BRILL

ASIASCAPE: DIGITAL ASIA 2 (2015) 183-212

ASIASCAPE:
Digital Asia
brill.com/dias

At the Edge of a 'Digital Area' – Locating Small-Scale Game Creation

Martin E. Roth
Leipzig University
m.roth@asobiba.de

Abstract

In this article, I develop a perspective on video game creation tools and related practices, and ask whether game creation can be a space of creative experimentation for scholars of the humanities. I argue that such questions cannot be directed at digital technologies or video game creation in general. Instead, a serious engagement with the tools and practices for creating digital space has to locate these tools and the space created with and around them within a broader context. If so, what are the building blocks and physics of game creation – what can be created and by whom? And how can they be studied and applied in, or repurposed for, the humanities? In its mixture of theoretical inquiry, empirical case study and programmatic sketch, this article is intended as a first step towards mapping game creation in its diversity and relations to other digital regions.

Keywords

small scale game creation – Japan – software – programming – digital areas – methodology – science fictional imagination – digital humanities

1 Introduction

Videogames are not just for playing. Game creators and designers around the world have come to use the medium for experimenting with ideas and communicating their thoughts and opinions to a diverse player-audience. This creative engagement is in no way limited to professional circles. With more accessible technologies, editors, and other free development tools, game

 | DOI 10.1163/22142312-12340030

creation is today an open playing field entered and experimented on by many and later explored and experienced by many. In Japan, Hichibe (2010: 289 my translation) observes not only a recent increase in individual content creation, but also a stronger presence in the market: 'With the help of the abundant information found in books or on the internet and by using applications on the computer, it is now relatively easy to create diverse contents; these can be distributed via the internet, amateur sales exhibitions, or shops.' While not a majority, Hichibe (2010: 290) estimates about 500-600 amateur game creator groups ('circles') attending the largest amateur sales exhibition, the biannual 'Comic Market', which hosts 35,000 amateur groups on three days twice a year. He has also commented frequently on the difference between independent game creation and so-called 'consumer games' created in an increasingly hostile, competitive environment by big companies. In particular, the Japanese case seems to show rather clearly how important independent game creation is today, as one of the few spaces left in which free artistic experiments and radical ideas can be found – as the pressure to create profitable games rises steadily in the console-dominated consumer market, small companies and new ideas struggle to enter a AAA and sequel-dominated market (Hichibe 2006: 68; 2009: 171). Moreover, in Japan, as elsewhere, games are increasingly used by small groups or individuals as tools for intervening in political discourse. Take, for example, the Hong Kong-originated 'Yellow Umbrella'[1] game that was created during the recent wave of protest against the Chinese election politics, or the Italian-based game collective 'Molleindustria',[2] which use games to express their political opinions or show social and economic realities.

Deploying the possibilities of playful digital technologies to explore ideas, share opinions and communicate beliefs to a potentially global playership, the creators contribute to exploring, expanding and constructing digital space. In this article, I identify some of these possibilities and ask how scholars of the humanities could benefit from investing in them. In other words, I try to envision how we could follow Parry's suggestion to '*think beyond the book*. Think of the book as one form, not *the* form' (2013: 18, emphasis in the original). Given the recent ubiquity of digital technologies in society, Suiter (2013: 9) states that 'we can see two highly complex systems – computer technology and the academy, one complex by nature, and one deeply complex by force of history – colliding and hybridizing. [...] We do not know what this hybridization will amount to. So all we can do is steer it by getting out there and learning more by creative experimentation.' He prompts us to 'create tools and efficiencies that

1 https://umbrella.awesapp.com/, last accessed 10 April 2015.

2 http://molleindustria.org/, last accessed 10 April 2015.

improve the way we do things, because only by so doing can we fully understand the new world we inhabit' (ibid.).

In this article, I pose the question whether video game creation can be such a space of creative experimentation for scholars of the humanities.

Crucially, I argue that such questions cannot be directed at digital technologies or video game creation in general. Instead, a serious engagement with the tools and practices for creating digital space has to locate these tools and the space created with and around them within a broader context. This context, or what I call the 'digital area of game creation', emerges as a space generated by a broad variety of digital regions, places and practices, often overlapping with other areas, cultures and intentions. If so, what kind of space does small-scale game creation belong to and help construct? What are its building blocks and physics – what *can* be created and by *whom*? And *how* is it created? What are the contexts of small-scale game creation? And how can they be studied and applied in, or repurposed for the humanities? Drawing on my own experiences and observations during an on-going game creation project with Unity, I take a closer look at one of the places within this space and attempt to capture some of its characteristics and border regions.

In its mixture of theoretical inquiry, empirical case study, and programmatic sketch, this article is intended as a first step towards mapping game creation in its diversity and relations to other digital regions. As such, it is limited in its scope and can merely provide a series of hypotheses for further studies. Within these limitations, I aim to show how digital game creation is embedded in various local and global contexts, and reflect on its potential for humanities scholarship. The article is split into several parts. In the first part, consisting of sections 2 and 3, I make a case for looking at digital game creation as an area. Following this, I give a brief introduction to my own game creation project, which served as an important background for this article, and I approach the tool Unity3D as a part of the digital area of game design. In this case study, I turn to several characteristics and potentials of designing games with Unity. In the last part, I ask why humanities scholars should engage with game creation.

I should mention that the aim of this article is neither to provide a comprehensive overview of the tools discussed, nor of the area in question. My focus is not on the creators or the contents. Rather, I look at a specific example of game creation practice, its techniques, and conditions from a decisively inexperienced perspective, as a scholar of the humanities and area studies with only little knowledge about programming and contemporary digital design methodologies. The fact that my own attempt at creating a game has not led to any playable conclusion yet indicates the difficulties involved in such an endeavour – this article hopefully shows that it is quite possible and fruitful to

participate in the digital area of game creation nonetheless, despite the many challenges that such participation entails.

2 Why Game Creation is Problematic

'Game creation' appears to signify an activity, or a creative practice the result of which expresses the creator's ideas. Thus, if one is interested in a specific game and its content, or in the motives of a specific game designer and his or her individual engagement with game creation, general notions like that of a 'digital area' may not appear necessary at all. However, once the focus is on the dynamics and constituting factors of small-scale game creation as such, as well as its structural possibilities for the individual, and in this case, scholars in the humanities, several issues complicate the matter.

Some of these issues are visible in Lev Manovich's recent work on software studies (Manovich 2008; 2013), in which he argues that software is the key to understanding media today, because data cannot become media without software algorithms and functions that interpret, filter, and visualize it. Manovich draws a helpful distinction between media and meta-media. While the former describes media in their traditional sense, the latter signifies the new properties or software functions that media have gained due to digitalization as data and 'softwarization', e.g. their inevitable existence as data processed by software. Given the structure of the computer, pre-processed digital data is almost impossible to read as it simply consists of endless rows of 0 and 1. Digitalized media, Manovich (2008: 106) says, can be deployed in various contexts due to their status as data – their appearance and behaviour can be manipulated via interfaces such as editors or visualized by specific programs in various ways.[3] For Manovich, the most important aspect here is that digital data can be processed by standard techniques available across digital data and software, such as search functions. In turn, this feature allows for the application of new or different functions on data originally not intended for such use or alteration. Media after software becomes 'meta-media', usually containing both a mixture of original media data (images, text, etc.) and a meta-language that processes this data. Together with the increasing compatibility of different media types due to their status as digital data, the layer of software allows the users to change the structure and even processing parameters and algorithms of a meta-

3 Try, for example, to open an html-file with your text editor, your word processing software and your web browser – the result is probably different in each case, and each software offers different functions for altering the visualization or even editing the data itself.

medium as such. For Manovich (2008: 107), this fundamentally new dimension of an already existing remix culture, namely the possibility of remixing interfaces and software techniques, allows the user to invent new media. He argues that this development is liberating: 'meta-media require only new software, and therefore they can be developed by a single person or a small group and easily disseminated. Never before has inventing new media been so easy, at least from a technical point of view' (Manovich 2008: 110-111).

