Sticky Ends: Employing Thinly-Sliced Narratives in Serious Games for Mobile Platforms

Matthew Lee

University of Pennsylvania
Philadelphia, Pennsylvania 19104, United States
lemat@nursing.upenn.edu

Abstract

Angry Birds. Clash of Clans. Cut the Rope. What do these three titles, arguably some of the most popular mobile games, have in common? On the surface, they lack a coherent narrative structure, being driven only by simple, perhaps even addictive, mechanics. This is typical for games designed for the mobile market, given average play sessions of 5-10 minutes. In contrast, many serious games are adopting narrative structures from console and computer games to contextualize the interventions they deliver. While useful on these platforms, techniques such as interactive music, open world exploration, AI driven characters, and rich graphics are not necessarily appropriate for mobile devices, which are limited both technically and in terms of user expectations and usage time. These limitations present problems both with initial engagement and with sustaining meaningful narrative arcs over many usage sessions, especially when it comes to games for health, which often involve narrative as therapy or as a catalyst to prompt behavior change. Given that serious games must compete against other apps for a user's attention, an understanding of how to package narratives in small slices of time is necessary. The AppHappy Project, an experimental design group composed of individuals from the University of Pennsylvania and the Philadelphia Game Lab, addresses this through evocative storytelling and community elements in its upcoming title, the mobile adventure game Journey to the West.

Keywords: Thin Slicing, Bite-Sized Narratives, Behavior change, Mobile Games, Serious Games

1. Introduction

With nearly 6.8 billion mobile-cellular subscriptions at the end of 2013 - almost as many subscriptions as there are people in the world, according to a report by the International Telecommunication Union (ITU), the mass proliferation of mobile devices worldwide has caused a dramatic shift in how content is consumed. While consumption of media content has traditionally been passive, studies of transmedia trends suggest that the landscape is shifting towards a more active relationship with content - that content consumers wish to become content creators [2]. Further, while immersion - long regarded as *the* measure of good storytelling in conventional ("hardcore") media - is still important, the success of transmedia experiences rely strongly on platform focus and lifestyle integration [3].

Two key examples of this are cell phone novels, a literary genre that arose in Japan and has come to dominate the bestseller lists there, and mobile games, which have exploded in popularity, with over a billion people participating in the mobile games ecosystem today.

Cell phone novels are literary works written on mobile phones, for distribution and consumption via mobile devices. They are notable for a near absence of the cell phone slang

normally seen in text messages and in online conversations, and for their tendency to deal with extremely serious subject matter such as drug abuse, depression, teen pregnancy and related topics in a realistic manner. They are characteristically serial, episodic works, consisting of chapters between 70-200 words in length due to the constraints of SMS text messaging, through which this type of literature was first created and distributed. While the technologies through which these works are distributed have expanded to include email and mobile websites, the length constraint remains popular, with what was originally a technical constraint becoming a genre specific convention. Due to this, writer of cell phone novels often adapt a form of minimalism, featuring the use of fragments, conversational or poetic language and cliffhangers, with what is not written being just as important as what is - much like text messages themselves.

This minimalism fits exceedingly well with what Levi Buchanan of Chillingo, a leading publisher of mobile games, describes as "bite-sized narratives" meant to be enjoyed in "stolen moments", where mobile entertainment normally finds its place [4]. Indeed, due to the emotional hooks present in the language, readers are drawn into the world of the story one message at a time - creating an intimate, real-time experience where each message is like a shared secret, a meaningful connection in an anonymous age [5]. Some would likely argue that the impact and legacy of the cell-phone novel can be subsumed by that of e-books, with these slices of narrative simply making reading more convenient, but the emergence of these novels as a popular literary form taking the publishing world by storm suggests otherwise. Indeed, as of 2008, only a few years following the release of first of these novels, half of the past year's bestselling novels were cellphone novels republished in book form [6].

Mobile games, which started their rise to prominence in 2008 with the launch of the Apple App Store and the spread of smartphones worldwide, have likewise achieved some degree of success on the global market. Indeed, even as early as 2011, studies showed that gaming apps were responsible for 50% of all mobile spending - and 70% of downloads - in the United States alone [7]. And by 2013, mobile games had become the most heavily used mobile app type in most of the world, with mobile platforms, which include phones and tablets, reaching nearly the same level of popularity as game consoles and computers combined among gamers [8].

As with cell phone novels, simplicity (of narrative and mechanic), mobile optimization, low cost to obtain, and enjoyment were found to be major criteria in determining if a game was likely to be downloaded and played, though games had an additional layer of complexity due to greater interactivity on device – necessitating art, interface design, and other elements unique to games. The most popular of the mobile games fell squarely into the casual category, which, by making no particular demands on the skill or commitment of players, provided flexibility "towards different types of players and uses" [3]. Immersion in the traditional sense of being completely caught up in a game was less valued in comparison, consistent with the nature of mobile gaming and the use of mobile devices in general, characterized by interruption, split attention, and short (5-10 minute) play sessions at irregular intervals [3, 4].

