

8. Conclusion

This thesis provides an in-depth examination of the impact of digital mediation and hybridisation on the form of comics. This concluding chapter presents a summary of the main findings of this examination. Firstly, it considers the success of the methodology and outlines the conclusions that can be drawn in relation to both the initial research questions identified in Chapter One and the key characteristics of the form of comics identified in Chapter Three. Secondly, it provides an account and evaluation of my original contributions to knowledge and practice. Thirdly, it identifies some of the main opportunities for further research and practice that have been raised as a result of my inquiry.

Summary of findings

In Chapter One I proposed employing a cross-disciplinary, practice-based methodology for the study of the digital mediation and hybridisation of the form of comics. This approach has been successful in allowing me to construct a critical framework of comic theory within which to analyse the operation of the form of comics. Through a process of informed outreach into relevant areas of media and games theory I was able to successfully deploy this framework and examine the impact of digital mediation and hybridisation on the form's operation. My study of this impact has been deepened and extended by the practice-based methodology employed during my inquiry. The prototype comics created as part of this methodology form a significant contribution to practice and serve to demonstrate the potential for the creation of new and novel types of comic that can result from the digital mediation and hybridisation of the form.

In Chapter One I also identified four main research questions. These questions, which have been central to my study as a whole, are as follows:

How are the key characteristics of the form of comics impacted by:

1. Digital mediation and extension of the comic page?
2. The challenges of architectural mediality?
3. Hybridisation with the ludic qualities of the videogame?
4. The integration of audible, time-based soundtracks?

To address these research questions I developed a model for the form of comics based on seven key characteristics. These seven characteristics are not intended to form an exhaustive list, but instead to offer a useful approach to describing and discussing the form of comics. While the operations of these characteristics are often tightly interconnected, the proposed conceptual division provides a useful set of lenses with which to analyse and discuss distinct aspects of the way comics operate when read. The resulting model is not intended as an exclusory summation of the form and as such it allows for the study of comic formats that do not demonstrate all seven characteristics. In brief summary, the seven characteristics can be described as follows:

1. **Space as time.** Comics use arrangements of images in space to represent arrangements of moments or events in time.
2. **Simultaneous juxtaposition of images.** Comics place images in spatial juxtaposition to each other, such that two or more images may be viewed simultaneously by the reader.
3. **Closure between images.** The reader of a comic derives time, meaning and motion out of sequences of static, juxtaposed images through the process of closure.
4. **Spatial networks.** Sequences of images form part of a larger spatial network of narrative and aesthetic interrelations that exists between all the elements in a comic.
5. **Reader control of pacing.** The pace at which the reader absorbs the information in a comic is controlled by the reader and determined by the pace at which they read and navigate the comic.

6. **Tablodic images.** The images in a comic exhibit qualities of the tableau, in that they are deliberately composed, framed and illustrated to represent key moments of narrative meaning.
7. **Word and image blending.** Although sometimes wordless, comics typically use a blend of words and images in spatial juxtaposition to convey meaning to the reader.

Chapter Four examined the impact of digital mediation and extension of the comic page on these key characteristics. A range of approaches to the digital mediation of the form were discussed, with a variety of different examples and formats of digital comic identified and analysed. As a result of this analysis, different types of digital comic were shown to place different characteristics of the form into greater or lesser emphasis. For example, digital comics using a 'guided view' (Iconology Inc. 2013) approach may display only a single panel of a comic at a time, preventing the simultaneous juxtaposition of images and limiting the ability of the reader to appreciate and navigate the larger spatial network of the comic. By contrast, zooming 'infinite canvas' (McCloud 2000a, 222) comics place all the panels in a comic's spatial network into a single, easily navigable plane, thereby emphasising this characteristic of the form.

The chapter also examined the extension of the comic page through the incorporation of animated elements. As animation is primarily time-based, its use in digital comics has the potential to disrupt the usual operation of the form, which typically uses the spatial arrangement of images to represent the passage of time in a narrative. In digital comic formats such as motion comics, the characteristic of space as time is replaced with time as time and the reader's control over the pacing of the comic is ceded to the animator. Digital comics that incorporate short loops of animation within their panels are less problematic. The looping nature of these animations mean that the progression of time in the comic's narrative is still established primarily through spatial arrangements of panels. As a result the reader remains in ultimate control over the pace at which they absorb and progress through the comic.