Manovich thus stresses the growing possibilities digital media and contemporary software hold for individual creators. However, he briefly qualifies this statement by adding that 'not every remix by itself is great; it all depends on who is doing the mix' (Manovich 2008: 110). Elsewhere, he grants that it 'takes talent to transform the possibilities offered by software into meaningful statements and original experiences' (Manovich 2013: 323). That said, Manovich generally remains vague about the accessibility of meta-media creation and does not address questions of literacy and accessibility. He seems to suggest that an interest in and the ability to remix or create on the level of software is mostly limited to 'professionals and scientists', as opposed to consumers, who 'think of computers as machines for downloading, storing, transmitting, and editing media. [. . .] Inventing meta-media is not simple, because it requires an in-depth understanding of not only computer science but also the history and conventions of various media and cultural forms' (Manovich 2008: 110).

In pair, Hichibe's evaluation of small-scale media content creation in Japan that I outlined in the introduction and Manovich's discussion of media software raise at least two questions in the context of game creation. Firstly, both authors seem to suggest that in this area, non-professional creators can potentially invent 'meta-media', to use Manovich's term. Sidestepping issues of the so-called 'digital divide' due to the limited space available here, we need to ask how difficult and accessible the technologies required to do so actually are – in particular for untrained participants. Regarding the present state of 'digital humanities', Julia Flanders (2013: 208) claims that 'under the hood (so to speak), increased speed and computing power has also given us tools that finally propel us over the threshold of possibility: humanities novices are becoming able to participate meaningfully in what would formerly have appeared to be impossibly technical projects.' However, it is not clear whether this is a general statement about the increase in accessibility to digital technologies – are we safe to assume that programming novices can likewise deploy contemporary tools for game creation meaningfully?

Secondly, from an area studies perspective, the above-mentioned claims about a broader accessibility of digital tools not only raise questions of individual requirements to participate, but also questions about the specific local and

regional conditions of game creation. In other words, when speaking of accessibility, we need to pay attention to local contexts and the availability of knowledge about respective technologies in different languages and different parts of the world.[4] That is, on the one hand, many game creation tools are available across borders and language barriers, and some are even maintained in multiple languages. Moreover, programming languages have no native geographical place attached to them other than computer motherboards.[5] On the other hand, the Japanese case introduced above highlights the regional specificity of distribution systems and cultures. In addition, educational backgrounds of the creators, financial possibilities in the amateur world, but also the availability of software tools, manuals, and tutorials in various languages contribute to shaping the local, regional, and global landscapes of digital game creation. The Japanese scripting engine 'NScripter' may serve as a case in point here. The tool is known in Japan and used in locally and even globally successful games such as 'Higurashi no naku koro ni' (released in Japan 2002-2006, released in English as 'Higurashi When They Cry' 2009-2010). However, the official version of the scripting engine is only available for Windows, on an all-Japanese website (see figure 1) with a Japanese manual.[6]

While unofficial versions for other operating systems and even attempted translations do exist, the tool appears decidedly inaccessible to non-speakers of Japanese, and the spread of NScripter beyond Japan can be assumed to be relatively low. Thus, NScripter clearly points to the importance of local and regional contexts of knowledge and language when it comes to digital content creation and knowledge availability.[7] Putting general discussions about 'the digital' or 'game creation tools' into perspective, it urges us to pay attention to

4 In a broader sense, this means thinking about the global division of access to computer technologies and internet resources. Such dimension would, however, exceed the scope of this article.

5 However, that is not to say that programming languages are free of influences. Loops and general identifiers, as well as fundamental classes and libraries in common languages like C++, C#, Java, or JavaScript are usually adapted from English.

6 A link analysis of the website using the Digital Methods Initiative's 'Link Ripper' (https://tools.digitalmethods.net/beta/linkRipper/, last accessed 30 June 2015) shows that the page is mostly self-referential. The only outlink refers to author Takahashi Naoki's Twitter account, on which he tweets in Japanese to an audience of 6088 followers (as of 30 June 2015).

7 While in the case of NScripter, one could speculate that its localness might be a result of the tool creator's target audience or language preferences, other examples show that the push towards 'local' software seems to be framed by national interests and the global competition about technological superiority (BBC 2014). I am indebted to one of my anonymous reviewers for pointing this out.

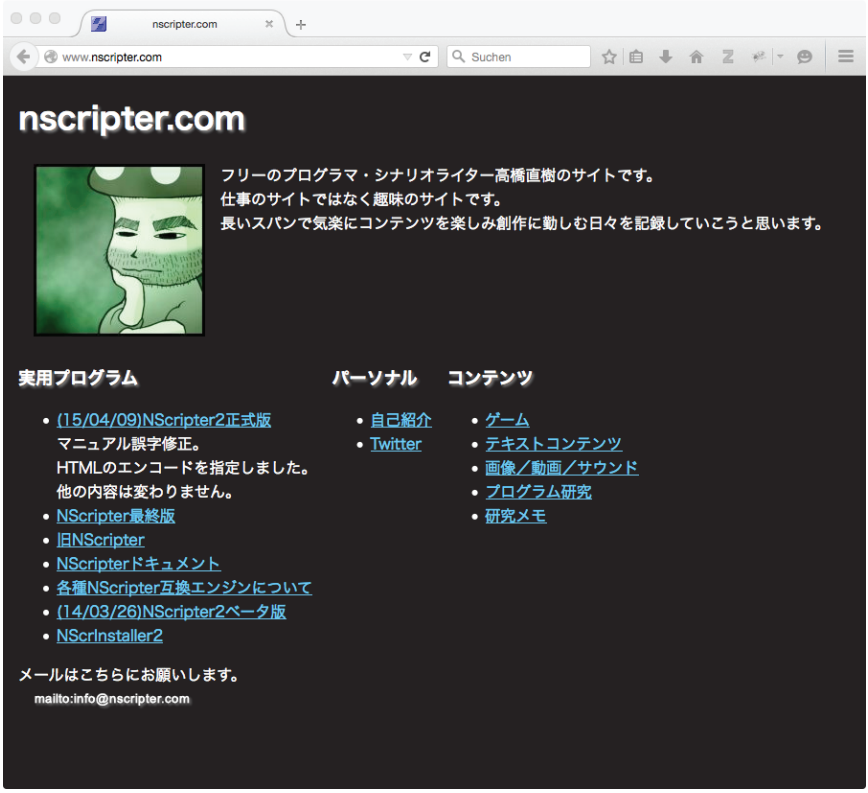

FIGURE 1 *Official website of the Nscripter engine. Source:* http://www.nscripter.com/, *last accessed 10 April 2015.*

specific tools and their contexts, including available knowledge about them. In a broader context, Richard Rogers (2013: 126) observes

> a historical shift in the study of the Internet, and especially how the web's location awareness repositions the Internet as object of study. The national web is one means of summing up the transition of the Internet from "cyberspace," suggesting a placeless space of email and packets, to the web of identifiable national domains (.de, .fr, .gr, etc.) as well as websites whose contents, advertisements, and language are matched to one's location.

Rogers alerts us to another dimension of localized knowledge based on current IP address practices (IP-to-geo mapping) and individualized search engine results.