Given these criteria, it should be no surprise that games with traditional narrative structures find little success in the mobile market - except when they are re-releases of titles which have already received acclaim on another platform, such as with the *Final Fantasy* series. Even then, these re-releases only achieve profitability through targeting hardcore gamers – the tiny fraction of the mobile gamer population that prefers immersion to flexibility, and charging them a one-time premium cost. As an example, each Final Fantasy title has a one-time cost of $15.99 to for the full game, using the traditional buy to play model for single player games. This can be contrasted with titles such as *Farmville*, *Candy Crush Saga*, and *Angry Birds,* which target the general userbase with a business model where the title is initially offered for

free. While seemingly counterintuitive, this generates high levels of revenue from advertisements, downloadable premium content and unlockable convenience features, as it exploits a player's emotional investment after playing for some time [8].

Unfortunately, while academic institutions and government agencies have taken an interest in mobile games given the ubiquity of smartphones and the new availability of crossplatform engines such as *Unity* and *Unreal 4*, most efforts to date have been lacking. Certainly, some products have proven to be effective in clinical trials, demonstrating robustness in content and effects, but content alone does not make games successful – especially on the mobile market.

For mobile games to be successful, content must be melded with platform-specific design considerations, focusing on how and when a user will interact with the game, and how content can be delivered in a user-centered context.

The AppHappy Project, an experimental design group composed of individuals from the University of Pennsylvania's Health Technology Lab as well as the Philadelphia Game Lab (a non-profit organization dedicated to the growth of small-team game development) was created to address this problem. Through a review of popular entertainment-focused and serious mobile games, methods of effectively package serious content for user engagement were identified and woven into a "thinly sliced" model of design. This model forms the conceptual basis for the design of the group's title in development, the mobile adventure game *Journey to the West*.

2. Serious Games to Date

To date, most serious games have been designed for use on the personal computer, a platform that is easier to design for due to relative uniformity of hardware/software, availability of tools for said design work, and the skill sets of game developers – which many institutions partner with to create their interventions. However, with new tools having become available which allow cross-platform publishing, some attempts have been made towards either adapting current games to function on mobile or designing mobile unique games.

Some, such as the one being SPARX, have attempted to port, or shift, their game to another platform and open it up to a broader audience, only to meet with mixed results due to overcomplexity. Some, like Katawa Shoujo, not only work but have received acclaim and recognition not because of any special design considerations, but because their initial focus on simplicity and interactive narratives touch people on a level they cannot articulate. And some, like Zombies, Run!, an fitness game designed explicitly for mobile, take full advantage of the mobile platform and have achieved commercial success.

2.1. SPARX: The Video Game for Depression

SPARX: The Video Game for Depression is a computerized self-help program for adolescents suffering from mild to moderate depression, created by Metia Interactive for the Faculty of Medical and Health Sciences of the University of Auckland. Designed as a Role-Playing Game (RPG) in which the player's avatar must fight against GNATs (gloomy negative automatic thoughts) in order to save the planet, using techniques of Cognitive Behavioral Therapy learned on the journey, SPARX employed traditional narrative structures to deliver and contextualize the intervention. As a pure intervention, it proved quite effective among its target population, with a clinical trial finding that it was not inferior to live treatment by a therapist [9, 10]. The game won numerous awards for innovation, and was licensed by LinkedWellness for cross-platform distribution to a more general audience [11].

Unfortunately, like most serious games, SPARX met with a rather tepid reaction from the general population, garnering fewer than 500 installs since its September 2013 launch on the

Android App store. Its branding may actually have hurt it, as while it received a great deal of media attention and excitement from the health community for being the first (and only) game to effectively treat depression, this same attention meant that potential users knew that this was a therapeutic app – and thus may have been exposed to stigma from using it. Indeed, with serious games dealing with stress management, being positioned as therapeutic would actually be harmful, given the stigma associated with mental health, which along with cultural factors in vulnerable populations form two of the largest barriers to seeking care [10]. This leads to either denial of need for the app or simple avoidance by potential users due to fear of how others will perceive them if they are discovered to be using a therapeutic app - rather self-defeating given that the purpose of creating a game-based intervention was to limit stigma and promote wider adoption of these tools.

Also problematic was the poor quality of the version of SPARX released for mobile, which did not leverage the capabilities of mobile phones and tablets or take into consideration the limitations of these platforms [12]. Unfortunately, while Unity, the cross-platform game creation system used to create SPARX, allows a development team to easily deploy functional versions of the game for a number of platforms, the onus is on the developer to make platform-specific adjustments for quality and target audience. The Android version of SPARX, which was put up on the Android App store, lacked these adjustments, with the absence of a mobile-optimized interface the most glaring omission, though the long play sessions and small text also did it no favors. As a serious game targeted towards a narrow computer-using audience, SPARX proved to be clinically effective. Unfortunately, as with many serious games that have attempted to refocus, a lack of experience in mobile design and cross-platform considerations led to this innovative intervention falling short, but as an intervention retargeted towards a general audience, it fails to meet the mark.

2.2. Katawa Shoujo

One of the rare examples of a cross-platform narrative-based serious game that has been well received by general audiences is Katawa Shoujo (KS), a freeware title that explores the story of several teenagers living with disabilities through an interactive narrative [13]. While it is little known among academics, it has attained a level of notoriety among gamers, not only receiving multiple nominations for Game of the Year 2012, but being selected as a top 10 Indie Games of 2012 [14]. This is all the more surprising given that Four Leaf Studios, the development team responsible for creating KS, was a team of volunteer collaborators, who worked on the game as a five-year long passion project. It was their hope that through this interactive tale, people would "recognize that the disabled were simply "humans with hopes and dreams, and messy, fucked up insecurities about being alive and happy, who feel not because they are disabled, but because they are ordinary" [13].