In Chapter Five the challenges of architectural mediality for the form of comics were considered. Context for this study was provided by an examination of the hypercomic which, although initially conceived as a digital format (Nelson 1974), has since been adapted for use in gallery-based comic installations (Gravett 2013, 131). Hypercomics combine the characteristics of the form of comics with the multicursal structure common to other types of hypermedia. In digital hypercomics that make use of hyperlinks between page-like groupings of panels, the non-spatial relationship between the linked groupings can diminish the fixed, spatial network that is usually characteristic of comics. Conversely, in hypercomics that make use of an infinite canvas structure of branching 'trails' of panels (McCloud 2000b), the spatial network characteristic is emphasised significantly.

To meet the challenges of architectural mediality, gallery-based comics can draw on approaches originally established for use in their digital counterparts. The cursality of hypercomics, which rely on readers choosing their own locally unique path through the spatial network, is sympathetic to the potential for more freeform exploration inherent to three-dimensional space. Techniques developed for use in infinite canvas comics can be successfully applied to architecturally mediated comics due to the large areas of continuous space available for panel layout on walls, floors and ceilings. For example, variations in the spacing between panels can be used to influence the reader's interpretation of the passage of time in a comic, while the relative position between the panels and the viewer can be used to create a variety of narrative effects.

One problematic aspect of architectural mediation is the potential impact it can have on the characteristic of word and image blending. The larger scale of some of the panel sequences employed in architecturally mediated comics means that at times the reader may have to turn their head to follow the entirety of a sequence. This introduces a discontinuity between the focussed reading of the words in a panel and the ability to easily apprehend the larger sequence to which the panel belongs. This aspect of the format means that wordless or 'silent' (Groensteen

2014, 107) comics can be better suited to architectural mediation than comics that employ a more standard word and image blend. Another possible approach is to present written elements of the comic's narrative as separate captions or blocks of text, so that the reader can consume them independently from the sequences of panels they accompany.

Chapter Six examined the hybridisation of the form of comics with the ludic qualities of videogames. This examination was practice-based and focused towards the creation of a series of prototype game comic hybrids. The chapter identified a game comic as a type of hypercomic that exhibits some of the key characteristics of games and uses some of the key characteristics of the form of comics as the basis for its gameplay. The spatial nature of the form of comics was also identified as providing potential for synthesis with the spatial characteristics of videogames. The resulting prototypes operate as narrative-driven 'games of progression' (Juul 2005, 72), with gameplay focussed around the exploration, construction or manipulation of the spatial network in each game comic.

Unlike a traditional comic, where the reader is free to determine how to interrogate and navigate the spatial network, game comics may place deliberate limits on how the reader views or progresses through the network. The level of 'agency' (Murray 1997, 126) felt by the reader as they control their own navigation of the spatial network within these limits is one factor that can point towards a more game-like experience. Comics that offer more game-like experiences may also feature a more regular dispersal of aporia-epiphany loops in which the player's progress through the network is deliberately gated, forcing them to pause and find the solution that will allow for further progression (Aarseth 1997, 90; Gazzard 2013, 103). In creating games comics, the design and implementation of these gates to progression can be challenging due to the complexity of interrelations that exist between the panels in a comic's spatial network.

As a hybrid format, game comics must strike a balance between working effectively as comics and being fun and engaging to play as games. This can be a difficult

balance for practitioners to achieve, as it requires drawing on design skills from two separate disciplines. The creation of a successful game comic may necessitate the simplification of some characteristics of the form of comics or some elements of gameplay in order to achieve a working balance between the two. In *A Duck Has An Adventure* (Goodbrey 2012a), the tabloid images in the comic were purposefully simplified to allow them to be quickly understood by the reader, allowing for a rapid and regular pace of interaction and progression through the comic. In *Icarus Needs* (Goodbrey 2013a), the collection and use of items to solve puzzles was simplified to require no additional input from the reader, so as not to interrupt the usual navigation of the comic's spatial network.