To sum up, any engagement with a topic like 'small-scale game creation' faces several problems that need to be addressed. Besides the question of skills, a major question concerns the availability of game development tools and the integration of specific practices in local, regional, and global contexts. As I have tried to show, to speak of 'small-scale game creation' as such appears as a problematic generalization. Berry (2012: 8) may have a point when he claims that 'technology enables access to the databanks of human knowledge from anywhere, disregarding and bypassing the traditional gatekeepers of knowledge in the state, the universities and the market.' Yet, this should not be taken to mean that regional, geographical, or language-based differences are mitigated entirely. At the same time, privileging distinctively local tools and practices like NScripter quickly risks falling back into the trap of methodical nationalism, e.g. a privileging of sources due to their clear association with seemingly natural categories like state, nation, or culture. In his search for 'Digital Asia' on several websites of universities in 'Greater China', Schneider (2015) shows that even seemingly cosmopolitan organizations are not overly well-connected transregionally and transnationally. He confronts us with the question of 'how realistic it is for researchers to overcome [...] "methodological nationalism" [...]. When the information networks we use collapse into local or national spaces, can we expect truly "transnational" cooperation across borders?' (Schneider 2015: 85) However, at the same time, the activities of game creators or architects and the games they create do travel and function not only as expressions of ideas and beliefs, but also as mappings, interpretations, adaptations, colonizations, and structural expansions of the landscape of media and meta-media, or what I prefer to metaphorically call 'digital space'.[8] The situation is further complicated by the anonymity often in play on respective communication platforms and websites that allow for knowledge accumulation and exchange. Therefore, we might not always be able to trace individual game creation practices or specific discourses back to a specific context.

8 In this metaphor, games are not only buildings that expresses an idea by means of colour, shape, functionality, etc., but following Manovich's notion of the meta-medium, potentially can become blueprints, parts of which are reused in other buildings and may change the landscape or even the 'physics' of digital space itself, i.e. by adding a new meta-language or programming paradigm.

3 The Concept of a 'Digital Area'

The issues raised above raise the question of perspective. If 'game creation' is caught in a tension between global and local poles and, as part of 'the digital', is based on common systems of code as much as on varying access to its technologies and knowledge about them, the question is, in what sense we can speak of and inquire something called 'small-scale game creation' in the first place?

Instead of reverting to generalizations or artificial restrictions, I propose to approach 'the field' of small-scale game creation in a playful way, along the lines of Jacques Derrida's (1992) radical proposal for engaging with fields the content of which is not known. Derrida distinguishes between two modes of play, namely sure play, which takes place within a well-defined structure and does not have to worry about its fixed boundaries, and 'non-centered play'. While '*sure* play [. . .] is limited to the *substitution* of *given* and *existing, present*, pieces' (1992: 1125, emphasis in the original), non-centred play 'plays without security' and is not interested in a centre or the security it provides by defining boundaries at the same time. In this spirit, I propose to understand 'small-scale game creation' as an entry point to a non-centred digital structure loosely connected by different practices, technologies, and accumulations of knowledge related to game creation.

The long-contested, multi-layered and 'productively vague' spatial concept of the 'area' is used here metaphorically to reflect on this spatiality of game creation as part of digital space and as a way of grasping the instable, overlapping contours of the structure, and to stimulate and draw attention to several problems and questions in the approach. It recognizes the methodological difficulties involved in and the effort required for studying and entering – let alone participating in – this space as an 'outsider'. Highlighting the importance of knowledge about (programming and design) languages, social and cultural conventions (i.e. the open source mentality), and laws (creative commons, etc.) required to 'go native', the concept of the 'area' reminds us of the impossibility of a complete transition into otherness and alerts us to our own position as a researcher.

At the same time, it urges us to think of game creation in spatial terms in a double sense. Firstly, it asks where we can locate game creation on a map of digital space and how it is related to other regions. What kind of online cultures does it host? How is it related to the sphere of professional game design, or to the players? How does it look geographically and architecturally, and why would anyone want to go there? What are its major cities and hubs, and how

does border patrol work? These questions sketch the primary sense in which I propose to apply the term 'digital area' as a playful concept on game creation, which is thus primarily approached as part of a broader digital space in its own right. Secondly, the term 'area' reminds us of the connection between the digital and the above-mentioned geopolitical categories, which remains crucial but should be tackled separately. In both senses, the metaphor 'digital area' is meant as a theoretical framing and methodological cautioning that benefits from a long, on-going discourse about the study of areas, its methods, aims, and effects. Scholars like Edward Said (2012), Naoki Sakai and Harry Harrotunian (Sakai & Harootunian 1999), Wendy Hui Kyong Chun (2003), or Chris Goto-Jones (2010, 2015), among many others, have drawn attention to the politics and hegemonic structures at play in the study, construction, and perception of 'areas' as well as to the methodological and methodical problems involved. In this sense, the notion of a 'digital area' may serve as a warning to remain open, flexible, as well as conscious of the construction itself and its effects.

In terms of a concrete methodology for engaging with such an area empirically, I am inclined to follow Anne Allison's suggestion, which appears as an approximation of Derrida's above-mentioned demands. Observing the similar problem of a perceived shift in anthropology and ethnography 'away from the bounded village into the global ecumene,' Allison (2006: 32) asks 'how does one do ethnography without the false comfort of imagined local boundaries?' She recommends to 'approach a subject not only through a body of literature and analytic guidelines but also by gaining understanding into its lived and discursive nature – how it is actually experienced, conceptualized, and talked about in the field' and to adopt a 'multiperspectival approach' in doing so (Allison 2006: 32).

Given the explorative character of this article and the extensive framework developed so far, the following empirical engagement with 'the area' remains selective and partial. Giving preference to first hand experiences, rather than general overviews over a broader scope based on secondary knowledge, limits the reach of my findings and suggests that more work be done in the future. Yet, while not apt to mapping the space of 'game creation' as such, this practical approach takes seriously Harootunian's critique of any research that views an area – in his case Japan – as a field 'filled only with raw, unmediated data, occupied by natives, waiting to be observed and studied' (Sakai & Harootunian 1999: 597). Acting in the field puts the researcher into the field rather than next to it, thus offering deeper insights into the multi-layered practice of a specific (local) part of the digital area in question as well as the difficulties and potentials game creation might hold for humanities scholars. Before I discuss some of the initial insights gained from my own engagement with game creation

in the remaining sections, I will briefly outline the context of my own game creation project.

4 Excursus: The *Computopia* Game Creation Project

I developed the idea for the game *Computopia* and began implementing the framework as part of the VICI project *Beyond Utopia – New Politics, the Politics of Knowledge, and the Science Fictional Field of Japan* by Chris Goto-Jones.[9] The idea was to express the findings of my PhD project on the political potentials of Japanese video games in their own gamic language. Three ideas guided the project from the start. Firstly, I wanted to use the dynamic, input- or action-based quality of videogames and their resulting 'unpredictability' as a way of problematizing individual (player) responsibility. Player actions should have a discernible effect on the game world, gradually changing its nature and mood depending on the player's choices. Secondly, I wanted to deploy the separation between the game system and its representation, as well as the partiality and flexibility of the latter, as a method for creating surprise, suspense, and a layer of reflection on the game content. Events and items were supposed to remain abstract at first and only later reveal their meaning. And thirdly, I was toying with the idea of 'exchange' as a guiding principle of the game. This concept has recently been discussed as a philosophical perspective on world history by Japanese thinker Karatani Kōjin (2014), who tries to understand the dynamics and mechanisms leading to the modern world system and its 'Borromean Knot' of capital, nation, and state. He reinterprets an adapted version of the Marxian social formations (clan society, Asiatic despotism/state, ancient classical slave system, feudalism, and capitalist modes of production) from the perspective of four different modes of exchange; namely, a reciprocal mode of gift and counter-gift (A), a mode of plunder and redistribution (B), a mode of commodity exchange (C) and finally an imaginary mode of 'associationism' (D), arguing that these formations can be understood as a shifts from one dominant mode of exchange to the other.