Mechanically, Katawa Shoujo is far simpler than SPARX. It is a branching story, with the player experiencing the world of the visual novel and its changes through the eyes of the protagonist, a high school boy who was stricken with a heart attack. There is no combat. There is no world to save, no enemies to face with fire and sword. There is no magic that will make everything better, no destined hero – only reality and the aftermath.

But this simplicity is not a fault; rather, like the minimalism of cell phone novels, to which this is a sort of spiritual successor, it forces the player to focus on the story being delivered, re-centering himself within the world of the visual novel. Instead of merely being an observer and noting that various bits of art look pretty, one can imagine oneself in the world of the story, with the realism of the story prompting self-reflection in accordance with Kendall Walton's theory of fictional subjectivity [15].

Now, as fictional subjectivity is a key point of immersive participation, one might wonder why this game works even on a mobile platform, given that this was also originally designed to be played on computer. The answer here is that like cell phone novels, the narrative is very thinly sliced[1], with each scene or "chapter" capable of serving as a detached episode, but with "sticky ends"[2] that leave one wanting to know what happens next. What happens next, of course, and the ending, changes with the actions of the protagonist – actions influenced to some extent by the player's choices, as game design itself is about presenting a player with meaningful choices.

But while every choice is meaningful, not all alter events, as the illusion of choice is as much a part of good design as player agency. This mix of choices adds a layer of complexity that adds to the game's replay value, even – or particularly - after one reaches an ending one may not have intended. In contrast with many games, where a point of failure is obvious, Katawa Shoujo required thought to navigate, as there were grey areas. Why one reached the end one did, how one could have chosen differently, what those choices meant are all things a player may reflect on. This often causes some degree of introspection as players wonder why they thought a choice would result in a certain outcome. And once the individual had considered what to do to reach the end they wished, figuring out the connection, he could proceed to do just that, in an example of fiction as relatable simulation [15].

Perhaps it is this repeated simulation of experiences, coupled with the realistic, conversational nature of the writing itself, that explains why many individuals have reported a desire for self-improvement after playing Katawa Shoujo. Perhaps it was that through this game, they could better connect with who they were – and connect with the characters, because on some level they understood them. Perhaps it was simply the subconscious realization that they could change.

The exact mechanics behind how it inspired behavior change are unknown, and more study needs to be undertaken on it, but it is just this sort of game, one aimed for the general audience, that might be the future of serious games.

2.3. Zombies, Run!

In conducting an overview of narrative-based serious games that function on mobile devices, one would be remiss to overlook "Zombies, Run!", as it is one of the few that have achieved commercial success. Indeed,

Created by Six to Start, an independent game developer and entertainment company based in London, *Zombies, Run!* was not created simply as a serious game or even a gaming experience. It was made to enhance the "thrill of running," using narrative context, smartphone sensors, and community elements to promote immersion in the activity itself. Interestingly enough, using the app while running provides very little disruption to a user's extant routine, save the addition of audio-based story elements as rewards to encourage continuation and the occasional interactive exercise where one would be "chased by zombies" and have to speed up to outrun them [16]. Essentially, it takes something people were already interested in and amplified its game-like characteristics, drawing people into the world of the game through running – and so did not have to compete against other games.

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[1] Thin slicing is a term originally coined by Nalini Ambady and Robert Rosenthal to describe the ability to find patterns in events based on brief observations. As described here, a thinly sliced narrative is one where small details are enough to notice patterns of change.

[2] Sticky ends refers to a concept in molecular biology, where a DNA molecule cut apart by restriction enzymes will have a leading and trailing stretch of unpaired nucleotides, which readily link up with molecules with complementary ends.

Building on that are further interactive and community elements that come into play following runs, with runners not only taking what they earn from runs and using it to build up their virtual town, but also syncing run information to the Zombielink database. This option lets them view calories burned, zombies evaded, story events and how they compare to others, as studies have shown that community support helps to maintain healthy behaviors.

Other companies had created fitness apps before, with Nike+ and a number of others, available for free. Yet, in the face of conventional wisdom, at a premium price point of $7.99, *Zombies, Run*! still managed to become the best-selling health and fitness app in the year it was released[17]. Its successors built on that initial success, and today, *Zombies, Run! 3* is still the world's most popular smartphone fitness game.

Why is this so? Why was it able to out-compete Nike and other established players in the field and become such a stunning success? Perhaps the answer lies in its use of narrative to further a non-traditional sense of immersion. Specifically, Zombies, Run! focuses on immersion not through deep engagement with a screen, but through "a transformation of awareness that fluctuates throughout the gaming experience" [18]. The core concept is that of the assemblage, a nominally geographical term denoting an entity composed of heterogeneous elements – in this case, the organic and the inorganic, with immersion taking into account shifts in attention between real world and game world at the interface between them.

In that sense, while a traditional game would require a player to sit and concentrate on the screen to the exclusion of all else, a mobile application requires less focused attention – but can be used throughout the day, during those stolen moments that arise from inactivity [4, 18]. "Zombies, Run!" uses this shifting, switching between mission text and a runner's own playlist to promote tension and immersion by contrast – a very interesting strategy that is not entirely dissimilar to the tension between agency and story in Katawa Shoujo, with slices of narrative punctuated by choice.

