an android smartphone camera to see a user's foot, and then overlay a virtual shoe on it for users to judge how well this apparel fits, and how it looks as a possible purchasing item. Or in *Figure 4* as it's used in conjunction with Artificial Intelligence (AI) algorithms to detect a person's hair and augment the colour in real time, similar to the *Snapchat* application of *Figure 1*.

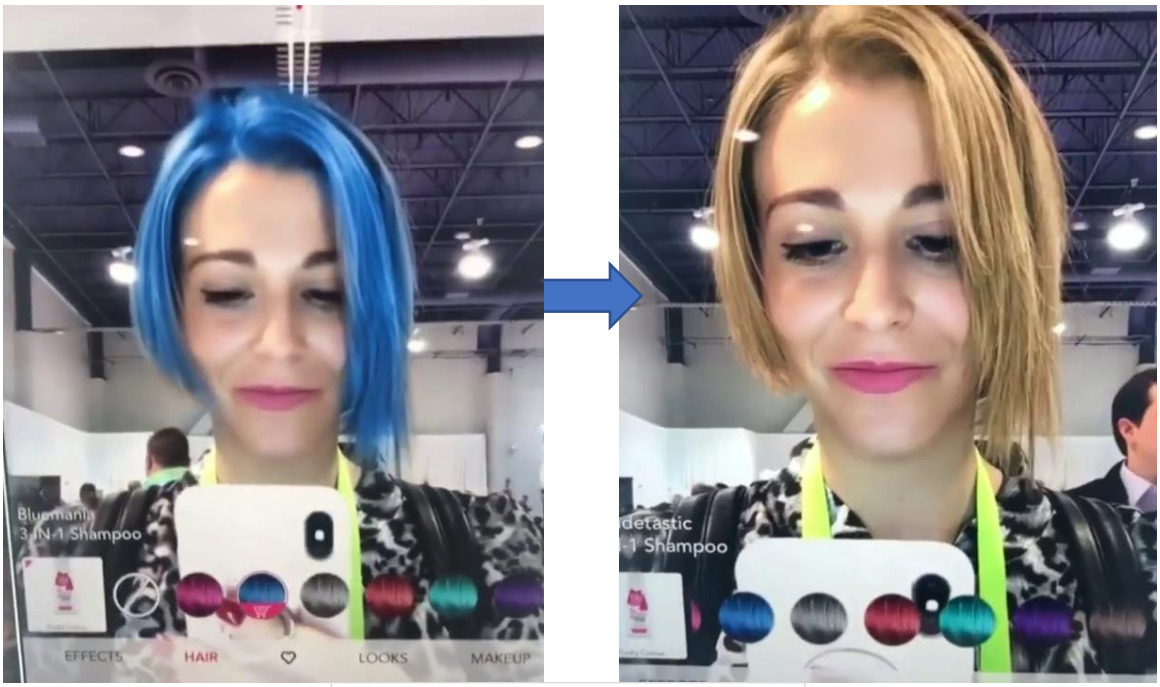


Figure 1: AR hair colour app (L'Oreal, n.d.)

The thesis of this paper seeks to focus on augmented reality (AR) specifically within the discourse of viewing simulations/augmentations through a smartphone device, exploring how it can be used as a potential storytelling medium. AR in built environments, medicine, webcams and other media shall be referenced in passing but shall not form the basis of this research. This is to answer the research question, how can AR be used to enhance the storytelling experience? This research shall be proposed as Creative Practice – with this dissertation focusing on combining the theory involved in the creative process and unpacking it as a research question. The research into academia shall be used for development of *Awakening* with this paper providing the theoretical frameworks, rationale and research methodology to supplement this proof of concept (*Awakening*). This AR

application uses *Unity* 3D's *Vuforia* (David Helgason, 2018), an add-on created to supplement the *Unity* software. What is does is it opens a smartphone's camera lens and overlays augmented, virtual information. See image examples below:



Figure 2: Awakening. This dissertations proof of concept with AR screenshots (Musoke, Awakening, 2020)

Chapter 1 of this thesis shall be a **literature review**. Defining the terminology and understanding the auspices of storytelling, from its global appeal to nuanced, socio-economic influence is a crucial first step. The understanding shall be supplemented further by a discussion on the cultural practice of representation and creating shared spaces with the aid of Stuart Hall and Henri Lefebvre. Formulating depth and intellectual engagement in the form of a story, and then adding visual and aesthetic appeal to it is a classic formula that has been employed by many storytellers throughout the ages (Eisner, 2008) (McCloud, 2006). This formula is employed beyond the realm of storytelling media, pioneering advertisement, branding and media to maintain a larger audience appeal (Bridges, 2013). As such, this above-mentioned preliminary research into storytelling shall form a foundation of understanding that can then be used to inform where and how AR can be included to enhance the storytelling practice.

The very nature of AR is visual & aesthetic appeal, with the bonus of allowing for interaction and engagement through touch, sound and vibration. Its innate compatibility within the storytelling discourse is all too apparent, as such researching Augmented Reality – it's history, uses and potential limitations had to be understood with considoration for how it could combine with storytelling. This inherent nature and compatibility of AR shall be interrogated as well: defining AR and examining what previous developers have done in the field of XR media shall assist in finding the best way to include AR not purely as visual appeal but mainly to add to the depth of the experience of a story. This will be tackled in the final Case Studies sub-section

Chapter 2 explores the **design decisions** that went behind the practical component of the final proof of concept. This part of the thesis functions as a technical report, beginning with a brief overview of prototype development. Finally, noting overall development *Awakening* alongside the preliminary research of Chapter 1. Semiotics, spacial practice and user-interactions within game were key components that served as a starting point to interrogated within the light of storytelling and AR compatibility. These research fields are slightly tangential to the core research topic, however prooved to be mutually inclusive as areas that combined to create a smooth AR storytelling exerpience. It was Sir Isaac Newtown that coined the phrase, "If I have seen further it is by standing on the shoulders of Giants." As such, drawing inspiration from the best of each of these research fields allowed the researcher to curate a development pipeline that was assisted by previously successful media. . Informal interviews with proffessionals working in the industry of AR shall also be mentioned in this chapter as well as in Chapter 3. These informal interviews were conducted with proffessionals who are working within the industry of XR technology and were more casual conversations than strict interviews, with emphasis being put on getting critique for the compostional elements of the *Awakening* Comic, and hearing their proffessional thoughts on the future of AR, its application in various sectors and other conversation points. Similarly, all these references helped to better situate the study and inform the design decisions of the creative practice.

As a greyscale Comic illustrated digitaly along with an AR android app developed by the researcher, *Awakening* stands as the cornerstone of this research, exemplifying the literature review and using it's contents to show how the preliminary research into AR and storytelling can find common ground as mutually inclusive fields within AR storytelling. A number of references and researchers came up who had explored Augmented Reality in storytelling as well. *Priyas Mirror* (Paromita Vohra, Priya's Shakti, 2014), *Masters of the Sun* (will.i.am, 2017) and Wesley Wong's *Comic Cubes* (Wong, 2018) prooved to be invaluable starting points as visual narratives that had successfully encorporated AR as a narrative device in a manner that also exemplifies the above mentional tangential research fields. As such, these Comics shall be used as case studies, examined and discussed to see what could be implemented or improved upon with the developmend of *Awakening*

In order to quantify the success of this study, data was collected by running focus groups that were facilitated by objective parties and/or guardians through an exhibition. These focus groups experienced the pages of the Comic as A3 printouts exhibited in a classroom space for group interactions through a smartphone loaded with the AR application, *Maar* (Musoke, Awakening, 2020). **Chapter 3** discusses this research methodology in detail. The participants were minors aged 15-17; this age group was chosen due to their exposure to Comics and entertainment media, i.e. they are the most likely cohort to be active consumers of AR and to engage with Comics, animation and interactive . The pages of the Comic were printed in A3 and exhibited with smartphone devices running the *Awakening* app for multiple people to experience this Comic in AR. Fascilitators at the schools were put into the space to assist with conducting the research while the researcher stayed outside of the space to avoid confirmation bias or any other form of interferance with the study. Anonymous quotes from the minor participants aswell as the informal interviews shall be referenced here with a focus on drawing information that can be used to build on this research for future studies.

Chapter 4 shall focus on recommendations for future study. This section is meant to compile the above mentioned data and research and objectively analyse it to see what went well, what didn't go well and where are the areas that could b improved in future. This research is meant to be a stepping stone for future creative practice or research – it's meant to collect and analyse data that can be explored further. With this in mind, this section of the dissertation aims to enlighten the viewer about the minor nuances of the research, comparing methodologies and evaluating the overall success of the research. Careful considoration was made to include an unbaised conclusion – one that drawns on the participants experience of *Awakening* rather than the researchers opinion of it's success.

Chapter 1: Literature Review

This first step when seeking to create a visual narrative as a proof of concept for how viable the technology of AR is alongside storytelling is to understand the terminology and better situate what kind of storytelling methods will work best within digital virtual spaces. The following chapter starts by laying a foundation of understanding based off different theorists. This proof of concept was created as an intersection of Manga and Comic. It is a

visual narrative that uses means of representation and is a spatial medium that requires users to move through physical space (Comic book pages) in order to create the virtual space (AR visuals). As such the user simultaneously uses and displaces ideas of representation, conforming to certain norms of the Manga/Comic genre while having to adopt new norms to navigate this augmented representation.

AR technology allows for interaction, shows virtual characters and uses progression in a manner that "game-ifies"[1] the reading experience. This much is apparent from a quick glance at the above mentioned Figures as well as the researchers own experience within developing AR content. As such, the following discussion shall show how phenomenological theories of sensory perception, representation and game fundamentals can be used to better understand what it means to navigate spatial-temporal realities, interact and communicate to combine it with the technology of augmented reality and enhance the storytelling experience. This discussion shall start with an introduction to the theorists – defining key terms and showing how they interact across disciplines to create a new storytelling experience. The result is that *Awakening* augments the storytelling experience by selectively borrowing from key theories in, eastern and western storytelling practice and representational conventions to enhance and augment the storytelling experience. These theorists were chosen as a starting point in an attempt to enhance the storytelling experience as per the research criteria of this document.

The first aspect to be examined is representation. In his writings about representation, Stuart Hall makes a point to express how important representation is in the means of production and exchange of meaning between two members of a culture (Hall, 1997). This representation hinges on language – the production of meaning of the concepts in our mind is often created through language, similarly, expressing these concepts requires language that uses meanings that other people will understand. For example, the very nature of this thesis uses representation (written language) to inform the reader about ideas and concepts around AR and storytelling. Our key terms for this understanding of representation are denotation and connotations, as well as signifier vs signified (Hall, 1997). The denotation is the literal meaning of a word. For example, the word fire denotes the natural element that

[1] Gamification (Salen, 2003) is a term that means applying game design principles or mechanics to non-game activities. For example, introducing a loyalty point system to a customer's shopping experience in the form of a card that gathers points through frequent shopping is a popular form of gamification meant to incentivise shopping.

is yellow, animated and warm. The connotation is the ideas or feelings that a word represents – so the word fire could have connotations of destruction, purification, illumination. These connotations can change from person to person based off experience, or cultural, social and ethical implications. Similarly, a signifier and signified work like the above. When one sees the word fire, the word becomes a signifier that points to the denotation and connotations of fire, the signified. One can see how representation is a language practice using signifier and signified or creating denotations that point to the intended connotations. This study of signifier and signified (symbols) to create meaning and language (interpretations) is known as semiotics. In this sense, meaning is constructed through the correct use of universally understood language (Hall, 1997). This language that we use holds the fabric of society together, mediating relationships and communicating values, beliefs and structures of thought to other people.

As content creators of art, Film, music, games, literature etc. – creators ideally aim to use the correct representations that explore ideas, invoke feelings or communicate to the viewer. As such, representation becomes an attempt at expressing one's phenomenological view or an attempt at communicating the complex sensorium of subconscious chatter that becomes known as the connotation. (The word phenomenological in this sense is borrowed from the philosophical term and means the unique combination of subjective thought, direct experience, memories and consciousness of an individual (Langdridge, 2018).) It is those unique feelings, thoughts and memories that are inside each of us which language attempts to express. Representation draws on this subjective view to express and communicate, however this subjective view uses culturally accepted denotations and connotations to better represent itself (Hall, 1997). And as such, art becomes a means of representations (BriHard, 2016) (Mogan, 2016). Representations can become a language of its own (Hall, 1997). Art can become a language of its own.

As a result, media like Comics, video games or smartphone apps rely on the correct use of language to convey meaning to the user. In order to facilitate active or passive engagement from the viewer, these media must use their own means of representation. This language isn't purely in word form, but also in a system of conventions, feedback loops and visual stimulus that a user can experience while interacting with these artistic media. Similarly, in order to best create an enhanced storytelling experience, this research will need to create a semiotic field that creates a seamless interaction between story and AR for the viewer.

Ultimately any form of media is a representation of reality, as such how content is written must properly represent it (reality) (Hall, 1997) (BriHard, 2016). In his discussions on Manga Brilliance as a representational means, BriHard is quick to point out how visual narratives like Comics use principles of art, specifically stylization or naturalism, at varying degrees to represent ideas or an aesthetic response through images juxtaposed with deliberate sequence. A sentiment that is echoed by Scott McCloud as well when he says that Comics are a spatial-temporal medium (McCloud, Making Comics, 2006) (BriHard, 2016). What is meant here is that, video games are representations of reality that double as spatial media. In a game, a player is not just passively reading the story but must actively take part in the story, making decisions and helping the story to progress by moving through a virtual space. Augmented Reality technology is like a video game in this sense; it is the player who must launch the smartphone application, lift their phone, and move it through space in order to see digital representations and extract meaning. However, the levels of interaction aren't the same with AR, they are often to a much lesser degree. AR, video games and visual narratives (like Comics, or Manga) are the 3 main media discussed above, and it is clear that representational practice is the mutual topic that they all share at varying degrees. However, it is now becoming apparent that space is also a mutually inclusive topic that all these media share.

In his discussions about mind a space, Henri Lefebvre is quick to point out how space informs mind. His theory observed how all life occurs within space. Representations like AR, Comics and video games have the mutually inclusive topics of space and mind, the placement of Comic book characters and their interaction with another must be understood by the viewer for the visual narrative to make sense. Similarly, video games and AR involve the viewer/player navigating through space to extract meaning through active interaction. Henri Lefebvre points out how physical space is often filled with social norms and agreements that govern actions within that space (Lefebvre, 1974). When entering a space, humans will often indirectly ascribe to certain set of unspoken rules, social norms and acceptable behaviours for that space. That is why humans display different behaviours and personalities based off where they are and whom they are with. You are a different version of "you" when you are at church, as opposed to your friends, or when you are at work. These environments (people and spaces) will most likely inform the mental space you are in as well as how you express yourself. Likewise, these physical spaces are filled with their own set of representations that people use to communicate and understand the space, and

govern their behaviour (Hall, 1997). In his podcast titled *Architecting the Mind*, Philosopher and public speaker, Jason Silva, takes this idea further by presenting how this interaction of space informing mind, ends up making mind inform space (Silva, 2017). For example, while in this church or with your friends/colleagues, your altered state of consciousness will, in turn, lead to you creating new spaces, tools, or interactions. Creating a feedback loop between space and mind. Minds create spaces, art, representations, video games and these creations in turn, inform mind (the creator's minds, the viewer's mind etc.). These informed minds can now create even newer spaces, new interactions, and new representations.

Combining Hall's discussion on semiotics with the above-mentioned theory on spatial practice, we can now say that representation understanding and special understanding are formed through interactions with people and things. This sentiment is echoed in the book, *Digital Ethnography: Principles and Practice* (2016), where they state that these interactions form the basis of meaning and in time, people make sense of these meanings and learn to transform their interpretations. Interactions with people and things form the primary unit through which meaning is made, shaping the ways that people develop relationships with others and constitute their social worlds (Sarah Pink, 2016). This poses an interesting question: how do virtual spaces compare, could they also inform relationships and representation practice as well as physically interacting with people and things? A question that could form too much of a digression at this point, but one that we will keep in mind throughout this paper.

It's not uncommon for children, who are more impressionable at younger ages, to learn things from Comic books and video games that they then take into their physical interactions with people and things in physical space (Mogan, 2016). In this sense, the virtual space *can indeed* inform physical space. For example, after playing hours of *Assassins Creed* (Ubisoft Montreal, 2010), some players will walk into their church and start seeing footholds to climb. Similarly, avid readers of Japanese Manga often learn how to understand Japanese slang and language in a manner that helps them become fluent in reading and writing at a quicker pace than others who learn the language through textbooks only. But how does AR possibly play into this interaction of space and place, and can this involvement of AR be used to enhance a story?

The technology of AR seeks to augment physical space. Whereas games are contained within a virtual space, AR is in the position of taking those conventions and understandings

of video games and impregnating them into physical space. For example, with *Figure 3* in the Introduction, *Wanna Kicks* AR app, a user can tap on their cell phone screen to change the colour of a shoe, drag the shoe onto the representation of their foot, and then see what their foot looks like with this shoe on. This is an interesting interaction that uses ideas of representation to denote a shoe and design principles of interaction and visual feedback to inform the user about their interaction and represent it through the phone. This interaction in turn, changes the user's representational understanding of their own foot by placing a virtual shoe there. Whereas visual narratives and video games might encourage this interaction of virtual and physical space slowly, AR can show you this intersection of virtual and physical space immediately. Our *Assassins Creed* (Ubisoft, 2008) player might imagine footholds in the church, but in AR he could see them immediately. Our Manga reader might slowly learn how to use the correct Japanese Kanji in social situations, but in AR he/she can immediately see the correct Kanji or language.

Various means of production, representation, gaming conventions and spatial media are intersecting here to create an interaction where digital meets physical spaces. By taking on the above mentioned discussions on representation, video game terminology and spatial practice, one can better enhance the lived experience through correct use of AR: allowing a user to better move through the interaction of an AR by drawing on already established norms, conventions and representational standards. These are norms that are meant to be intuitive, that borrow from the user's digital spatial practice. Arguably, one could adapt these same principles and conventions into creating an AR storytelling experiences that combines the best of the above-mentioned academia.

Similarly, video games are fundamentally a special medium; all video games involve moving or interacting within a digital space and within a limited spectrum of options (Costikyan, June 2002) (Salen, 2003). Games, like all art media (Film, literature, animation, Comics etc.) are representations of reality, or physical spaces. Any form of media is a representation of reality, as such how content is written must properly represent it (reality) (BriHard, 2016). However, when we look at this "reality" with Lefebvre's understanding, one becomes instantly cognisant of how different spaces inform that reality. That "reality" can have different meanings for different cultures, ethnicities etc. In other words, the representations used in this virtual reality (a video game or augmented reality experience) could easily denote unintended signified and ruin the semiotics within digital media.

And so content creators must use the right representations and spaces to create the correct connotations in a viewer's mind, so that the viewer knows how best to interact with your game or art medium. Like in the example of *Figure 3* above, the designer of that application must use conventional understandings of space, feedback systems and reality to inform the user on how to use their AR application. Similarly, this is how games manage to engage and immerse a viewer; one isn't just watching characters within a fictional space as they would when reading a Comic, but rather the player is taught the conventions and rules so that they can play the role of that actor, interacting within the space. A space that, in turn, uses representations and informs mind and alters behaviour (Costikyan, June 2002). Similarly, AR applications like *Wanna Kicks* use the correct representational practice and conventions to teach the user how to navigate within that AR realm.

Please note that the above summaries are done to supplement the following discussion – in truth, this academia has much more detail and depth to their ascribed topics however for the purposes of this discussion we shall use the above-mentioned understanding. Now that we have a better grasp of the key terms of game design, representation and space, the discussion can flow into a closer examination of storytelling and augmented reality. This discussion shall use the above-stated key terms in conjunction with a closer analysis of its use in storytelling, with some relevant examples to illustrate a better understanding. The next aspect to be analysed is storytelling specifically within visual narratives.

What does it mean to tell stories?

Storytelling has advanced with technology – going from 1 author writing a book to entire studios of hundreds of artists, musicians, producers, writers etc. Visual narratives like Comics are unique with their own conventions of representations, often utilizing sequential art to convey meaning, communicate a narrative or show the progression of time and space (Eisner, 2008) (McCloud, Making Comics, 2006). Comic books are defined as serialised storylines that exist with characters and a setting within a preconceived universe and storyline layed out as sequential art (Centeno, 2020). Some Comics are updated by a team of artists and writers that provide new storylines and content, using the familiar characters. By contrast, graphic novels are defined are new stories that were never told before, created into a single volume - similarly, not all of them are fiction (McCloud, The Visual Magic of Comics, 2005). Comic strips or newspaper Comics are usually made in short form, for

newspapers or magazine, and do not require serialization of an assortment of characters (MacWilliams, 2008).

When looking at Comics as a global storytelling medium, 2 powerhouses have managed to make record sales in that department; namely western Comics and eastern Manga (Japanese greyscale Comics that have contributed immensely to the global phenomena of Japanese visual culture). European and African Comics have also been in the scene for a long time, with their own notable influences and rich history. For this paper, we shall focus on Western Comics and Japanese Manga.

Western Comics have a long history and are arguably one of the richest sources of mass media that has come out of America and into the global market (MacWilliams, 2008). Birthing merchandise, Films and other mixed media avenues in their wake. Similarly, Japan's Manga culture has become a global phenomenon, with over 60% of the world's animation being done in Japan often in direct response to successful Manga sales (MacWilliams, 2008). Examining the leading theorists for western Comics and eastern Manga is a crucial first step towards making this proof of concept as a cornerstone of this research paper. This understanding shall be used to better situate *Awakening* within the discourse of visual narratives.

Scholars have been in a disagreement about when visual narratives like Comics actually started. Early Biblical stories were told in illustrated format to help spread early Christianity to the illiterate, while Egyptian Hieroglyphs and Roman Trajan Column were utilising sequential art with words as far back as 2690 BC! Similarly, when you throw Rock Art into the mixture, you find that humans have been illustrating sequential art for as far back as we can trace our existence as Homo-sapiens. As a result of this somewhat tumultuous history of visual narratives, we shall start the history of Comics by using the above stated definition of Comics to look at the history of modern, serialized Comics.

Modern American Comics first formally appeared in around 1890s when rising rate of literacy allowed for a new market of readers (Centeno, 2020). This made Comics quite attractive to the market, with the first Comic strip (Richard Outcalt's *Yellow Kid*) making a huge increase in newspaper sales**.** This success drove Richard and other artists to spend the 1890s-1930s adapting visual tech of word/thought balloons, image sequence and panel design into the conventions of today's understanding of a Comic book (MacWilliams, 2008)**.** *Yellow Kid* became the first illustrated book to call itself a Comic, finding success among the

younger market of children due to its aesthetic and slap-stick humour (Centeno, 2020). Although Comic books of the time relied heavily on stereotype and were a propaganda tool, they did nonetheless help create the iconic look of a glossy full cover page and colourful interior of illustrations and word balloons. Comics became new visual culture as national symbols that America shared, culminating when *National Allied Publications* (the precursor to *DC Comics*) created the "modern" superhero.

These Comics were geared towards the younger generation, with a few newspapers supporting it for their adult target market with a focus on humour and parody. This led to the Golden Age of Comics and cartoons (1938-1956), with names like Fred Quimby, Walt Disney and Chuck Jones helping to take Comics into animation. At this stage, Comics and animation were seen as children's entertainment (MacWilliams, 2008). However, they were also wracked with anti-Nazi, anti-Japanese propaganda as the World Wars provided a high demand for patriotism and nationalism among the American readership. Comic sales skyrocketed, even encouraging the government to become involved in the printing and publication of these stories. However, this Golden Age didn't last long as Super-Hero Comics started seeing a rapid decline in the post-war period (1950-1970s) as the readership started familiarising themselves with peace rather than war. Similarly, the Hippie Movement and psychedelic renaissance mirrored a rise in popularity of other genres, like romance and drama (Centeno, 2020).

It was around this time that Stan Lee became head of *Marvel's* creative team, using the "Marvel Method" to create more nuanced superheroes like *Spider-Man* (Marvel Comics, 1962) and the *Black Panther* (Marvel Comics, 1966), while encouraging the artists and writers to collaborate closer. This method worked well, creating a slight resurgence in Comic book sales (Centeno, 2020). This resurgence met with the Hippie movement, as other artists started using a more psychedelic colour palette, with storylines that were "trippy". Horror narratives gained more traction, as did socially conscious narratives. Unlike the war-time Comics layered with propaganda and racial stereotypes, this age of Comics was a bit more complex, featuring mixed race protagonists and morally ambiguous storylines.

The 1980s-2000 started with the Dark Age in Comic books, with notable stories like *Watchmen* coming through to shock the audience. They went into the tortures that African Americans dealt with, creating strong characters like T'Challa and Storm that embodied strong African identities within a modern society. These allowed Comics to explore social

and moral politics of their time, showing how the children that grew up reading Comics were now adults that were capable of creating their own Comics that grew up with them. It was around the 1990s that Japanese Manga started infiltrating the world as well.

The history of Manga and its creative process shall be interrogated a little further on in this subsection of "telling stories". For now, we shall unpack a bit of the theory and creative process of Comics. What follows is an exploration of Comic theory and the development process. This research hopes to extrapolate a design process from the following theory, one that can be used to create a visual narrative that can adequately compliment the AR interrogation in a manner that enhances the story.

Alan Moore is a big name in the modern Comic industry, effectively pioneering the medium of Comics from childish pastime to a work of art. The above mentioned *Watchmen* (1985) as well as *V for Vendetta* (1982) are some of his most notable works which helped elevate the status of Comics as a potential storytelling device that could sit on par with literature or Film in its ability to invoke emotion and filled a reader with vivid experiences led by word and image. He has won numerous awards including numerous *Jack Kirby Awards*, *Eisner Awards* and even a clean sweep of multiple, back to back awards for Watchmen and *Swamp* Thing. His book titled *Writing for Comics* (2003) aims to communicate the complex processes involved when crafting a story. From the onset of the book, Alan makes it clear that he doesn't want to divulge a strict formula of application that will guarantee storytelling success – for that is an impossible task that gets in the way of cultivating one's own creative approach. Rather, the book aims to express a method of thinking, conceptualising and approaching the entire practice of storytelling using a method that has been established by other successful pioneers in the storytelling industry. His methodology sits eye to eye with Will Eisner's work with a stronger focus on character, story and exposition development.

On the other hand, Will Eisner's book, *Graphic Storytelling and Visual Narrative* (2008), is an in-depth examination of what it takes to tell a story through graphical/visual narrative. Eisner's contributions to Comic books has won him numerous awards, most noteworthy being his award from the National Cartoonists Society in 1967, 1968, 1969, 1987 and 1988. His books, *The Contract with God* (1987), *The Spirit* (1940) and *City People Notebook* (1989) are just some of his famous books that helped raise the name of Comic books above children's past time and into mainstream art and storytelling, standing side to side with Film

and famous paintings inside art galleries. Google even celebrated Eisner's 94th birthday by using The Spirit as their logo (Google Archive, 2011).

Eisner's concepts are very similar to Moore's regarding how to formulate a story, however he goes the step further of illustrating each point and describing how one should best translate this story into visual imagery. He focuses not just on the act of writing and compiling the story, but on its combination with visual imagery to evoke emotion. Wil Eisner defines a Comic as "sequential art" (Eisner, 2008), definition that we have already used numerous times in this document. This definition is still broad at best, and could easily be substituted for any visual narrative, not just Comics. As such his approach to storytelling was based on any creating a formula of narrative that could be applied to various visual narrative genres and types: his methodologies could be used to create a Film, a video game, a manual, a Comic, even a piece of literature - without much change in the structure and finer nuances.

Both Alan Moore and Will Eisner have industry experience and a unique style of writing that imparts knowledge. Essentially, it's not just "industry experience" – they fundamentally shifted the world's perception and understanding of the way Comics work. Eisner heavily contributed to the modern Comic style and Moore crafted what is now considered the genre of Graphic Novels with his intensely deep and provocative writing (Whitcher, 2019). Interrogating this knowledge within the space of the new storytelling medium of AR was ideally done to see which concepts spoken by these 2 avant-garde's still hold true and which ones require adjustment for AR integration.

Scott McCloud's *Making Comics* (2006) is a book that supports both Will and Alan's work. McCloud's work is more vigorous and detailed, combining both these above-mentioned ideas while elaborating on the unifying aspects of visual narratives. From Mangas and Comics to newspaper Comic strips or children's illustrated books, McCloud divulges information that will allow one to adapt into any number of visual narratives. Similar to Wil Eisner, his definition of a Comic is images juxtaposed in deliberate sequence in order to convey an idea or illicit an aesthetic response (McCloud, The Visual Magic of Comics, 2005). This is a fascinating proposition in its ability to encapsulate the raw essence of storytelling within visual narratives yet is still broad and doesn't really tell the reader how Comics are different to other visual narratives. Because of this, he does make special note of how the lessons in his book can be used to create any form of sequential art, not just Comics.

Nonetheless, this information on creating visual narratives is paramount for the beginner and advanced creative practitioner alike as it places a foundation of understanding that can be adapted into a variety of visual narratives; newspaper, western Comics, Japanese Manga, storyboarding etc. The experimental nature of this book's knowledge is a perfect complement to the experimental nature of this research; using McCloud's concepts of making a Comic to experiment with different visual narratives, art styles and prototypes was a crucial first step in creating the initial AR prototypes that allowed for the final proof of concept. This was done while keeping Moore and Eisner's recommendations in mind

When comparing and discussing these 3 academics, it is easy to lump them into the same category. To put them together under the section of "Comics". However, a closer analysis reveals that each approaches the act of storytelling within their own microcosm of understanding. A microcosm that they then develop in unique ways to reach the same destination – a well told story, represented through Comic panels. All the roads really do lead to Rome.