What intrigues me about Karatani's perspective is his attempt to actively seek out ways to overcome the contemporary status quo of today's global capitalism – a system that seems to be characterized by the lack of alternatives to it. Or, as Jameson (2010: 24) puts it, our capacity to imagine utopia or a different future in general is increasingly hindered by 'a conviction that fundamental change is no longer possible, however desirable.' The question for

9 http://asiascape.org/beyondutopia.html, last accessed 30 June 2015.

the project was thus whether a digital game might be an interesting format to interpret, explore and transform Karatani's ideas, both by following the logic of digital games and by deliberately translating his structure to a digital world. Writing this article, I have established the general structure of the game, but have unfortunately not been able to finalize a playable version yet. In order to offer a rough idea about the game nonetheless, allow me to cite from my initial one-page design document:

> The idea
>
> This game is about individual choice and its consequences in a world that is based on (different forms of) exchange (an idea I have from Karatani). In several stages, the game challenges you, the player, to discover its environment and try to find a way out. And, try to survive until you do. You can explore the environment by traversing it and can interact with the moving objects you meet, by moving in relation to them and by a FPS-type of exchange (which can succeed or fail).[10]
>
> At first, these exchanges seem random and arbitrary, but soon you will both experience and DISCOVER that there is something else going on. Or rather, that there is more to this world than what you see at first. This more seems to react to your level of "technowledge" – the bits and bytes guiding you out, which you can collect along the way . . .
>
> The rules/development of the game over time:
>
> You, the player, can collect or harvest data packages in the environment or from moving blocks. These are predefined or can be set up into different states, of which the player in the beginning does not really know what they mean.
>
> You need to find a way out of each stage while staying alive, following a trace of pre-defined data packages which can be collected. Moving objects in the environment can be interacted with, and will respond to your actions/interactions in various ways, depending on their internal state and prior experiences. They generally follow 3 (maybe 4) different patterns, [for clarification here] called reciprocity, domination/submission, and exchange of commodities, and form communities based on these principles with or against the player.

10 FPS or first-person-shooter is a videogame genre, in which the player perceives the game world through the eye of a character and engages in weapon-based combat.

> Thus, by interacting with the environment, the player influences the ways in which the other objects act and interact, triggering a chain of events that leads to the emergence of a society. Player actions are reflected in the next stage, making it easier or more difficult, and at the same time shaping a specific kind of society. At the same time, he or she discovers the meaning of the interactions along the way and might, finally, be able to make a real difference.
>
> You'll see when you get there . . .

This description served as starting point for the game, which changed direction several times. Apart from the content, a crucial step was the choice of an engine or development environment and programming languages. For 3D game projects like the one I had in mind, Unity[11] and the Unreal Engine[12] stand out as up-to-date, sophisticated, and well-documented game development environments, which offer a certain level of out-of-the-box elements and preconfigured objects while also featuring powerful tools for custom game design. Standard versions of both tools are freely available to individual, non-commercial users – both companies demand licence fees or royalties for commercial use.[13] By the time I started the project, the Unreal engine (v. 3) appeared slightly more complex to handle and less compatible to my own technical equipment, which is why I decided to realize the project in Unity.[14]

In the following sections, I will try to situate Unity within the broader context of the digital area of game creation, both 'locating' it and discussing some of the characteristics of the surrounding region its practical use pointed me to.

5 Boundaries

Unity, also called 'Unity3d', is a software originating in the US. Contrary to NScripter, it is marketed globally and used by creators in many countries and with various levels of professionalism. However, Japan – as one possible candidate for comparison – appears to play a relatively minor role in the company's

11 http://unity3d.com, last accessed 9 April 2015.

12 https://www.unrealengine.com/what-is-unreal-engine-4, last accessed 9 April 2015.

13 For more details, see http://unity3d.com/unity/faq and https://www.unrealengine.com/faq, both last accessed 9 April 2015.

14 Currently, both engines appear to have upgraded their capabilities and the Unreal Engine (v. 4) might be worth revisiting.

United States	37
Taiwan	10
Canada	6
United Kingdom	5
Australia	3
Japan	3
Singapore	3
Republic of Korea	2
Philippines	2
Russian Federation	2
Algeria, Argentina, Armenia, Belarus, China, Finland, Germany, Greece, Hong Kong, Hungary, India, Indonesia, Israel, Italy, Malaysia, Mexico, Spain, Switzerland, Thailand, Tunisia, Ukraine, Vietnam, Puerto Rico, Serbia	1 each

FIGURE 2 *Unity user groups by country. Source:* http://unity3d.com/community/user-groups, *last accessed 9 April 2015.*

efforts and is also not prominent among the user groups listed on the Unity website. The numbers compiled in figure 2 certainly do not say much about the quality of the knowledge and the discussions available, but they do serve as a first indication that the breadth and amount of knowledge accessible in a certain country, area, or language differs.

Yet, the difficulty of determining the spread of this tool or its discursive spaces is that it seems hard to establish its boundaries and national differences. A first approach for mapping the Unity-related web is to perform a link analysis with the *Digital Methods Initiative's* IssueCrawler.[15] A snowball crawl, which simply reproduces a network of links from the URLs 'http://japan.unity3d.com', 'http://unity3d.com ' (set up with one degree of separation from the source urls, crawl depth set to three layers into the specified source urls) shows that national domains (.jp and .co.jp) play a minor role in the link network of Unity (see figure 3).

15 See https://wiki.digitalmethods.net/Dmi/ToolDatabase (last accessed 30 June 2015) for this and other useful analytic tools created by the *Digital Methods Initiative*.

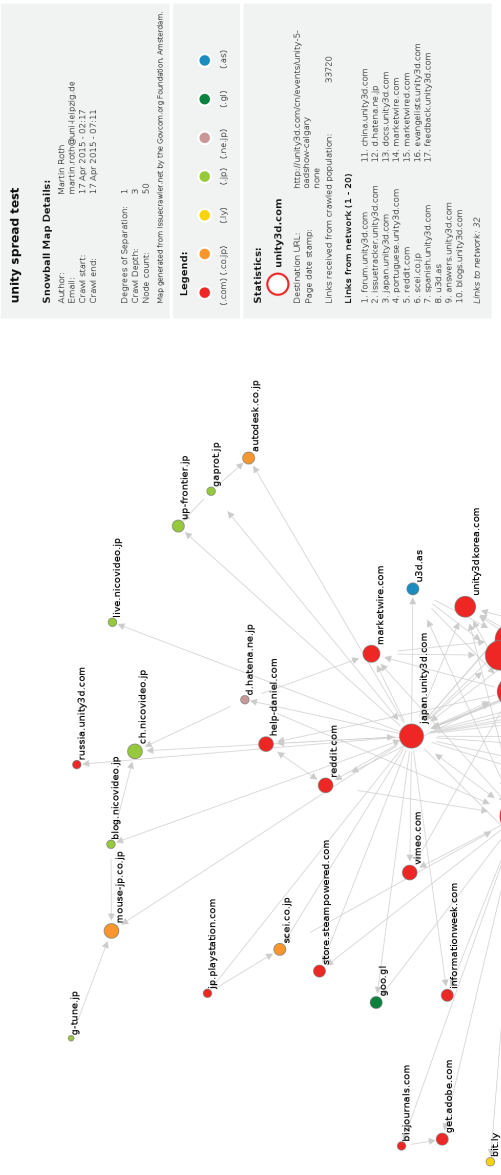

FIGURE 3 *Unity snowball network graph produced with the IssueCrawler tool. Japanese domains (.co.jp, ne.jp, and .jp) are orange and green, '.com' domains administrated by Verisign in the US are red.*

A co-link analysis with the same tool (two iterations and a crawl depth of two), which returns nodes or sites with at least two links from the seeds – in this case 'http://unity3d.com ', 'http://japan.unity3d.com ', and 'http://unity3d.com/jp ' – offers a similar picture in which most links refer to international or English-language pages (see figure 4).

While it is beyond the scope of this article to offer a detailed analysis of the networks found, the scarcity of links to Japanese websites is interesting.[16] To give one example, both analyses indicate that Unity links to Nintendo. Examining the co-link analysis in more detail, however, reveals that Nintendo.com receives a total of 1566 links (27 links from the core and 1539 from the periphery), whereas Nintendo.co.jp (the Japanese page) receives no links at all.