Of course, one cannot ignore the framing of "Zombies, Run!" as a possible explanation for its success, as it was not labeled as a mobile game or a fitness app which monitored activity. Instead, it was positioned as something that enhanced the thrill of running, which largely eschewing graphics for audio. This may have set it apart enough from the predefined categories that it wasn't thought of as a competitor to either, but something that could be bought *in addition to* the others, or in place of a running *accessory*, most of which are significantly more than $7.99.

Given the nature of mobile games, and how narratives are sliced – the first, and most important, determinant of whether a customer will think a game is fun is the narrative a developer weaves about the game itself. Research by Mary Flanagan, director of the innovation lab *tiltfactor*, demonstrated this, with 20% of a given audience would be willing to play a game labeled as "educational", 95% of that audience would play the very same game if relabeled as an action-adventure title [19] On top of that, they would be more tolerant of boredom in the latter, suggesting that there is a degree of stigma bound up with serious games, and games for education. If that holds true for health games as well, then SPARX's very framing as clinically effective may have crippled its potential for acceptance in the general population, a caution to keep in mind as developers of serious games considers how to validate and trial their apps.

3. Tools of Game Narrative

Over the past few decades, the video game industry has developed and refined a number of sophisticated tools with which to drive narratives and build traditionally immersive experiences. Some of these, such as music, sound effects, voice acting and visual spectacle,

have been previously used in other aspects of the transmedia spectrum; while some, such as dynamic difficulty modulation, robust AI, and interactive music are unique to games [20].

Of the transmedia tools, music (in its non-interactive form) is one of the oldest, as it has been inextricably entwined with storytelling and religious rites in almost every human culture [21] In some, it developed alongside the tradition of theatre and the performing arts, with radio shows and silent films establishing music's importance even in modern media, where it has been seen as a key element of narrative. Where music accompanies a work, it drives the emotional quality and tempo of the work, serving to create the atmosphere. In a horror movie, it drives anxiety; in an action game, it drives urgency and determination; in an art game, it usually drives contemplation. In fact, it is a common saying among game designers that Shigeru Miyamoto himself declared music to be the air of the world – but whether that is truly attributed to him is unknown.

Whether or not he said that, however, music has only become more prominent in games, with experiments in reflexive and interactive music becoming another way in which one can interact with the world at large.

The theatrical tradition likewise set a standard for a focus on the visual environment and a sense of spectacle, much of which carried over into film in terms of costuming, sets and special effects, and then into video games. As the medium matured and technology advanced the larger game companies began to move from simpler 2D graphics towards photorealistic renderings, with things like realistic water and physics effects being seen as the Holy Grail which all sought to obtain.

However, a distinction has emerged between games produced by larger (AAA) studios and those produced by smaller (independent) studios. AAA studios tend to focus on long, photorealistic games due to the availability of greater technical and logistical resources, while independent games tend to prefer simpler games. They focus on stylized visuals to create visual languages of greater expressivity, use more subtle cues, and experiment with more efficient ways of production. Whatever the styles they prefer, however, both attempt to create visual and aural ecologies for their worlds through cues in character animation, sometimes use mechanics as an evocative narrative element, and explore the idea of emergent narrative arising through player interactions with the world [22]

Of the other narrative techniques in games, the most important is likely a robust artificial intelligence (game AI). Defined here as the algorithmic techniques that produce an illusion of intelligence in a virtual game world, mostly in defining what animations to choose, how a character moves, and how the environment reacts to player actions, AI is what really what separates video games from their traditional counterparts [23]. Indeed, in the absence of a game master, AI must direct and guide player interactions, regulate the world of the game, and negotiate a player's experience with allies and enemies alike.

For unlike film, theatre, or other more passive forms of entertainment, games are a form of interactive multimedia, games must balance both authorial intent and player agency when it comes to relaying a narrative. When done well, this balance can result in an incredibly engaging experience, drawing users into the story, with a rich sense of investment and ownership not seen in any other medium.

3.1. Journey – a Non-verbal Traditional Narrative

This delicate balance can certainly be seen in the experiences produced by Jenova Chen and his experimental game studio *thatgamecompany,* a company dedicated to creating timeless interactive entertainment that positively affects the human psyche [24]. Many of their games lack the verbal elements of narrative, and so serve as an excellent showcase for the tools of narrative common to all games.

Journey, for example, the critically acclaimed art game awarded numerous Game of the Year Awards in 2012, relies entirely on environmental and emergent narratives. The former is revealed through relentlessly beautiful graphics, lighting effects, and rich instrumental music, while the latter arises through multiplayer interactions to shape a user's experience [24]. Indeed, one of the core features of *Journey* was to explore how players would interact without being able to communicate with words or to hinder one another's movements.

One might think that the lack of a verbal narrative might hinder its ability to convey emotion, but with the ambiguity of the narrative vacuum, the player's desire to understand leads to an attachment to the fictional frame, strengthening the subjective experience. Each journey then, is not simply what the developers place into it, but what the player invests as well, leading to unique, powerful experiences that have occasionally been described as being spiritual, a pilgrimage to somewhere other. In that sense, Journey is an example of evocative narratives, the sort which would work well on mobile platforms. Its visuals, done in a style that is both breathtaking and easy to engage with, are bold and alluring. Its puzzle oriented gameplay challenges the player and encourages re-experiencing the tale. Its random pairing mechanic, allowing one to encounter an unknown player once a level, gives on the feeling that for a moment, one is not alone in the vast wasteland. All these would work very well in a mobile game, save one: music.