Chapter Seven examined the impact of the integration of audible, time-based soundtracks into the form of comics. The chapter established sound in comics as usually being imagined by the reader based on visual representations that use a combination of words, images and graphic devices to evoke different sound effects. In digital comics the multimodal nature of the blend of word and images can be extended to incorporate elements of perceived, audible sound. These audible sounds may be non-diegetic and exist outside the story world of the comic as accompaniments to the narrative of the comic or as part of the navigation process by which the reader traverses the spatial network. Alternatively the audible sounds may be diegetic in nature and directly integrated into the story world of the comic, often through the use of a visual element that acts as a 'root' (Cohn 2013, 35) for the sound within the story world.

Similar to animation, the use of audible sound in a digital comic may potentially challenge the reader's control of pacing. The tempo and length of a piece of music or a sound effect can influence the pace at which the reader progresses through a comic. The use of time-based audible sound effects of fixed duration can also conflict with the more 'indefinite' way fictional time is usually established in comics via spatial arrangements of panels (Groensteen 2013, 70). To address these issues, digital comics may employ responsive soundtracks that automatically adapt and synchronise themselves to the reader's pace of progression through the spatial

network. Such soundtracks are usually modular in their construction and make use of loops of audible sound that are faded up or down in response to the reader's position in the spatial network of the comic. Like the use of looped animations within panels, these loops of sound offer less conflict with the indefinite depictions of fictional time presented in the spatial arrangement of a comic's panels.

Responsive soundtracks allow digital comics to support their narratives using audible sound with similar approaches to those established in film and videogames. For example, 'territory sounds' can help establish the location of a scene (Chion 1994, 75), while sound that 'vectorizes or dramatizes' (13) a sequence can be used for foreshadowing or to build expectation in the reader (Nitsche 2008, 142). I explored the design and operation of responsive soundtracks through a process of practice-based research that resulted in the creation of the game comics *Icarus Needs* and *The Empty Kingdom* (Goodbrey 2014). Through an iterative cycle of creation, evaluation and reflection I developed an understanding of how the successful placement of audible sounds in a digital comic relates to the accurate tracking of the reader's locus of attention.

This fidelity of response in an audible comic's soundtrack is limited by how closely the reader's position in the spatial network of the comic can be tracked. Digital comics that use page-like groupings of panels have a low fidelity of response as they can only track the reader as they transition between pages. Digital comics that use guided view, panel delivery or infinite canvas approaches may exhibit a higher fidelity of response in their soundtracks. At high fidelities of response, responsive soundtracks can more easily integrate finite-duration spot sound effects synched to specific moments within the narrative. The 'synch point' (Chion 1994, 58) for a spot sound effect is best placed in the gutter between panels, so as to enhance rather than conflict with the reader's use of closure in mentally completing the action depicted in the panels.

Contribution to knowledge and practice

While academic study of the form of comics is a growing field, there has been relatively little examination within the field of the form's ongoing process of digital mediation. My thesis provides a comprehensive review of current literature and links this with a critical survey of digital comics practice. This survey takes in both the historical development of key digital comic formats and a full range of contemporary professional practices. My thesis documents the exploration of these ideas through my own design practice, which in turn fed back into the development of further theory. This integrated theoretical and practical inquiry forms a significant contribution to knowledge and practice within the fields of comic studies and digital comic creation. It will be of use to anyone studying the impact of digital mediation and hybridisation on the form of comics and serve as a guide to practitioners in identifying the practical implications of these theories for the design and creation of digital comics.