Overall, these numbers suggest that the Japanese pages are not embedded as firmly in their national web as the generic (English language) page. However, such measurements can merely be a rough approximation – a search for 'unity 3d' with Japan and Japanese as country and language settings, respectively, returns a wide range of both Japanese and English language sources on Unity. In addition, registered country does not necessarily determine language. Consider the random site of 'Hosoya Schaefer Architects AG Zürich', which is registered in Switzerland – and is listed as one result in the snowball analysis.[17] While the *Digital Methods Initiative's* Language Detection tool indicated that this page is in English, a look at the page itself reveals not only that most contents also exist in German, but also that there is a rudimentary version of the page with its most basic information in Japanese as well. Moreover, such measurements do not take into account that Japanese users might communicate and inform themselves in English. The site discussed here does not link to Unity directly and is thus 'far' away from the sources of my initial crawl. However, it exemplifies the difficulties any attempt to determine the 'national' or 'language' boundaries of a topic or website faces – the boundaries present themselves primarily as boundaries of methodology and method.

16 The co-link analysis might need further tuning in the future. In particular, it would be interesting to include other relevant sites in the seed url list. However, a first attempt to do so based on a list of urls returned by a Google query did not produce any useful results. Moreover, since it is quite likely that a new user discovers and explores the possibilities of Unity through the official site (see the two following sections), these sites do mark a central entry point and can thus offer some indication of how Unity is embedded in the web.

17 http://hosoyaschaefer.com, last accessed 3 July 2015.

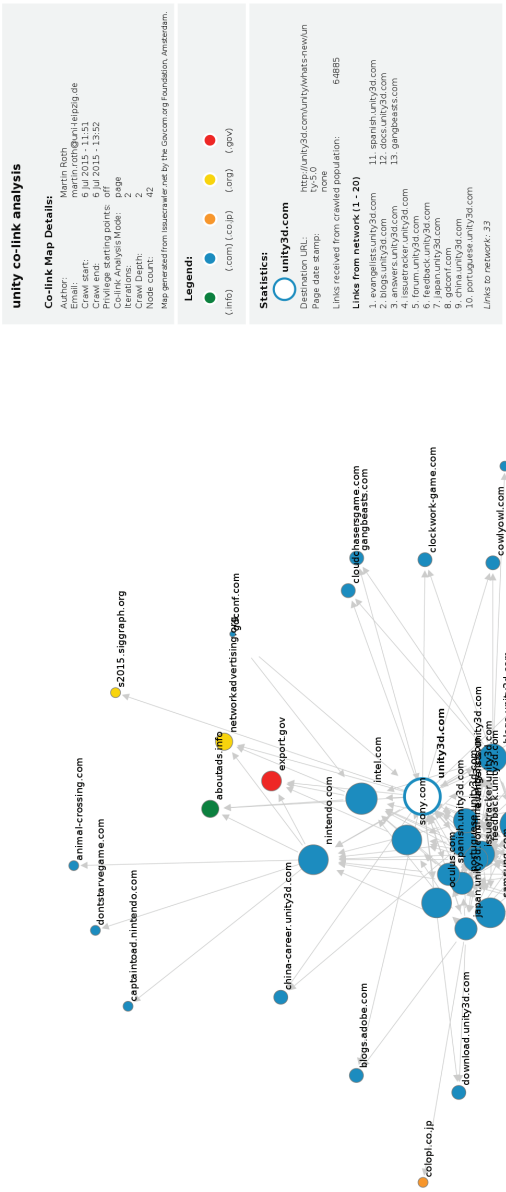

FIGURE 4 *Unity co-link network graph produced with the IssueCrawler tool. The only Japanese domain (.co.jp) is orange, '.com' domains administrated by Verisign in the US are blue.*

Nonetheless, one indication for a crucial difference in knowledge availability may be found when comparing the English and Japanese 'Tutorials' section of the Unity website. The English version offers seven tutorial projects and short tutorials on 182 topics in various categories, plus an archive or 69 live training sessions.[18] A brief look at the Japanese version reveals that while all tutorials are available there as well, none are translated to Japanese.[19] While some information on working with Unity is available on the Japanese subpage,[20] this indicates a substantial difference in accessibility to online knowledge about the tool provided by its developer between English and Japanese. Likewise, a query for the term 'unity 3d' on Amazon.com and the Japanese Amazon.co.jp on 30 June 2015 return a number of 473 English-language books on Amazon.com and 64 Japanese-language books on Amazon.co.jp. This seems to replicate the trend observed on the official website. Again, such numbers do not say much about the quality of the contents, nor should they be taken to mean that Japanese users of Unity cannot access books outside of the Japanese language sphere. Complicating the matter further, one might ask whether we must also take the difference in size of the English-speaking community into account when reviewing these quantities. In sum, these indicators suggest, if anything, that Unity is firmly embedded in the English-language sphere – the boundaries of this claim, however, are porous to say the least.

6 Hybridity and Remix

For my own project, I mostly drew on English-speaking sources. By the time I started working on the game, my most recent attempts at programming dated back more than ten years. Although I could rely on some rudimentary knowledge of informatics and programming (pascal, assembler c++) as well as a basic understanding of media editing tools, game creation tools struck me as relatively 'exotic'. The Unity Engine is a sophisticated environment shipped with a version of the powerful integrated development environment *MonoDevelop*, which allows users to write and edit scripts for Unity objects in C#, JavaScript or Boo. My own earlier experiences in mind, the first discovery was a surprise: Instead of reading introduction volumes on programming in Unity,

18 http://unity3d.com/learn/tutorials/modules, last accessed on 30 June 2015.

19 http://unity3d.com/jp/learn/tutorials/modules, last accessed on 30 June 2015.

20 http://japan.unity3d.com/unity/workflow/, last accessed on 30 June 2015.

I found myself watching an almost endless stream of tutorial videos and how-to guides created by the makers of Unity as well as by individual programmers and designers who shared their knowledge and experience. While I cannot say how this compares to 'learning' programming basics from scratch via books in terms of effectiveness, the accumulated mass of online video tutorials and free code snippets provides an easy, accessible entry point into the world of digital game creation that might suffice for simple game projects.

This 'complicity' between visual tutorials and code snippets is no coincidence, but a crucial element of the digital area of game creation that takes into consideration three main dimensions of digital content creation; namely, graphical user interfaces, diversity of application, and the kind of 'remix' that Manovich identifies as the central paradigm of contemporary media creation. Unity is a showcase example in this respect. The software is built as a hybrid of visual editing environment (Figure 5) in which pre-existing and newly defined objects are built from various elements – the playing field on which objects can be placed and visually modified to generate landscapes, levels, and playing environments complete with lights, physical materials, and moving elements – and the MonoDevelop scripting environment (Figure 6), in which any object can be modified by adding small pieces of code to it that define custom behaviour and may contain anything from variables for appearances to complex algorithms defining responses to status changes or simple back-and-forth movements.

These two elements allow for myriad of possible usages and combinations of pre-configured and own objects, thus offering an open playing field for the creator. Crucially, object orientation, meaning the principle of building a software product by creating autonomous, inheritable, flexible, and reusable objects,[21] makes objects and scripts in Unity – up to a certain level – compatible with the work of other creators. As scripts function on any object that meets their requirements, such an operation is simply a matter of copy and paste. In other words, visual editing and the remix of meta-media and even their language are central practices in Unity.

21 For a short explanation, see, for example, http://docs.oracle.com/javase/tutorial/java/concepts/object.html, last accessed 16 January 2014.

