
Kai ʻOpua

About the Project

Kai ‘Opua is a science fiction builder / puzzle game, in which the player assumes the role of a simple boy named Iki. Iki is stranded on a moon sized whale-like creature named Kai ‘Opua, who is sick and needs help to return to health. The game is accessible and playable via website, and will not require any third party plug-ins or software beyond the web browser of player’s choice.

The aim of the project is to create a universal design education tool, primarily targetted at players of both genders of ages 10 - 14, to teach them to better understand grid, spacing, order, modularity, and efficiency within design. Tangentially, also about Hawaii!

Technology

HTML5
CSS3
Javascript
WebGL

Libraries *(code)*

Modernizr
jQuery
SignalsJS
ThreeJS

Assets

External	14%
Original	86%

Location

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Overview

This project explores possibilities of game-based learning within the context of a graphic design education. Right now, a global network now exists that puts all professionals in competition with one-another, and in order to stay competitive as educators, we must be able to produce professionals that can solve problems creatively. However, traditional teaching methods may in some contexts be unable to provide the kind of education students need, and initial research[1] suggests that game-based learning may be a viable solution.

[1] See Blunt (2006) for results of a study on the effect of games on learning.

This project seeks to utilize the good principles of game-based learning in the form of a video game called Kai ‘Opua that has the player adopt the identity of a Pacific Islander, lost at sea, who finds a home aboard the most unexpected of creatures by learning the ways of taro farming. The player, a young boy lost at sea in his canoe, is found by a dying whale and offered a deal: he may live happily on the whale, but in return must cultivate plant life on the whale’s surface to return the whale to health. Players live through a series of days, where each day they are given a supply of plants which can be used to heal a neglected area, or field, on the whale’s surface. It’s like the popular game Tetris[2], but instead the goal is to use the modular pieces (plants) to fill the entire grid-based space of a field, and eventually all the fields on the whale’s surface, using as few pieces as possible. This video game is intended to teach players situated meanings for key visual communication concepts of grid and modularity, in a way that allows them to create high level relationships between these and their creative work.

[2] See Pajitnov (1984) and Mojang (2011) for gameplay influences.

Initial target audience ranges are teenage students, roughly ages 10 - 14, and college level undergraduate students, ages 18 - 22, of all genders. Using two split audience ranges is intended to look for answers to how age may influence the effectiveness of game-based learning. These will be individuals who do not approach their world like a designer of interactive virtual media does, but should have an interest in solving problems and role-playing new identities. These individuals use computers to get information, and may be proficient in using digital tools, but struggle to connect abstract design concepts to real solutions. Players will have a basic knowledge of computers and internet navigation.

Keywords

game-based learning, visual communication, graphic design, good learning tools, good learning framework, video games, grid, modularity, hybrid learning env.


Play!
Source Code
Kai ’Opua
Share
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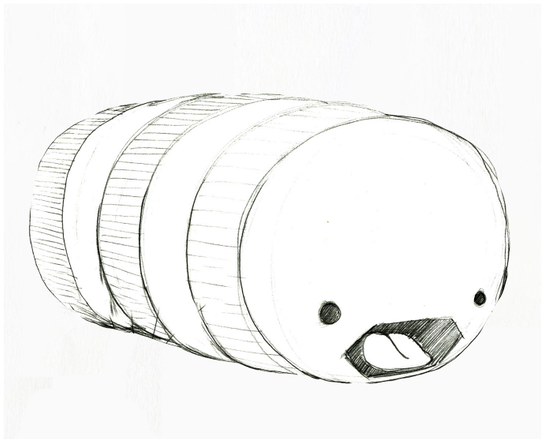
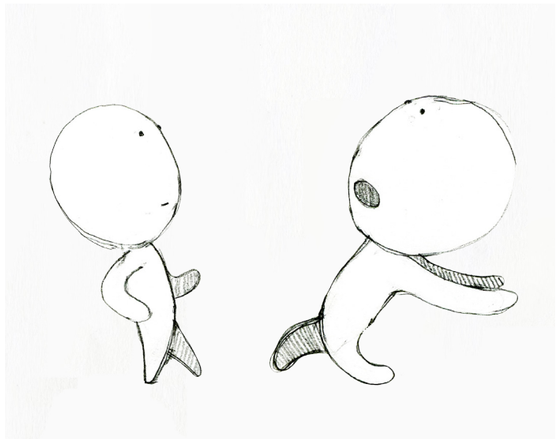




On Design

[3] For a more detailed explanation, see Hover (2012).