One of the key narrative elements of *Journey* is its haunting Grammy nominated soundtrack, composed by Austin Wintory. It frames the experience, providing an ambience and atmosphere that players wander through, and is very effective in that role. However, the use of music to drive gameplay experiences has traditionally been problematic on mobile [12]. That is not to say that it cannot be done, but given the use cases for mobile devices and mobile games - often played while waiting for appointments, commuting, or taking a short break at work or at school - playing music is often not possible. Yes, one could use a headset, but sometimes, that would be rather impractical.

3.2. Narratives in Mobile Games

Returning to the topic of mobile games, let us first define the use characteristics and limitations of mobile devices and mobile entertainment. In terms of limits, the majority of users do not listen to music while gaming on a mobile device, and weaker processors tend to limit what visual effects one can have. Complex AI is also generally unnecessary, as there few complex environments and animations to manage.

The majority of consumers use their phones for 5-10 minute sessions, at longest, often in distracting environments, where they cannot pay full attention to their phone or tablet [8]. Thus, immersion in its traditional sense is not valuable, as it may distract a player from keeping track of time, or something equally as relevant. Due to this, users tend to favor casual or "disposable" entertainment, which is inexpensive, easy to pick up and easy to put down again, without requiring much in the way of initial time or monetary investment. Also important are the previously criteria for what makes a game successful on mobile: low cost, simplicity of mechanic and narrative, flexibility in play.

From this we can derive that successful mobile narratives need to be thinly sliced. That is, they should present with enough information to understand both how to play the game and who the characters are in a single glance. The opening of Disney's *Where's My Water*? is a good example of that, as it flies the viewer along a sewer, encountering a few disreputable denizens along the way, before ending up at an Swampy the alligator sitting in an empty bathtub, with no water coming out [4]. Immediately, one sees the impact and the goal – that one needs to get the water to the tub. And when one does link him to water, the bathtub fills and the alligator is happy – a small, but complete narrative arc.

The same can be said of *Cut the Rope*, where Om-Nom, a green and rather friendly looking monster looks longingly up at a piece of candy swinging from a rope, with a number of obstacles in the way. As the rope swings away, he gets more anxious; as it comes closer, he looks relieved, and so one develops a feeling of wanting to help Om-Nom.

Neither of these use much in the way of descriptive narrative – and neither does Clash of Clans, which is centered emergent narratives, as it is a social game which involves forming a community and competing against other players [25]. It, too, is a simple game, which is a strength in mobile, as it allows for quick matches, without a large time investment – except when one chooses to make them to build up the clan. There is no time for descriptive narrative here, merely for show-not-tell characterization, with overarching design elements providing emotional hooks and offering cues for the user to fill in the nuances of the story.

Evocative narrative is the buzzword for mobile games, given the constraints of time and screens, and the pressure not to lose the momentum of a story. The industry trend is towards a lack of verbal narrative, but that is not likely to work for serious games, given the educational element inherent in them. But that does not mean verbal narratives will not work on mobile devices; cell phone novels predated modern mobile games and were optimized for consumption on phones, so perhaps there is a way to integrate these thinly sliced narratives in the phone novel tradition into serious games.

3.3. Serious Games Narratives - Challenges and Approaches

Serious games face additional challenges in design, as most have a didactic element to them, often requiring the inclusion of specific content for educational or clinical purposes, as well as instruments to collect data from users. Generally, these entities either find in-house talent or partner with a small game studio to create their mobile games, though in many cases, the companies involved have little mobile design experience.

Designers of traditional games, as discussed above, have fewer restrictions than those who work on mobile platforms, with users far more tolerant of early flaws or slow starts on traditional platforms due to feelings of investment [3, 5]. Essentially, because games on platforms such as consoles or computer are more expensive to acquire and tend to require more time to play proficiently, the economic principles of loss aversion takes effect - users do not want to have "lost" money on a purchase [26]. While most serious games do not cost as much as entertainment-focused titles, the association with the platform remains.

In mobile games, however, loss aversion works differently. Given the low (or nonexistent) initial financial and emotional investment such games require, users are more concerned about wasting their time. Thus, within the first 15-30 seconds, users make their first judgments about a mobile game; within 30-60, they have decided whether to continue playing or to uninstall [4].

This is particularly problematic given the use of long introductory sections for serious games, which often involve pre-intervention surveys, health screening instruments, and text-heavy tutorials. These may be tolerated (to an extent) on conventional platforms, but are quite unacceptable on mobile, as users demonstrated time and time again. Even SPARX, acclaimed as it was, clinically proven as it was, has suffered from this greatly, among other challenges to mobile optimization [11].

To design serious games that maintain clinical effectiveness or educational impact but have broad appeal, adopting a thinly sliced model of design is necessary (Figure 1). In this model, after identifying the problem a serious game seeks to address, design considerations proceed along two paths simultaneously.

The first is the traditional path known to clinicians and academics, which involves identifying the clinical framework the program will use as a basis for its interventions, the

subsequent interventions and goals, and the measures that affirm whether or not the game is meeting these goals.