For example, Scott McCloud's microcosm starts with the *5 Core Elements* that interact in **all** Comics. These are:

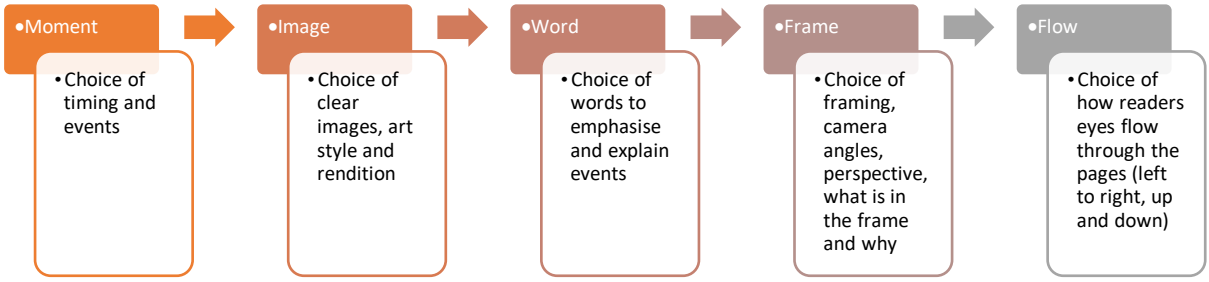


Figure 3: An adaption of McCloud's elements of clarity (McCloud, Making Comics, 2006)

If all of these are used interchangeably and correctly, they create an unparalleled level of **clarity** in the viewer. On the opposite spectrum of clarity, there is **intensity** – this is the raw impact of the art style and can be broken up into the elements of:

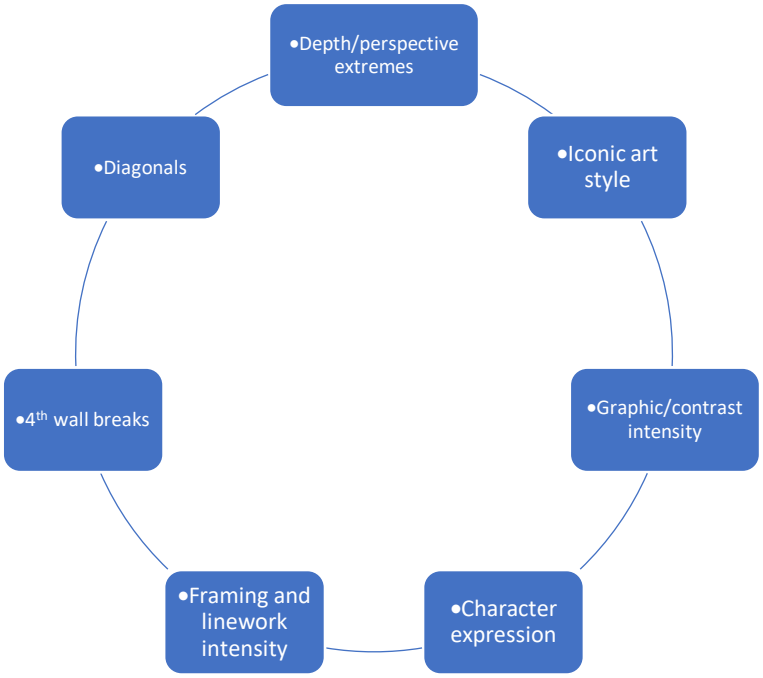


Figure 4: An adaption of McCloud's elements of an intensity (McCloud, Making Comics, 2006)

Unpredictable use of these elements of intensity creates raw appeal and is meant to captivate the viewer into admiring the aesthetics and visuals of the Comic. Remember, Comics use principles of art (tone, colour, line etc.) – as such raw aesthetic appeal (intensity) bodes well to captivate a viewer and maintain their attention (Eisner, 2008) (McCloud, Making Comics, 2006). Too much focus on clarity can create a boring Comic experience that doesn't have enough impact to pull the viewer in and maintain engagement. Too much focus on intensity could bombard the viewer with visual fidelity without putting enough clarity for the story to make sense. However, these views are subjective, for example, younger readers might gravitate towards a bit more intensity in action Comics, while older audiences might prefer clarity in a drama or humour Comic. And so, creating a Comic is done to balance these 2 extremes, extremes which might differ with genre, art style and medium of choice (McCloud, The Visual Magic of Comics, 2005). For Scott, starting with these points in mind helps to direct the goal of the story, to keep focus and somewhat ground the story. Then altering them as the story, characters and setting gets more detail is the next step.



Figure 5: An example of Clarity taken from Garfield (Davis, 2018) Comic Strip

For example, if we look at *Figure 9* and use McCloud's elements of Clarity (*Figure 8*), the timing of the events happens in a short span of time. The art style is a classical cartoonish stylisation, with minimum shadow or light direction. The words are clear, and large in each frame. Framing is deliberately placed from 1, unchanging angle, showing both characters. The movement of the viewer's eyes is a simple left to right, across 3 panels which, when combined with the words, they deliver the humour (the pun) of the story. This *Figure* focuses on clarity and doesn't use a great extent of McCloud's elements of intensity.

By contrast, if we look at *Figure 8,* we see a wide variety of camera angles, high contrast figures and facial expressions. Despite Spider-Man having a single mask on, we can see a deliberate change in facial expressions across the panels, showing concentration and a bit of hostility. Perspective extremes as well as a graphic art style that shows multiple shadows and light sources combining through the use of a complimentary palette (blues and yellows) and dynamic line work. This Comic page focuses on intensity, allowing the viewer's eyes to move through the panels and the actions of Spider-Man. This example was purposefully chosen as a Russian translation to show how the combination of the above



Figure 8: An example of Intensity from Avenging Spiderman (Marvel Comics, 2012), Issue 1 Page 3, Russian Translation

mentioned elements of clarity allow the viewer to understand what is happening despite the language barrier. Yet at the same time, this example shows more of the elements of Intensity that Figure 7.

Figure 9 is an example that uses a mixture of McClouds's clarity and intensity. Often dialogue heavy scenes like this won't require as much intensity, however intensity can help to maintain the viewer's attention and point out focal points through correct use of line work, perspective and character expression (McCloud, The Visual Magic of Comics, 2005). In this scene, the content of the dialogue is dependent on the events that have transpired, as such, a level of clarity is required to situate the characters within the environment. The panels focus in on the dialogue, showing us character expression, perspective change and speech bubbles while the negative space around the panels is used to provide exposition on the environment (moment), body language (image) and setting (frame). This is a technique often employed by Comic book artists to create a loop of movement through the viewer's eyes.



Figure 9: Batman Detective Comics Rebirth Deluxe Edition Part 1, page 9

Will Eisner and Alan Moore don't mention this balance of intensity and clarity in their creative process at all – their focus is the characters, the world and the story **first**. Their initial microcosm of strong world and character development will create a foundation for the art style, colour palette and other visual aesthetic choices that come later (Eisner, 2008) (Moore, 2003). These choices work best when informed by the above-mentioned clarity vs intensity of Scott McCloud's. What Will Eisner and Alan Moore have in common is not only this approach to building a foundation, but their import on starting with a theme. What is your story about? This isn't the synopsis of the story- rather it is the overarching themes and

motives informing everything. These themes can be abstract lessons, beliefs, social issues etc. that, once situated, help to inform character design, psychological disposition and even colour palette and use of perspective in a visual narrative's aesthetics and art style (Moore, 2003). Finding the answer to this question helps to create universal and local themes that your reader will relate to (Eisner, 2008). A superhero story about a boy getting powers and saving people is good and well, but rather put stronger links to the hero's journey that we all go through, showing the change and growth that comes from being challenged by the world on ethic and moralistic levels helps elevate what the story is about, imparting morals and learning to the reader. In this sense, simple superhero Comics like *Spider-Man* become powerful tools for informing adolescent children how to navigate the scary, big world of adults. Not just purely entertainment or fiction. Perhaps this is why these Comics have such massive success stories and a global fan base – the children who were initially exposed to *Spider-Man* grow up into adults who still relate to the challenges and conflicts that Spider-Man goes through on a metaphoric, subjective level.

These researchers are from a western perspective of storytelling. By contrast, eastern visual narratives that shall be analysed for this thesis are Japanese Manga; greyscale Comics that flow from right to left (instead of left to right). These eastern storytelling practices, specifically Manga and Anime, are a cultural hybrid resulting from Japan's contact with the west (Ito, 2008). They are culturally odourless, yet maintain a level of distinctly Japanese through their common mixture of various global themes, stereotypes and fantasy (MacWilliams, 2008).

In the past, Japan was known for its zen monasteries and imperial culture – however modern technological advancements have put Japan's mass visual culture, technology and animation as their core constituents, with a massive 25% increase in global sales from these 3 markets alone (MacWilliams, 2008). Jean Marie Bouissou concludes that the Manga and Anime from Japan is popular not because of Japan's harmony with nature, and eastern philosophy but how it is a "mediascape of dreamscape" (MacWilliams, 2008). "The aesthetic of excess, conflict, imbalance and overt sexuality" is arguably what makes Manga and Anime so popular, its ability to use a stereotypical children's medium and convey raw context to the extremes of lived human experience. These are universal themes that the human experience can relate to, stories that are expressed in Anime and Manga for a global audience. As such the Manga and Anime visual culture in Japan has become an important

part of daily life for Japan's citizens, with everyone having been a consumer at least once in their life (MacWilliams, 2008). This is because these visual narratives expresses people's fears and voices their dreams – like a constant chatter of the collective unconscious they seem to embody the dreamscape of the masses through media (MacWilliams, 2008). As a result, there is an avid target market for Manga an Anime across all ages and genders – the adolescent teenage, the working salaryman, the domestic housewife, urban accountant, rural farmer etc., all these different people are potential consumers of Manga or Anime in Japan.

As a result of the above stated, Manga's massive appeal and success both locally (Japan) and internationally is that it's an art form that is developed to appeal to the masses. This is also the reason its history and development are so different to Western Comics. Its key is accessibility, making it exoteric instead of esoteric. Its target market is the average consumer, not the connoisseur, while it aims to reflect cultural norms rather than transgress them as most avant-garde movements seek to do (Nakar, 2008). It does this by sticking to the fundamental definition of artistic representations as being representations of reality; Manga and Anime in Japan use reality as a reference while introducing exaggeration, comedic effect, parody and other subversions of reality. As oppose to Western Comics which often introduce otherworldly villains, dystopian realities and parallel universes (Centeno, 2020).

Japanese Manga do this using sequential art and analytical montage to scatter narrative action over several frames (Phillipps, 2008). Manga also has less text to purposefully make it easy to read. The result is that the stories of Manga are often made by one writer/Mangaka (artist who draws Manga) and are done as a continuous story that introduces the protagonist to conflict, growth and change (Phillipps, 2008). There is a definite start, middle and end to every Manga. This formula is a more restrictive approach to storytelling, one that is very similar to the hero's journey. This is a stark contrast to western Comics which often go through multiple creators (writers and artists), shifting with each creator's interpretation and done with multiple storylines and parallel developments. The result is a protagonist who undergoes many changes and has no definite end (Moore, 2003).

Will Eisner approaches the understanding of storytelling by framing it within modern Comics and graphic stories. Eisner unpacks how Comics are essentially a visual medium that aims to use universally understood images that imitate or exaggerate reality to describe/narrate, a

task that has been done before through the history of humanity (Eisner, 2008). The story is the most important part, it is the frame of intelligence that holds the Comic together – and the Comic uses images to help communicate this story (Eisner, 2008). Alan Moore by contrast is inspired by making stories that are true to life, that reflect the nature and essence of the lived experience. Both use the starting point of an idea, a "what if" scenario or a problem that can be slowly solved through the story. For example, Alan Watt's issue #40 of Swamp Thing, The Curse – the crucial idea/problem in this issue isn't the direct events of the plot and how the characters navigate, talk and go through the environments. Rather the idea/problem tells us about the difficulties endured by women in masculine societies, using the common taboo of menstruation as the central motif (Moore, 2003). This idea isn't explicitly told but rather is a subliminal motif that the story can solve slowly through each page, each issue.

Moore states that ideas can come from anywhere, from any experience or what if scenario. The best way to test your idea is to start with the self; what do you like, what kind of ideas and stories resonate with you? In analysing the self, you are analysing the average reader of your work, so identify what you share with everyone, and appeal to it. To further add to this concept of idea creation, Eisner introduces the concept of "problem creation + solving". Your initial idea, or "what if" should have an inherent problem that is slowly solved through the story, through words and actions. Different cultures have different problems that they can resonate with. For example, a South African story that inherently questions race, gender roles or poverty is likely to appeal to South Africans because it appeals to a cultural phenomenon that we share. However, there are also universal problems that any human can relate to – the nature of love, despair, fear, hope or existential crises. Thus, a stories major hook/idea should draw on the experience and reality of the reader (above-mentioned cultural phenomena or universal themes) and then support a sense of drama by presenting characters, situations and plot twists that are slowly resolved through the story (Eisner, 2008) (Moore, 2003). For example, a common theme of *Batman* is him being so traumatized by his parent's death that he embodies that trauma and fear in the representation of a bat in order to fear those villains who would attempt to traumatize other innocent civilians (Rollin, 1970) However, the "problem creation" that appears is that *Batman's* villains often challenge this childhood trauma of his, they use that weakness against him. This presents ethic and morally ambivalent situations that challenge Batman to overcome his trauma in an ever-increasing sense of drama. This problem creation is solved with the protagonist,

Batman, conquering each villain and taking another step towards conquering his own weakness and childhood trauma. Metaphorically speaking, he encourages his viewership to also acknowledge their own weaknesses and overcome them slowly and resolve the emotional conflict within.

On the other hand, Japanese visual culture is often influenced by a whole plethora of benefactors that often shape and craft the story. Japanese Comics (Manga) do not exist in a vacuum, they are closely connected to Japanese history and culture and include politics, economy, religion, family and gender (Ito, 2008). As such, they don't only reflect the current situation in Japan but also the various tenants of society that are linked to myth, belief and fantasy and other views that the Japanese have about themselves and about others. Not to say that western Comics are not this, with studio houses like *DC Comics* and *Marvel Comics* actively making parallels to these benefactors. For example, *X-Men* (Marvel Comics, 1963) is synonymous with capitalist America and homophobia.

The legendary Manga artist and Anime producer, Osamu Tezuka, is considered the founder of Japanese Comics and has often been dubbed as *Manga no Kamisama* (God of Japanese Comics) due to his crucial role in the development of post-war Manga (Nakar, 2008). Manga used to be a parody of reality, often done as gag strips that were reserved for the upmarket Japanese elite on picture scrolls known as *Emakimono* (Ito, 2008). It was Tezuka who took this format of gag Comics and transformed Manga into long-format stories that could appeal to a broader audience (Phillipps, 2008). He was in his teens when World War 2 started and afterwards he dedicated his practice to teaching peace and respect for life through humanistic themes that came out in his storytelling practice. His awards and dedication helped elevate Manga to the level of respectability that they have now with titles like *Mighty Atom* (Astro Boy, 1952) *Ribon no Kishi* (Princess Knight, 1967). With storytelling that focused on the possibilities of word-picture combinations, he tested and challenged his ability in response to his readerships changing preferences, going through 3 major phases of development and change in art style that culminated in his ever growing success in the industry (Phillipps, 2008). The result is the Japanese community strongly associated the story-Manga to his name.

Tezuka's approach to storytelling was very similar with Wil Eisner's and Allan Moore's – with the exception being an even stronger emphasis being placed on emotional engagement and conflict resolution through events, narratives and metaphors that his viewership could

directly relate to (MacWilliams, 2008). The success of most of his stories came from characters and stories that he made as a youth during the war – the result was later on the most successful ideas he had to promote post-war humanitarian ideals in his adult years came from a previous version of himself that was the same age group as his young viewership (Phillipps, 2008) His adventure stories usually focused on the opposition of civilization and nature, with a strong trend towards peaceful conflict resolution as we can see in his popular Manga *Sharigawa no Himitsu Kiri* (1948) (MacWilliams, 2008). His science fiction stories often structure the narrative by showing the opposition of democracy and dictatorship – with strong reminders of war, despair and conflict coming through the pages. The result is that his Japanese viewership were re-experiencing the struggles of the war through reading his Manga's, they could feel the fear and other emotions as reminders of what once happened. These stories are a reaction to contemporary history (MacWilliams, 2008).

Tezuka often drew on international themes and universal representations to aid his viewership in fostering a globalized identity after the crisis of war. His romantic Mangas often had German folktales superimposed with Disney stylistic elements, musicals and prominent animal figures. His knowledge of European and western storytelling classics (*Tarzan* (1999) and *Treasure Island* (2002) among others) was impressive and often expressed in his Manga for his viewership. As a result, his stylistic choice closely resembled that of *Disney* (Walt Disney, 1923) especially in later years. As a child, he would often attend *Takarazuka,* all-women revue costume plays, with his mom and as an adult he would gladly import themes, plots, scenery and characters from these events into his Manga (Phillipps, 2008). The result of these Mangas was a massive influence on girl's Manga (called *Shoujo*) in Japan, expanding the viewership and genre capabilities of this storytelling medium for an ever-expanding viewership.

Tezuka's relationship with western storytelling was strange as he often borrowed cinematic effects from western Comics into his work, however his feelings of ambivalence towards the United States often came through despite the inspiration it had on him. This resulted in characters who were paradoxical towards colonisation, technology, capitalism and other themes associated with western ideologies. This conflict and emotion would come through as characters with conflicting ideals would often confront each other – reflexions of a confrontation that was happening within many Japanese people as the United States

forcibly placed itself in Japanese soil after the grievous events of World War 2 (MacWilliams, 2008).

The most interesting point about Osamu Tezuka's storytelling development was his creation and use of characters. His characters often featured in multiple Manga. In interviews, Tezuka often spoke lovingly of his characters and saw them as a cast of actors that he could use in multiple Manga, interchangeably. Often his characters would even utilize forth wall breaks by commenting on this, as we see with the character Hige Oyaji when he first appears in *Mighty Atom* (Astro Boy, 1952). Upon appearing he asks the other characters if they know him, which they respond "Of course we know you, you appeared in Tezuka's other Manga too! What are you doing here?" To which Hige replies, "Yes, I am here as a teacher but in the previous Manga I was an indispensable detective for Tezuka". Tezuka's unique relationship with his fictional characters was one that he sought to elevate from fiction into his reality, in the process he was helping his viewership to bond with his characters in a similar fashion, creating new levels of emotional engagement with his stories. Tezuka would often put himself as a caricatured cartoon into his Manga. This allowed Tezuka to reconstruct himself through the pages, creating a new identity for himself. This method of representing the self through a Manga is one that multiple Mangaka have commented on, often using their fictional characters as expressions of the self (MacWilliams, 2008).

By analysing Osamu Tezuka's approach to storytelling, we can see a different paradigm and approach that wasn't distinctly Japanese yet nevertheless, appealed to the Japanese market while using universal themes and conventions within storytelling. Other successful Mangakas have done this with their work to create massive appeal globally. Notable industry giants are the creator of *Dragon Ball Z* (1994) Akira Toriyama and Tite Kubo with *Bleach* (2001).

Yes Manga is created by one person (with assistant Mangakas for inking and finer details) but similar to western Comics it also undergoes heavy story editing through editors and the magazines that they are published in. For example, Shueisha's Weekly *Shonen Jump* (1968) often has weekly polls in their magazines where readers get to vote for their favourite Manga stories. This puts pressure on the creators as the lowest scores means their Manga can easily get cancelled. Tite Kubos's *Bleach* was a long running favourite that suffered this fate. Despite his young age, Tite Kubo's fore-mentioned work competed with industry giants

Akira Toriyama (*Dragon Ball* Z) and Eiichiro Oda's *One Piece* (1997) for years. His final Manga arc titled *The Thousand Year War* received lower and lower reviews till *Shonen Jump* told him he had to conclude his story in a few weeks rather than the months that he had in mind initially. Later interviews with Tite Kubo revealed that the insane work pressure that Mangakas go through because of editors and publishers is what contributed to the steady decline in his work. His initial *Bleach* Manga pages were alive with unique compositions and vivid characters, while the final Manga arc lost that stylistic detail and psychological development that his characters often had because of the mounting work pressure, despite having more assistant Mangakas to assist in this regard.

Regardless of the above mentioned, popular Manga never really die out. As mentioned earlier on, representational practice relies on the cultural semiotics of the viewer, it draws on the phenomenological field. In this sense, the viewer is co-creating the representation with the author, the story comes alive in the mind of the viewer –that is where it has the most impact. As a result, often popular stories go out into the world and are re-created by those that received this mental impact and decided to create their own representations of it (fan art, merchandise, fanfiction etc. these are all subsets that are created by the viewers of the story, not the author). As a result, the death of the author becomes the birth of a new form of heavy editorial practice. For example, *Dragon Ball Z* (1994) "ended" when Akira Toriyama released the final Manga chapter in 2006, however fans of the medium continued to develop stories in the form of Manga, Anime and video games like *Dragon Ball AF* (Manga series Young Jijii, 2000), *Dragon Ball Abridged* (YouTube parody series by Team Four Star (2005)) and *Dragon Ball Heroes* (2018 animation created by Toei Animation instead of franchise creator Akira Toriyama).

With the history lesson behind us, the discussion can now lend its way towards analysing Japanese storytelling practice from a practical view. The following section shows how the above-mentioned academia lends its way towards practically drawing a Comic/Manga page, linking storytelling theory with practice.

The storyteller must master the tools used to tell this story (Eisner, 2008). Our modern era has introduced animation, photography, videography and games as tools that use technological advancement to create entire genres and media for storytelling. On the other side of the spectrum we have literature and graphical narratives, media that aren't as dependant on technology yet still are capable of conveying story. No one tool is greater or

worse than another; the fact that writers continue to create widespread immersive experiences today despite the rise of technology shows how the human mind is willing to indulge in a story no matter what tools are used (Mogan, 2016). Similarly, western storytelling vs eastern storytelling doesn't have to be a battle of one being better or worse than the other. Rather both are often used as mutually inclusive schools of thought with the shared objective of using sequential art to tell a story

Mangaka place a stronger impact on visual fidelity and understanding first, often exaggerating aspects of the Manga purely to favour the flow and movement and the reader's eyes (BriHard, 2016). Story and progression are used in tandem with this fidelity and understanding, with character psychology, world placement and other intrinsic motivations being guides for this visual fidelity (BriHard, 2016). This understanding is like McCloud's distinction of clarity vs intensity while using Wil Eisner and Alan Moore's importance of story building. The only difference is the order of these elements. As such, the core focus for the Mangaka is how to make reading left to right as natural as possible for the reader (McCloud's Movement and Flow). There are 5 categories that allow this to happen, each standing as elements of this visual fidelity for the Mangaka:

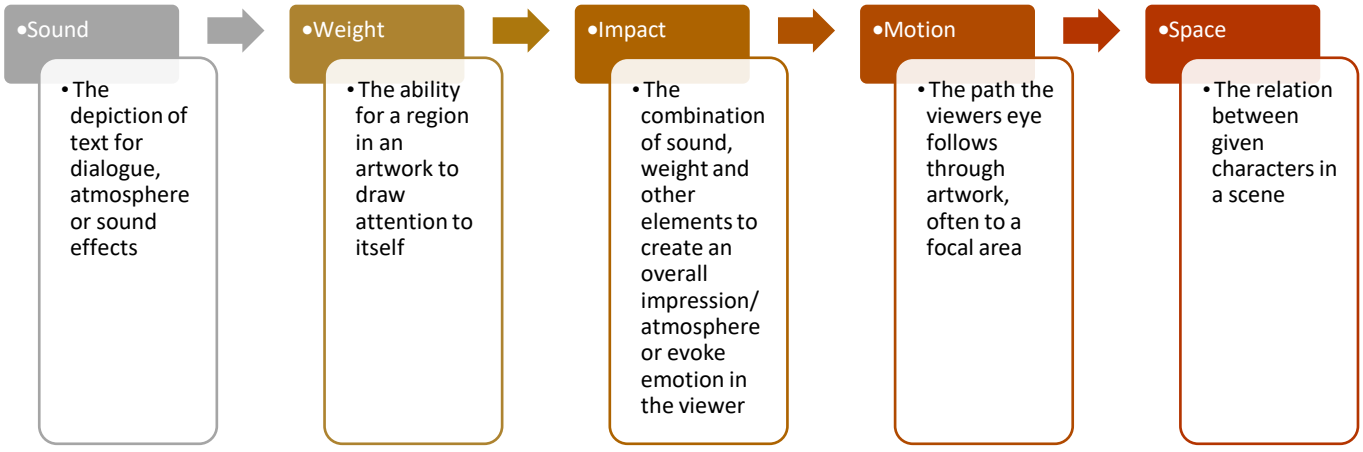


Figure 6: 5 Categories of visual fidelity in Manga (BriHard, 2016)

All of these are used to guide the reader's eyes and are synonymous with Scott McCloud's definition of flow. These elements aim to combine the above-revealed clarity and intensity, giving the creative Mangaka free range to experiment with contrast, character expression, word etc. if it adds to these elements. Practical examples of these 5 Categories shall be mentioned in the Figures to follow.

Practically speaking, the conventions for Comics and Manga are very similar – with sequential art being created to tell a story. The use of art principles is paramount (line, volume, tone etc.) with the major distinction being the appearance of panels allowing a Comic page to be read in a progressive manner as the viewer's eyes go from panel to panel, as oppose to an artwork which is often one panel that doesn't progress to another one for sequential storytelling. Similarly, creating recognisable spaces with clear visual connotations is done to facilitate movement of the eyes and understanding in the viewer (Eisner, 2008) (BriHard, 2016). The reader moving their eyes through visual imagery is synonymous with exploring different spaces and moving through time.(McCloud, The Visual Magic of Comics, 2005). Every reader has their own pace and speed at which they move through, and so the Comic must facilitate understanding of content regardless of the users speed (McCloud, The Visual Magic of Comics, 2005). In doing so, the sequential art can also imply sound through written onomatopoeia that are encountered once a viewer's eyes have been led through the sequence of panels and encountered.

The biological evolution of cephalization is defined as an organism evolving sensory organs on the part of their body that experiences the environment first (Britannica, 2019)– for us humans it is the face. As a result, we have developed big brains that are, in part, developed for reading and understanding other people's faces, body language and verbal language. As such, people's eyes often gravitate towards the upper panel of a Comic, noticing faces and eyes quickest (BriHard, 2016) (Langdridge, 2018). Therefore, people will identify faces quickest when looking at abstract art; a form of visual art that prioritises having no recognisable representations to reality. Despite a Manga being black and white, seasoned readers of Manga have no trouble distinguishing between their favourite characters. Funny enough, even when there are no faces and eyes, people will pull them out of abstract imagery with the least amount of signifying information.

Mangakas use this biological information along with the Rule of Thirds in order to place focal points, characters facial expressions and words at places where the viewer's eyes will gravitate towards to first: upper left and right of a panel. This rule is often seen in play with western Comics as well (In *Figure 8: Avenging Spider-Man* page, Spider-Man is rarely placed in the centre of the page, rather he's offset to the left or right slightly to accommodate this rule of thirds. The only exception being the final panel where the supporting cast are placed to the left and right.)

Manga also flow from right to left, as such characters depicted in these Manga often face to the left (Comics to the right), to help lead the viewer's eye towards the next panel (McCloud, Making Comics, 2006). Similarly, humans have a habit of looking at what others are looking at – if more character's in a scene are fixing their eyes towards one person, then the viewer is likely to notice that one person too (BriHard, 2016). This is an especially helpful tool when your medium of choice is black and white, as often the detail of an environment can confuse a viewer, not giving them space to notice your proposed focal point. See figure below for an example

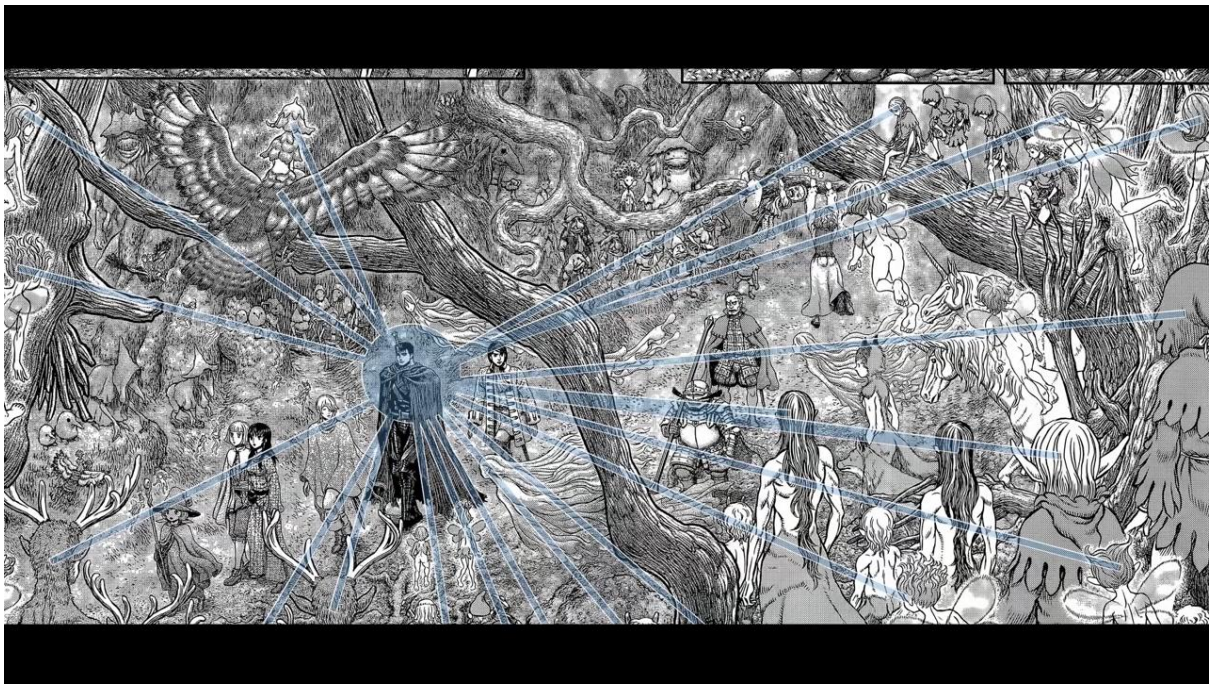


Figure 7: Screenshot from Brihard's analysis of Manga Brilliance showing Berserk Episode 346 (Miura, 1989, pp. 4-5)

The only time that this rule is often broken is when characters will look to the right to return the viewer's eyes to a panel that is important. Characters that are sharing a dialogue often create a loop of movement as they will face each other, always directing the flow of the viewer's eyes from left to right and back, containing the dialogue and providing an opportunity to create tension and other emotional ques through body language within the characters (McCloud, Making Comics, 2006) (BriHard, 2016).