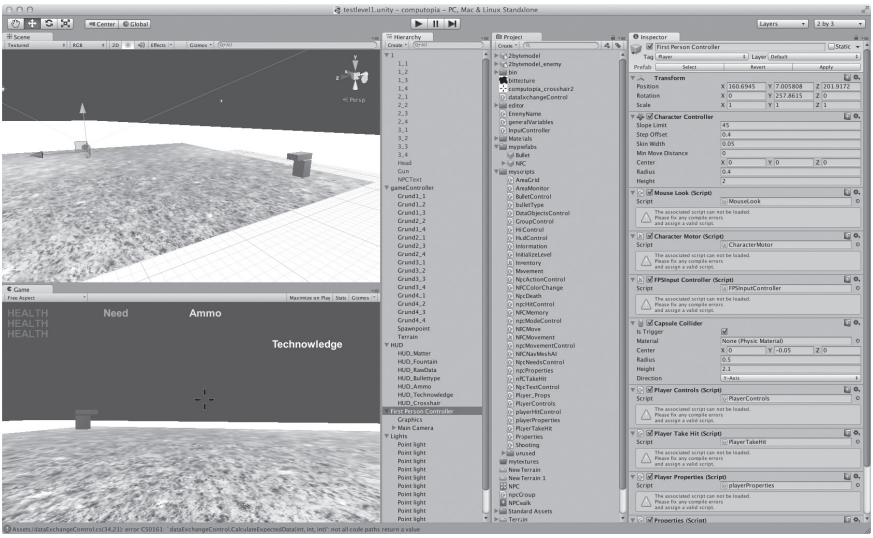

FIGURE 5 *The Unity GUI.*

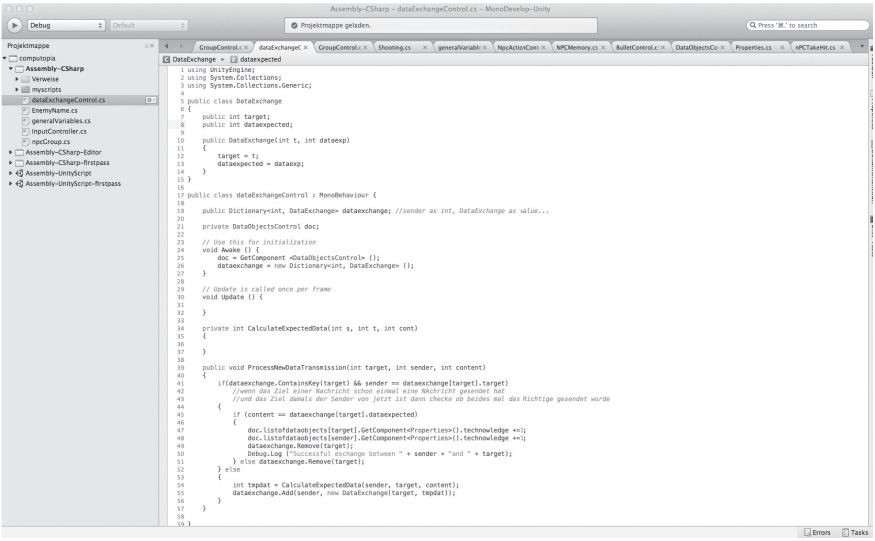

FIGURE 6 *MonoDevelop.*

For inexperienced creators lacking a deep understanding of programming in the respective languages – like myself – this can be both a blessing and a curse. On the one hand, it allows for including sophisticated functions into one's game, turning the game creation process into a tireless search for existing solutions to problems similar to the one at hand (in most cases, somebody somewhere has encountered a similar problem). This method delivers results in most cases and makes creating a game easier than expected – not least because the Unity website itself is a rich source of useful and well-documented examples. However, applying complex code without fully understanding it always carries the risk of taking the project beyond one's own capabilities to control its code and behaviours. Speaking from experience, such practice can either lead to frustration or motivate further study and empowerment.

Crucially, Unity is not only playful in its invitation to remix, but also due to the ability to reflect changes almost instantaneously in a simulated preview of the game, shown in the lower-left panel in Figure 5. With a click, the game can be started and the results of previous alterations of coding are shown. Such instant visualization or testing of the progress reflects on demands made on the game creation process by experienced game creators. Bruce Shelley (2001), for example, states that 'Prototyping is not only useful from a technology standpoint, but is also critical for testing gameplay. Designers are usually left guessing until their games can be played. There are always surprises when a game is first played, some good and some bad.' In addition, it also renders the combined process of creating a game and learning how to do so a decisively playful activity. The possibility to change the game within seconds invites the designer to explore the various possibilities at hand. Adapting the old dictum of 'learning by doing', in the area of game creation one may speak of learning by playfully remixing.

7 Information and Interaction

If remix culture in general depends on ingredients to remix, game creation requires ideas, objects and code to flourish. Interestingly, the official materials mentioned above only amount to a small share of the sources used for these remix activities – a fair share of the code snippets is either user-based or provided by other parties. This characteristic points to two contrary elements of the digital area of game creation; namely, the interaction among the creators and the static libraries and documentation of programming languages.

What struck me most about the projects was the vividness of the community, which exists on platforms like YouTube, the Unity Forums, GitHub, or StackOverflow. StackOverflow[22] is a popular Q&A forum for knowledge exchange among programmers, used by amateurs and professionals. As part of the StackExchange platform, StackOverflow employs a user-based rating system for both questions and answers and complements this evaluation with a sorting mechanism that displays the 'best' answers first. Due to this system, a user sees the answer to a question deemed most useful by most viewers – and thus the most promising solution – first. Built entirely as a voluntary user forum, StackOverflow depends on an active, patient and helpful community of experts. Christian Fritz (2014) discusses this aspect in a blog post:

> Once you start using StackOverflow a little seriously and start contributing, you realize why it works so well: it makes it rewarding for those who help. Analyzing the reasons why it is so rewarding, whether it is the fact that questions are reviews [sic] and rated, resulting in mostly high quality questions, or whether it is the mere collection of *reputation*, is beyond this blog post. But because it is so rewarding, there are sufficiently many people who are willing to spend time helping others, and hence anyone coming with a question can get it answered in often a very short amount of time – quite often in significantly less than 10 minutes.

While it is doubtful whether the principles of StackOverflow can be generalized for a broader context of digital culture, its importance in the digital area of game creation is nonetheless palpable: Many visits to the site during my own project – often by following my search engine's suggestion based on my query – showed that the community is surprisingly helpful and patient even with beginners as long as the individual asking shows respect and that an effort has been made to find out themselves on some rudimentary level. The statistics of 10 April 2015 indicate 9,369 questions tagged with 'unity3d'. In addition, YouTube.com returns approximately 259,000 results for the search term 'unity 3d'. As in the case of Unity user groups, these numbers alone say little about the quality of the contents or their usefulness. However, in combination, I believe it is safe to say that innovative, algorithmic and visual forms of knowledge exchange are a crucial foundation for the digital area of game design – not least because they are also an important layer on which the area overlaps with other areas such as software application programming (through

22 http://stackoverflow.com/, accessed 10 April 2015.

the languages) or media design (in particular, where creating objects and their appearance with additional software like Blender[23] or others is concerned).

On the other end of the spectrum, we find rich sources of knowledge and remixable contents in language documentations like the .NET Framework class library documentation found on Microsoft Developer Network[24] and scripting API references like the Unity Scripting Reference.[25] In this sense, the digital area of small-scale game development (and presumably also its neighbouring areas) are developed and expanded in an interplay between software, knowledge about its capabilities, discourse about these capabilities and solutions to problems among amateurs and with professionals as well as individual and collaborative practices. This mixture of amateur and professional players as well as that of different topics and interests found on StackOverflow, also further strengthens my insistence on the openness of the 'digital area', which appears to be organically interwoven with other areas and practices in various layers, like YouTube broadcasting, software programming, discussion forums and their culture, or professional language documentations.