The second is a path more often used by designers, which involves identifying characteristics of the target audience. It is important to note that this means not only considering what other interventions have worked for this demographic in the past, but where and when designers expect their game to be played. This in turn influences what platform the serious game will be designed for, the genre of the game, and the story elements one includes, given varying tolerance thresholds for boredom.

Both tracks feed into the game's mechanics and visual language, which should provide the majority of the information a player requires, though some verbal narrative may be included to highlight significant story or concept elements.

This model also addresses the issue of framing for general audiences, by noting the elements of design included within a general frame. Notably, this does not generally include the problem to be addressed, the clinical framework, the interventions and goals or the target audience. Platform, genre, visual language, and mechanic make up the bulk of the frame, though the story can make an impact as well.
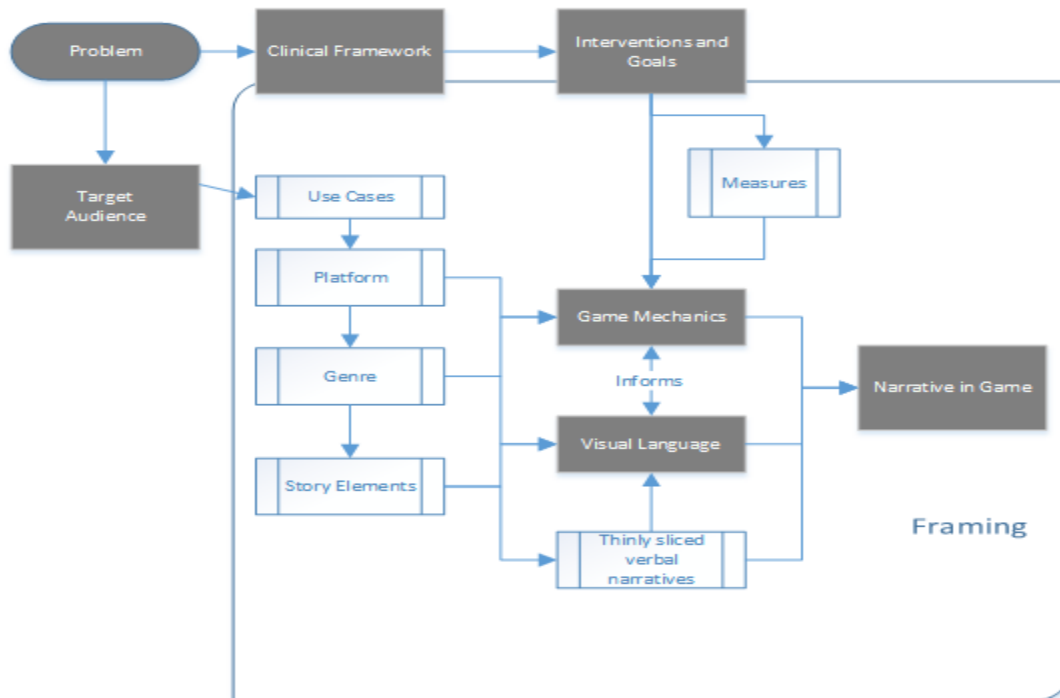

Figure 1. A Model of Design for Thinly Sliced Serious Games; Note How Vistory Elements are put into Both Game Mechanics and Visual Language

Understanding and rigorously applying this model of design may result in the creation of serious games that reach a wider audience and meet with better reception.

4. The AppHappy Project – a Case Study in Design

The AppHappy project, a multidisciplinary, experimental design group composed of individuals from the University of Pennsylvania and the Philadelphia Game Lab, intends to explore the possibilities of thinly-sliced narratives in the development of *Journey to the West*.

Following the tradition of cell phone novels, which partially inspired the work, the game will touch on difficult aspects surrounding adjustment and serious issues, and is aimed at promoting better stress management and positive mental health. However, while it is designed as a health game, *Journey to the West* it will be framed as an experiential adventure-game targeting the student population at large. As opposed to conventional serious games, which use a disease treatment paradigm, this game uses the theoretical framework of Salutogenesis [27], a model that focuses on supporting the well-being of healthy individuals.

Because of this, while the game will involve some elements of Cognitive-Behavioral Therapy, it is meant to be more experiential than didactic, utilizing elements of evocative storytelling to create short, episodic play sessions appropriate for mobile use, promoting self-reflection and introspection. In terms of fostering continuity of play across multiple sessions, *Journey to the West* grants the player a consistent avatar that persists through the episodes, with brief references to past "quests" embedded in the narrative. This avatar serves as a surrogate of self in exploring, advancing through, and changing the world, building reputation with those encountered and gaining cosmetic equipment and skills as one progresses.

Of course as with evocative strategies in psychotherapy, we keep in mind that what is on a screen or in the world is not necessarily what is experienced - that what is experienced is only what enters the mind, with narrative elements useful only insofar as they can evoke a response [28] Sticky ends at the beginning and end of each play session will help to frame the piece as part of a greater whole, as well as provide a small reward to the player for finishing.

We further wish for the characters to seem real and relatable, so what language is used will balance artistic minimalism with a conversational style, with players engaging with the storyline through the eyes of a protagonist leaving his home village for the first time, chosen for the honor of journeying to the distant West, in a direct allegory to the experience of coming to university. This is the reason for the choice of *Journey to the* West as a subtitle, as the name, drawn from the title of a famous 16th century Chinese novel, has connotations for all audiences. For international students, it may well evoke the trepidation and excitement of coming to a new land for international students, while domestic student may be reminded of the journey to the American West, where opportunity was mixed with danger, and sometimes frustration.