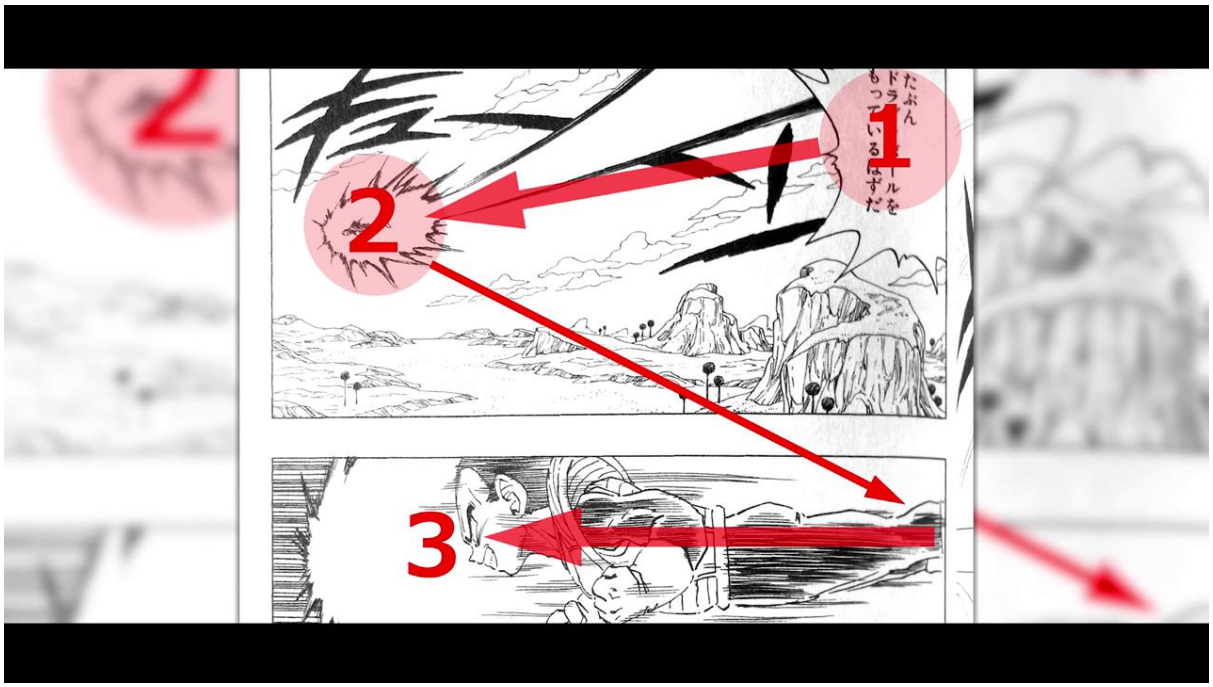


Figure 8: Dragon Ball Z's Manga Volume 21 Chapters 244 (Toriyama, 1989, pp. 28-29). A closer look at Manga brilliance by Brain Ashcraft (BriHard, 2016)

Figure 13 above is meant to exemplify these elements. The red arrow shows how the contrast of the brushstrokes creates clear impact lines with weight. Similarly, the combination of sound (1) with this weight and impact creates strong movement taking us to 2. At this point it is the end of the panel, so the viewer's eyes go down to the next one and are immediately led forward by a strong combination of weighted, contrasted lines, character movement and negative/ positive space placement of the character. All these create a great mixture of clarity *and* impact, leading the viewer's eye forward into the story.

Spacing is a major issue for most Comics and Mangakas, an issue that shows how deliberate planning is needed to delicately piece together any visual narrative that uses multiple Comic/Manga panels. In cinema, directors can pick space for their actors to occupy and remain consistent too. However, with Comics this can often shift, so a sense of distance and spacing is important for the viewer to make sense of and is the most important aspect of clarity that must never be overtaken by intensity (McCloud, Making Comics, 2006). Often to help with this sense of spacing is the placement of sound text – sound effects like BOOOOOM, SKREEEEEEE etc. as well as speech/thought bubbles can help direct the viewer's eyes to the next character and facilitate an understanding of space. Similarly, use of weight and intensity can help direct the viewer's eyes through a Comic page.

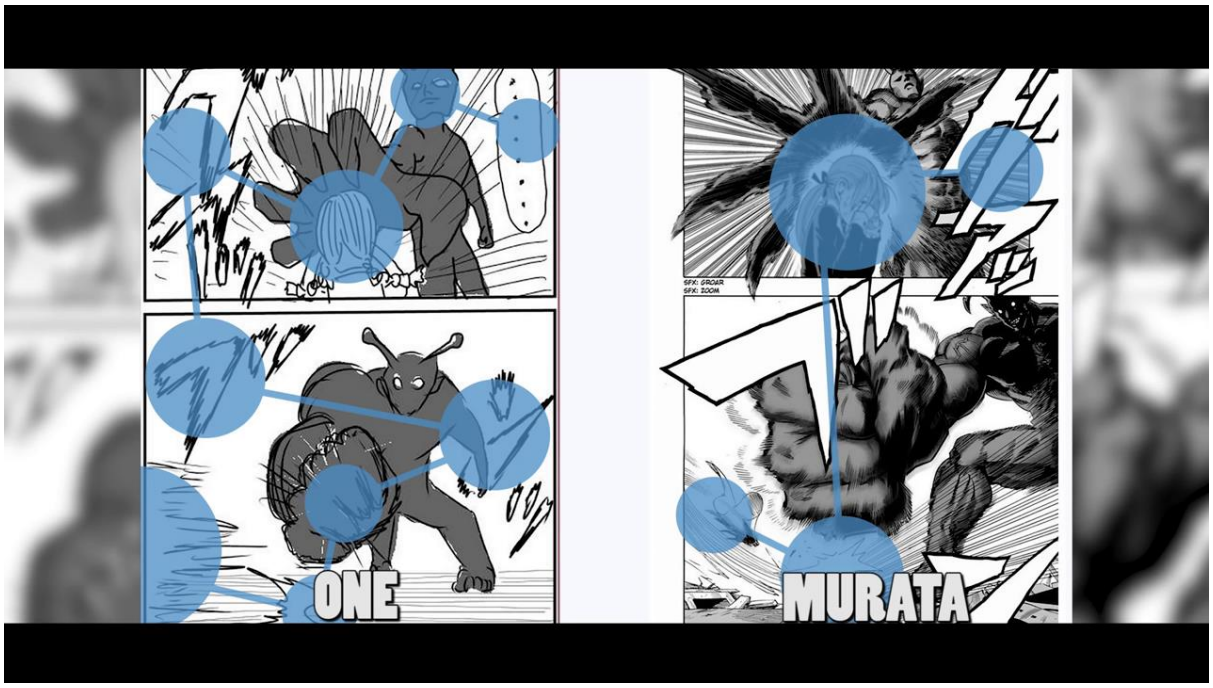


Figure 9: Comparison of original One Punch Man Manga (One, 2009, pp. 7-8) on the left and the redraw done by illustrator Yuseke Murata on the right (One Punch Man Chapter 1 Page 9) (BriHard, 2016)

The above figure is an example of how placement of sound can drastically alter the flow and movement of a viewer's eyes. On the original web Comic drawn by One (left above figure), we see that the placement of sound effects both before and after the character's hand gesture create a messy scene where the viewer's eyes are jumping around without any clear focal point or story telling progression. In nature, sound is slower than light. As such, sound often comes after we have seen the stimulus. However, for dramatic effect, Film directors and animators have long noted that placing sound effect at the same time as the visual stimulus creates the most impact in the viewer (BriHard, 2016). In Manga and Comic placement, putting sound **before** visual stimulus not only creates anticipation for what is to come, but also helps with the movement and flow of the viewer's eyes through the panel. On the right above figure, we can see that Yusuke Murata's interpretation of One's original web Comic is informed by SWIMS; utilizing every aspect of the page for both clarity and intensity. The sound comes first, then we see the enemy's hand rushing towards a helpless girl. The next sound effect helps pull our eyes down into a crushing fist, with strong movement lines indicating that something/someone rushed in and grabbed the little girl, flying off to the left of the panel.

These above mentioned Mangakas, writers and storytellers all answer the question of this subsection by indirectly stating that what it means to tell a story is conveying a story as a representation of reality. Even going as far as to use psychology and biology to better inform

design decisions for the story. Even in fiction, the storyteller aims to draw on a pool of recognisable cultural imagery and universal connotations (representations) to better illustrate or convey to the reader/participant (Ryan, 2001). Storytellers would do this by holding the reader's attention, using unique, provocative or attractive imagery that has a logical sequence and connection with the story (McCloud, Making Comics, 2006). In this sense, the characters and unfolding narrative is a representational medium for the story. This is where AR can fit in. The nature of AR is mainly appeal to the tactile senses through provocative imagery (Mogan, 2016). This is mainly visual; however, vibration and sound can be used as well. The act of exploring an idea slowly, solving the core problem through the stories' characters and environment, is done to keep the viewer hooked so that the viewer draws on their own experience and reality to feed into the story (Eisner, 2008).

To compare western and eastern Comics then is to compare stylistic references and choices first. Mangas, being black and white, place more importance on the use the intensity on use of sound, weight and impact to create a sense of motion that allows for the readers eyes to move through the page and make coherent sense of the events. Emphasis on the movement of the eyes is done to convey meaning and a sense of space. This means visual impact and clarity are goals that are worked towards at the same time. By contrast, western Comics have colour at their disposal, and so rely less on the stylistic choices of SWIMS, preferring instead to balance visual impact with clarity. What this means is the choice of moment, spacing and words is carefully done to convey meaning first, with clarity being import, while the visual impact comes after through the use of perspective extremes, 4th wall breaks and character expressions. Whereas Japanese Manga caters to everyone, with varied genres that all recognise that anyone and everyone can be a target market, Western Comics often have a fixed demography of a target market that has shifted and changed with history, responding to socio-political context of the time. The Japanese even have a genre of Manga that is specifically made to teach the reader about careers and jobs, showing the lifestyle of certain careers through multiple chapters (MacWilliams, 2008). One notable example is *Bakuman* (2008), a Manga series that follows the life of a Mangaka, showing his development and career. Other Manga will teach viewers about doctors, lawyers, accountants etc. – almost every career field has a Manga dedicated to it to inform its readers. Noticeably the end product has more similarities than difference; both media intend to use sequential art to convey a story involving conflict, human characters (often) and power systems that are fictional yet borrow from realistic settings, physics and rules to

allow for intellectual engagement from the reader. But not all the time, just as there are slice-of-life, no super power Mangas geared towards female readers (*Shoujo*), there are also western graphic novels that engage an audience through romance or drama instead of superhero battles.

What does it mean to augment?

This intersection of design decision, setting and the reader's experience proposed in the above-mentioned frameworks and methodologies for storytelling have been pushed to new creative heights by many storytellers before. As discussed above, storytelling methodologies have their own representational norms and a whole host of conventions that can be deployed by the creator to enhance clarity and intensity in an effort to maintain the viewer's attention throughout the reading experience. These storytelling methods have done well to captivate viewers throughout history, reflecting socio-economic change, making social commentary and even providing gags and humour to a global audience, regardless of gender or age. AR and VR technologies now present whole new ways of pushing this storytelling trope to new directions. XR media are ideally immersive technologies that mostly rely on existing media (pictures, sound, 3D models). The core aim of this research is to examine how AR can be used to enhance storytelling. As such, the next section will touch on the history of Augmented Reality as well as its predicted future to better expand on how AR has been used and can be used.

The authors of the journal article, *The Emergence of Augmented Reality as a Storytelling Medium in Journalism* (Bridges, 2013) propose that there have been 3 major stages of AR development. Extended Reality media (XR) were first conceptualised and developed near a century ago, with earlier concepts being more in writing rather than physical prototypes. Like Venevar Bush's concepts of the *Memex*, early XR was mainly developed in thought and ideas, spoken of and written as a technology that would eventually arise capable of extending the limitations of our physiology's natural senses (Schell, 2016). The advent of the first computer game harkened the arrival of these XR concepts. When Evan Sutherlands created the first VR game, *The Sword of Domacles* (Sutherlands, 1968), he opted to call it an experience rather than a game (Team, 2018). A virtual experience, rather than virtual reality per se. This above mentioned first stage is arguably the hardest to mark because references to augmented reality go back as far as 1901 (Team, 2018). This record was in a novel titled *The Master Key* (1901), where the author Frank Baum describes a gift that the main

character receives from a demon. This book never specifically mentioned the term Augmented Reality, rather this gift was called the *Character Marker*. It was a pair of glasses which could be worn to show a letter mark on everyone's forehead indicating their character (for example, the label "E" for evil people). This hearkens to Augmented Reality headsets like *HoloLens*, which is interesting considering the time this was conceived.

Preston Thomas Caudell developed the technology and "officially" coined the term Augmented Reality while he was working for Boeing where factory workers had to organise factory parts in 1990 (Bridges, 2013). Preston's work was centred on military and flight operations, with the main definition and function of AR being a technology that allowed one to extend a human's senses by providing virtual information that could change/augment a user's experience (Braun, 2003). Modern-day heads-up displays (*HUDs*) used by fighter pilots as well as projected simulations are possible today because of Preston's initial research into AR. Preston Caudell was quick to define the medium, sticking true to earlier concepts in the field of XR and defining his work and technology as "an extension of the senses, that can overlay information and data over reality to provide a user with more insight about the world around them" (Bridges, 2013).

This above stated definition of "augmented reality" has remained unchanged since Preston first coined the term and developed the technology and is the definition that shall be used for this thesis. How we can apply this definition is what creates the multiple levels of depth that the technology may offer.

The application of AR in various fields was the second phase as this technology went rampant among the market afterwards, being used within fields like medicine, media and the arts. The technology was expensive and large, mainly used as a research technology for institutions and laboratories that could afford it, however many avant-garde artists found ways to use the technology in new ways within the arts. Notable examples are Myron Krueger's *Video Place* (1972-1990), a responsive virtual environment that allowed users to see their reflection interacting with virtual data on a screen. Morton Heilig's *Sensorama* (1975) was another development that used technology to immerse viewers in a viewing experience that incorporated sound, movement, smell and other tactile senses. Although not classified as augmented reality per se, these avant-garde movements still fit in our above-mentioned definition of augmentation due to how they transformed the viewer's experience and perception of reality. Artists till today are still dabbling in AR, more

information on these current developments shall be elaborated on in the Case Study section to follow.

The third stage of AR development was marked by the miniaturisation of technology, allowing it to be mobile, and the commercialization of it as corporate industries made it easier for the public to access its features. Advancements in GPS technology, phones to smartphones, wireless internet connectivity and "apps" (software systems that could be downloaded onto smartphones) encouraged users to start developing and using XR content more. 3rd wave augmented reality started in the 1990s and has lasted till the modern day (2020). It is recognisable as AR that uses smartphones to bring the experience to the viewer's pocket, allowing them to carry it around with them. Some examples of this type of AR is one developed for the New York Time's (A.G Sulzberger, 1851) called *Aurasma* (HP Autonomy, 2011), an application that was done to augment some newspaper articles. Likewise, *National Geographic* (1888) has created massive installations for users to experience in AR in malls, projecting spectators onto virtual screens that have animals and nature around them. Figures 1-3, in the Introduction are another notable example of 3rd wave AR, as well as the AR in the case study section to follow.

The most successful AR games that have been made are ones that apply this above-mentioned understanding of AR on multiple levels. *Pokémon Go* (Niantic, 2016) is an example of this and was a global sensation within a few months of its release. The premise of the game system was like most *Pokémon* mobile/digital games that came before however, AR mobile use came within collection as players had to physically go out into the world outside and use their phone to spot Pokémon to collect. The Pokémon were 3D characters on their phones that would use GPS tracking to project themselves into physical reality at set locations. This beckoned a new type of gameplay that required walking, socialising with other enthusiasts and exploring areas of your neighbourhood. Another great game was the *Walking Dead* (2012) and *Run Zombie* (2013), AR mobile games that had players physically running away from zombies. The later encouraged people to get fit, to jog outside and created a fun approach to an otherwise tiring task. However, AR's application isn't purely limited to game space. Yes, the innate fun and interactivity of games has created more momentum within AR, however it isn't the only way to use AR.

It is here that Jessie Schell proposes that a 4th stage of AR development will happen in the near future, marketed by the widespread use of XR technology as XR headset sales will

double (estimate) each year until the market is saturated with devices (Schell, 2016). Effectively every business or household will have at least 1 XR app in use for accessibility (smart-home allowing users to interact with systems in the house by donning a virtual display), communication (conference calls using the *HoloLens*) or entertainment (XR board games and children's books) (Schell, 2016). This is supported by the statistic showing how smartphone's have slowly become ubiquitous household items in South Africa, as the technology becomes cheaper with every year (Statista, 2019).

Extended Reality media have a more varied approach to creating – their innate ability to introduce interactivity brings a plethora of theoretical and practical approaches to work with for this creative practice. Our first theoretical approach is AR use within journalism. There are multiple publications aiming to focus on how AR can be used in journalism, some even with a case studies that examine AR through the lens of a practical component. AR serves the same baseline function as news and journalism; it augments the way a user experiences and perceives the world around them (Bridges, 2013) (Team, 2018). This common ground is a noteworthy observation that motivates how AR could be implemented in various ventures for a more in-depth engagement from the use. Journalism is a visual media that relies of representational conduct (language) to impart information to the viewer. Seeing how this field used AR to enhance the readers experience provided some notable insight on how this research paper may seek to enhance the storytelling experience of visual narratives like Comics through the use of AR as well.

Another example is Rob Mogan's research into AR and VR storytelling within game design. This direction led him to discover that AR development means one must create an immersive and interactive story that isn't just built around the player, but where the player is their own protagonist (Mogan, 2016). The player can interact with the system – and throughout the system they can interact with the characters and setting to, in turn, alter their (reader's) experience (Mogan, 2016). This is an interesting observation by Morgan, one that hints at a possible feedback cycle that exists within the system of the story and the system of the reader, facilitated through active participation and interaction. At this point this is an observation made with designing AR for games in mind. Nonetheless, creating a primarily story driven experience with interactivity is ideal for this *Awakening*, although might not be as direct as Mogan's game design approach.

Storytelling in Collaborative Augmented Reality (Braun, 2003) is another paper that provided notable insight into creating an AR application that elicits collaborative participation from multiple users. This book section begins by defining key terms in storytelling and XR, noting how most AR uses by the public have been most successful in the realm of game development (e.g. *Pokémon Go* (Niantic, 2016*)* or *Everquest* (Verint Interactive, 1999). Other than the authors obvious disdain at using this technology for such "useless, time consuming, non-profitable systems", there is the worthwhile observation that people enjoy interacting within a fun, pleasurable system (a game). The authors decide to use interactive storytelling systems from games, removing the essence of agency and competitive drive to win, and instead replacing it with a stronger focus on audience participation and the inherent rising action and plot structure of storytelling while still retaining fun, pleasurable parts of the interaction. Audience participation theory (APT) is used to apply this towards creating an AR proof of concept in the form of an educational AR guided tour through Germany's Heidelberg.

This method of adopting game design principles and fundamentals has been done multiple times for various applications within AR due to how designing in AR can be mutually beneficial with game design. Similarly, this is the direction that this research takes in attempting to answer the question, "how can AR be used to enhance the storytelling experience?" It would seem that the most worthwhile ventures into exploring this question before have led to mutually inclusive domain where augmented reality meets game design. These 2 books relevance to my research is paramount and provided a foundation of research for me to expand on into the production of *Awakening*. Similarly, the case study that the authors created as an AR application provides a well of information that was appropriated for this thesis's proof of concept.

All these facets of AR and predictions are exciting to say the least, yet not without criticism. One device that lived up to Schell's 4th wave predictions was the *Google Glass* (2013), an AR headset that aimed to work as a mobile, hands free computer that could synchronise with a user's phone. Designed as a pair of glasses, this device allowed users to communicate with the internet and their phone via natural language voice commands and gestures; basically, a head mounted computer. This devices camera could overlay information to a viewer without them having to break away from reality to view a separate device – text messages, alarms, camera/video functionality and more was intended to be included. So it functioned

similar to the *Microsoft Hololens* in *Figure 2* of our introduction. However, initial beta releases were met with a stream of criticism; the biggest being privacy issues. For example, 3rd party developers could hack the device, viewing a user's password input. Camera and video functionality could be activated inconspicuously – this was viewed as potential spyware that caused *Google Glass* to be banned in various companies and countries. Potential eye pain from prolonged use, poor user accessibility options for the linguistic/auditory minority[2] and the safety hazard that the device presented created even further banns, negative reviews and bad media coverage, resulting in the beta devices being pulled back and sales halted. At this moment, *Google* has formally apologised for the device, yet still has a team that is working on *Google Glass*.

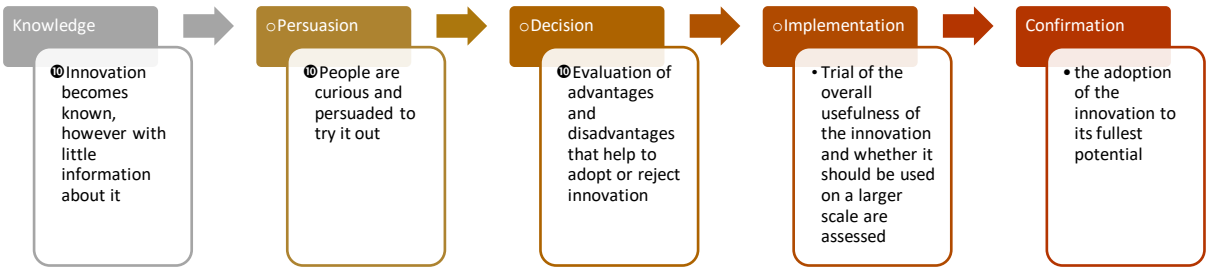


Figure 10: Rogers Diffusion of Innovation Model (Bridges, 2013)

Rogers' *Diffusion of Innovation* graph (See *figure 14* above) states that if an innovation fails to get acceptance from each stage of development, then it'll inevitably fail (Bridges, 2013) - as seen by *Google Glass*. Based off this graph, the uncommon nature of *Google Glass* created mass appeal in its initial 3 phases (knowledge, persuasion and decision), most likely due to the reputation of the company, its resources in expanding these phases and the engrossing nature of the device. However, the implementation phase failed to minimise the disadvantages of the device. Similarly, Rogers' model has an extension that states that for an innovation to be adopted easier there is a rate of adoption that can speed or slow widespread acceptance of an innovation (*Figure 15* below). This rate of adoption is namely

[2] Blind/deaf and other disabled persons



Figure 11: Rogers' rate of Adoption model (Bridges, 2013)

The above stated *Google Glass* controversy and diffusion model highlights how obstacles, limitations and problems are bound to arise from development. Both the *Rate of Adoption* and *Diffusion of Innovation* offer one steps to anticipate how well a product can be received by the public. *Google Glass* was seen as a horrific failure by most, but as a researcher and academic, this thesis proposes that we look at it as an opportunity to learn from those mistakes. The inclusion of the above mentioned has been placed here as lesson to be learnt from *Google Glass.* It is a lesson to be considered if *Awakening* shall be taken further into publication or public consumption. However, for the purposes of enhancing a storytelling experience, this above mentioned debacle doesn't fit in to this discussion.

At this point in the discussion, we have defined what storytelling means (specifically visual narratives within the context that this research aims to implement) as well as augmented reality, going as far as looking at AR that was received well by the public and AR that didn't do too well. Experience and enhancement are subjective terms that need to me elaborated on as well. Experience is defined as, "practical contact with and observation of facts and events" or "an event or occurrence which leaves an impression on someone" (Simpson, 2015). Enhancement on the other hand is defined as, "intensifying or to further improve the quality, value or extent". With this in mind, we can see that the goals of this research are to take the existing storytelling understanding and further improve on the impression it leaves on the viewer. In defining representational and special practice, we've seen how game design fundamentals and augmented reality could assist in this regard. We shall now take a moment to delve deeper into what it means to enhance.

Representational practice and artistic media all aim to use varying levels of immersion in order to compel the viewer to keep experiencing this media. Augmented Reality is in the position of being able to combine various proponents of performance, game design and storytelling theory to present information that can augment and enhance a user's senses (Braun, 2003). It situates itself in the middle, allowing for greater levels of enhancement and

aesthetic appeal. This enhancement goes hand in hand with immersive discourse, with the core goal being to use aesthetic, visual stimuli to maintain the viewer's attention as one does with any storytelling escapade (Eisner, 2008). Janet Murray's book section on *Immersion* is the definition that shall be used for this dissertation. Her framework seeks to analyse the various levels of immersion, detailing why they are necessary and how they can be understood in context of various examples. And in unpacking her definition of immersion and the conversation around it, we can take it to understand how this research aims to enhance the storytelling experience as a whole

Immersion is taken from the word that means submerging oneself in water, yet it is used to mean submerging oneself in a whole new reality. Whether this reality is enforced through a game, music, a performance – it ideally seeks to transport the user out of this reality we all know, for a new, fictional and agreed upon reality (Murray, 1998).

It's fascinating how people can have such varied cultural, cognitive and emotional experiences and knowledge – yet still interpret and understand content together, universally. It is this aspect of correct representational practice alongside immersion that leads to this endogenous meaning that is intrinsic to these media. Most notable is the fact that new levels of narrative immersion have always feared and coerced artist and philosopher alike. The invention of the printing press frightened some into thinking man would lose itself in these new narrative immersions. Even today, many speculate what will happen to us if virtual reality becomes a common household technology (Murray, 1998). It would seem that where science creates and shows us what possible, art seeks to interrogate and show us dangerous potentials in immersion.

This act of immersion often accompanies the magic circle. The term magic circle is that agreed upon space that we enter when indulging in entertainment (games, Films, theatre etc.) as we leave reality to enter what we know isn't real, yet treat as real (Floyd, 2012). It is that endogenous meaning that allows players to fully immerse into games (Costikyan, June 2002). The enchanted space where immersion takes place (Murray, 1998). Rob Mogan and Bart Trzynadlowski both mention this magic circle in passing, with Rob stating that his research into storytelling and AR led him to discover that AR development means one must create an immersive and interactive story that isn't just built around the player, but where the player is their own protagonist. In this sense, AR becomes a tool for immersion as it elicits the participant to actively partake in the magic circle, to not only acknowledge its

existence but to further cement it through participation. It is through this active participation in the magic circle, and immersion that follows it, that creates an enhanced experience. Without the magic circle, without immersion, it would be very difficult to create a lasting impression, to hold a viewer's attention onto the story.

Crossing into this enchanted space of immersion has become easier with technology, as computer systems continue to create spaces where individuals can act and express themselves. It would seem this immersive ability humans have is ingrained since childhood and never really given up. In Wil Eisner's discussions on storytelling, he mentions how our ability to immerse ourselves in a story is what allows stories to carry so much information that is relevant for cultural exchange (Eisner, 2008). Similarly, it is because this space of immersion is not real, that it is so real. The fact that it has real influences on our thoughts, emotions and selves, means that in order to keep it an enchanting space, we must keep it at the precipice of real and non-real, and never let it become *too* real (Murray, 1998).

It's like the Uncanny Valley, it's a concept that was introduced by a Japanese roboticist from the 1970's (Floyd, 2012). This concept states that the fictional world maintains a level of enchantment and artistic allure, all the stronger as it develops its own stylization to reality. This is evident in part 1 of the graphs upward trend in *Figure 13* below. This allure creates an increasing appeal and level of immersion in the viewer, as the visual stylization increases in realism. This can be seen in Comics or cell phone games that have distinctly digital representations (environments and characters) with a consistent style and look that is clearly not the same as reality. (Floyd, 2012). You can push the realism to enhance this immersion in a new reality by mimicking reality – an example is current generation video games and Films which aim to create ever more realistic graphics and effects for deeper immersion. However, once we push the realism too much, we forget the stylization entirely, and so the whole concept loses its enchantment and can become eerily, disjointedly similar to reality (part 2 of the graph below). At this point appeal and immersion decrease in the viewer, its flaws to reality become more apparent rather than its creative simulations. This is the valley. If we push past this point, we can reach a level of realism that is indistinguishable from reality (part 3), one that immerses players on whole new levels. However, you risk being caught in the valley while striving to reach this level of realism.

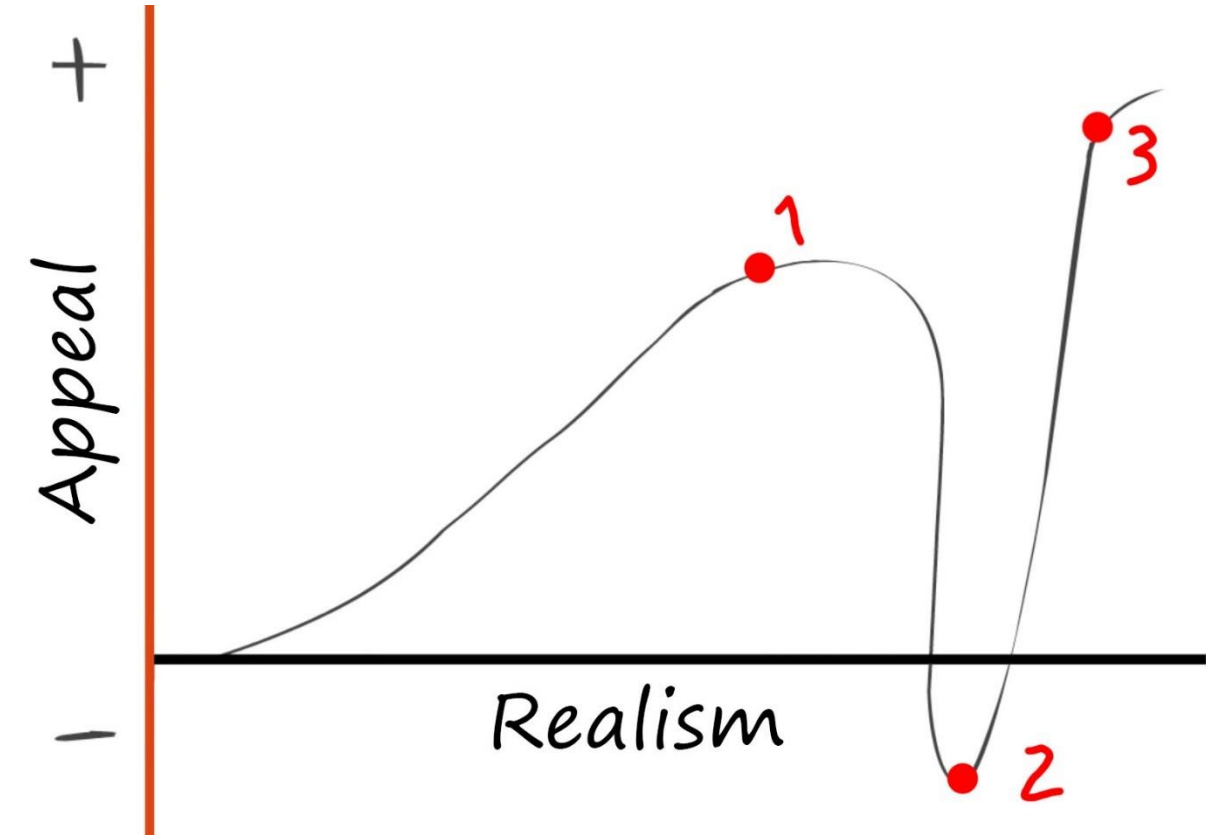


Figure 12: The Uncanny valley illustration taken from Daniel Floyd's web page (Floyd, 2012)

Subsequently, either we aim for photorealism, or stylization – nothing in-between. What really assists with establishing a level of non-reality in those artistic mediums that push immersion through realism, is to have a reminder that reality is easily accessible, this all feels real but isn't, you can stop anytime. And so, it becomes necessary to find and establish this border between reality and non-reality (Murray, 1998). Video games have employed this in clever ways, with some games where the player avatar plays an impatient animation if the player doesn't interact with him for long enough – a reminder that this fictional world has a border to cross, it requires your interaction and willingness to submit to a new world. This adds a level of personality and "realism" to the virtual experience, while cementing the border, the non-reality of it all. Even as players in a game we know that entering it too rationally will drain it of its otherness, so we rather play along, submitting to the endogenous meaning within this new world (Salen, 2003).