Through the analysis of the work of comics theorists and practitioner theorists my study counters the lack of a practical formal definition of comics by proposing a new model of the seven key characteristics of the form. This model is of potential use to anyone wishing to study or discuss the operation of the form of comics, from deep readings of specific texts to broader studies of how different types of mediation can impact on the way comics operate when read. The model offers advantages over previous exclusory definitions of the form by acknowledging that different examples or formats of comic may place greater or lesser emphasis on each characteristic. This allows previously-debated formats and examples of 'disputed boundary cases' (Witek 2009, 149) to be examined as comics, despite the absence of one or more key characteristics. The non-exhaustive nature of the model also allows it to be easily modified or expanded by future scholars to meet the specific requirements of their study.

My thesis contributes the first detailed history of the hypercomic, documenting the emergence and development of its formal qualities in digital media and its later

adaptation for use in architecturally mediated formats. By providing a historical survey of significant hypercomic works I also contextualise my own work as a pioneering digital comic practitioner. The large body of experimental and innovative digital comics that I have created over the course of my professional career form a significant contribution to practice within the field of digital comics. Amongst this body of work, my exploration of the potential of the hypercomic helped to grow the use of the format on the web and later in gallery settings. My work with zooming infinite canvas structures has been of particular significance. I created the first comic to employ a zooming infinite canvas interface (Goodbrey 2002) and later developed and released a toolset to allow others to easily create their own zooming comics (Goodbrey 2005).

Through the use of the practice-based methodology employed during my doctoral study I have extended my hypercomic practice with the completion of a number of significant new works. The gallery comic *Black Hats In Hell* (Goodbrey 2013b) was exhibited in Hatfield and London and featured in the book *Comics Art* (Gravett 2013) as a major example of the format. The game comic *A Duck has an Adventure* reached number six in the paid comic apps on *Google Play* (Goodbrey 2012b) and was a shortlisted entrant in the *New Media Writing Prize* (2012). The game comics *Icarus Needs* and *The Empty Kingdom* are innovative for their introduction of a new approach to videogame hybridisation in which the player directly controls the movement of an avatar in exploring the spatial network of a comic. This approach increases player agency and can allow for the use of page-like grouping of panels without reducing the fidelity of response in any accompanying audible soundtrack. As detailed in Chapter Six, these game comics also reached a substantial player base of online gamers, receiving a large number of review, response and playthrough videos on *YouTube* (2016a; 2016b; 2016c).

In conjunction with these practice outcomes, my doctoral study has also resulted in a number of peer-reviewed publications, including three journal articles and three book chapters. The full details of these publications are listed in Appendix C. The dissemination of both the practical and theoretical findings of my study has served

to further establish my standing within comic scholar and comic creator communities as a leading expert in the field of digital comics. An indicator of this standing was provided by the British Council, who invited me to speak on the subject of digital comics to visiting delegations of comic creators and publishers from Belgium in 2011 and Bangladesh in 2013. I was later invited by the British Library to curate a retrospective of significant British digital comics that went on show as part of the *Comics Unmasked* exhibition in 2014.

In Chapter Two I documented in detail my work to promote the study of digital comics through the presentation of papers and keynotes at major national and international academic conferences. A full list of these conference contributions is provided in Appendix B. Towards this goal I also proposed and edited two peer-reviewed academic journals themed around digital comics (Goodbrey 2015; Goodbrey and Nichols 2015) and in 2015 organised the first English-language digital comic symposium, *The Comic Electric*. The symposium was held in conjunction with the NESTA funded *Electricomics* project (Electricomics CIC 2015), with whom I have worked as a research partner and consultant parallel to my doctoral study. The project has proved successful in raising the profile and potential of digital comics amongst both comic creator and wider arts communities, with the Electricomics app being ranked by *The Guardian* in the top 25 iPad apps of 2015 (Dredge 2015).

Opportunities for future research and practice

As the media that support the form of comics continue to develop and change, comic creators will continue to respond and adapt their work to take advantage of the potential of new platforms and emerging comic formats and audiences. During the course of my study into this ongoing process of mediation and hybridisation, I have identified three major areas for future research and practice.

1. Additional hybridisation within architecturally mediated comics.
2. Game comics that operate as games of emergence.
3. Augmented and virtual reality comics.