On this journey, the player, through his avatar, will encounter others who need help, make friends, and experience the story of the Journey – and of course, will learn how he change the world. In our game, the core gameplay mechanic through which this can be achieved is "breath", drawing on the tradition of Qi (or Ki), the life energies that run through the world in Eastern mythology. Early on, the player will be taught the proper rates and rhythms of breathing to connect the inner and outer worlds, slowing down (or pausing) the game and allowing the player to "see beneath" surface appearances. In this paused state, enemy illusions are rendered useless and the visual landscape itself may be altered through "magic", performed using gesture mechanics reminiscent of the Celestial Brush techniques in the art adventure game *Ōkami [29]*. These involve tracing specific runes and patterns to enable certain effects, though using magic will of course drain one's Breath, forcing one to breathe again to rebuild it.

For a unifying visual language conducive to evoking movement and change, we have elected to use a 2D art style based on East Asian inkwash and watercolor techniques. In initial focus testing, participants felt more relaxed and reported higher levels of engagement than with either a 3D art style or a more photorealistic 2D style. As well, in terms of interface design, we have chosen to eschew obvious buttons, arrow keys and other artifacts from computer-oriented titles. Instead, we will allow players to direct their characters simply by tapping and dragging, and to invoke special abilities by tracing patterns on the screen, making

exploration and gameplay more organic. We seek to build not just a serious game, but an experience, and all these elements together help to build a feeling of connection between the player and the game world, reinforced each time a player uses a breath technique, or moves their character.

This sense of connection and identification – this surrogacy - is vital to the process of introspection and contemplation necessary for behavior change. Essentially, through actions that reinforce the link between the virtual and the real, exploiting evocative storytelling to allow real world stressors and situations to be mapped into the game space, coping strategies learned in game may have real world impact [15]. Importantly however, it is there that they learn other lessons, such as that no matter what they go through, they are not alone.

To serve an additional layer to promote continuity and reflection, we intend to add vetted community features, including a semi-anonymous forum where players can reflect upon moments in the game as well as issues without, with forum avatars gaining more cosmetic options as one progresses within the game - and with participation in offline events. Seeded with mentors (domestic students) from the University of Pennsylvania at large, this has the added benefit of fostering a sense of community and trust among users, and to coordinate offline event planning [30]. This is not only because community elements help to support and build healthy habits, but because Weiley, Somers, and Bryce of University of Newcastle, Australia find that online platforms can assist with building a sense of community, allowing individuals to engage in safe, comfortable discussions while developing the social confidence to pursue real world friendships. This is consistent with a community ecology approach to cultural competence, and has been shown to be positively correlated with social adjustment isolated groups such as international students, and other displaced populations.

Journey to the West is thus an example of a narrative-based serious game that draws from the lessons of cell phone novels, the genre that first proved the case for evocative narrative. As well, it takes cures in design from successes in the mobile game market, utilizing strategies of evocative narrative and induced contemplation to produce impact and engagement. At the same time, organic mechanics and community elements to allow the game to feel comprehensible, manageable, and meaningful to the player. Not so coincidentally, these are the components of coherence, the prime determinant of whether stress will become harmful - or whether it will instead be motivating and conducive to growth.

Through *Journey to the West*, we hope to demonstrate the viability of narrative-based serious games for the mobile platform, testing a model of design that relies on thinly-sliced narratives and sticky ends for context and continuity.

5. Conclusion

With the mass proliferation of mobile phones worldwide changing how we consume content, new opportunities have risen for serious games to target a more general population. Thus far, efforts to shift previously created serious games to the mobile medium have not met with great success. Part of this has been due to overly specific framing, which offer potential players their first slice of narrative about the game – and not an overly optimistic one, given the stigma associated with serious games. Part of this has been due to a lack of attention to the considerations and affordances of mobile platforms, what they allow, and what is discouraged. Properly shifting a game from one platform to another does not involve simply exporting a new build for that platform – platform specific optimizations and adjustments need to be made, or no matter how effective an intervention might be, it will not be used.

But while we consider the ongoing changes in the present, we must also consider what has worked for mobile devices in the past, with cell phone novels – and lately, visual novels like

Katawa Shoujo - being excellent examples of platform adaptation and evocative narrative that have often been overlooked. Granted there may be cultural factors in play for why these proved so successful, and thus more research is advised. There lessons to be learned from the past, even if what existed then was not as technically sophisticated as many serious games today. What is important to remember with games is that no matter how innovative or useful and intervention associated with them might be, if no one uses it, then the intervention is meaningless.

While mobile games present a great opportunity for serious games, many of the traditional techniques of narrative engagement need to be rethought in terms of the mobile platform's flexibility of play. To date, few narrative-based serious games have met with success in the market, with the notable exception of *Zombies, Run!* , a successor to which remains the world's number one fitness app, and *Katawa Shoujo*, which still enjoys a great deal of acclaim and recognition as a game that made people understand not only those with disabilities, but themselves. However, in terms of mental health, there have been no great successes. The AppHappy Project's *Journey to the West* seeks to change this by rigorously applying the principles of thinly sliced narratives, sticky ends, evocative storytelling to build a rich context through which reflection and contemplation may be mediated, as well as social features to provide support for healthy behaviors, establish a sense of community, and allow individuals to learn and grow in both the virtual world and the real.