After looking at the above mentioned research into immersion and the magic circle, we can better situate the role that AR has in complimenting the above as a tool that can enhance overall immersion and the effects of the magic circle. AR allows us to overlay virtual information that is meant to mimic reality in a manner that can fit on the Uncanny Valley. It requires active participation to use (one must launch the app on their phone, or wear the AR

headset and turn towards the visualization), and, as a result, will always have a reminder that it is not real. Because it's not real, we can submit to it and appreciate it. However, this AR use must be done right else it risks being a major drawback (similar to Google Glass), sitting at the bottom of the uncanny valley as a gimmick that attempted to add to immersion but instead took away from it. If represented correctly, AR can enhance the overall spectator/reader/player experience by adding a level of augmentation that would otherwise be difficult to achieve without AR. This augmentation fits into the above stated definitions of the magic circle and immersion and can result in an enhanced experience. When combined with storytelling, AR can present hidden information, allow for active participation and interaction and result in an experience that would not be the same if the AR wasn't included.



Figure 13: Game Developers Conference on designing for the AR experience (Trzynadlowski, 2018)

In Bert's GDC talks on designing AR experiences for his users, he mentions that his design focuses on bringing those digital representations to reality, through AR, without attempting to alter the environment and physical world (Trzynadlowski, 2018). He wants his viewer to know the border of reality and non-reality is there, however he doesn't fear to play with that border, blurring it and moving it as the digital characters interactions become more and more invested in the physical world. As we see with the example above, where the game characters interactions and objectives use real objects like the couch, as elements of game play. Now the player's character must activate a digital elevator (the red, ascending cubes) to interact with the physical couch and reach the object.

As a result, Bert makes his participants actively participate in making this border stronger, this enchantment more immersive. We play along, immerse ourselves in the endogenous meaning in order to enjoy it more. What is more, we then intellectually re-enforce this new

non-reality rather than question its reality and actively suspend disbelief. In doing so, we allow ourselves to enjoy the experience more by willingly participate in its immersive-ness.

In linear storylines the author oversees the progression of the story, the reader's role becomes a passive one as they are guided through the story by the author. As is the case with Film, Comics and books. The spectator is a passive participant using mental activities to perceive and interpret representations. Whereas in nonlinear storylines, where interactivity is introduced, one is allowed to participate in this story, co creating the storyline with the author. Video games allow participants to interact and compete towards quantifiable outcomes in a manner that allows expression and meaningful decision making (Costikyan, June 2002). Similarly, including interactive AR into a conventional line art story blurs the line between passive and active participation, allowing participants to potentially take the story in their own direction and interpret the representations in a manner that the author didn't intent. This participation is what game designers cater for through their use of decision making, however designers cannot always anticipate the degree to which players will use and alter the system (Costikyan, June 2002), as such design must be carefully steered for maximum effect, entertainment and impact on the player.

To re-iterate, the definition and theory around immersion shall be used synonymously with enhancement for this research paper's question, *how can augmented reality be used to enhance the experience of storytelling?* In order to enhance creative practice, it has been noted by multiple sources that using correct representational practice to deepen the immersion around an experience shall often enhance the experience and impression on the viewer. The experience of the story can take multiple forms and media, it can be a video game, a Comic or a Film; each has its own representational practices and levels of engagement that can create unique experiences that are different for each media. Each alters spatial practice in its own way. As a result, AR has gone through multiple uses since its inception, birthing different ways of using the technology for different experiences. When looking at storytelling specifically, academia amongst visual artists has been consulted because of its ability to compliment AR's image tracking capability. However, the spectator experience can present various participatory roles within AR – one could make a game out of an AR story, using non-linear storylines, or a linear storyline with enhanced visual effects and cinematography for more immersion. Stuart Reeves and co-authors propose a way of

designing the spectator experience that has been adapted for multiple interactive art installations.

In *Designing the Spectator Experience* (Stuart Reeves, 2005), they propose a methodology for approaching this conundrum that game designers face. Their methodology can be adapted for games and AR Comics in a similar fashion. Paying attention to revealed and hidden manipulations vs effects can better structure the experience based on the level of immersion required (Stuart Reeves, 2005). For example, a Film based experience needs to focus more on technological graphics for immersion, as oppose to a Live Action Role Playing (LARPing) session, which relies on physical, tangible limitations and manipulations for desired effects (Stuart Reeves, 2005). With this in mind, an AR Comic would focus on a mixture of graphic fidelity for increased immersion and physical, tangible limitations as the AR must be used in relevant context to physical space. It is this relevant use that would help the viewer willingly adopt the endogenous meaning of the experience while ascribing to a new pattern of thought through this spatial construct (Lefebvre, 1974). It is important that, for any and all immersive experiences, a level of consistency is established and maintained (Murray, 1998). Brenda Laurel makes the example of the 4th wall in staging and dramatic performance. In Brenda Laurel's discussions on *Computers as Theory* (1991), this consistency is echoed from the perspective of a performance artist. For example, if the 4th wall is clearly present, then suddenly breaking that established convention can be disjointing to the spectators experience (Laurel, 1991). As such it's always best if the thought of a play comes through what is already enacted, represented, patterned or language in order to maintain this consistency (Laurel, 1991). The 4th wall break should be at least alluded to earlier on before the break happens to avoid this disjointing.

Participatory roles can also lead to new levels of immersion within the experience (Stuart Reeves, 2005). Computer systems have introduced avatars, allowing the player to embody the protagonist and go on their own adventure. RPG games are particularly famous for this, with games like *Skyrim* (Bethesda, 2010) and *Sims* (Electronic Arts, 1999) being infamous for sucking players lives for hours at a time because of this ability to give participator roles to the players directly. The ability to create oneself, choose your clothes and abilities within a game, and experience the narrative first-hand rather than through written/watched accounts is what makes this roleplaying so effective. The use of augmented reality within storytelling experiences presents an intersection of linear and non-linear stories. Game

fundamentals like interactivity and immersion can be used at varying levels depending on the purposes of the AR application. However, innately story driven narratives like Comics can use AR to either steer the viewer through an authored story or to represent the player through avatar or allow them to make decisions throughout the story. A combination of options can be used that take from games, Film and Comic theory.

Designing for the Spectator experience (Stuart Reeves, 2005) is a fascinating paper that uses a unique methodology to dissect various levels of public vs private interactions that participants can have with technology or a performance. Similarly, the levels of manipulation and the resultant effect also influence this methodology by creating an intersection of interactive performance styles and levels that have been used successfully in the past.

It's worth noting that performance in this term is a broad term that can be as literal as theatrical performance, to as vague as watching a stranger use their phone or presenting on *Microsoft PowerPoint* (Stuart Reeves, 2005). Ultimately, the word performance has been used in a variety of contexts and so the author here would like to encapsulate as many of them as possible for they all exemplify the methodology. Notions of public and private space aren't nuanced enough to truly flesh out this methodology, and so manipulations and effects have arisen to do justice (Stuart Reeves, 2005). Manipulations are carried out by the primary user – whether that be the main performer, gamer or technology user. It can be me and you on the streets, or the artist on the stage. They don't have to result in direct input into the technology/art performance and can be as simple as secondary movements that show aesthetic flair and skill to the viewers/spectators (Stuart Reeves, 2005). What's important to note here is that they almost always manipulate something. They manipulate the machine, the technology. They manipulate the viewers, specifically their emotions and thoughts. Or the performer him/herself is manipulated into a state of confidence and concentration.

The main thing is that they always have a result on the participant, player, performer or technology – they have an effect. And so, the spectator's experience can be channelled using these above mentioned notions of manipulation and effect to reveal/hide the manipulation and/or effect there in (Stuart Reeves, 2005). Understanding manipulation and effect within immersive experiences allows us to distinguish between secretive, expressive, magical and suspenseful.

The figure below defines each distinction, allowing us to see how they can be used interchangeably to create varied levels of interactions.

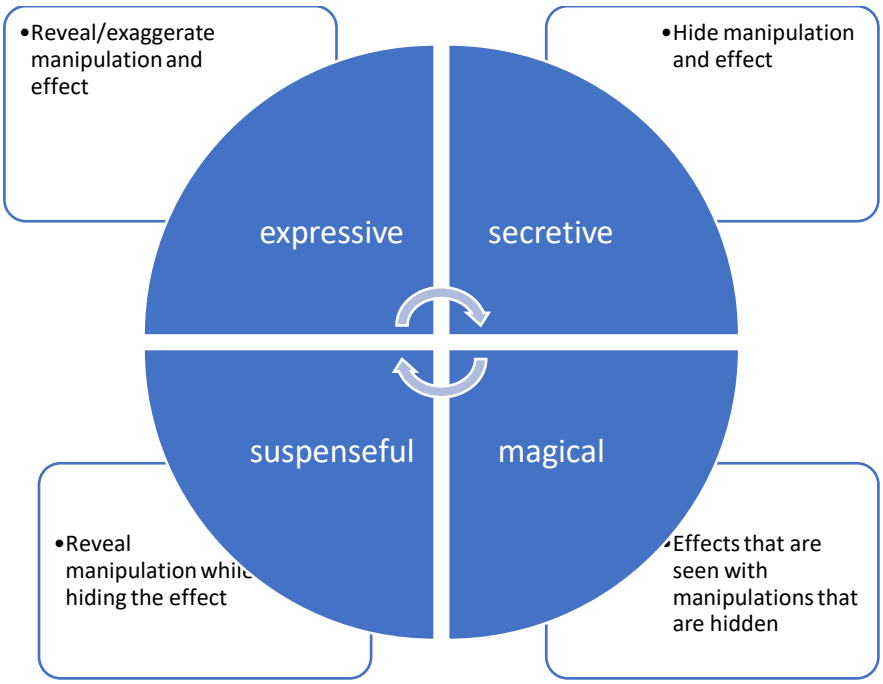


Figure 14: Taxonomy of the 4 levels of manipulation vs effect use from Designing the Spectator Experience (Stuart Reeves, 2005)

Partially revealing, amplifying and transforming effects is another method of enhancing the spectator experience through a level of unpredictability and chaos. Depending on the installation or performance, this could work into various levels of the above figure at the same time. Similarly, playing on the stereotypes of performance (implied awareness of performer stage and audience) presents an interesting occasion to subvert these expectations (Murray, 1998). AR technology, like games and VR, often works at all 4 of these levels of manipulation and effect. For example, a video game's coding and scripting to structure the software is both magical, in its ability to create beautiful particles or visual effects, and secretive, as the viewer won't see the exact coding and how that code combines with physics rendering and hardware to create the system that holds it all in place. AR's uses allow for a more nuanced approach to this above-mentioned taxonomy. As such, this figure shall be used again within Chapter 2: MA AR Production while using the proof of concept as an exemplary model for it.

Regardless of how much of this taxonomy is used, the real magic circle is happening in the *mind* of the spectator, without being explicitly told and is what makes the connections or

expands the magic circle to encapsulate the spectators own narrative, with their own unique interpretations to create a new kind of immersion. This model can somewhat fine tune that magic circle, anticipate its trajectory and try to create the correct connotations that the author intended, however one cannot 100% guarantee this due to the sheer number of subjective variables that each participant brings to the experience (cultural norms, previous experience and memories, skillset, mental acuity etc.)

This creates the prospect to explore how transitions and handovers can be exploited. At which point does the spectator step into the magic circle, and how do they do this? Is it from a formal briefing? Or it's implied from entering the space? There is no right answer for these questions as various levels of taxonomy can be used to answer them, creating different levels of interaction and performance. For example, an AR game would have the implication of starting when the hardware (smartphone, *Microsoft* headset etc.) is switched on, however it's staging beyond that could use visual stimulus tags or GPS location tracking. This would make a difference between having an accompanying 2D Comic page to view an AR experience, and being able to take the 3D virtual characters of a Comic into any space, changing the points at which the spectator steps into the magic circle.

The ideas and methodologies expressed in this paper are fascinating to say the least, and present clear examples and applicable methods for use in one's own creative practice. What truly sets this methodology apart is the import on how the spectator experience is designed by the creative, but ultimately comes to life in the mind of the spectator – as they experience the suspense, magic or expression. Similarly, to summarise the above, we have managed to look at what it means to "enhance" by using the keywords of immersion and the magic circle as synonyms that can better help situate what we mean when we say "enhance". Also, these above mentioned keywords helped to better situate how AR stands in a position to take storytelling terminology and conventional representational practice within it and then use they keywords to enhance storytelling through AR's visual fidelity, interactive components and other taxonomies of manipulation for the reader. The core research question here is "how can one enhance storytelling through the use of AR". The above literature defined storytelling, enhancement and AR to better situate the criteria that shall be used to interrogate this question.

A notable mention at this point are some of the industry professional's that were consulted during the development of this research. First is Stephen Julie Stephen Chheng, an

international artist who has done various AR commissions for Museums and Organizations around the world. She came to Wits University to give a workshop on creating meaningful AR content and it was at this workshop that the researcher met with her. It was a brief encounter that allowed for some insightful conversation and even presented some time to show her some early development of *Awakening* for her to critique. The other professional was met at the *Johannesburg Art Gallery (JAG)*, where the researcher for this paper was asked to give an introductory workshop on How to Augment Reality for Beginners as part of the Art of Comics 2019 exhibition (Groenewald, Art of Comics, 2019). It was here that he met Russel Van Der Merwe, a working gentleman who had developed a few AR and VR platforms for his publishing house and marketing firm. Russel attended this workshop at *JAG* and often offered some noteworthy knowledge, specifically on the current target market of AR. The last industry professionals to mention were both met at the *Amaze Train Jam* (2019) which the researcher attended. Robin "Wobbles" Baumgarten describes himself as an "experimental hardware game maker" and although doesn't work in AR nor VR directly, his expertise within crafting unique interactive interphases provided for some excellent conversation and a refreshing take on what it means to "augment reality". He's travelled and attended Game Jam events all over the world, fine tuning what it means to dabble in interactive media. Meeting him enlightened the researcher that AR doesn't have to be purely with technology, as stated above the very role of journalism and news is to somewhat "augment our reality". To augment reality can be as simple as providing an interactive feedback loop that allows one to change their perception of the world around them. On the other hand there was Gareth Steele, the co-founder of for *Eden Labs* and video editor for the *Amaze Train Jam*. Meeting him had always been a chance encounter at previous AR and VR events, however the Train Jam allowed for the researcher to really get a conversation going with this avant-garde. His work , with co-founder Rick Treweek, within *Unity*, AR and VR had singlehandedly elevated *Eden* Labs contributed in creating awareness for interactive media and digital arts in South Africa. Currently he works very closely with *Tulips and Chimneys* in creating AR/VR art installations and projects around the country.

Since their contributions were in informal conversation and chance encounters, this research paper shall only really unpack their knowledge in Chapter 2. This and other above-cited academia shall be exemplified further in Chapter 2: Design Paradigm.

Case study

Combining Augmented Reality with storytelling has been done before, with various levels of success and reception. The following sub-section details what has been done before, analysing the preliminary research and pool of creative productions that utilized augmented reality's image tracking application to convey a story.



Figure 15: Masters of the Sun with 3D projections through AR (Filipino, 31 August 2017)

Musical ensemble, the Black-Eyed Peas released an AR Comic titled *Masters of the Sun* (Filipino, 31 August 2017) that combined audio with limited 2D animation, 3D models, audio and particle effects to tell the story of a cyberpunk afro pop world inspired by the 80s hip-hop culture that stirred their music production (will.i.am, 2017) (figure above. Bibliography has a link to the video review). The video review by Nicki Nichole (Nicki, 2018) is what shall be used for this case studies analysis; however, the review doesn't go through the entire Comic. Fortunately, the reviewer talks about the experience while showing video footage of the AR experience for each page of the Comic. This exploration of AR to enhance storytelling is done primarily through a linear story – the only interactivity that viewers have is through how they position their phone. However, meaningful interactions that change the outcome of the characters or the story are not present in this form of AR. Audience participation is kept at a minimal role so as to ensure that the author's story comes through to the viewer. As a result, this AR is more of a supplementary use rather than a compliment – it adds to the story through slight distortions in spatial representation while never truly complimenting the Comic book beyond this minor active role. It never provides the player with a chance to become the protagonist, rather they watch the protagonist's story unfold as a viewer. As a result, *Masters of the Sun* uses AR in a similar fashion to how AR in journalism is done; it

caters to a sense of magical and secretive expressiveness by revealing hidden information through 3D, 2D and audio. However, it never really provides meaningful interactions that border onto expressive or even suspenseful interaction. Players lift their phone now, and see the effects of the page now – touching their phone screen, dragging a character across a page or even pressing an interact button to initiate the dialogue isn't an option. In other words, the player/viewer has very few manipulations at their disposal and, as a result, they only experience a superficial level of the Taxonomy of Manipulation (*Figure 21 repeated below)*. If we were to adapt Murray's Immersion and the magic circle described above, we can see that the AR adds a level of immersion and facilitates a deeper engagement within the magic circle, however this engagement can be taken a step further through introducing interaction that makes the viewer feel like they are also the protagonist.

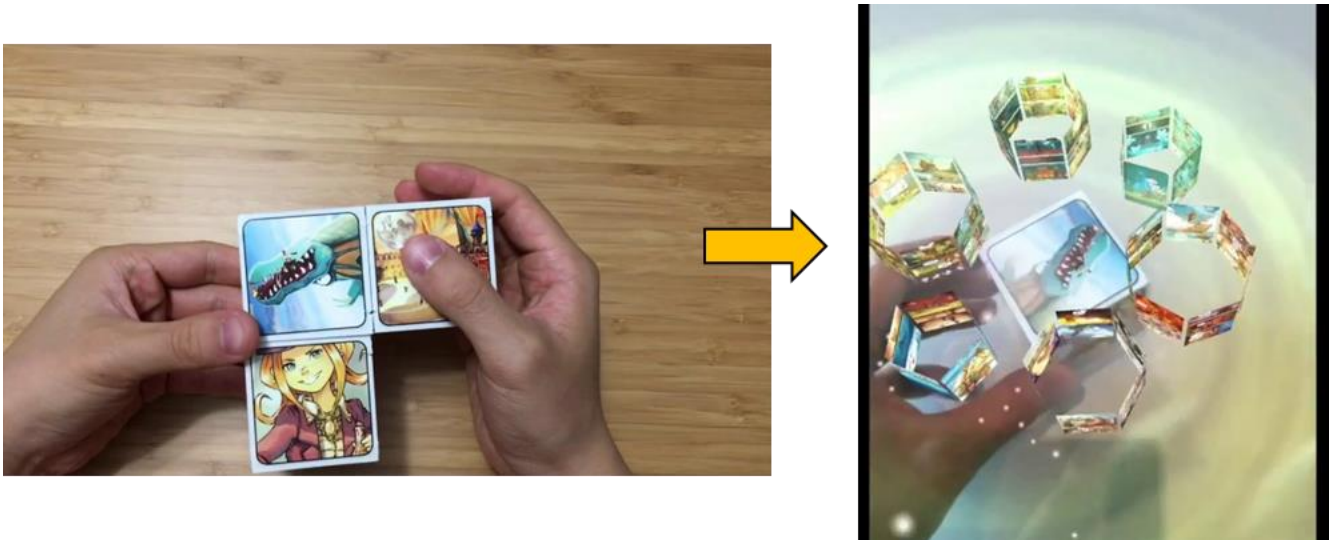


Figure 16: Comic Cubes demo video screenshots showing the AR integration (Wong, 2018)

By contrast, Wesley Wong developed physical AR cubes that picked up on the 2D image printed on each face of the cube, as well as the 3D shape of the cube itself to project a nonlinear story that could be understood by scanning the face of the cube and reading up on Comic panels of either the characters, environment/setting or objects of that fictional story (Wong, 2018) (*Figure 20* above. Bibliography has a link to the video). This doubled as an interactive activity that users could piece the story together by their own interaction, choosing where they want to start. Similarly, users could engage by saving their favourite story elements to share or read later. There are 3 cubes with each cube focussing on different themes; namely on characters, objects, or environmental setting of the story (See

figure above). Upon scanning a cube, multiple Comic panels would appear for the user to click and read or save for later. The order in which the user scanned the cube was arbitrary, allowing the user to experience a non-linear story that they must physically interact with and choose which aspect to uncover first.

These *Comic Cubes* take the elements of a linear story (settings, environment, characters, objects etc.) that are defined by the author, yet allow for the story to unfold in a manner that is defined by the user. This level of interactivity exemplifies Rob Mogan's approach to AR storytelling by allowing users to become protagonists that literally decide where they will start in the story. As oppose to *Masters of the Sun* which reads from A to B to C as a regular Comic, the *Comic Cubes* can be read in whatever order and yet still combine to become a fleshed out story. The way the story comes together is chosen by the viewer, who wears a more active role in deciding. As a result, the user must submit to the magic circle on a deeper level by participating and scanning the cube physically, but then must mentally piece the story together depending on the order in which they scan the cubes. In that sense, these *Comic Cubes* acknowledge our previous observation, that the " the real magic circle is happening in the *mind* of the spectator, without being explicitly told, and is what makes the connections or expands the magic circle to encapsulate the spectators own narrative". This is only possible through correct representational practice that allows a viewer to understand what to do without being explicitly told.

Wesley's *Comic Cubes* don't have an instruction manual, they are a *Unity Vuforia* (2018) application that launches on one's smartphone. The user must then point the phone at the cubes to see multiple Comic pages, and then click to expand the Comic book page. This type of interaction requires one to somewhat "fiddle" with the app and figure it out, and the physical interaction is the same regardless of which cube they start with. However, in the mind of the viewer, this interaction is developing as they go from one Comic cube to another. The user's active participation feeds into their mental understanding and simultaneously reinforces the magic circle and sense of immersion by slowly expanding on a linear story that requires their active participation to fully reveal this story. At the same time, the user is seeing their manipulations across various Taxonomies (figure re-inserted inserted below) – the expressive manipulation is immediate, as they scan the cube and see the Comic page, the suspenseful happens in the mind, as they slowly piece the story together through physical manipulation, it creates a slow build-up of the narrative plot that

is unique to their interaction with the cubes. The magical and secretive is happening as the code in the background combines the AR and Comic cubes, encouraging users to wonder "how is my phone doing this? How does it know to see this cube and project that digital interphase?" (This is a question the researcher often got from participants in Chapter 3).

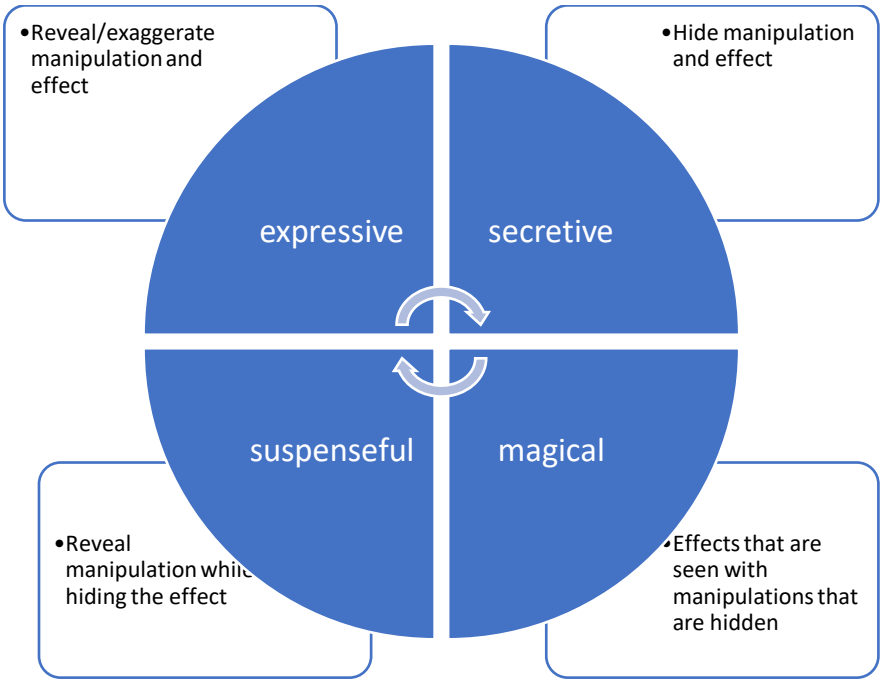


Figure 17: Taxonomy of the 4 levels of manipulation vs effect use from Designing the Spectator Experience (Stuart Reeves, 2005)

Priya's Mirror[3] (Paromita Vohra, Priya's Mirror, 2016) is the AR Comic that will be examined as the final case study for this section. This is because it was the only Comic that the researcher could get their hands on to experience physically and as an AR application. Masters of the Sun and Wesley's Comic Cubes were only experienced through video footage and as such, lack the direct experience that is necessary to properly analyse this digital medium. Nonetheless, these above-mentioned AR Comics shall be used to compare with *Priya's Mirror* in order to bring more depth and understanding to the discussion.

Priya's Mirror (2016) is the sequel to *Priya's Shakti* (Paromita Vohra, Priya's Shakti, 2014) and follows Priya, a rape victim survivor and super-hero, as she helps to save acid attack victims and defeat the demon king, Ahankar. The story is a full colour Comic book that uses the *Blippar* (Devineni, 2014) smartphone application to introduce augmented reality. Each 2D page is read by the camera lens and converted into digital media that uses animation and interactivity at various levels to immerse the reader and keep them engaged

[3] Thank you to the Wits Digital Art School for supplying a hardcopy of this Comic.

throughout the pages. Priya's Shakti was the "first"[4] of its kind as an AR Comic, hitting international acclaim and propelling the publisher, Ram Devineni's, to winning the Grand Jury Prize at the 2015 Sundance Film Festival (Devineni, 2014).

This Comic is a unique take on augmented reality; the multi-layered approach to AR creates characters that pop out and into the viewer's perception at varying depths, encouraging the user to explore the page from various angles. By doing so, the Comic manages to further fill physical space with not just virtual information but also real information about acid attack victims. It does this in 2 major ways; some pages activate links to media coverage and video footage, detailing the events of the horrific acid attacks during their peak in India. Other pages augment the Comic page directly, revealing hidden information, introducing animation or sound and other visual effects similar to *Masters of the Sun.* The most startling page is the cover, which activates the selfie-camera (front camera) of the user's smartphone, showing the user a reflection of themselves superimposed with burn marks to simulate what the user would look like if they were an acid attack victim. Overall, the reviews of this Comic were positive, with users reporting varied levels of engagement and interaction.

By contrast, *Masters of the Sun's* (2017) use of 3D models, dialogue and sound feels like a stiff experience that falls into the error of adapting the methods of the previous technology directly into the new technology without introducing something new that can make the new technology stand out as its own medium. Being Comic book lovers themselves, the *Black Eyed Peas* no doubt did this intentionally to pay homage to Comics while introducing something that would make their Comic stand out from the rest while still fitting into the medium. In *Masters of the Sun,* dialogue hops out of the page and character voices are audible, with sound effects and text lighting up in response to the natural movement of a viewer's eyes. The result is an experience that mostly uses AR to detail sound, thought/speech bubbles and other elements that really don't need AR because they work fine on their own. Despite this, the choice of sound adds some wonderful atmosphere to the page, however it abruptly disappears when the viewer's camera goes to the next page. This loss of progression can pull the viewer out of immersion and hinder the experience of a

[4] First is used interchangeably here as other AR Comics have been released before this one, however this one was the first to combine AR in the way it did – as a tool for social change, using multiple facets of AR technology.

virtual space (Costikyan, June 2002). One could drastically minimise the loss of progression by maintaining an ambiance through sound that constantly played throughout the Comic, and then some sound effects that respond to certain pages. By comparison, *Priya's Mirror (2016)* has no sound except for the pages that open video footage of news coverage around the acid attack. These inclusions of sound are contextual, to inform the viewer of the reality of the situation. Yes, these video snippets pull the user out of the fictional story, however they do so to strengthen the link between fact and fiction – showing how the events of the Comic are inspired by true stories. This is an interesting subversion, a result purposefully breaks immersion in an attempt to reinforce that immersion, similar to a 4th wall break. This technique is hinted on at the early stages of the Comic, and

This presents an interesting dynamic of immersion. For ideally viewers engage in immersive media like Comics, games and Films to forget about reality, whereas this Comic actively reminds the viewer of reality to further support the social awareness of its themes. In this instance, the momentary loss of immersion is necessary. As such, the Comic further bridges the gap between representation and reality; instead of merely representing acid attack victims as stylised caricatures and renditions on a 2D page, it further shows you the real victims. This is an interesting subversion and invasion of representation and spatial practice. Instead of seeing a normal reflection of yourself in your camera, as you are in physical space, the Comic shows you a representation of yourself as an acid attack victim. By doing so, it personalises the experience of being an acid attack victim, invading the space you perceive and changing your relationship to it.

Notable mentions for possible case studies are Benjamin Mitchley's *Dorpville* Comic. Mr Mitchley is a South African based Fine Artist, illustrator & Animator in Centurion. His Augmented Reality work uses *Artivive* (2017), an Augmented Reality development platform and smartphone app, to bring select artworks and prints of his to life. His Comic is an AR Comic that also uses the platform. At the time of writing this paper, attempts to reach Mr Mitchley have been in vain, and attempts to find his Comic, reviews, videos etc. so as to better unpack it as a possible case study have also been in vain. His YouTube channel does provide a plethora of AR prints and visuals to admire, however, due to these being artwork prints and not Comics, they shall not be included as possible case studies. Similarly, the work of *Tulips and Chimneys* and *Eden Labs* would make for some excellent case studies however their AR work is difficult to find and experience, watch reviewers or otherwise experience,

and their VR work is a little too broad to assist in this discussion of how to enhance storytelling through AR.