So far, I have argued that the centrality of 'remixing' and instant testing in Unity afford a quick, playful entrance into its creative potentials. I have mentioned the abundance of information, discussions, and tutorials available in English, which offer help even for creators like myself, who are not trained programmers, making the tools available to novice users. The fact that this engagement depends on a broad range of available knowledge and existing solutions underscores their importance. In light of the tilt towards English-language knowledge perceived above, this raises the question whether the tool is equally accessible beyond the English-language barrier. This is primarily a question of methodology and methods for situating digital tools in geopolitical space, which I believe are not yet ready for the task and require further development – in particular, the question remains how the quantitative data easily accessible about the existing information on Unity relates to the quality of this information, and how we can evaluate and compare the rich online resources across different languages and user groups. However, given the ease of use I have described so far, one might still wonder why this should matter to humanities scholars. How does video game creation contribute to academic work? In the following section, I make the case that game creation challenges

23 Blender (http://www.blender.org/, last accessed 10 April 2015) is a free and open 3D animation suite. In the context of Unity, it is mostly used for modelling complex objects.

24 https://msdn.microsoft.com/en-us/library/gg145045(v=vs.110).aspx, last accessed 10 April 2015.

25 http://docs.unity3d.com/ScriptReference/index.html, last accessed 10 April 2015.

us to think differently and organizes our imagination in a different way, thus offering a novel ground for experimenting with theories and developing new ideas.

8 Algorithms and Imagination

While equipping myself with knowledge about the mechanics and functionality of Unity, I started to work on the game. This was as much a process of trial and error in terms of the technologies and languages that come into play, as it was an iterative process of redefining the content of the game while working on it. Versed programmers and designers presumably have a better oversight of their games from the start. However, even experienced game designers like Katie Salen and Erik Zimmerman (2004: 11-12) point out that inventing games is neither easy, nor a straightforward process, because 'it is not possible to fully anticipate play in advance.' They recommend a gradually developing, 'iterative game design' for all games, based on frequent testing as a way of circumventing failure.

In addition to the already mentioned playful quality of instantaneous simulation and remix, this iterative process hosts another playful element resulting from a tension between imagination, logical thinking and emergence. As soon as objects are equipped with an algorithm designed to process dynamic, non-predefined input, the game world becomes – to greater or lesser degree – an emergent space. Jesper Juul (2005: 73-83) distinguishes between four levels of emergence in rule-based videogames; namely, emergence as variation afforded by rules (i.e. in Chess), emergence as non-disclosed patterns that 'appear' emergent for the player because they are not explicit from the rules, emergence as irreducibility due to rule complexity and emergence as novelty due to unforeseen re-combinations of rules. Based on this categorization, two sources of emergence can be identified; namely, the rules (patterns, complexity) themselves and the actions possible within the boundaries of these rules (variation, recombination). In addition, emergence can be seen as either a result of deliberately introduced openness or of an unintended potential due to complexity and unpredicted player actions or computer performances of the code.

This potential emergence is amplified by the aforementioned principle of object orientation underlying contemporary game creation software. As mentioned, object orientation aims to build a program out of separate objects authored in so-called classes, which can be reused, specified or added to in many ways without having to change the object itself or the entire code. This

means that objects as well as any scripted classes added to them in Unity work independently of others and can be reused in various contexts. Once a (functioning) script is active, it will take its cues from the game world and respond to them according to its routines. These routines, in turn, can be randomized or made dependent on dynamically changing input or data and they may be copied and reused. In other words, as soon as an algorithm is established it can be deployed on different objects or activated in different contexts, each time with potentially different results. For example, one may instruct a non-playable object to pursue the closest object to it, copy that object ten times and get a group of objects that each pursue another object and automatically change the target once one of the other objects – in pursuit in turn of another object – crosses its path of pursuit. The result (if carefully equipped with the necessary exceptions and tests) are almost unpredictable movement patterns on the screen.

In a discussion of Photoshop filters, Lev Manovich (2013: 134-139) observes a similar effect. He shows that while filters like the 'wave filter' are designed to simulate realistic effects, the range of input allowed can lead to unexpected, non-periodical, abstract effects when the algorithm is fuelled with parameters outside of a 'natural' range. In other words, by playing with the parameters of algorithms originally built to represent some physical or human law or theory, it is possible to generate structures and visualizations beyond imagination. This un-imagined generation, of course, does also offer itself to be deployed in rules-based contexts, such as object behaviour or artificial intelligence. In all cases, the designer does not have to think about the results of a specific calculation, but only needs to care about the flawlessness of the algorithm and the range permitted for the parameters – the actual calculations are made by the computer. Examples of – deliberate or accidental – variability and emergence range from the possibility to widen the viewport in Quake 3 Rocket Arena to the game's emergent possibility of the 'rocket jump', which defies the intentions of the game design in a productive way by using the harmful explosion blast of rockets to reach places otherwise inaccessible.

This twofold emergent quality of the game creation process hosts an intriguing possibility for the imagination as well as scientific thinking. Darko Suvin, one of the founding fathers of sf studies famously defined Science Fiction as a genre of cognitive estrangement, '*distinguished by the narrative dominance or hegemony of a fictional "novum"* (*novelty, innovation*) *validated by cognitive logic*' (Suvin 1979: 63, emphasis in the original). He grants that the novum itself does not have to strictly follow scientific principles. 'The novum is postulated on and validated by the post-Cartesian and post-Baconian scientific *method*. This does not mean that the novelty is primarily a matter of scientific facts or

even hypotheses' (Suvin 1979: 64-56, emphasis in the original). Similarly, well-known Japanese writer Abe Kōbō (2002) identifies 'pseudo-science' and the testing of new hypotheses as the foundation of science fiction.

> In literature, proximity to discovered facts is far less important than adherence to the internal laws of discovery itself. In other words, it's a question of forming a hypothesis and then seeing to what extent you can erect a new system of rules, utterly different from the existing rules of our everyday lives. [. . .] When a fresh hypothesis is brought in, the everyday is suddenly destabilized and begins to take on strange new forms. It becomes activated, objectified, and our consciousness is roughly shaken (Abe 2002: 346).

The playful emergence mentioned above seems to hold a similar possibility in a slightly different fashion. Whereas both Suvin and Abe emphasize the need to 'play out' the effects a novum or hypothesis has on a thus altered world, game creation environments shift parts of the simulation to the level of the software and the computer, which approaches the code strictly logically. In addition to the designer's imagination, a hypothesis may thus involve variable, emergent and unknown elements, which are specified only later during gameplay by the player or the computer. Most importantly, algorithms, which calculate outcomes dynamically and in sometimes unforeseen ways, mark game creation as a new type of playing field for what might be called 'unpredicted imagination'.

My own attempt at testing the idea of exchange in a digital game may thus be seen as an attempt at using these potentials in an academic context – it appears difficult to predict what the outcome will be prior to completion. Certainly, the mere existence of emergence and variability does not turn games into spaces of speculation and novelty. Yet, combining creative design with the computer's capacity for logical simulation, game design environments offer new spaces for experimenting with theories, thoughts, and opinions.

9 Outlook

Additional experiments are certainly necessary in order to learn more about the digital area of game creation and its neighbouring spaces. Several important questions remain unanswered or open for future inquiry. Firstly, I have focused solely on a single game creation tool and drawn on my own individual experiences. A comparison with other tools will shed light on the relations

between those tools and their place within the digital area, as well as their link to geopolitical categories. Likewise, I have not touched upon the collaborative practices and open source software projects, and the role platforms like *GitHub* play in their coordination and dissemination. Thus, this exploration of some of the characteristics of game creation in Unity can only be viewed as a starting point for further explorations. Whether the characteristics found in Unity can be generalized to other game creation tools remains an open question, the answer to which might allow for a first distinction between different places within the wider area. Despite these shortcomings, the above has hopefully shown that game creation can be understood as a digital area in its own right, and has to be analyzed critically from this perspective – area studies offer a useful set of questions for such inquiries.