Acknowledgements

References

[1] International Telecommunication Union, "Measuring the Information Society 2013", International Telecommunication Union, Geneva **(2013)**.
[2] Latitude Studios, "The Future of Storytelling", Latitude 42s **(2013)**.
[3] J. Juul, "A Casual Revolution: Reinventing Video Games and Their Players", MIT Press, Cambridge **(2009)**.
[4] L. Buchanan, "Bite-Sized Narratives: Conveying Impactful Narrative with Emotional Hooks", Game Developers Conference 2014, San Francisco, California, **(2014)** March 17-21.
[5] P. Levinson, "Cellphone: The Story of the World's Most Mobile Medium and How it Has Transformed Everything!", Palgrave, **(2004)**.
[6] N. Onishi, "Thumbs Race as Japan's Best Sellers Go Cellular", New York Times, **(2008)** January 20.
[7] Information Solutions Group, "2011 Popcap Games Mobile Phone Gaming Research", Information Solutions Group, Bellvue, Washington, **(2011)**.
[8] Information Solutions Group, "2013 Popcap Games Mobile Phone Gaming Research", Information Solutions Group, Bellvue, Washington **(2013)**.
[9] S. N. Merry, K. Stasiak, K. M. Shepherd, C. Frampton, T. Fleming and M. F. Lucassen, "The effectiveness of SPARX", a computerized self help intervention for adolescents seeking help for depression: randomised controlled non-inferiority trial." BMJ: British Medical Journal, vol. 344, no. 7857, **(2012)**.
[10] C. Twomey, M. Byrne and G. O'Reilly, "Innovative ways to help increase access to CBT," Forum, vol. 30, no. 10, **(2013)**.
[11] Linkedwellness: Click. Help. Hope, SPARX: The Video Game for Depression [video game], **(2013)**.
[12] R. Grossberg, "The Anatomy of a Successful Mobile Game," Wired: Innovation Insights, **(2014)** January 21.
[13] Four Leaf Studios, Katawa Shoujo [video game] **(2012)**.

[14] P. Harrison, The Indie Game Awards 2012, GamePlayersReview, http://gameplayersreview.com/the-indie-game-awards-2012/ (**2012**).

[15] R. Klevjer, "What is the Avatar? Fiction and Embodiment in Avatar-based Singleplayer Computer Games. (Doctoral dissertation), University of Bergen, (**2007**).

[16] Six to Start, "Zombies, Run!" [video game] (**2012**).

[17] M. Walton, "The Story of Zombies, Run: How an indie took on Nike, challenged the rules of narrative design and started the Kickstarter revolution", Gamespot, (**2012**) June 13.

[18] C. Southerton, "'Zombies, Run!': Rethinking immersion in light of nontraditional gaming contexts", Transmedia: Storytelling and Beyond Digital Interfaces conference proceedings, (**2013**).

[19] M. Flanagan (Speaker), "The unanticipated processes and consequences underlying games", MIT Comparative Media Studies/Writing Colloquium [Audio podcast], (**2013**) November 22.

[20] J. Simons, "Narrative, Games, and Theory." The International Journal of Computer Game Research, vol. 7, no. 1, (**2007**).

[21] N. Wallin, B. Lennart, S. Brown", The origins of music", MIT Press, Cambridge (**2001**).

[22] M. Jungbluth, "Animation Bootcamp: Establishing an Ecology for NPCs", Game Developers Conference 2013, (**2014**) March 17-21, San Francisco, California.

[23] M. Riedl, "Interactive Narrative: A Novel Application of Artificial Intelligence for Computer Games", Proceedings of the 26th AAAI Conference on Artificial Intelligence, Toronto, Canada, (**2012**).

[24] Thatgamecompany.. Journey [Video game]. Los Angeles, California: Jenova Chen. (**2012**).

[25] Supercell, Clash of Clans [Video game] (**2012**).

[26] H. Arkes & C. Blumer, "The Psychology of Sunk Cost", Organizational Behavior and Human Decision Process **35**: (**1985**), pp. 124–140.

[27] A. Antonovsky, "Health, Stress and Coping", San Francisco: Jossey-Bass Publishers, (**1979).**

[28] D. Crenshaw, "Evocative Strategies in Child and Adolescent Psychotherapy", Rowman & Littlefield, Lanham, Maryland (**2007**).

[29] Clover Studio, Ōkami [Video Game]. Osaka, Japan: Atsushi Inaba (**2006**).

[30] S. Weiley, J. Sommers and H. Bryce, "Reducing social isolation and loneliness through technological communication," 19th ISANA International Education Conference, Skycity Convention Centre, (**2008**), Auckland, New Zealand

Author

Matthew Lee is an alumnus of the University of Southern California's School of Cinematic Arts, and is currently a PhD Candidate at the University of Pennsylvania and Scholar of the International Game Developers Association. Formerly attached to USC's Center for Scholarly Technology, he laid the foundation for the university's presence in Second Life, collaborated with the MacArthur Foundation and other organizations on projects relating to Virtual Worlds and the Public Good, and assisted in the development of technologies for healthcare simulation and learning. His research interests include preventative approaches to mental health, fully interactive virtual worlds, and how games can be used for the public good.