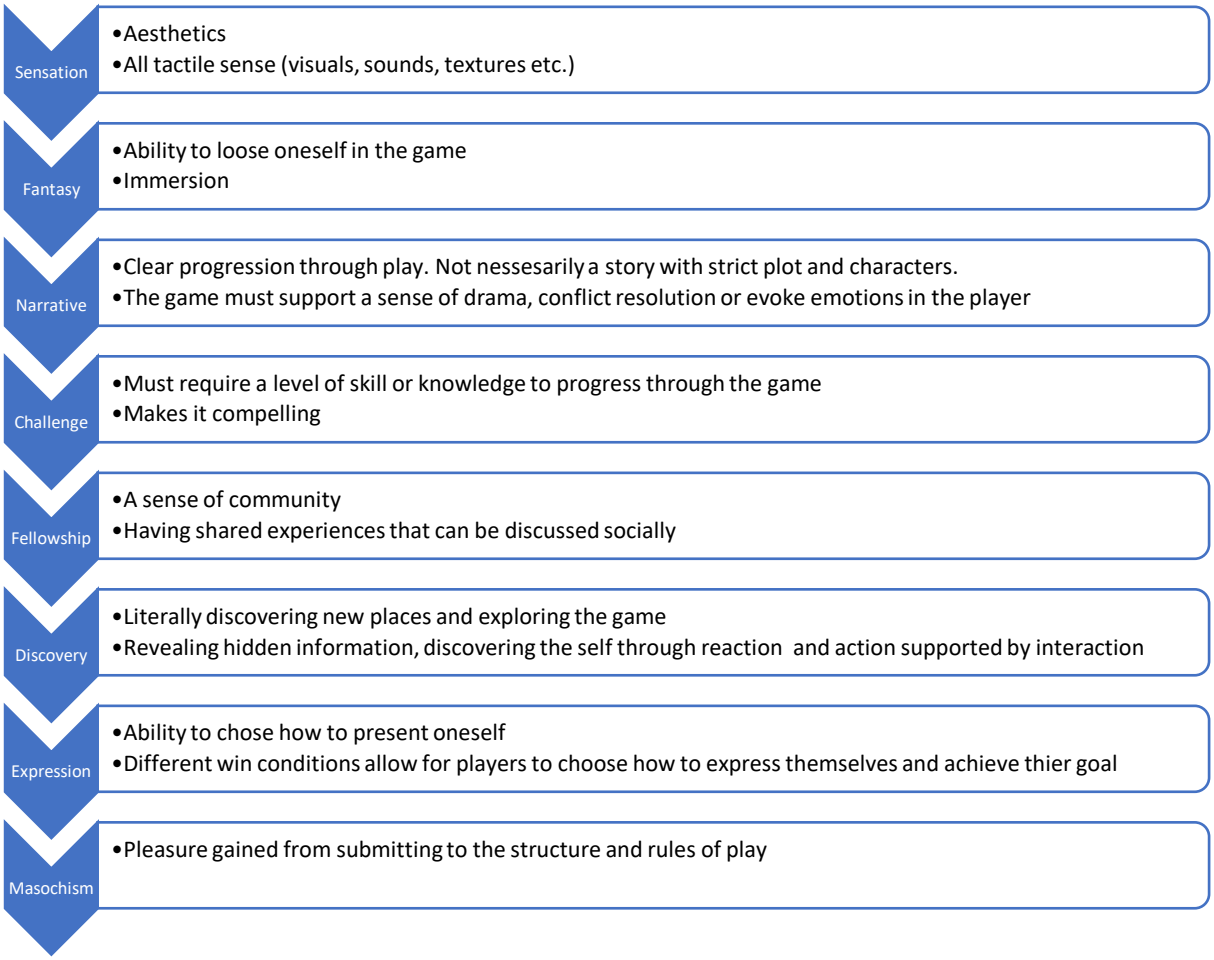
If we were to analyse these 3 case studies mentioned with reference to Leblanc's taxonomy of gamer needs, we will find varied levels of usability in each. These AR Comics are not games, however, they do borrow from gaming fundamentals and aspects of the definition in order to create endogenous meaning within each interaction, compel users to keep interacting and they require active participation for the story to unfold, rather than passive. Regular Comics require the reader to physically turn the page, while reading the sequential art to make sense of the storyline. This is a linear interaction that doesn't have true interaction, one that is synonymous with literature and authored experiences (McCloud, The Visual Magic of Comics, 2005). Yes, it requires interaction and decision making, however this decision making isn't directed towards quantifiable outcomes as it would be with gaming interaction. It isn't done to achieve an intrinsic or extrinsic motivation that assists the viewer in reaching a defined goal. As such, for the purposes of this discussion, conventional Comic reading is passive interaction and not active interaction. Active interaction, within regards to gaming fundamentals and terminology, is a goal directed interaction that allows players to express themselves and make clear decisions (Salen, 2003). It's an interaction that requires players to weigh multiple options and choose one that will have the best course for their goal. Rather than having 2 options, to read or not to read. To turn the page or not to turn the page. The latter is a more passive engagement and interaction.

A game is a system in which players engage within artificial conflict, defined by rules, to reach a quantifiable outcome (Salen, 2003). AR Comics are not video games because A) players aren't always engaging in artificial conflict, there are no clearly defined rules, and the outcome of the experience isn't quantifiable. However, using Leblanc's taxonomy of gamer needs as well as the proponents of this above-mentioned definition can help elevate an AR experience to new levels by understanding how the AR can interact with a Comic to create an enhanced engagement that isn't just a visual gimmick.

For example, with *Masters of the Sun*. There is artificial conflict presented on the pages, however the viewer never engages rather the viewer watches it unfold through the Comic and AR. There are no defined rules, per se, but the AR runs on a smartphone application. This means it requires a structured system to facilitate the interaction, one with its own

rules and conventions to aid the viewer. The outcome of the experience is not quantifiable. This is the same with Priya's Mirror; although some pages present unique interactions like the selfie camera or the video footage, these interactions are passive interactions that have the user scanning, waiting and then watching what takes place on the Comic. None of the pages present gamified experiences eliciting to make real, meaningful choices that alter the storytelling experience.

Wesley Wong's *Comic Cubes* are similar – however their use of themed Comic cubes allows for an added level of interaction. Viewers can choose where they want to start the story from, can choose which pages to favourite, and must actively make sense of the story not just as literal visuals ques in front of them but they use previous information from whichever face of the cube they chose before. This means that players are making sense of the story from a unique aspect informed by their own decision on which theme or Comic cube they start with and progress from. This interaction is still passive, as it doesn't help to work towards any quantifiable outcome, however it is a level that the other AR Comics don't have.



Nonetheless, when looking at Leblanc's taxonomy we see a much deeper interaction happening. It might seem little too late to bring up this taxonomy so late in the discussion, however it comes aptly due to its ability to somewhat summarise all the above mentioned literature reviews into a single taxonomy that we can refer to. All these Comics are rife with endogenous meaning, informing the viewer about their own story and allowing for unique engagements in each. **Sensation** is defined as how good visuals can provide a form of sensory pleasure. Not just visuals but all form of sensory phenomena. This *Masters of the Sun* Comic capitalises on AR for sensation – presenting a myriad of 2D and 3D effects, particles and representations to satisfy the viewer's sensation needs. The use of audio, although being somewhat superficial, still manages to create the relevant atmosphere. Stan Lee's familiar voice as the narrator coupled with sound effects and ambient music really completes this AR experience. Similarly, these sensory phenomena help with **fantasy;** the ability for the viewer to lose themselves in the experience. Fantasy as described above is synonymous with the magic circle described earlier on. It's best defined as what does this medium do that allows the reader to willingly submit to the sense of immersion? All of these case studies attempted to use AR to answer this question, to use AR as a gateway towards

deeper immersion. And all of them achieve this at different levels and in different ways through using the same technology of AR

Comics being a storytelling medium innately have **narrative** in them; a clear progression through the "play" with a sense of drama, conflict resolution and evocative emotions being used at varying levels throughout the experience. **Challenge** or struggle is what compels users to learn game systems and express themselves in unique ways. None of these Comics present a level of challenge that can cater for this sense of active interaction and progression through the story, although the *Comic Cubes* do somewhat border on a challenge as one needs to fiddle and figure out how to make sense of them. All of them do provide a sense of **fellowship**, having a shared experience is as easy as reading the AR Comic with someone else by your side as you both experience it together. The research methodology employed for this dissertation capitalised on this aspect, using exhibition spaces and group interactions for users to read *Awakening* together and learn its system. More on this in the next chapter. The other sense of fellowship is community, knowing that others have done the experience to and they are people that one can discuss nuances with. **Discovery** was best employed by Wong's *Comic Cubes*, as each cube was a small piece of a grander narrative, a piece that players could discover actively by choosing which Comic cube to start with. Similarly, all the Comics reveal hidden information using AR, as such users are discovery new details of the story either way. Whether they are turning a Comic page and scanning with AR or a choosing which Comic cube to scan first, the result is the AR will reveal new information. This Discovery is arguable at best; for example, *Masters of the Sun* could be read without AR and one would still know the story. Adding the AR doesn't add much discovery. By contrast, *Priya's Mirror* undoubtedly uses AR to create a sense of discovery, reading this Comic without AR would be a completely different experience. And Wong's *Comic Cubes* would just be illustrated cubes without the AR, there wouldn't even be a Comic!

Expression is one aspect that none of these Comics really allow for – there are no win conditions or quantifiable outcomes that present the viewers with opportunities to make meaningful decisions, and viewers can't choose how to present themselves. Remember, video games are spatial mediums – in order to navigate these digital spaces, the game presents players an expression of themselves in the form of an avatar, a player character or token. These AR Comics have players navigating a digital space however there is no avatar,

no player character, no token or component that represents the viewer on these AR experiences. **Masochism** is the final aspect of this taxonomy, and simply means allowing players to submit themselves to the system. With video games, the structure, rules and quantifiable outcomes present the occasion for players to loose themselves and submit to the video game as a means of expressing a new identity and making meaningful decisions that carry endogenous weight (Costikyan, June 2002) (Salen, 2003). AR Comics present a level of masochism; however, it doesn't cater for the same definition as a video game. Players submit themselves to the experiences purely because of the affordances of discovery, sensation, fantasy and narrative the AR technology allows for. Formulating depth and intellectual engagement in the form of a story, and then adding visual and aesthetic appeal to it is a classic formula that has been employed by many storytellers throughout the ages (Eisner, 2008) (McCloud, 2006). AR's primary function is visual and aesthetic appeal – therefore the technology lends itself so well to these Comics and storytelling experiences despite it not catering to every gamer's needs and definitions. However, if one wants to create meaningful immersion that harkens onto what it means to "enhance a storytelling experience", then the *Comic Cubes* and *Priya's Mirror* used AR to provide a deeper level of enhancement than *Masters of the Sun.*

Ultimately AR Comics can stand as their own medium that can borrow from existing media (game's and Comics). As such, it requires its own rules and conventions for representational practice (Hall, 1991).

The above framework of placing AR Comics within gamification is an attempt to better unpack the possible design directions that have been implemented before, and to improve on them for this proof of concept which aims to use AR to enhance the storytelling experience. With the above mentioned in mind, this report shall now document the design decisions of *Awakening*.

Chapter 2: Design Paradigm

With the core aims of this research paper in mind, we have discussed how storytelling and visual narratives developed. The scope of Comics was considered particularly because of its global appeal and historical success in conveying a story and its visual aesthetic. Afterwards, the conventions and theory around telling stories was discussed. Similarly, the history of AR was examined in a similar fashion, with supplementary theory around immersive theatre

being used to better understand what it means to enhance. Explaining these allowed us to better understand the core aims of this research, namely, how can the technology of AR be used to enhance storytelling in sequential narratives (Comics). The case studies that followed were done as a practical model that exemplified the above mentioned theology into augmented reality and storytelling. After much critique and analysis of the literature, as well as the researcher's own experience with conventional visual narratives and AR Comics, it became apparent that the biggest question for enhancing a storytelling experience through AR was how to make movement as natural as possible between the physical page and the AR app. Most literate readers could make sense of the Comic by reading the images from left to right, up and down as they would a normal literature document. The images are sequential and so they made sense, adding up to the broader narrative that they told through art. However, the use of AR was one that users weren't guaranteed to be familiar with, regardless of literacy, and required an intuitive element so that users could integrate AR virtual information as well as the physical Comic to make sense of the narrative at an enhanced level.

Similarly, a Comic's innate function is facilitating flow and movement of the viewer's eyes as they actively piece together the motion and narrative in the sequential word-picture format (McCloud, 2005). This would require that the Comic preserves the intellectual engagement of interpreting a linear storyline by using visual aesthetic and imagery evocative imagery that can maintain the viewer's attention throughout the narrative (Eisner, 2008) – this is what provided the most potential alongside AR as was likely the reason why previous content creators who tackled the issue of AR and storytelling also resorted to Comics as the visual narrative of choice.

Comics, like all art, are a representation of reality (Hall, 1997). As such, how content is written and created must properly represent reality (Lefebvre, 1974). Yes, the design principles of artwork and painting can apply to visual narratives like Comics however Comics and Manga aim to convey more story and narrative, as such they have multiple panels laid in sequential order to facilitate this narrative. The 1 panel per page layout of a children's book was too limiting and static, creating a predictable loop of engagement (viewer would look at the page, then look at the AR, then turn the page to repeat). Similarly, newspaper strips were too short and predictable to include AR, their focus on clarity over intensity meant that they really didn't need visual appeal and aesthetic immersion. Their emphasis on

jokes and puns meant that they were innately dialogue heavy and didn't really need AR enhancement as they functioned aptly on their own. As a result, Comics were chosen for this researches approach of augmenting the storytelling experience through AR. In theory, other visual narratives and storytelling media could be enhanced with AR as well however Comics are primarily visual mediums, a large part of their global appeal across audiences is that they allow for various art styles and intellectual engagement. The purposes of this proof of concept used Comics due to their innate enhancement features of extending the senses and clear image tracking capability of AR.

This preliminary research into the history of storytelling and augmented reality along with the above-mentioned observations provided the necessary information for prototyping various stylistic choices, computer programs and integration models. These resulted in 3 prototypes that shall be discussed below. The most promising prototype was then developed further and integrated with AR for field testing among willing participants.

Prototype development

Production for this Master's creative practice begun with some minor concept images and Comic panels to see how well various augmentations work within Comic format storytelling. All these concepts were quick, undetailed sketches because the focus was AR implementation: ideally to get sketches down on paper quickly and move onto developing the smartphone AR app for testing. Drawing the artwork and developing from sketch, to ink, to full detail is a time period that can be estimated accurately at the researcher's skill level. However, the smartphone AR app development often has an unpredictable timeline, due to it requiring more setup, coding and problem solving. **Concept 1** was a 3-page action Comic that was done to test AR as a linear storytelling medium -one that could animation the pictures and show more information about the story. This prototype used paper-based drawings along with *Clip Studio Paint (2012)* animation software and *Unity's Vuforia (2014)* for AR integration of

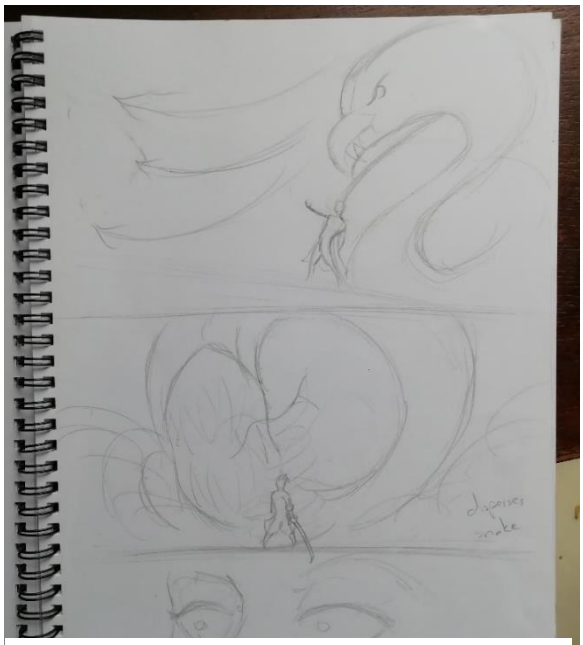


Figure 18: Prototype 1 – initial sketches (Musoke, AR Storytelling Prototype, 2019)

the sketches and animation. Early sketches weren't enough for the AR systems camera to recognise and augment (*Figure 23)*, and so inking was required to further detail the pages for augmentation (*Figure 24*). This is because image tracking visuals had to have either high contrast or dynamic colours to ensure that the AR camera would recognise them without a problem.

Each panel for this story is animated one by one, in sequence, so that the viewer's eye is guided through the story by each individual panel being animated one by one rather than together. This results in a seamless reading experience that guides the viewer's eye through the composition of the entire page, like how Comic book artists and Mangakas use contrast, volume and line direction to lead the reader's eye through static images. This movement of the reader's eye shall be emphasised on the animation of the panels in order to communicate the story beyond the pages of the illustration.

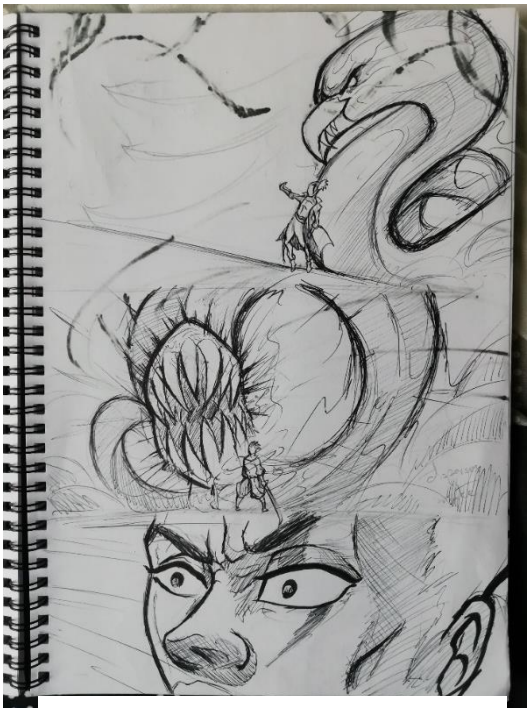


Figure 19: Prototype 1 - inking and detail (Musoke, AR Storytelling Prototype, 2019)

The goal for all these concepts here is to hold the reader's attention by using Wil Eisner's suggestion of unique, provocative or attractive imagery in the form of animation, that has a logical sequence and connection with the story (Eisner, 2008).

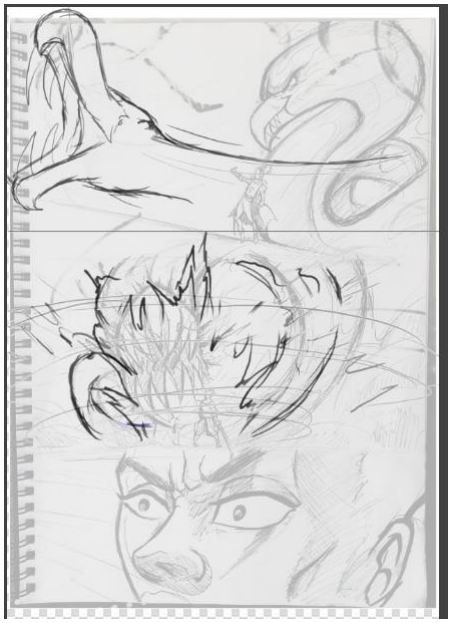


Figure 20; Prototype 1 with AR animations (Musoke, AR Storytelling Prototype, 2019)

As we can see in *Figure 24*, the resulting animation frames are meant to illuminate the viewer with information about info that happened either before, during or after the events illustrated on the static, physical page. See full video on this YouTube link: [CONCEPT Augmented Reality AR Comic 1 - animation, fight - YouTube]

Ultimately each panel ended up being its own unique animation. It looked awesome and flowed nicely, however it didn't utilise AR to present information that would truly enhance the storytelling experience. The Mangaka's adherence to SWIM could just as easily intensify the frames and provide clarity for the viewer to imagine the animation without needing AR. In this sense the AR use was superficial at best – creating a progression of information that simply utilized animation principles that resulted in a visual gimmick that lacked substance, interactivity and true immersion. It borrowed from 2 media (Comic and animation) rather than standing out as its own medium (AR storytelling), and in this sense it only enhanced the story a little bit.

Another issue was that of including sound with animation. Sound and movement are spatial phenomena that use time AND space at a set pace/speed, to progress and reveal information. However, Comics are innately static panels, the reader creates their own understanding of space and time rather than ascribing to a set pace of space and time. Scott McCloud noted this observation in his TED talks, reviewing how the advent of computers allowed for new virtual forms of visual narrative. Yet early creators of web Comics often made the McLuhan-esque[5] mistake of taking the content of the previous technology and appropriating it into the shape of the new technology." (McCloud, The Visual Magic of Comics, 2005). Rather than using the new technology and creating a new media that had its own conventions and representations practice.

[5] Herbert Marshall McLuhan CC was a Canadian philosopher, whose work is among the cornerstones of the study of media theory. He coined the expression "the medium is the message" and predicted the World Wide Web almost 30 years before it was invented

AR Comics, like Film, art or video games, are representation of reality that must conform to a new set of rules of representation. In Comics, space = time; the readers movement through space advances the narrative events i.e. time. Temporal phenomena like animated movement and sound show us that time = time, because these phenomena literally unfold over time. And so, introducing them to Comics often breaks the continuity and unique flow that the reader has set as their own unique pace. Repeating an animation over and over again somewhat helped with this break of continuity, as the resultant gif format animation allowed viewers to admire the motion and animation, breaking down movement into a series of stylised renditions that used Wil Eisner's suggestion of unique, provocative or attractive imagery to maintain a viewer's attention. However, this break of continuity in sound made it more apparent, it resulted in an abrupt, disturbing reminder that the experience of this AR prototype was just a momentary indulgence that could be shattered at any moment. Arguably this break in immersion could work in favour of Jannet Murray's *The Experience*. "Similarly, it is because this space of immersion is not real, that it is so real. The fact that it has real influences on our thoughts, emotions and selves, means that in order to keep it an enchanting space, we must keep it at the precipice of real and non-real, and never let it become *too* real" (Murray, 1998). This break of continuity could assist with this regard, however the break felt a little too abrupt in concept 1, perhaps a smoother fade in/out effect for animations and sounds could help to minimise how abrupt it feels while enhancing immersion.

Concept 2 began as an attempt to add 3D objects and interactivity to a children's story. Again, traditional sketches on paper were made then detailed on computer using *Adobe Photoshop* (Thomas Knoll, 2019) (sometimes referred to as just *Photoshop* in this report*)*. 3D models were then made using *Unity's* basic 3D geometry (cubes, spheres etc.) to be integrated within *Vuforia* (David Helgason, 2018). The art style and story were chosen to accommodate a younger audience (age 13 and under) while the sketches were done traditionally and detailed digitally (*Figure 26)* to speed up production time. The traditional Comic panel layout was kept, although single illustrations per page would be ideal for this type of children's book because children are the least likely to be literate, and so conforming to Comic conventions of left to right, up and down, would mitigate some of the target audience. AR implementation here was intended to add 3D virtual effects and objects combined with interactivity. Players could click and drag objects, move the player, or interact with other objects in the scene. The story takes the form of a boy who goes into a

new town, finds their soul mate, and then loses them after falling to other distractions. This story uses simple characters and so a low-poly, abstract aesthetic was used with simple 3D objects (cube, sphere etc.). AR is meant to add a 3D projection of this boy in town. Players take control of the smaller objects (labelled Boy on *Figure 27*) as they manoeuvre through the town while other objects and colours (other people) drift away from the boy to replicate loneliness and discrimination through game mechanics. Eventually the boy gets brighter and glows stronger the closer he gets to finding their soul mate (labelled Her on *Figure 26*).

This concept was exciting in theory; it allows one to truly game-ify an AR visual narrative, giving players the affordances and means to engage with mechanics and rules, playing a game and truly interacting while experiencing the story. However, the scope and demand of coding knowledge to implement this across multiple pages of a Comic required an engineer/computer science student to truly implement the coding demands within the time frame. As a Digital Art Honours alumnus, the researcher's skillset was limited within coding, and so not all systems of interactivity could be put in in time. This illuminated the time frame and scope of the Masters. Focusing on developing software and code that was beyond the qualifications of the researcher could prove too much for the deadline of this Masters. This prototype was a learning opportunity that would work best with a team of dedicated individuals that could focus on each facet of its creation. Mainly art and coding/app development.

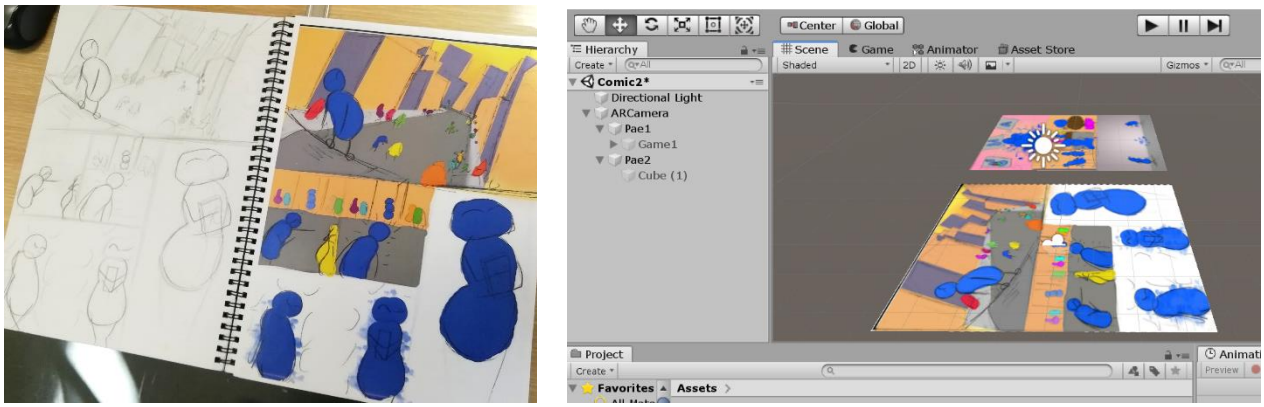


Figure 21: Initial sketches for Prototype 2 along with Unity 3D (David Helgason, 2018) screenshot of sketches in scene (Musoke, AR Storytelling Prototype, 2019)

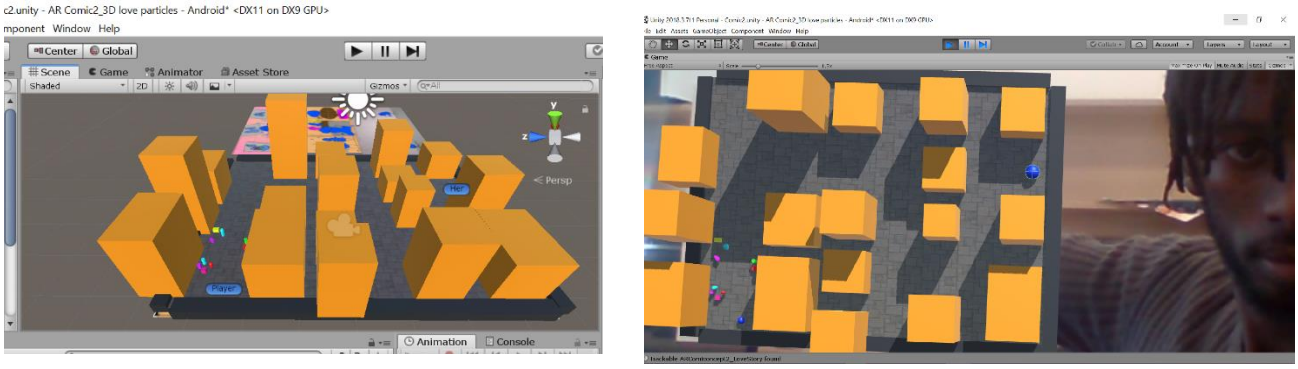


Figure 22: Prototype 2 sketches with 3D environment over them (Musoke, AR Storytelling Prototype, 2019)

The final **concept 3** for this proposal is another action driven narrative. The goal for this was to build on concept 1, adding a 4th wall break as an attempt for a new level of immersion as characters, particles and animations all fly out of the page and into the viewers world. Introducing limited interactivity (concept 2) was also the aim here, to make viewers partake in the story through mini-games that some pages could offer. The viewer would be required to move the characters, make them jump over obstacles, and to interact in order to help them progress through the story. In this sense, the fictional character is like an avatar for the viewer, who is sometimes a player. The player and the character are both the protagonist and need each other in order for the story to make sense. The conceptualising begun as traditional sketches, was inked digitally and finally animated using *Blender 2.8* (Roosendaal, 2019). *Blender 2.8* is ideally a 3D modelling software; however, this latest version allows for 2D animation in a 3D space. This allows one to create traditional images (2D illustrated characters, environments etc.) that use the inherent locality and positional tracking of 3D space to allow AR to take these 2D animations into the 3D physical world. The result was wonderful, pulling the viewer into the scene and allowing them to explore the space of the Comic beyond the boundary of the page as an added level of interactivity that could reveal hidden information. User's had to move their AR device close, further and around the page to reveal the full extent of the story. As stated above, Comics are spatial phenomena that use the readers set



Figure 23: Prototype 3 sketches and AR animation (Musoke, AR Storytelling Prototype, 2019)

pace/speed to create the progression of time. They are a sequential medium and so taking these inherent features of Comics and enhancing them through AR implementation proved to be a worthwhile exploration avenue for concept 3. Removing sound fixed the issue of space time phenomena as discussed in concept 1, while keeping animations that played on loop and even flew out of the page kept viewers locked on each page for a little longer, immersing them further and encouraging them to make sense of the narrative by interpreting the animations as they flowed from 1 panel to another. Viewers would often move their phone through physical space, exploring the space around each page to follow characters and find interactions. This further encouraged willing participation and immersion from the viewer through an intuitive learning process. See full video of this concept on this YouTube link:

CONCEPT Augmented Reality Comic 2 - 2.5D animation - YouTube

Proof of Concept (*Awakening*) Production

The initial prototype development phase was a crucial addition to the proposal document, showcasing what was possible in concept for this MA research within the scope of the researcher's qualifications and time frame. They provided a much-needed learning prospect to find the best workflow that could facilitate this creative practice and proof of concept. Correspondingly, studying and experiencing case studies of what was done before in AR storytelling helped to inform the decisions and design process for this proof of concept. Combining this with the preliminary research of the literature review was the final step form creating the proof of concept (*Awakening*).