The first area forms a continuation of the inquiry into architecturally mediated comics documented in Chapter Five. In the practice-based inquiry that centred on the creation of *Black Hats In Hell*, opportunities for additional hybridisation in architecturally mediated gallery comics were considered as being outside the scope of the study. Further research is therefore needed in order to understand the impact on the form of any such hybrid elements.

These elements could include the use of screens or projected images to allow for the integration of video and animation into the spatial network of an architecturally mediated comic. Similarly, elements of audible sound could be triggered to play at certain points in the narrative through the use of sensors to detect the reader's presence in specific areas of the gallery. Three-dimensional sculptural panels could also be employed, and these might incorporate kinetic or physically interactive elements. The parallels between digital comics and gallery comics identified in Chapter Five could potentially be further extended through the study of these additional hybrid elements. For example, the incorporation of sound and video elements into a gallery comic may have similarities with the use of sound and animation in digital formats.

The second area of opportunity for future research and practice comes as an extension of my research into the hybridisation of videogames and comics. The practice-based inquiry detailed in Chapter Six focussed chiefly on game comics that operated as games of progression. These games were noticeably successful in terms of their reception by a predominantly "gamer" audience. The potential exists to also create game comics that operate as 'games of emergence' which feature 'a small number of rules that combine and yield' a large number of different variations of play (Juul 2005, 73). These rule-based games could feature comic narratives

constructed generatively as a result of the play of one or more players attempting to achieve a variety of different winning outcomes.

Although primarily progression-based in terms of its puzzle-focussed structure of play, the game comic *Margaret Must Succeed* (Goodbrey 2013c) featured a more generative approach to narrative than the other prototypes created during my doctoral study. The difficulties encountered in implementing this generative narrative points towards some of the potential challenges involved in creating game comics that operate as full games of emergence. The complex range of interrelations that exist between the panels in a comic's spatial network can lead to generative comics requiring significantly higher workloads in terms of narrative and gameplay design, coding and art asset creation. They may also require different strategies of reading and play in order to be understood and enjoyed by their audience.

To more fully explore the operation of the form of comics in emergent game comics, further research is needed. To pursue this research using a practice-based methodology, the scale of work involved would make it advantageous to work as part of a larger development team. Given the timescales involved in their creation, the existing prototypes made as part of this doctoral study were by their nature relatively short in terms of their total gameplay time. From a practice standpoint, a larger development team that draws from a talent pool of both comic and videogame creators would allow for the creation of richer, more complex and longer-form game comic experiences.

The third area for future research and practice concerns the potential offered by augmented and virtual reality for the creation of new formats of comic. When viewed through an augmented reality (AR) device such as a smartphone, real-world environments or objects can be visually augmented with additional computer-generated elements. Currently AR is commonly used by comic companies like Marvel to add overlays of additional making-of and worldbuilding material to printed comic books (Marvel 2016). This information is typically provided in video

or textual formats; there has been little exploration of the potential to display new content through AR panel sequences that extend off the page, or of the use of AR to integrate sequences of panels into existing real-world environments. Virtual reality (VR) refers to a more fully immersive computer-simulated three-dimensional environment or surround-video that is typically viewed through some form of VR headset. At present VR has been relatively little used in connection to the form of comics, although some examples have begun to emerge of digital comics that have either been created or adapted for reading via VR devices (Oniride 2016; Madefire 2016).

Both AR and VR are increasingly accessible technologies for the creation and consumption of media artefacts. Further research is needed in order to explore the different ways these platforms can be used in conjunction with the form of comics. This inquiry would examine the kinds of story that AR and VR can be used to tell, and how these uses may impact on the key characteristics of the form. Like the study of generative game comics, pursuing this research via a practice-based methodology may require collaboration with a larger development team in order to access the requisite range of design and technical skills. While such an investigation was outside the main scope of my doctoral study, approaches to the navigation of the spatial network and audible sound design in virtual comic environments may draw on ideas discussed in conjunction with the hybridisation of comics and videogames. Similarly, theories concerning the mediation of comics in three-dimensional architectural spaces may be of relevance to the placement and reading of panels in augmented and virtual environments.

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