As argued above, Unity – and, as far as my own brief experience with the Unreal Engine go, other tools as well – are accessible and offer interesting possibilities. They prompt us to experiment with and deploy concrete thoughts, visions and ideologies, which otherwise appear hidden behind knowledge and abstract theoretical constructs. Game creation forces the creator to approach the subject at hand from a fresh, even unsettling perspective. In my case, the need to come up with an implementable, consistent, and somewhat teleological concept was one of the most serious hurdles during the project, not least because translating a theory from the humanities into logical rules that are playable requires the designer to make ideological decisions (i.e. define goals). This proved more difficult than expected. Nonetheless, the partial realization of the game offered a fresh perspective on Karatani's work and my thoughts about it, in turn transforming my own views.

I should add that my own project did not suffice in terms of determining the value game design could have for academic inquiry and the imagination, not least because I am not able to present a playable game to underline this point. This article is thus not meant to hide the fact that creating videogames is certainly one of the more demanding engagements with contemporary digital technologies. My intention is therefore not to claim that humanities scholars should become programmers or media designers. In the aforementioned article, Schneider (2015: 88-89) emphasizes the importance of a rudimentary understanding of programming languages, but also questions the ability of humanities scholars 'to learn programming languages and acquire such "code literacy", on top of their teaching, research, and administrative duties.'

However, with growing resources available and easier-to-use tools being developed, one might say that the 'threshold of possibility', mentioned by Flanders (see section 2), is in reach. Whether humanities scholars can truly engage with these possibilities depends as much on their own preferences, as it

depends on the institutional backup game design receives as a serious mode of academic inquiry and communication – much has to happen with regards to the latter. At the same time, such engagement depends on the actor's attitude. In the context of game creation, one might say, we have to become hackers in the sense of the term discussed by Tad Suiter. According to Suiter (2013: 8), 'hacking activities use playful creation to enrich knowledge of complex systems', or a 'clever gaming of complex systems to produce an unprecedented result.' Both the playful and the creative, unprecedented potential mentioned here notably match the characteristics of Unity and, most likely, other contemporary game creation tools. I would like to conclude with this similarity; namely, that in game creation as in hacking,

> There is that sense of play. It's something that "serious" academics do not get to explore as often as they should. [...] Play leads to types of problem solving and synthesis that would otherwise be impossible. [...] The academy, ultimately, can only be invigorated and improved by an infusion of the hacker ethos that goes beyond the computer science departments and infects all the disciplines. It has the potential to help fix problems in the system, deepen our understanding, and make our lives a little more fun (Suiter 2013: 10).

By experimenting with digital technologies in this spirit, humanities scholarship can not only 'play more', but also play a more active role in mapping and participating in digital areas and their discourses, instead of keeping at a distance.[26]

References

Abe, Kōbō (2002), 'The Boom in Science Fiction'. *Science Fiction Studies*, 29(3), 342-349.

Allison, Anne (2006). *Millennial Monsters: Japanese Toys and the Global Imagination*. Berkeley: University of California Press.

Berry, David M. (2012), 'Introduction: Understanding the Digital Humanities'. In: David M. Berry (ed.), *Understanding Digital Humanities*. Basingstoke: Palgrave Macmillan (pp. 1-20).

26 I would like to thank my anonymous reviewers for their engagement with my ideas and their very instructive comments.

BBC News (25 August 2014), 'China Plans New PC Operating System in October.' Retrieved 30 June 2015 from http://www.bbc.com/news/technology-28928369.

Chun, Wendy H. K. (2003), 'Orienting Orientalism, or How to Map Cyberspace'. In: Rachel Lee & Sau-ling Wong (eds.), *Asian America.Net: Ethnicity, Nationalism and Cyberspace*. New York & London: Routledge (pp. 3-36).

Derrida, Jacques (1992), 'Structure, Sign and Play in the Discourse of the Human Sciences'. In: Hazard Adams (ed.), *Critical Theory since Plato*. Fort Worth TX: Harcourt Brace Jovanovich (pp. 1117-1126).

Flanders, Julia (2013), 'The Productive Unease of 21st-century Digital scholarship'. In: Melissa Terras, Julianne Nyhan & Edward Vanhoutte (eds.), *Defining Digital Humanities*. Farnham & Burlington: Ashgate (pp. 205-218).

Fritz, Christian (23 June 2014), 'StackOverflow Inspired Scientific Discourse?' Retrieved 10 April 2015 from http://bibbase.org/blog/stackoverflow-inspired-scientific-discourse.

Goto-Jones, Chris (2010), 'Alien Autopsy: the Science Fictional Frontier of Asian Studies'. In: Chris Goto-Jones (ed.), *The Asiascape Collection v.1*. Leiden, Netherlands, pp. 22-27.

——— (2015), 'Playing with Being in Digital Asia: Gamic Orientalism and the Virtual Dōjō'. *Asiascape: Digital Asia*, 2(1-2), 20-56.

Hichibe, Nobushige (2006), 'Bunkasōzō no jōken – Futatsu no gēmu "ba" no bunkaseisanronteki kōsatsu kara' (The Conditions of Cultural Creativity – Examining Two Game 'Sites' from the Perspective of Cultural Production). *Bulletin of the Graduate Division of Letters, Arts and Sciences of Waseda University. I, Philosophy, Oriental Philosophy, Psychology, Sociology, Education*, 51, 65-73.

——— (2009), 'Possibilities of Sustainable Small-Scale Game Development: Qualitative Data Analysis of Development of Doujin and Indie Games'. *Journal of Digital Games Research*, 3(2), 171-183.

——— (2010), 'Gēmugyōkai ni hirogaru indipendento no nagare' (Independent Spreading in the Game Industry). In: *Dejitaru gēmu no kyōkasho* (*Textbook on Digital Games*). Tokyo: Softbank Creative, pp. 289-308.

Jameson, Frederic (2010), 'Utopia as Method, or the Uses of the Future'. In: Michael D. Gordin, Helen Tilley & Gyan Prakash (eds.), *Utopia/Dystopia: Conditions of Historical Possibility*. Princeton NJ & Oxfordshire: Princeton University Press, pp. 21-44.

Juul, Jesper (2005), *Half-Real: Video Games between Real Rules and Fictional Worlds*. Cambridge MA & London: The MIT Press.

Karatani, Kōjin (2014), *The Structure of World History. From Modes of Production to Modes of Exchange* (translated by Michael K. Bourdaghs). Durham & London: Duke University Press.

Manovich, Lev (2008), 'Understanding Meta-Media'. In: Arthur Kroker & Marilouise Kroker (eds.), *Critical Digital Studies: A Reader*. Toronto et al.: University of Toronto Press, pp. 106-111.

——— (2013), *Software Takes Command*. New York: Bloomsbury.

Parry, David (2013), 'Burn the Boats/Books'. In: Daniel J. Cohen & Tom Scheinfeldt (eds.), *Hacking the Academy*. Ann Arbor: The University of Michigan Press, pp. 15-18.

Rogers, Richard (2013), *Digital Methods*. Cambridge MA: The MIT Press.

Said, Edward (2012), *Orientalismus*. Frankfurt (Main): S. Fischer Verlag.

Sakai, Naoki & Harry Harootunian (1999), 'Japan Studies and Cultural Studies'. *positions: east asia cultures critique*, 7(2), 593-647.

Salen, Katie & Eric Zimmermann (2004), *Rules of Play. Game Design Fundamentals*. Cambridge MA: The MIT Press.

Schneider, Florian (2015), 'Searching for "Digital Asia" in its Networks'. *Asiascape: Digital Asia*, 2(1-2), 57-92.

Shelley, Bruce (15 August 2001), 'Guidelines for Developing Successful Games'. Retrieved 16 January 2014 from http://www.gamasutra.com/view/feature/3041/guidelines_for_developing_.php.

Suiter, Tad (2013), 'Why "Hacking"?' Daniel J. Cohen & Tom Scheinfeldt (eds.), *Hacking the Academy*. Ann Arbor: The University of Michigan Press, pp. 6-10.

Suvin, Darko (1979), *Metamorphoses of Science Fiction*. New Haven & London: Yale University Press.