The following section details this creative practice, detailing the software used and decisions made throughout production. Please note that the entire video of *Awakening* can be found on this link: https://youtu.be/XGtvU4jmWTM

Augmented Reality (AR) Masters Comic 2019/20 - YouTube

The production of *Awakening* Comic began with a thorough detailing of set, setting and thematic, following the advice of industry greats like Osamu Tezuka from the east, and Alan Moore from the west. In order to tell stories, in both cases, word-picture sequential art was done as a statement documenting historical, political or socio-economic factors for the viewership to relate to and learn from (Moore, 2003) (Phillipps, 2008). Wil Eisner calls it problem creation + solving (Eisner, 2008). This statement/problem creation is done as a

theme that is meant to be relevant to the viewership, as discussed in Chapter 1: what does it mean to tell stories. South Africa has seen a recent rise of xenophobia and gender-based violence. That is the social issue and problem that was identified for this proof of concept. Creating a story that shows comradery, loyalty and inspires love for those that are different to us (ethnic, racial or gender differences) was a clear direction to take to help to solve this problem. Fortunately, African philosophies like Ubuntu are based on this premise; translated Ubuntu means humanity and acknowledges how humans have evolved this far through generations of co-operation, through ascribing to a similar set of beliefs and working towards a common goal.

In this sense, it becomes apparent that storytelling is a representational practice of its own. *Awakening* isn't just visuals and characters for the readership, but also an opportunity to create representations that use the readers/viewership's experiences to provide clarity on the events. It is a chance to represent Ubuntu and other abstract ideologies in a metaphoric sense, and then strengthen this metaphor using AR. In order for a reader to not just see this Comic as literal illustrations but also to understand the link to figurative metaphors that express social issues and abstract thought, the correct representations and signifiers and denotations must be used to link to the correct signified connotations and communicate concepts.

Considering this, the initial idea was to make a story that would deal with issues of discrimination and unfair treatment within a cast of strong, female characters. This motivated the idea to present a metaphor for xenophobia in the form of humans that are born with powers/abilities that strike fear in the population that isn't born with abilities. This wide-spread appearance of "inhumans" was known as *Awakening*. These inhumans band together as Clansmen, doing jobs around this dystopian future Johannesburg as an attempt to show how inhumans can elevate society and assist where others cannot. Ironically, inhumans often compete among each other, pushing their abilities and expressing a heightened emotional resolve to win when confronted by different Clansmen who threaten their reputation amongst regions of Johannesburg. The protagonist for this story would be Mirembe, a normal human boy, born and raised within ancient African septs that disassociated from society. Mirembe's ability to focus on the similarities with inhumans rather than the differences resulted in the first natural *Awakening*; he learns these super-human abilities over time. When creating Comics, Alan Moore found that identifying a

problem/social issue that can be expressed metaphorically in his stories was easy, however solving this problem was implemented best over multiple Comic issues.

In Chapter 1, we made the example of Batman's conflict resolution and dramatic rise alongside problem creation and solving (the hero's journey). Similarly, what was discovered when writing *Awakening*, was that it was difficult to create strong links to this thematic within an 8-page Comic. Strong links like those that Alan Moore and Osamu Tezuka create require emotional engagement (MacWilliams, 2008); the viewers must get a sense of character disposition and understand the relationships within the story first (relationship between characters and between characters and the world) before being presented with situations and circumstances that support a rising sense of drama or express the social issues and deeper metaphors of the story (Moore, 2003). This is to better contextualise the situations and circumstances that create strong links between the events of the story and the social issues that it represents. As such, a great deal of the above mentioned rationale behind the story is intended to be explained over multiple Comic issues beyond the scope of this proof of concept.

As a result, the story of *Awakening* is not complete and ends with a "To Be Continued". It is done as small slice of a much grander narrative, and is meant to present action, setting and exposition as a contextual frame for the reader to better understand the relevance of AR within storytelling media. The action genre was picked not purely from preference but also as a springboard for relevant AR implementation within the story. Equally, when creating stories, Alan Moore advises that the storyteller starts by analysing the self and using genres, themes and visuals that appeal to the self. "In analysing the self, you are analysing the average reader of your work, so identify what you share with everyone, appeal to it through your story" (Moore, 2003). Similarly, Japanese *Shonen* Manga and western super-hero Comics are the staple favourite genres of the researcher and have inspired the art direction and content creation of the researcher for many years. As such, an action genre was also chosen.

The power system used in *Awakening* is also meant to be a metaphor for African spirituality and humanitarian ideals. In *Awakening*, these superhuman abilities utilizes a force known as Source. Source is believed to be the very creative fabric that holds existence in place – in some cultures it is known as The Universe, God, Light, omniscience etc. In *Awakening*, it is energy that can be manipulated directly by those who have successfully undergone the

Awakening. The only way to manipulate it is to fully know and experience one's connection with Source, that all exists because it is a manifestation and embodiment of Source. That the entirety of the creation evolves by serving itself – that humans evolve by serving other humans within the spirit of Ubuntu. This includes the self. In this sense, the realisation creates a mental evolution in humans that allows them to see the interdimensional level of reality, to truly love their neighbour as they love themselves and in doing so, tap into the fabric that holds that reality in place. Once tapped into, humans can then re-create reality around them, manifesting psychic ability. Or alter their genetics to adopt animal mutations that enhance their limited human senses (for example the strength of an elephant, or speed of cheetah).

Once the thematic, power system and deeper metaphorical links of the narrative were decided upon, production of *Awakening* began with character development and environmental design. When creating characters, Scott McCloud noted how a sense of drama was often created best when characters had strong motivations and dispositions that would cause them to have strong, unpredictable and memorable encounters with each other and the environment (McCloud, Making Comics, 2006). Characters that didn't share beliefs would clash, and conflict resolution would come about through the unfolding narrative. As a result, 2 female characters would be alongside our male protagonist – with personalities that were exaggerated to act as a buffer against the protagonist's modest personality. The environment would be a future Johannesburg city, with mythical elements imposed to create a medieval sci-fi genre. This was done to show a stronger link between technology (AR) and modern South Africa, as this genre would provide opportunities for the reader to use their AR to take control of characters, or to reveal hidden information about this fast paced, sci-fi world that looks so similar to reality. In this sense, AR implementation could be a relevant bridge that closes the gap between the physical world of the reader, and the futuristic world of the Comic. AR could act as a temporal device that allows the reader to use their own "ability" and power (technology) within this narrative.

Traditional paper-based sketches were used for basic composition, panel layout, character mock-ups and other conceptual details of the layout of each page. The focus for each page was to provide a unique visual look that could be recognised by AR. The AR implementation was also conceptualised at this point of development. The sketches of each page were laid out in a manner that would best support the AR intentions of that page.

For example, page 1 was the establishing shot. This page would present the environment, the city. The goals for AR on this page were to introduce interactivity, providing the reader with their first opportunity to learn how to interact with the page. As a result, the initial sketches have space for the horizontal swipe AR component. A top down view was chosen for page 1 to show the city, with an AR slideshow that would show the reader different angles and views of this city as a horizontal scroll bar that responds to touch input. This was to provide hidden information to the viewer. After getting critiques from Julie Stephen Chheng, a horizontal slideshow was replaced with a vertical one. Julie Chheng talked about how AR is a new technology that most viewers aren't familiar with, as such including AR should be done in a manner that is as intuitive as possible for the viewer. Similarly, the AR should introduce relevant information. What this meant is she agreed that the AR could present different angles and views of the city, to further the exposition and provide hidden information to the viewer as a form of relevant information. However, since page 1's illustration was showing a top down view, then AR interaction would intuitively make sense to let the reader scroll from top, down (vertically) rather than horizontally.

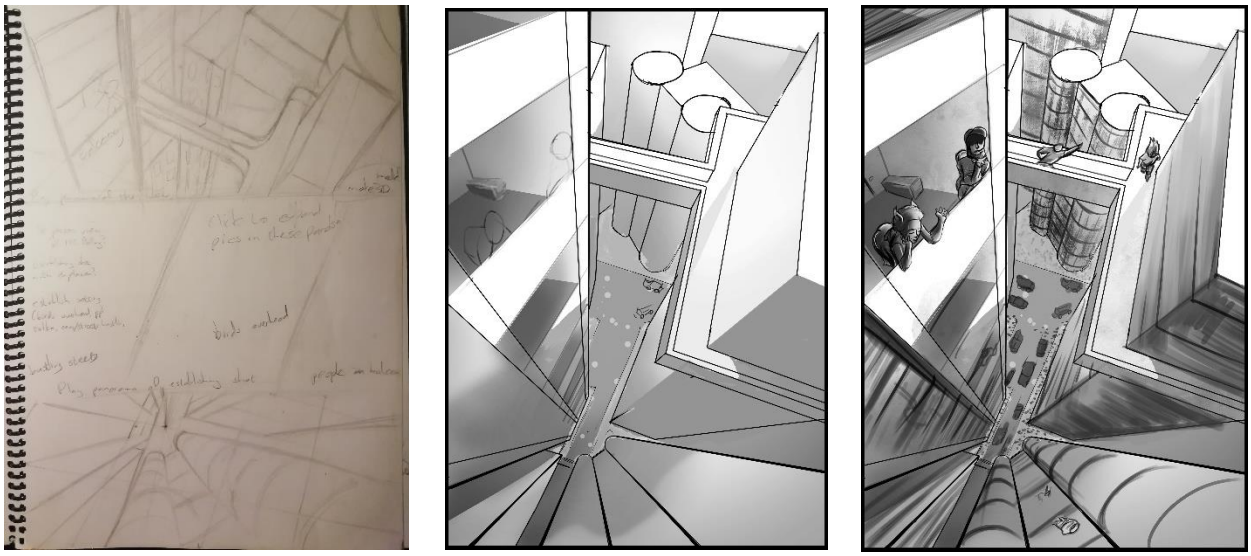


Figure 24: From left to right, the initial sketch, followed by digital drawing and final the digital illustrations of page 1 of the Awakening (Musoke, 2020)

These sketches were then be detailed with *Adobe Photoshop CC 2019,* to add ink detail, tonality and otherwise finish the printable edition of the *Awakening* Comic. Greyscale was used as a reference to Japanese Manga aesthetic, while western left to right Comic panels were used as part of the convention that the South African viewership would best understand (western Comics). Special note was taken to make these panels unique, detailed

and high contrast so that the AR application would immediately recognise them without an issue.

Creating the AR assets required a combination of *Blender 2.8* (Roosendaal, 2019) and *Adobe Photoshop CC 2019* (Thomas Knoll, 2019) to create animation, icons and other art assets for integration with the gaming engine. This gaming engine was *Unity,* used to compile the above-mentioned art assets with the Comic pages. *Vuforia* (David Helgason, 2018) was the *Unity* plugin used to create an augmented reality integration for smartphones to use. This app would open the camera lens and once it sees a Comic page, it overlays the virtual/digital information (art assets created in *Blender* and *Photoshop*).

A slow rise of progression was meant to be implemented in AR with each page slowly contributing to the rising drama and allowing the reader to use their acquired AR knowledge in future pages. This means that the illustrations would also start off with a simple layout and then increase in intensity, with the AR introducing more animation and interactivity with each page as the reader progresses through, to further immerse them while maintaining a level of interest (Eisner, 2008). This design decision was adapted from Jessie Schell's Flow graph and Aristotle's poetic.

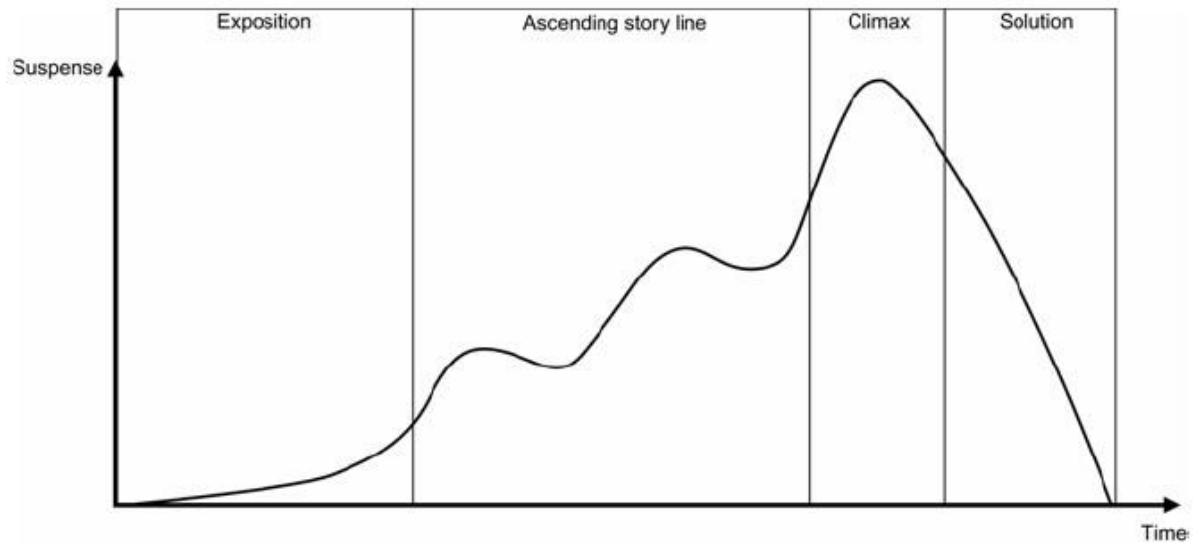


Figure 25: The classical line of suspense according to Aristotle's poetic.

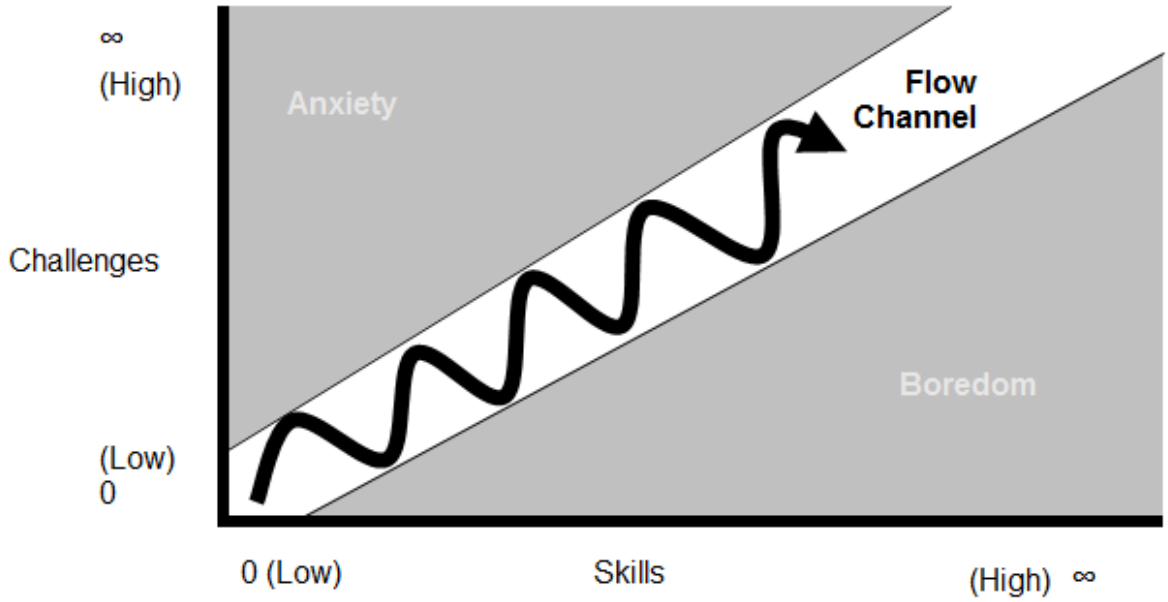


Figure 26: Jesse Schell's Flow Chart taken from Cnprocyon's analysis of Flow within World of Warcraft (cnprocyon, 2015)

The newly adapted graph (figure below) represents the passage of time as pages of the Comic and appeal (as a quantitative value) is intended to increase throughout the course of the Comic reading experience. The storytelling and AR use was designed with the intention of creating a rise in intensity of visual stimulus to mirror this increase in immersion, facilitated by AR, taking place in the viewer's subjective experience of the Comic. The user's use of AR on each page was intended to create a rise of anticipation, sensation and reveal of information that would likewise increase the viewer's appeal. Correspondingly, the downward path of the graph being synonymous with the viewer pulling out of the AR immersion to look at the page, using the conventions of a linear story to passively engage while interpreting representations on the page. This, along with turning the page and lifting the AR smartphone in anticipation, created the down facing curve of the graph. The final page introduces 3D for the first time, at the same time as the story reaching its climax and leaving viewers wanting more, represented by the biggest peak and quick decent of the end of the graph. Similarly, in order to not loose clarity with this rise of intensity, AR implementation would ideally be used to provide clarity about the events of the page in case the viewer doesn't fully understand the illustrations. The AR use is meant to be relevant in this sense, as reading the Comic without the AR wouldn't provide as much information, interactivity and understanding.

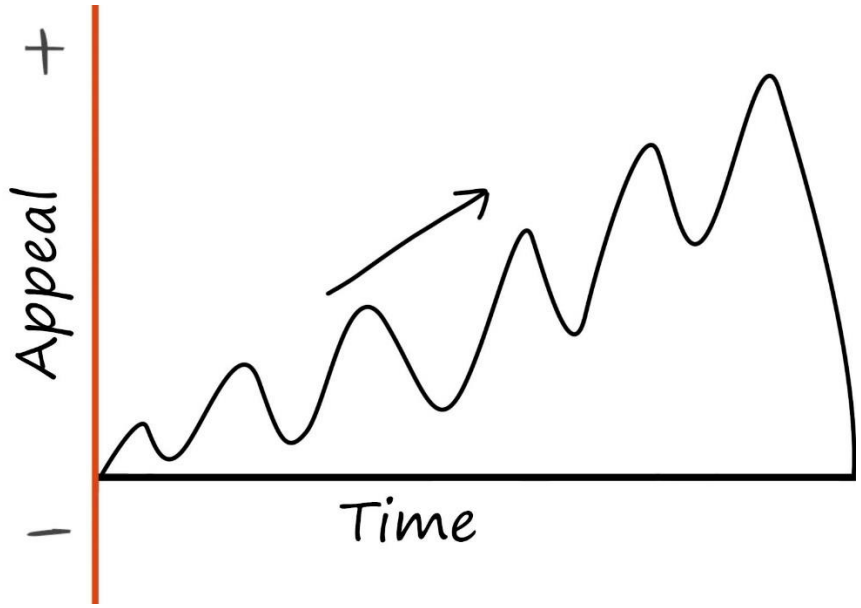


Figure 27: Rise and fall of Awakening's (Musoke, Awakening, 2020) progression. Adapted from Schell's Flow Chart (Figure 7) and Aristotle's poetic (Figure 6).

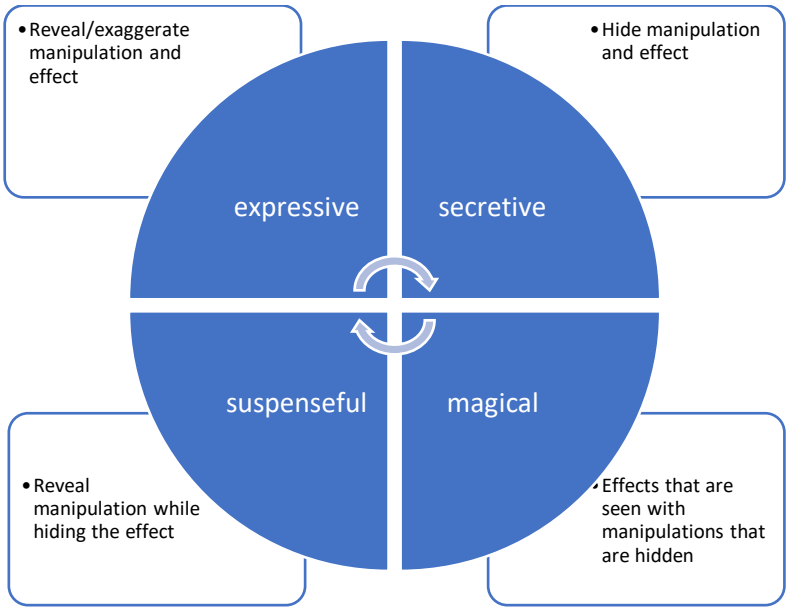


Figure 18 Repeated from page 42

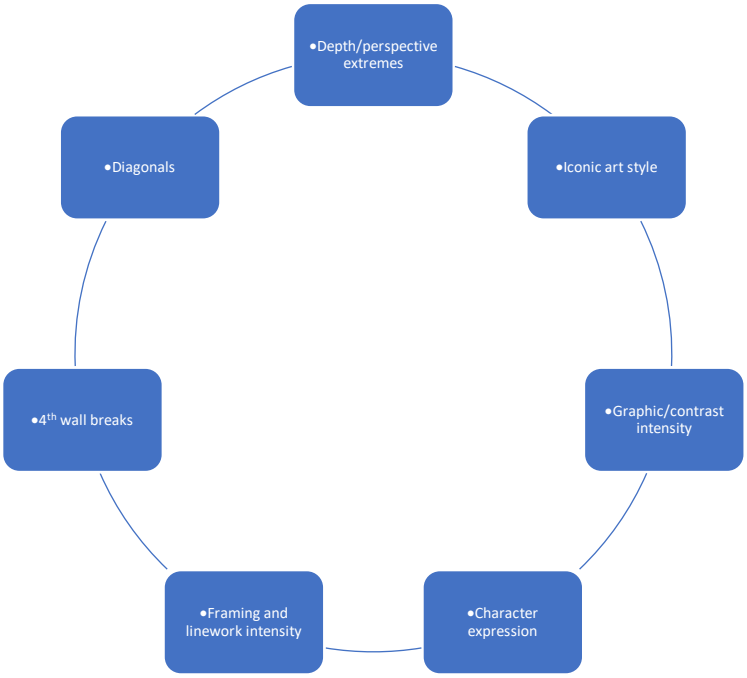
In *Figure 18 (inserted again above)*, *Designing the Spectator Experience* provided a taxonomy to use when creating immersive experiences that require audience participation and increased levels of immersion for maximum effect. The 4 main substituents of this taxonomy are Secretive, Expressive, Suspenseful and Magical and are defined in the *figure 18* above. Using *Awakening* as an exemplary model, we find that the magical element of this proof of concept is they cornerstone of its success; namely the way the interactions of *Photoshop*, *Blender* and *Unity* algorithms and coding to create art assets that interact in AR seamlessly with their manipulations of software and hardware hidden in the smartphone device yet effects visible as the core AR experience. Similarly, *Awakening*'s manipulations

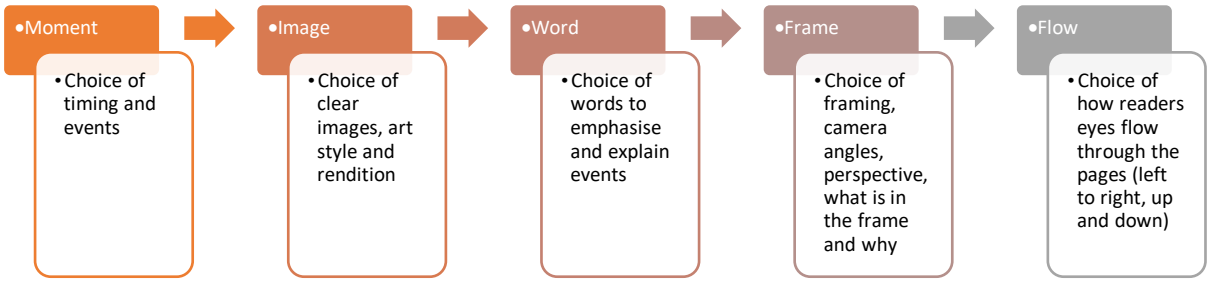
reveal themselves as animations, manipulations that are sequential art that is drawn frame by frame to create the illusion of life that result in an expressive manner that reveals/exaggerates the manipulation and effect. This conclusion is evident in the research, for the reason that when gathering research data from participants (more details in Chapter 3), the most common reply for question 2 b (Do you have any questions, confusions or inquiries about the AR Comic experience as a whole?) was "how did you make the phone recognise the images and overlay data?" The very nature of this question shows a certain level of curiosity about expressive, secretive and magical nature of AR, it is curiosity aimed at finding out what those hidden AR manipulations are that allow this Comic to happen. There are no interactions which hide the effect while showing the manipulation, to create suspense. Adding more page 3 instances of a game (as defined by Salen and Zimmerman above) would allow players to collect high scores, items or abilities (quantifiable outcomes) for completing pages correctly. These quantifiable outcomes could assist the player of this AR Comic later, as later pages could reveal that one would need to obtain enough items, abilities or high scores from previous pages in order to progress with the AR interaction. By doing so, these quantifiable outcomes would be earned through interaction (revealed manipulation) while hiding the effect of how useful they are in later instances of the AR Comic. Similarly, the 4th favourite page amongst research participants was page 3, purely for its interactive "jump" button allowing players to control one of the protagonists as they run along the roof.

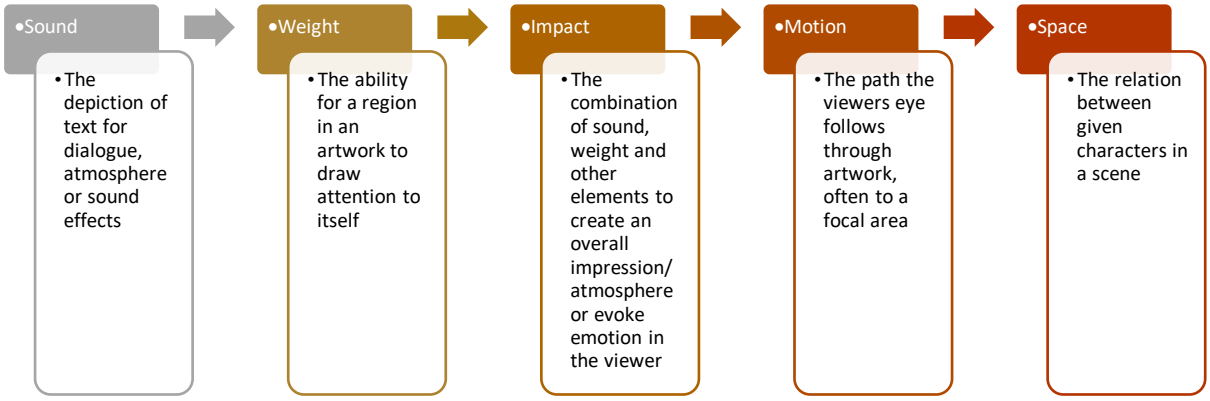
Awakening is not a game at all, purely because it doesn't conform to the definition of a video game throughout the experience, the definition being that games are a system in which players engage within artificial conflict, defined by rules, to reach a quantifiable outcome (Salen, 2003). However it is a form of immersive and interactive media. There is a system at work, there is artificial conflict being represented through the pages, however the viewer of the Comic does not engage in this conflict as they would in a conventional game. There are no rules strictly written for the player to follow. There is no quantifiable outcome within this interaction; the viewer of *Awakening* has interactions however those interactions don't really alter the story or change the outcome in any meaningful way. And finally, there is a level of endogenous meaning that *Awakening* required in order to create immersion that pulls viewers into the magic circle. The very nature of AR is magical – it is a device that displaces and places virtual space with in the here and now. In doing so it forces the viewer to re-create their interactions with space. With the guidance of Henri Lefebvre in

mind, one can say that the new AR space that is created brings its own set of rules and conventions that the user must conform to in order to navigate this space. In doing so, endogenous meaning is created – the nature of the experience requires readers to understand that what they see, the affordances of their interactions, and the resulting system at play, and results in it only carries meaning within this AR experience. It is this endogenous meaning that was the core focus of creating a meaningful AR experiences that enhanced storytelling. In order to better facilitate this and result in a sense of enhancement, the above-mentioned methodologies, namely immersion, an understanding of the magic circle and storytelling representational practice was used in tandem.

Wil Eisner mentions that visual narratives use the algorithm of formulating depth and intellectual engagement in the form of a story, and then adding visual and aesthetic appeal to it is a classic formula that has been employed by many storytellers throughout the ages (Eisner, 2008). The very nature of AR is aesthetic appeal, allowing sound, particles, visual effects and other haptic feedback systems to fill the viewer's perception. As an artistic media it brings a level of magic and fantasy into the experience through providing information that opens a gateway into levels of fantasy and immersion that other media don't allow (Mogan, 2016). This fantasy and immersion is the cornerstone of what it means to enhance storytelling. As a result, the first 2 parts of this above-mentioned taxonomy, Sensation and fantasy, are catered for through AR's intrinsic function of extending the senses and overlaying information to the viewer. Narrative is supported by the visual storytelling elements of the Comic itself – the sequential art within *Awakening* uses a mixture of Scott McCloud's rules of clarity and intensity alongside the Japanese Mangaka's SWIMS (figures re-inserted below. We can see this exemplified throughout the *Awakening* Comic, an example would be page 2 of the Comic (*Figure 32* below).


•Depth/perspective extremes
•Iconic art style
•Graphic/contrast intensity
•Character expression
•Framing and linework intensity
•4th wall breaks
•Diagonals


•Moment
•Choice of timing and events
•Image
•Choice of clear images, art style and rendition
•Word
•Choice of words to emphasise and explain events
•Frame
•Choice of framing, camera angles, perspective, what is in the frame and why
•Flow
•Choice of how readers eyes flow through the pages (left to right, up and down)


•Sound
•The depiction of text for dialogue, atmosphere or sound effects
•Weight
•The ability for a region in an artwork to draw attention to itself
•Impact
•The combination of sound, weight and other elements to create an overall impression/ atmosphere or evoke emotion in the viewer
•Motion
•The path the viewers eye follows through artwork, often to a focal area
•Space
•The relation between given characters in a scene

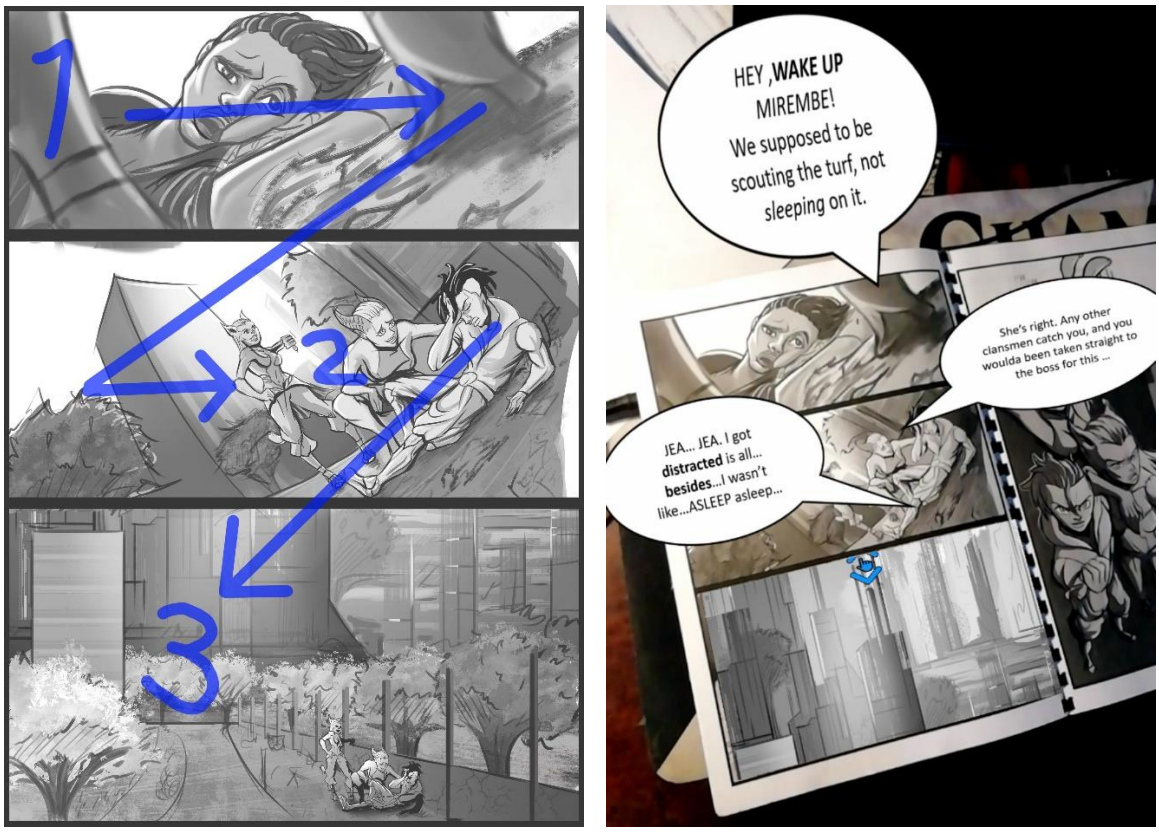


Figure 28: Pages 2 of Awakening for analysis in MA thesis (Musoke, 2020)

Natural flow and movement of the readers eye was the starting focus of design, as the development of this Comic took from classical Manga conventions of this importance of flow, and subverted it towards leading the viewer's eyes from left to right (instead of right to left within a Manga). Starting a 1, the reader's eyes will gravitate towards our protagonists facial expressions first (since people notice faces and eyes first (BriHard, 2016)). They are then led diagonally down and left to the next frame, where the harsh contrast of the city backdrop along with depth/perspective is used to give information about the setting. The viewer's eyes then naturally flow from left to right on this panel, settling at point 2 where various character expressions, line work intensity and tonal gradients are used to give a sense of spacing and weight to the characters, setting them apart from the background while facilitating this natural movement of the viewer's eyes so that it lands on the characters as naturally as possible. At this point, the viewer's eyes are led diagonally down and left again by the position of our main characters body, allowing the viewer's eyes to end on the last panel, point 3, where a zoomed-out perspective is given of the environment. This last panel's AR has an interactive screen on panel 3, where the viewer can swipe vertically as form of 4th wall break, allowing them to see more information about the environment in a manner that they wouldn't be able to on a conventional Comic.

Since the Comic was greyscale, adding blue as a signifier of interactivity was decided on. Wherever the colour blue was used, it accompanied image/text of possible interaction ques for the viewer. As we see above, the blue allows the user to scroll up and down. In this sense, the 4th wall break is used to break out of the panel and to interact with it. The choice of imagery, of timing and of weight, impact and spacing is all done to better facilitate flow and movement of the viewer's eyes (BriHard, 2016) (McCloud, Making Comics, 2006). The choice of words was placed to provide information about the characters personality and relationships in this page and to add to the flow and movement of the page. These words have been placed at the intersection of various eye movements. The words were all placed in AR to provide more reason for the AR to be adding to the story, rather than it being purely a visual gimmick. This shows how the issue of spacing within Comics as discussed by Scott McCloud can be handled effectively through AR, thereby enhancing the storytelling experience by facilitating movement of the viewer's eyes and word placement to provide an extended understanding of spacing of the characters and objects within the Comic. Similarly, this extension removes the limitation of spacing that conventional Comics would have as they are limited by the page.

A sense of discovery was created through revealing hidden information in AR that wasn't available before, information that the user must find by moving their smartphone device through space and pointing it at different aspects of the page so that this information is revealed. This places discovery in the viewer's hands, as their own willingness to use the software was what created a reward of information to them. Similarly, Costikyan defines this as literally discovering new places and exploring the game (Costikyan, June 2002). This interaction of discovery, sensations and narrative creates a very real "masochism"; it creates a world which users are all too willing to lose themselves in and submit to the rules and system. We know this because the least favourite page of *Awakening*, as per the results of Chapter 3's research, was page 8. Purely because users didn't want the experience to end, the To Be Continued was a reminder that their submissive role is over, they can return to reality – yet their response was one that showed a reluctance to let go of this masochistic immersion into *Awakening*. This analyses the design decisions for just 2 pages; however, all of the Comic pages had their own required level of AR change that was needed. Similarly, the focus for this research is more on the experience of AR and storytelling, quantifying how successful this research was hinges on the response of the participants, which is what Chapter 3 shall discuss.

Statistics for phone usage in South Africa all showed a positive, growing trend towards the general public's adoption of smartphones (Statista, 2019). This statistic predicted that by 2030, every household in South Africa will have at least 1 smartphone. Similarly, Jesse Schell's predictions for VR and AR revealed that the exponential adoption rate of AR and VR technology by the general public was astounding, with an estimated 25 million XR devices to be in the global market by the year 2025 and beyond (Schell, 2016). The miniaturization of AR technology meant that it's adoption rate increased even more, adding to Snapchats astounding success purely because there was a market of compatible smartphone devices that were ready to use the technology (Racette, 2015). When looking at Rogers' *Rate of Adoption* (*Figure 12 on page 39*), along with the above-mentioned statistics and predictions for AR's usage, it became apparent that the perceived relative advantage of AR had already been proven as successful in the modern market. The technology was compatible with smartphones and worked almost intuitively with users. Humans are innately visual creatures – our sense of sight is the most dominant one, adding to a massive visual culture of games, art, Films and other visual dominant sensations. As such, the complexity of AR was minimised by this intuitive understanding that users had in knowing that is acted as an extension of this dominant visual sense. Despite this, during the production phase of this MA's proof of concept, *Awakening*, focus was put on minimizing eye movement and maximising ease of usability within AR, so that viewers wouldn't struggle or get confused. The result was astounding, as group experiments among participants ideally functioned on observability, with students seeing their colleague's reactions to the AR and then coming closer to look over their shoulder, sharing the experience and facilitating a sense of fellowship along with it. Seeing Rogers' *Rate of Adoption* happening throughout the development process of this MA as well as in the research space was immensely gratifying.

This observation however was not met without criticism. While talking to Russel, one of the industry professionals consulted at the *JAG* workshop, it became evident that, in his experience of creating AR for direct mass media, consumption and adoption was an increasingly difficult endeavour. Yes, people would respond positively to public installations and exhibitions, especially if the AR software was already loaded onto another device. However, those same people were often reluctant to download the AR software on their phone and take it home with them. Russel shared that users of smartphones are very conscientious about data, storage space and app usage, and as a result they often simply refuse to download AR only apps. The result was that his development and AR app usage

would end at the installation or exhibition, his clients would report low usage statistics amongst willing participants. Similarly, conversations with Gareth Steele and Robin Baumgarten tended to reveal the same, that people would willingly pay and come to exhibitions or installations that had digital art (*rAge*, *Comic Con Africa* and *Playtopia* to name a few), yet would rarely ever request to buy and take these experiences home with them. This presented a troublesome distinction wherein we see that the statistics point towards AR becoming more and more prominent now and in future (Schell, 2016) (Statista, 2019), however hearing what industry professionals went through in the field of AR in the present day proved to be showing us something else, a conundrum of sorts. This slow rate of adoption could stand to provide enlightening information if it were to be researched a little more.

Chapter 3 Research Methodology

In order to better quantify the results of this research, it became apparent that non-medical[6] human participants were needed in order to provide feedback on the success of the proof of concept, *Awakening*, and to judge how great a storytelling medium it was alongside Augmented Reality. 4 Key concepts were decided upon for the design and analysis of this ethnographic procedure; namely *experience, practice, things* and *relationships* which shall be defined and examined throughout the course of this chaper.

Experiences is defined as the phenomenological word refering to how it is embodied and lived through sensory and affective modes. The very nature of experience is subjective, it involves the experience of things that are impossible to express through langauge, nonetheless we attempt to cater for it's communication through games, Films and other entertainment media. Games have been noted structures that convey experience to the viewer in ways that other media can't. As a result, attempts to understand and interpret it's meaning often involve researchers involvement in sites of other people's experiences. Researching experiences has often been done with conventional tools (interviews, surveys and other diary methods) however, these methods don't reveal unspoken, unconscious elements of the experience and so researching how the unconscious manifests through

[6] Non-medical human subjects are usually social science related and involve surveys, interviews and focus groups to observe responses and behaviour. By contrast, Medical human subjects for research are clinical trials requiring biological tests, data collection etc. often for the evaluation of vaccines, drugs or hormonal changes.

routines, ha bits and activities of daily life is a better option for the systematic collection of data (Sarah Pink, 2016).

Things are spatial phenomena or objects that people use, they often carry meaning and can have sentimental value to us. For example, clothes, cars, cell phones, TV's – all these things are informed by power relations in race, culture, ethnicity etc. – ascribing unique value and meaning to things and informing how we use these things (Lefebvre, 1974). Things are always becoming rather then set, they are initially labelled with consumerist value but then the consumers take it to other levels by using them in new ways (Sarah Pink, 2016). This is why designing experiential media like video games or XR (extended reality media like VR and AR) can be so difficult, as mentioned above already (Chapter 1). These things, in a way, become extensions of the self through personalization and projection. Parts of the self become stabilized through our things, we learn to feel at home through them (Vogt, 2007). However, it is through how we use these things that their meaning becomes created, it is through practice. And this practice often comes through in manners that the creator/author did not intend.

The study of *practices* emerged through an interest in how human actions and ha bits are shaped and maintained over time and the ways in which these impact the world. Practice is all about ha bits, so it stresses routine over action, dispositions over decisions (Sarah Pink, 2016). This is why Henri Lefebvre says that our relationship with things can inform practice through spatial interactions (Lefebvre, 1974). Our routines and ha bits start forming dispositions that we associate with certain things, with certain spaces.

Studying media use and understanding amongst people is a necessary step for any ethnographic research. Focusing on non-media centric approach is the next vital step. We don't just use tech, but its spread means we have become active producers and shapers of the content. Just as the human creates spaces and technology, those spaces and technology inform mind and create moods, emotions and other phenemonoligical phenomena (Silva, 2017) (Langdridge, 2018). To combat this, the questionaire content of this research not only asked for feedback on the AR experience, but also briefly examined browsing ha bits, hobbies and favourite storytelling media to try understand the ha bits and motivations of the participants. The questions were asked right after the participants experienced the AR Comic,they focus on finding out demographic answers and technology use within

storytelling so as to better situate the research data as a foundation for understanding their interactions with the AR Comic.

Similarly, Malinowski argues that *relationships* are formed with word expression/language, which establishes the links of friendship amongst people (Sarah Pink, 2016). The result of which is relationships that are constructed and internal dialogues which we have a constituted within social interaction with different objects (people and inanimate). The effect is our world is socially constructed and does not live outside of actions and social interactions. Social context shapes our lives, our performance and expressions, which, in turn, shapes social structure of the world. This understanding not only assisted this research in crafting a methodology of research that would help answer the research question, but it also assisted with designing the content of the proof of concept, *Awakening*.

This above-cited information points out the importance of things, ha bit and relationships within constructing digital media content and examining research participants as they use their understanding of social structures, language and ha bits to use digital media content. All of this culminates in a certain experience within the participant. All this is a vital step in answering the research question; *how can AR be used to enhance the storytelling experience*. As expressed in Chapters 2, design paradigm, a great extent of delicate design was used to create the content of *Awakening* for minors to experience and enhancement of storytelling. Using Chapter 1 literature, topics like semiotics, spatial practice and storytelling/game fundamentals were used to establish relationships between the fictional characters and the world they were in – with AR acting as a lens to view this world, encouraging users to interact with the AR technology to help the story progress and communicate to the viewer. In this sense, AR became a tool to deepen immersion and the magic circle, resulting in an enhanced experience with the story that otherwise wouldn't be there if it wasn't for the AR technology. When we say "wouldn't be there" we mean in the sense that AR provides a very particular experience of enhanced storytelling. This enhanced storytelling would be possible without AR, however it wouldn't do what AR does and would have to borrow from other media or representational practice to create a different form of enhancement.

Observing the success of this design through human research participants was a hurdle that went through multiple iterations (prototypes, ethics application, research procedures etc.) Research participants were minors from select high schools around the Johannesburg City

region. Highschool students were picked as the most likely demographic of people to be exposed to entertainment media like Comics, animation and games as well as familiar with technologies like AR and smartphone applications. Likewise, they are the target market for this Comic as the most likely age group to relate and use entertainment media and contemporary technologies. This information became apparent to the researcher after having been invited to lead an AR workshop at *JAG*. This workshop was open to the public, with special invites being sent to Animation School students and high schools in the city, alongside social media advertisements that were geared towards getting attention towards the exhibition and workshops that were taking place at JAG at this time. This AR Workshop was lead by the researcher and was a 2 hour duration that involved us introducing the technology of AR and its application, and then explaining how to go about creating AR content using *Unity*'s *Vuforia* (David Helgason, 2018). There was a mixture of people in the audience, however it was mostly youth aged 13-18 that showed the most avid interest; asking questions, making examples and following along to the workshop. They were keen to share their ideas about the future of storytelling, Comics and AR as well, often letting the workshop presentations slip into conversation about media culture and entertainment. It was here that some proffessionalsin the industry of AR also appeared, listening to the workshop and offering invaluable industry insight about AR, specifically it's popularity amongst youth, it's slow rate of adoption and it's limitless potentials.

This observation could be biased however, because most of the people who were in the audience were aged 13-18, so it's more likely that they would be the ones showing interest to the workshop. Nevertheless, their presence in the space shows a clear interest that was used to motivate this research direction.

It was at this point that the research methodology of this paper came together. Through the above-cited knowledge acquisition, supervisor consultations and research, it was decided that a focus group would be shown the Comic through an exhibtion that was fascilitated by objective parties whom inha bit the space and conduct the research on behalf of the researcher to avoid confirmation bias. The research would be conducted within school hours, at the schools premesis, to aleviate some of the pressure that minors would have at traveling to unknown environments. Permission was requested from the high school principals and was received as formal letters stating that the research could be done during the student's breaktimes so as not to impede the academic schedule. These objective

parties became assistant researchers. They were teachers at highschools that were identified as ideal for conducting this research as they would allow the minors to act without pressure, knowing that a familiar parental figure is in the space at all times. These highschools were The German School, De La Salle High School and Helpmekaar High School. These schools were partly private, sometimes fully private schools, their students belonged to families with middle to high income so they were even more likely to have smartphone devices that were capable of running the Awakeining AR application, while being more likely to having been exposed to AR technology as well (through social media, direct experience, or conventions that they'd attended).

While consulting with these objective parties, it became apparent that the initial idea of giving students the Comic to read, the download link for the AR and then interviewing each student, one by one, afterwards, would be too time consuming a process for these assistant researchers. Similarly, the ethics committee at Wits University identified some issues of downloading with application. With this above mentioned advice in mind, the research acquisition changed into a public exhibition that would feature the pages of the Comic printed in A3 and put side by side within a space that could fascilitate group interactions. The researcher's phone would have a working version of the application with optional download links available in QR code and bitly link shorteneres, that participants could download to experience as well. Questionaire and consent forms would be placed at the end of the Comics for participants to walk through the space, experience the Comic, then answer the forms. The questionairre questions focused on demographics, phone use, entertainment media, AR exposure, and the AR Comic experience. The questions aimed to extropulate statistical data that could be compared and cross analysed so as to better understand this target market and, in future, create AR content that is not only relevant to their dispostions but also inline with their hobbies and viewing ha bits, something that can be accessed easily and understood as a seamless experience that drawns on their established conventions, experiences and ha bits. Understanding their things (entertainment media and digital devices), and creating content that could be used in a similar fashion to how they use their things would be ideal. Similarly, the questionaire aimed to answer the research question of "how can AR be used to enhance the storytelling experience" by monitoring the students as they experienced the AR Comic and providing questions that would attempt to quantify their expereince. The questionairre questions and results are in the next subsection, Research Results.

Figure 29: (Left) Participants using phone to view the AR Comic





Figure 30: Setup of exhibition space at De La Salle High School's

The process was done in groups, as one student would hold the phone while 3-6 students stood around him/her to experience the Comic together, making comments, laughing and sharing the experiense. Other students were in the space, waiting for their turn, as such this observability acted inline with Rogers' Rate of Adoption by creating an anticipation and willing excitement in students as they saw their colleagues experiencing and reaction to the AR Comic. This allowed the researcher to observe the reactions of the participant without being in the space, with the assistant researcher taking pictures and videos to show the researcher after. This provided insight into how well the rise and fall of the Comic's AR progression worked, and if the Comic was enahnced through AR at all. Ideally such subjective questions aren't always answered easily on a questionairre, so the second hand observation that the assistant researcher provided was welcomed. At times the researcher would have to come into the space to fix download/application issues, answer questions and assist with conducting the research. All in all it took about 8 minutes to experience the AR Comic, and 10 minutes to answer the questionaire. Totalling to about 16min for a group of 6 students to experience the Comic and answer the questions that followed.

Participant observation became a tool of communication *and* research, as personal locative and mobile media were used as part of a research process. Both within our relationships with participants and as parts of people's relationships with each others that we wish to observe unfold. In this context, observing the relationship between participants, technology and a Comic page was paramount for the discourse of answering the research question. "Additionally, scenarios of use, and re-enactments as participants use and show us how they

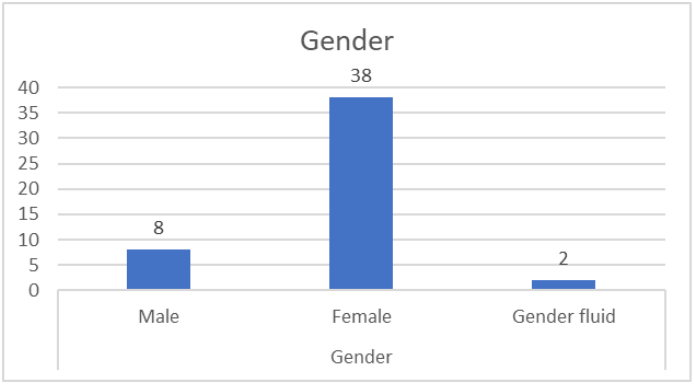
use various platforms and applications, can enable us to consider the types of performativity and etiquette (tacit and phatic) that are part of the ways that social relationships are constituted through the material and immaterial dimensions of the ways that people use and experience digital media." (Sarah Pink, 2016). This was exactly the case as many participants didn't even notice that touch screen interactivity of the blue aspects, even after putting signifiers like the words JUMP or small pictures showing a scroll up/down gesture. However, once one person discovered this aspect, they would share it with others. Now everyone was scrolling on pages 1 and 2, as well as jumping on page 3. Some asking to go back and re-experience the AR Comic as their new discovery created a newfound sense of anticipation as the participant knew that their relationship with the AR space and things was bound to transform.

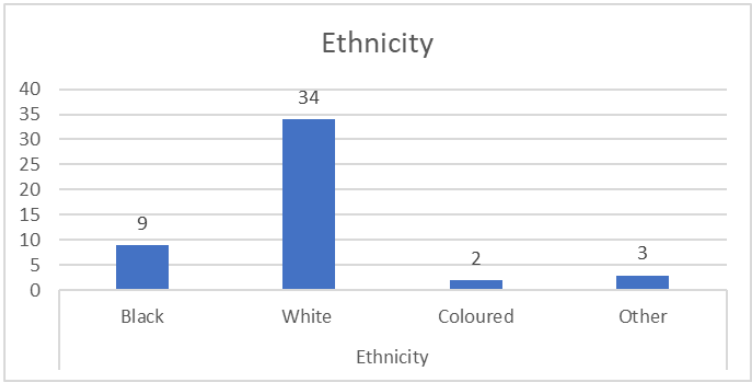
Talking with Julie Chheng provided a large body of insight in this regard, as often she realised that intuitive technology use hinged on correct representational practice that could universally communicate to the user despite their difference in cultural, ethic or demographic information. Her workshop noted that AR presented an opportunity for users to redefine their connection with the arts through direct interaction. In this sense, an artwork would normally tell a story, or a Comic book would expose a narrative. However, she found that the commissions she would receive were by clients who knew that they had to offer users something different, something that enhanced the conventional storytelling practice within the arts while still catering to a universally understood system of representational practice. In this sense, her workshop outlined a system that she had tried successfully with other participants in an attempt to enhance the storytelling experience within certain spaces (museums, malls etc.)

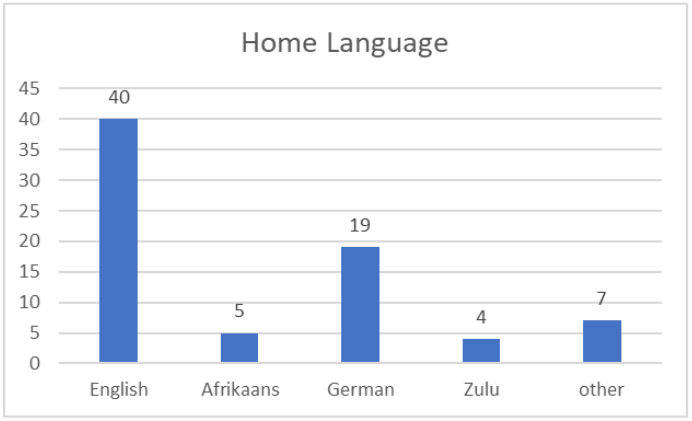
Research results

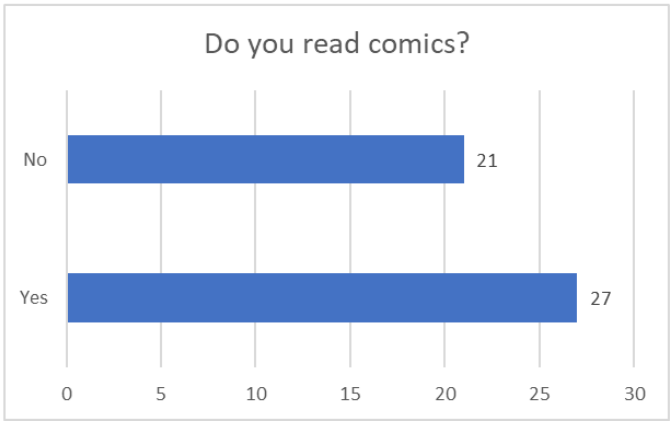
The questions of the questionnaire are in the Appendix before the Bibliography. A total of 48 participants were involved in this study, aged 15-17 years old. Because the AR experience was done in small groups, the participants answered the questionnaire in groups as well, comparing results and discussing answers. This means that the participants likely influenced each other's answers, resulting in a slightly diluted concentration of information. Please note that data labels that show <1 3> are for questionnaire answers that required the participant to circle a single number between 1-10, with 1 being least likely, and 10 being most likely. All the participants who circled between 1 and 3 (equal and greater than 1,

equal and less than 3) were added and represented as that data label. Similarly, some answers required a sentence that participants would write to elaborate on their answer. These answers have been summarised in this section by looking for keywords amongst answers and using those keywords to create a cohort of participant answers. Please refer to the questionnaire in the Appendix for more clarity. Nonetheless, the following is a summary of the participant's demographical information (Questions 1a – d).



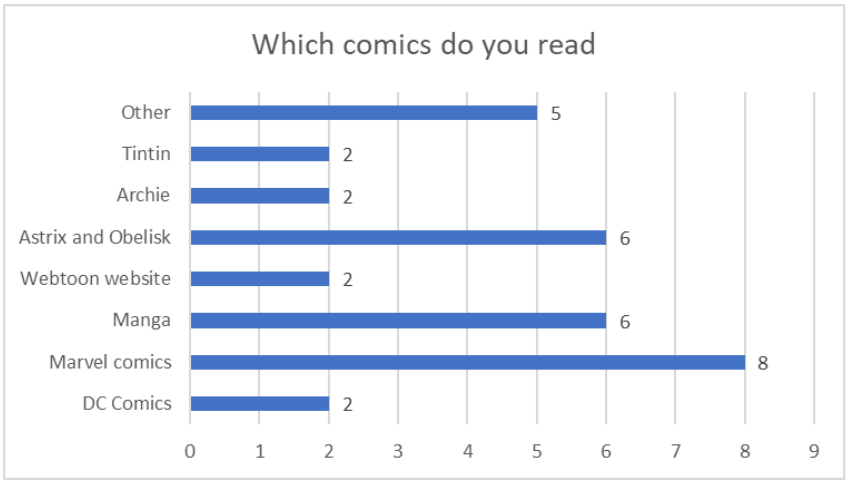




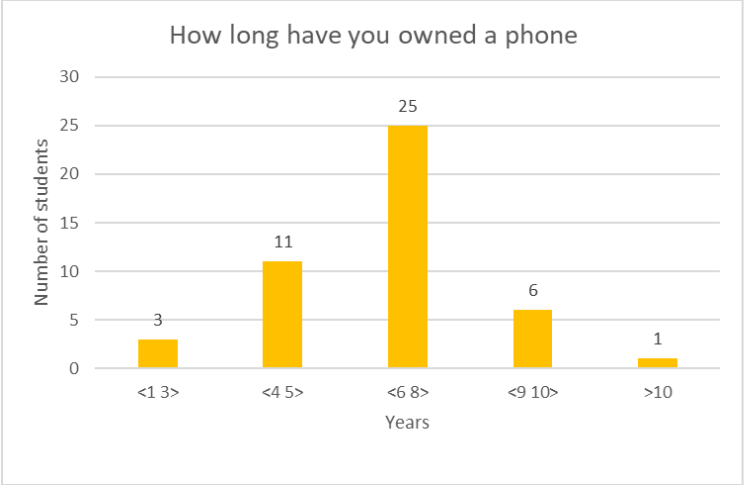


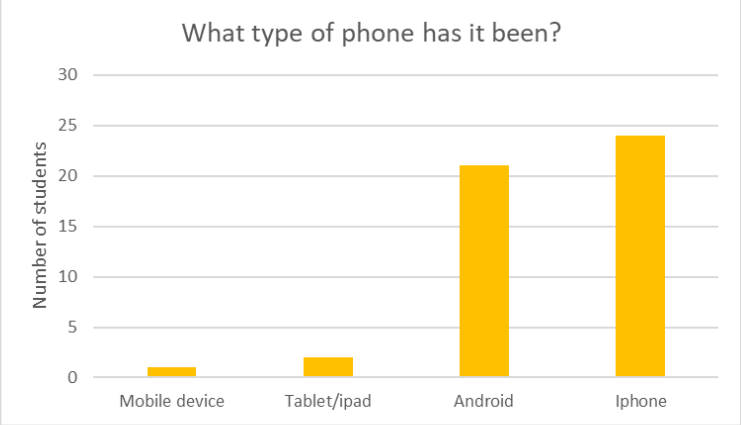
The genders of the participant were mainly female. The dominant ethnicity being Caucasians (whites), the others namely being 1 Chinese and 2 Indians. Home languages were mainly English, with the others being 1 each for Sotho, Sepedi, Swahili, Tsonga, Urdu, Bulgarian and Portuguese. This was an unfortunate coincidence as a larger spread of ethnicities, ages, gender and home language would have been ideal for extracting more concise conclusions on the experience of this AR Comic. As mentioned in Chapters 1 and 2, the cultural, socio-economic background of a person shall create their own unique sphere of semiotics and spatial practice. The result is that different people can experience the same media yet extrapolate conclusions that the author never intended. Despite this, most successful media can transcend these differences among people to communicate a unified

front of representations by relying on the unifying aspects of the human experience (we all know love, loss, pain, happiness etc.) Testing on a wider pool of demographic data would help to better pin point the results of this study.



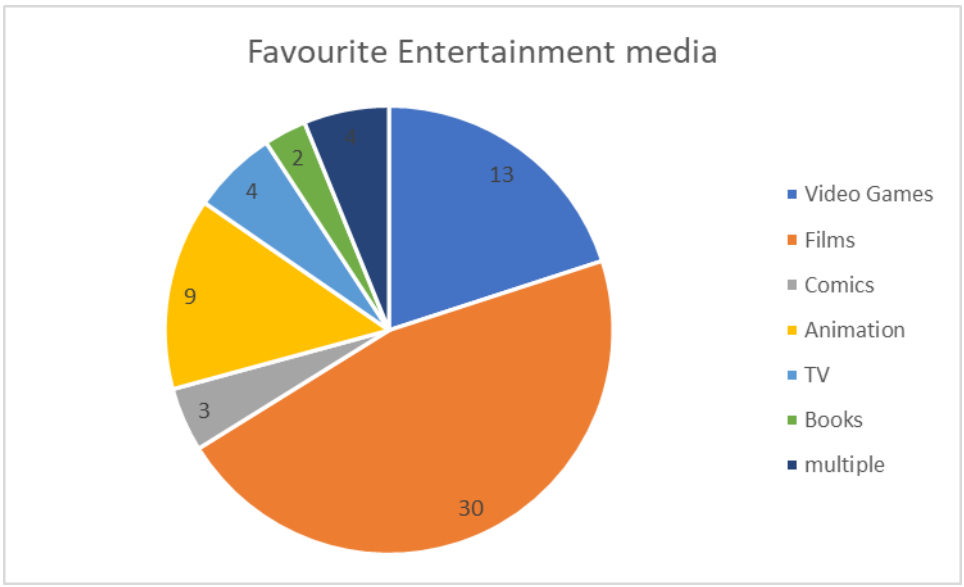
56% of participants read Comics, with *Marvel* Comics (Marvel Comics, 1939) being the most popular of that cohort. The Mangas that were referenced were *Shingeki No Kyojin (Attack on Titan)* (Isayama, 2009), *Tokyo Ghoul* (Ishida, 2011), and *Death Note* (Ohba, 2006) while the others were a mixture of Comics and newspaper strips getting 1 mention each.



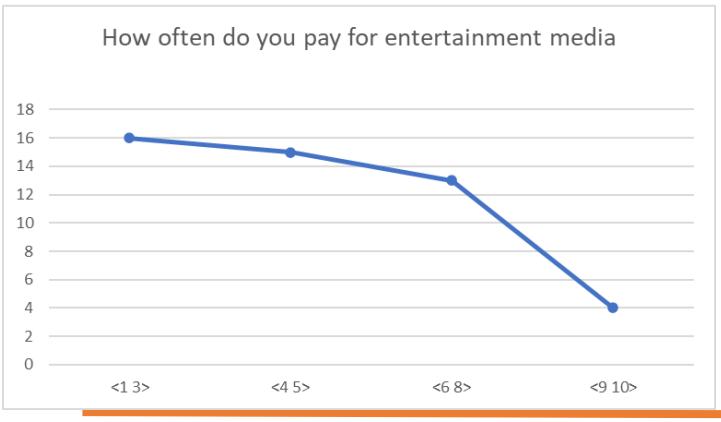


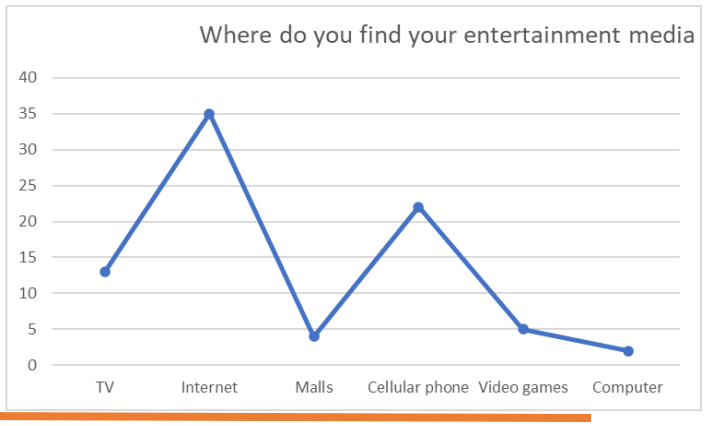
Questions 2a-b were about the participant's phone use. All the participants had/have phones, with the age group suggesting that most participants were first exposed to their own phone at about 8-10 years of age. Android and iPhones dominated the research group, with a strong correlation showing that the longer a participant owned a phone, them more likely it was to be an iPhone user. The schools that were consulted for this study were reasonably expensive schools that would undoubtedly have a large number of students who have access to technology. By asking evaluating the response to this question, we can see that we are more likely to encounter viewers who will be somewhat familiar with AR and interactive smartphone apps. An encounter that is great right now for finding participants

who can objectively judge how well the AR enhances storytelling, however this cohort of participants aren't as great for seeing if the representational practice that was employed for this proof of concept is capable of communicating effectively to a wider demography of users. South Africa's racial and socio-economic majority are poor class blacks (Statista, 2019). They are also the largest perpetrator of xenophobia, rape and other crimes that plague our nation. As a result, they are the ideal target market for this Comic, both for reaching a larger profit margin and for impacting an audience through representations that speak to the South African experience.



Questions 3a-d were about entertainment media. Films were cited as participant's favourite entertainment media, as well as the most likely source of their storytelling experience, with over 60% of participants showing this figure. Video games came second, with animation following soon behind. Strangely enough, those participants who read Comics didn't always cite it as their favourite medium, often picking animation, video games or Films as their favourite medium. Some participants picked multiple categories, if not all, showing a varied interest that perhaps would change with age and generation cohort (for example, in their childhood years they would be less likely to read books, and as adults they mightn't have time to indulge in video games as often). Similarly, the largest gender pool for this study was female. Perhaps this shows a direct correlation that hints that





this is what girls of that age engage with more than if the test group were mostly adolescent boys. Further testing on a cohort that includes boys might show a different result.

How often do you pay for entertainment? Was a problematic question, being that the participants were minors, they were unlikely to directly pay for certain entertainment device – their parents/guardian would provide a phone, internet connectivity or buy their gaming console for example. Nonetheless, buying a Comic, video game or data/airtime for continuous use of this entertainment device often fall on the minor's pocket money and their own financial decisions thereafter. Even if this pocket money was an affordance given by parents/guardians, the minors would still have the freedom of choosing how to spend this money.

Most participants used the internet or their cell phone for entertainment. When asked why this was their favourite medium, it became apparent that a priority to stay connected and "online" so as to access the best content of entertainment was paramount (download a cell phone game, streaming Netflix, or reading Comics online for example). Discussions with Russel while giving the workshop at *JAG* revealed a similar anecdote about participants and AR; he noted that getting participants to install or download AR apps was problematic as most participants didn't want to go through the hassle of data costs, storage and time waiting for installations. However, AR apps that were integrated within browsers usually received stronger responses and re-usage statistics. This shows a possible connection that one could exploit by developing Comics that must can be bought or read online, with an AR camera lens that is integrated on the Comic's website so as to complete the experience through minimum hassle for the viewer. An exploitation that is supported by the above observation in this research that most minors (aged 13-18) that appreciated storytelling would respond well to using their cell phone and internet browsers for AR enhancement.

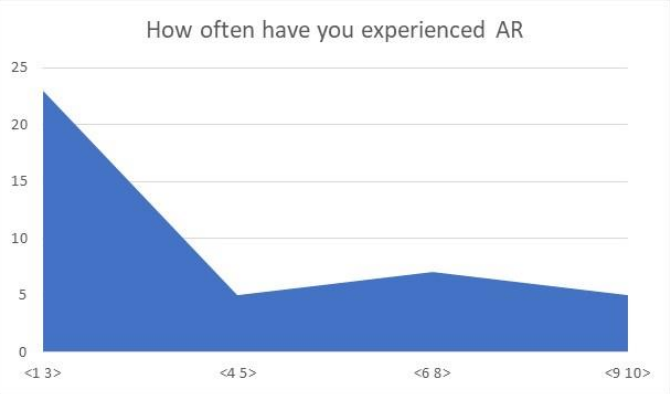
8.32% of participants noted interactivity and/or community within video games as being their main reason for picking video games. Similarly, it was often the Film users who were more willing to pay for entertainment media. So a possible formula would be to introduce Comics that used AR to introduce Film effects (animation and motion) with minor interactivity, then charging users to either purchase the Comic or use the AR web browser could be fruitful for taking this research paper into a published IP (Intellectual Property)

The realism, opportunity to relax and emotional engagement of a good storyline came up even more often amongst those who preferred Films. One participant phrased it as, "passive

entertainment for the mind to wander", a sentiment that was paraphrased by multiple participants and shows that 10,4% of participants prefer the passive engagement of being guided through a linear storyline as oppose to non-linear storylines like interactive games. By contrast, games were often cited as the favourite media by the boys, due to the ability to actively engage in the storyline.

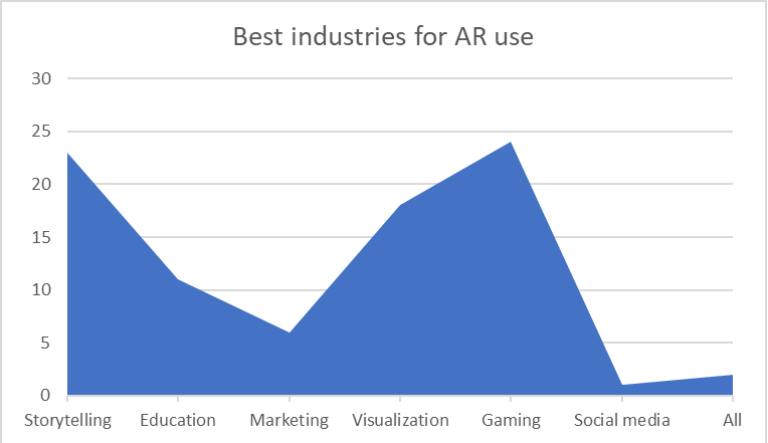
Films were the most popular medium of choice; however, internet was how most people accessed their mediums, hinting that malls (cinema) and TV (paid TV prescription) aren't as popular as they used to be as avenues for accessing Film media. Having internet access can be a computer, smart TV or cell phone, and so those participants who marked cell phones as their preferred medium engaged in a mixture of entertainment media through their phone, media that requires internet access for acquiring Films, games or animations. Other notable answers that were given were ones that that express an interest in the arts as a whole. Similarly, relaxation escape or the drive to "immerse oneself in a story" came up often for books, Films and video games, with 1 participant noting how the art style and story was what made games and animation their preferred medium. With this in mind, it would seem that the participants of this study do support that a level of immersion and willing submission into an alternate reality is their driving cause for engaging in artistic media. This sense of immersion was widespread as books, Films, video games and Comics all got answers that mentioned this reason for their engagement.





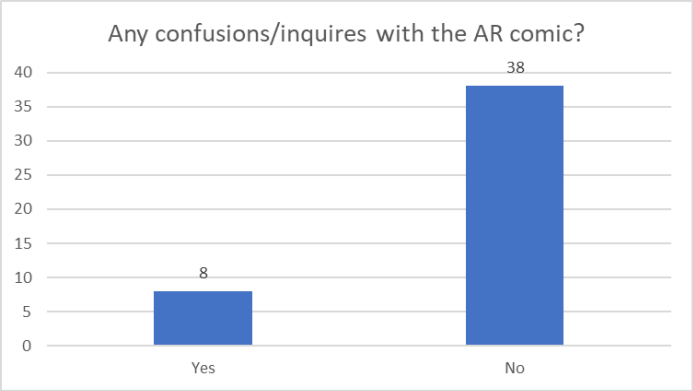
Questions 4a-e were their exposure to AR. 35, 4% of participants hadn't experienced Augmented Reality before as this was their first time. Those that had experienced or heard of AR often mentioned social media (8, 32%) or Snapchat/Instagram filters (12, 5%) with 1 participant each who had either experienced 4D cinema rides, personal research into AR/VR and 3 who had each seen it at *Comicon Africa*, malls or other public installations that used

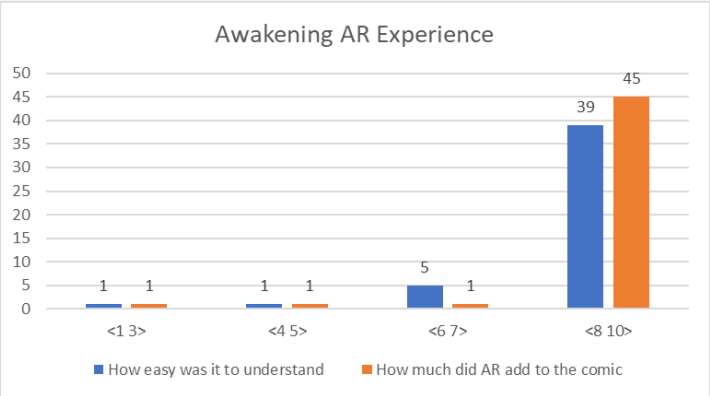
the technology. 3 Participants had heard of AR before, yet never really used it, and 2 had seen other people using the technology of AR.



The most popular use for AR was storytelling and gaming in the participant's opinions, with reasons being given as AR being a great tool for immersion and engagement that could transform these industries. With this reason in mind, 2 participants mentioned that AR would benefit all these industries, circling all the given options. Entertainment and engagement came up as reasons with 20% of participants mentioning these key words in their respective industry of choice as well. Within storytelling, 3 participants stated AR as a way of enhancing, amplifying or improving the storytelling experience, with others saying creating "epic stories" and "virtual images that can't be experienced in reality" as their reasons for picking storytelling. Within education, 3/11 (28%) of those participants mentioned entertainment and interest as the key words in their answers, hinting that their love of entertainment was a driving factor that could enhance education through providing an entertaining sensation to interest the learners. This sentiment of engagement and entertainment came up sporadically amongst various industries, often having at least 1 participant who would provide it as a reason for each industry of AR use. Another participant noted how AR enhances space, and video games being spatial medium means that AR would work best within that industry. Those that mentioned visualisation noted that AR is a visual enhancement technology, that "a picture is better than words", and so using it in this industry would be ideal.

These answers all point at a similar trajectory of participants seeing AR as a way of taking existing media and improving on it, adding immersion or deepening engagement throughout.

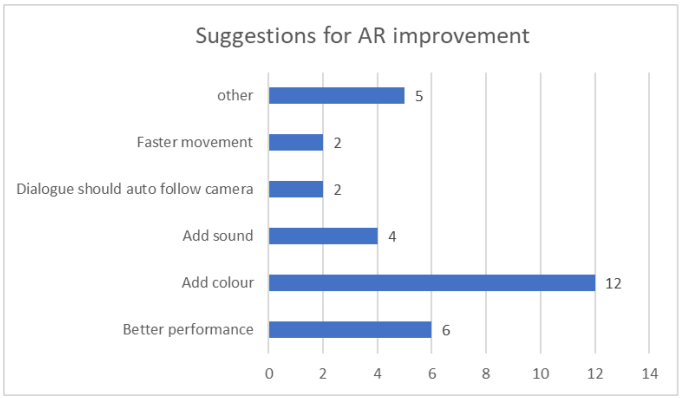


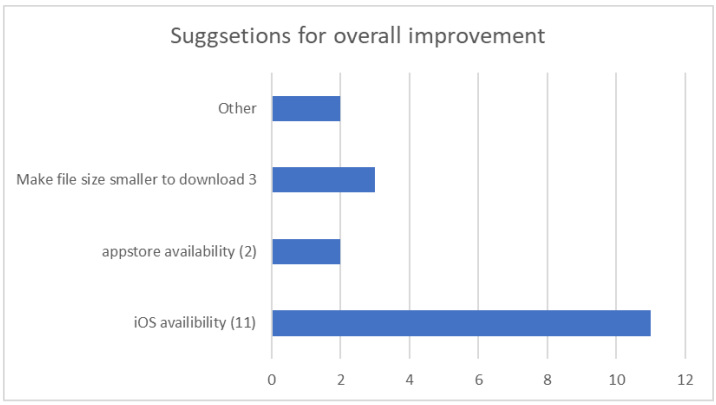


The final section is questions 5a-g. Comic readers had no problems with the AR experience, and were the most likely to rate 9-10 on the reading experience of *Awakening*. Those that had confusions/inquiries and answered yes were curious about how the technology works, often elaborating by asking "how does the cell phone recognise the page? Is the paper special? How long did it take to create?" and other production type questions that the researcher answered after the research was gathered so as not to influence the participant's answers. This speaks to the comments made after the first demography graphs; these users are from middle – high income household and so they were familiar with technology, Comics and other interactive/storytelling media. Similarly, these users were chosen for this reason so as to find willing participants that could streamline the experience and provide objective feedback based on their established understanding, conventions and experiences.

Many participants felt that the Comic added to the experience, those that didn't failed to provide feedback that could really help resolve the issue. Because experience is such a subjective phenomenon, it could be that the participants simply had no words to explain how to improve the AR experience since they had no frame of reference, they had no previous AR Comic to compare this one to. Discussions with participants after the study as well as with the assistant researcher showed that most participants expected to experience the Comic as they had other Comics, to walk through the space passively and see the artwork. However, once the AR app launched, shocked, excited and positive reactions came out. Users would go through the Comic multiple times to see if they missed anything, and experience the AR Comic in groups while chatting among themselves. All this shows positive feedback that the AR experience really did enhance the storytelling and although participants didn't always give written feedback as to "why" or "why not", they provided feedback through their reactions and relationships with each other, with the space and with the things in the space. Just as Sarah Pink had noted, this form of quantitative research can

be difficult to extrapolate through conventional methods (surveys, interviews questionnaires etc.) and so having the assistant researcher in the space and the short question/answering session after the research was conducted helped to garner this subjective information about the nature of the AR experience.

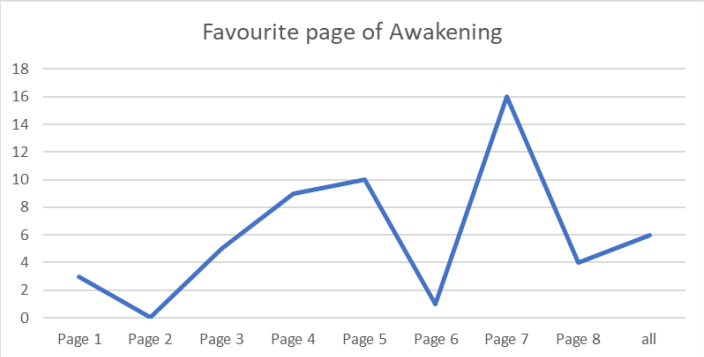


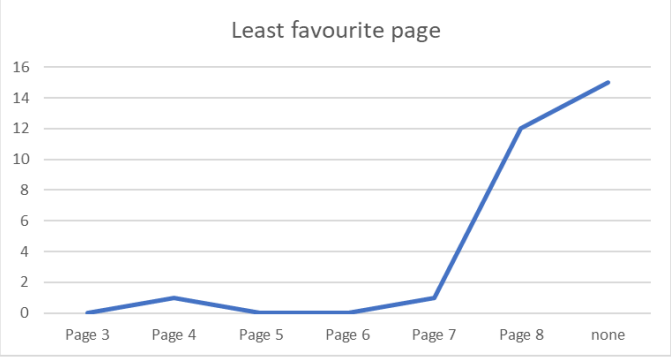


The most common suggestion for AR improvement was adding colour, followed by better performance. The latter can be explained as the initial research issue. During the first participants, it was found that the researcher's smartphone that had the AR application working had an issue of buggy and incoherent – it didn't give the intended experience to the participants despite numerous tests before hand to check that the application was running accurately. Sending this app to other participant's phones or letting them download it on their devices, which were more powerful smartphones, helped with this issue however some participants had already experienced the bad performance of the initial phone. These participants who experienced the buggy app also gave low scores for the above questions of "how much does the AR add to the experience/suggestions for improvement" as their replies were along the lines of "fix the application" or "the AR application didn't work properly". The application worked perfectly during initial tests and development at the researcher's lab and so it was at this point that it became apparent that the only change in conditions between the research lab and the schools, was that there was more radio interference and electromagnet signals from other people, and other devices in the exhibition space. The performance issues often started once participants walked into the exhibition space.

Turning the researcher's smartphone to aeroplane mode solved this issue and provided a smooth viewing experience to the participants, however it had already tainted the experience of 4-6 participants who felt that the AR experience required better performance on the phone. Availability across operating systems was another suggestion that came up.

The app was designed for Android devices only, so those with iPhones that could run the app unfortunately had to experience the app through someone else's phone or the group interactions. Only 8, 3% of participants suggested sound, showing that majority of the users didn't require sound to make sense of the Comic and enjoy the experience. This data backs up Scott McCloud's observation on time and space being temporal phenomena that aren't prerequisites for the visual storytelling experience. Other suggestions for improvement were to add more 3D objects that popped out the page and adding more focus on interactivity (page 3). Professional feedback from industry experts (Gareth Steele and Julie Chheng) suggested that each AR component of the page has a fade in/loading bar, so that it doesn't just pop into the viewer's sensorium but rather fades in. Another suggestion by both industry experts and minor participants was that the text and dialogue was hard to see, so perhaps adding an auto tracking function whereby the text bubbles would follow the orientation of the camera would be ideal. Adding zoom (touch screen pinch) interactivity was another suggestion that participants made, however the design of this Comic intended to focus on user interactivity as touch input as well as movement through space; users could zoom into any aspect of the AR Comic by moving their phone closer to the page. Often users would pick this up after a few tries of using the app, as initially they would hold it awkwardly, trying to accommodate for others around them to see as well as for the Comic page to be visible in order to activate the AR overlay. As a result, another suggestion by multiple participants was to be able to keep the AR Comic page on the phone screen after it initially found the Comic page, a way of "saving" the page to be viewed later in a comfortable manner – similar to Wesley Wong's *Comic Cubes.*





The intentions for the progression of pages 1-8 of the Comic were meant to somewhat mirror *Figure 29*: an adaption of Jesse Schell's flow diagram and Aristotle's poetic, on page 78 in terms of the appeal of each page. A slow rise in progression happens within the story

and is meant to happen to the viewer's interaction with the story through the AR – each page introduces a little but more interactivity or a different AR experiences that builds on the previous. As we see in the above graphs, this intention is partly successful as participants' chances of having a favourite page increased with each page, resulting in the climax of page 7 and denouement of page 8 and onwards. Participants reported enjoyed the animation and movement on all the pages, with page 7 and 5 being noted for having figures that flew out the page contributing towards that being the favourite page. This 4th wall break was intended to pull the viewer in and seems to have been successful in doing so. Seeing how positive the response shows a relative level of success with this intention. The least favourite pages were none, closely followed by page 8 with the most quoted reason being that participants didn't want it to end, seeing the "To Be Continued" was a reminder that the participants experience, and immersion is over. Similarly, other participants noted this page as their least favourite because nothing happens; there's no interactivity, there's very little movement, it just has a 3D object floating.

Chapter 4 Recomendations for future work

The *Awakening* AR Comic was successful in terms of using the literature as a specimen model to show how AR can be used to enhance the storytelling experience. Participants also provided positive feedback that confirmed that the AR added to the storytelling experience by enhancing it. Despite this, further research and future work would benefit from learning from the mishaps and mistakes of this project. The following section lists recommendations for future work.

A large majority of the participants were Caucasian females from middle to upper class households. However, the majority of South Africa is middle to low income Africans. As such, a future recommendation for this type of research would be consider testing AR storytelling of this nature on a microcosm that is representative of the majority of South Africa. This would better analyse how relevant the story is for the masses, as well as how effective the representational methods are in communicating to a wider target market while somewhat maintaining the intentions of the author.

Many participants of the research enjoyed the interactivity of *Awakening* yet found that it was minimal interaction that didn't truly create opportunities for meaningful decision making. In future, using this AR framework to create a more game-ified experience within

AR– one that presents players with artificial conflict, that has quantifiable outcomes (created through meaningful interactions that begin at each page and are carried over to other pages) and one that has rules and mechanics that players can use in a variety of ways to express themselves within the system would be an exciting avenue to develop into. In this sense, the AR would take a passive, linear Comic book story and enhance it into an active, non-linear storyline. This would also increase replay ability; encouraging participants to learn the mechanics and develop more skill in the AR games over time while having each page contribute to a broader narrative.

There are a variety of approaches to understanding the experience of the participant, central to all of them is describing and understanding experience as a critical component of understanding research questions (Sarah Pink, 2016). To know what it is like for participants to be in the world, to be in virtual and real worlds, and how this informs their practice and ethnography is ideally what this research was after, however going about it as a questionnaire is a conventional method that didn't really reveal the more nuanced aspects of understanding the experience of the viewer. This is evident in questions 5a-b, where participants are given a rating of 1-10 to describe how much the AR added to the storytelling experience. This experience encompasses unconscious ha bits and programming yet recording this data on just a questionnaire wasn't enough to reveal these subconscious ha bits. In future, a more in-depth analysis of browsing ha bits, and daily routines of the participants could help to illuminate more information on their direct experience of an AR Comic towards enhancing storytelling.

The phone running the AR application was struggling to work smoothly because of radio interpherance from other other phones – putting the phone into aeroplane mode fixed this issue. Stronger devices that the students had ran the application smoothly without needing to switch to aeroplane mode, highlighting an important observation of compatiility and ease-of-access that must be considered before launching this itellectual property for the general public. Similarly, this issue tainted the experience of afew participants (<5), resulting in sub-optimal research results. In future, uplaoding the AR app to a free to access web broswer link, that wouldn't require downloading or specific software systems (*Android* vs *iOS)* would be fruitful in allowing users to experience the AR on their own devices.

Participants didn't always pick up that blue colours meant interactivity, so they didn't scroll on pages 1 and 2, nor jump in page 3. This shows a semeiotic issue whereby participants, in

future, would need more representations and signifiers showing them possible interactions before reading the Comic. This would be synonymous with the tutorial level of a video game, whereby the mechanics (affordances given to the player) are explained before the game starts. This aspect of the Comic would need to be communicated better for the viewer.

Design changes that would be considered in future is to create a higher quality of AR integration. The current variety of AR worked well (animation on some pages, gameification on others, 3D objects on some), however improving the quality of the animation and 3D objects as well as the depth of the game mechanics is a strong consideration for future development. Ideally this Comic should be published in future, as such placing a stronger focus on building a development team (producers, illustrators, software engineers etc) would be ideal for creating content that can be published regularly. Finding a publishing house or a sales franchise (*CNA* or *Exclusive Books* for example) would help provide editorial insight and larger market penetration.

Ideally this proof of concept is a forerunner to a potential business venture, as such creating a marketing and public relations would be implemented in future to gain the largest body of followers that would support this endeavour while providing insight into what changes they like or don't like. As a result, a future publication of this AR Comic would be one that strongly considers the opinion of the viewer and tries to respond. For example, if more viewers suggested a stronger focus on animation and removing game design mechanics, then future issues of this Comic would do so the judge the response. Viewers that find hidden easter eggs would be incentivised by getting a discount on the store front. All of this would be done with a close consideration of Rogers' *Diffusion of Innovation* graph, to ensure maximum market penetration and positive reception.

Chapter 5 Conclusion

This research dissertation was a study of the use of AR in storytelling. The research question can AR be used to enhance the storytelling experience was proposed, with the hypothesis saying yes, it can. The research of this paper began with thorough analysis of existing methodologies and academia around storytelling and augmented reality practice done before hand and used to create a proof of concept that would help answer the research question. The methodologies presented in the literature review were carefully considered and cross analysed with existing case studies to see their practical application. Most notable was how representational practice and special practice informs the participant's mental landscape, and that mental landscape can in turn inform future representational and spatial practice. Game design methodologies that were most notable were LeBlanc's taxonomy of gamer needs and the definition of games. Doing so allowed us to see how conventional storytelling mediums aren't games, however the inclusion of AR could present interactivity and direct engagement that could borrow from game design terminology to facilitate a deeper interaction through AR. Next was the subsection on storytelling; analysing the auspices of storytelling to find a formula that could be applied for this proof of concept was the main goal of this section. This section analysed industry giants from the west and east, giving a quick synopsis on the timeline of Comics and Manga and then giving practical examples of how each used their own formulas on a Comic page (*Batman*, *Garfield* and *Spider-Man* example for western Comics, and *Berzerk*, *One-Punch Man* and *Dragon Ball Z* for eastern Manga).

The section on augmented reality followed a similar trajectory of brief historical summary and then a theoretical exploration of what it means to augment, and what it means to enhance. The latter used discussions on immersion and the magic circle to situate a criteria which we used to judge what it means to enhance. And finally, Leblanc's taxonomy as well as Stuart Reeve's taxonomy of manipulations was used as a starting point to better understand the levels of immersion and engagement that were possible between the author, the medium and the viewer/participant.

Furthermore, these methodologies were then used to inform the design direction of *Awakening*, our proof of concept. This proof of concept, called *Awakening*, was an 8-page AR Comic done on greyscale paper and exhibited in a public space for focus groups to

interact with. Their interactions were facilitated by objective parties (assistant researchers) who provided a questionnaire afterwards for participants to fill out.

The results of the questionnaire and participant research confirmed the hypothesis and showed a positive reception to the technology of AR being used alongside storytelling. The participants thoroughly enjoyed the Comic experience, agreeing with the research hypothesis that the AR technology enhanced the story in a manner that was more than just a visual gimmick. Some recommendations for future work have been noted, with special note being taken to focus on recommendations that could help future researchers as well as creative practitioners who wish to use the findings in their own fields of work. A deeper interaction of AR and a deeper enhancement of the storytelling through AR is possible.

As such, we hope that whomever find this research can use it to better our understanding of AR use within storytelling.

Appendix

Questionnaire

1. Demographic info
    a. **Please indicate gender**

Male Female Other:

    b. **Please specify ethnicity**

Black (African) White (Caucasian) Coloured (Mixed race) Other:

    c. **What languages do you speak at home and at school?**

_____

    d. **Have you read Comics before? If yes, which ones?**

_____

2. Digital Media use
    a. **How long have you owned a cellular phone (number of years)?**

_____

    b. **What type of phone is it?**

Mobile device Tablet/iPad Android smartphone Apple iPhone

Other: _____

3. Entertainment
    a. **What is your favourite entertainment media?**

Video Games Films Comics Animation

Other: _____

    b. **Why is this your favourite, what makes you indulge so?**

_____

    c. **Where do you usually find your entertainment media**

TV Internet Malls cellular phone Other:

_____

d. How often do you pay for access to entertainment media? 1 meaning highly unlikely, 10 meaning always.

1 2 3 4 5 6 7 8 9 10

e. How do you experience storytelling media?

Video Games Films Comics Animation Verbal

Other: _____

4. AR

a. When and where did you first hear or experience augmented reality

Just today! Past 6 months past year past 2 years years ago

Other: _____

b. How often have you heard of, or experienced augmented reality? (1 meaning never, 10 being as much as daily)

1 2 3 4 5 6 7 8 9 10

c. Why did you circle that above number?

_____

d. What do you rate are the best industries to use Augmented Reality in?

Storytelling Education Marketing Visualisation Gaming

other: _____

e. Please tell me more on why you chose the above answer.

_____

5. AR Comic

a. Do you have any confusion, questions or inquiries about the AR Comic experience as a whole?

_____

b. How easy was it to use and understand the Comic with the AR app (1 impossibly hard, 10 easy and understandable)?

1 2 3 4 5 6 7 8 9 10

c. How much do you feel the AR adds to the Comic (1 being nothing, 10 a lot)?

1 2 3 4 5 6 7 8 9 10

d. What suggestions do you have for improving the score for the above question (suggestions to create relevant use for AR)

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e. What else would you change or improve about the experience as a whole? This isn't limited to AR but can also be suggestions for layout, app download and overall choice of interaction/experience.

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f. What was your favourite page of the AR Comic experience, and why?

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g. What was your least favourite page of the AR Comic experience, and why?

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