I approach interactive design primarily through Biological Translation[3], a process of translating biological objects into mathematically generated digital environments. By mimicking nature’s emphasis on ideas of all sizes, it allows visual communication to be chosen rather than inflicted or denied, and in so doing situates itself as an increasingly universal method to explore, understand, and teach design, art, and science.

In the dissemination of knowledge (generally speaking, this includes all academic fields) there has historically been more emphasis on knowledge conveyed using only the underlying logic, or very small and specific ideas. This is opposed to knowledge conveyed through the natural expression of that logic: the larger, wonderful ideas whose responsibility it is to show the incredible beauty of the underlying logic. As an example, consider the specific logic of a signal in the brain and its expression as the most outlandish and beautiful body movements in a dance. Focus on the former creates an exclusionary situation in which many audiences are unable to learn, and necessitates a flexible method to transfer between logic and its natural systems.

To fill this need, I use a set of human languages native to visual communication, new media, and interactive design. First, the language of code allows the algorithmic systems provided by the scientifically gathered information to be quickly used in a logical manner to generate an array of desired representations. Interactivity is added upon that, as a language that comes natural to the user, to allow the user to indirectly but tangibly interface with the code. Lastly, form is used as the conscious language bridge between code and user by translating mathematical system into visually tangible meaning.

The combination of these languages form the universal nature of Biological Translation, which can then function as a medium to teach agency, or the idea that information is a choice and our own decisions matter, through non-linear progression and emergent visual communication. The non-linear progression is composed by objectives that can be approached, ignored, and completed at any time and in any order, which refers back to the process of hierarchy and grid in design. User reactive mechanics such as gestural, or body language driven, manipulation allow for complex behavior, similar to the way high level design spawns from object-oriented, modular design methods. Biological Translation allows the use of visual communication to ask questions about our universe and explore possibilities that both engage and inform.

On Teaching

Designers of virtual or digital space, just like any other creative professional, have a mental framework they use to understand problems and create solutions. This involves a number of concerns common to all designers, such as structure, function vs. form, audience, and play. It also involves special emphasis placed on values such as usability, interactivity, accessibility, and efficiency.

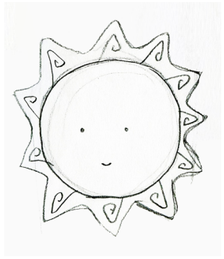
I structure my classes through a hybrid of class and game, designed to build these mental frameworks and engender an appreciation for interactive digital design. Because games are defined by rules, a good designer works much like a good player: they are able to analyze and understand the rules of each new problem. These rules are often inspired by classic teaching methodology and learning outcomes, redesigned to mesh with the current digital generation. Games themselves are an incredible source of extrinsic motivation, something the class environment can benefit from[4], provided it is handled with care and not the cause of overabundance of reward. In these games, students earn experience points, not grades, and progress through levels that grant increasingly complex creative abilities (freedoms).

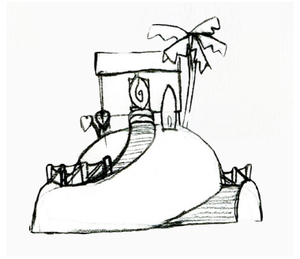
[4] See Gee (2005) for a great breakdown how games may help learning.

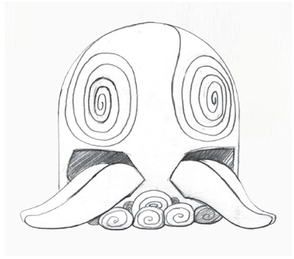
Students should be encouraged to play throughout their academic time, because the better we think we do something, the more we enjoy it, and the better we want to do it. The ability play well is the key to growth, and as influential designer Paul Rand states, the “play instinct” is the human process of experimentation [5] [6]. Play, then, must work in harmony with critical and honest feedback, and this can be approached by ensuring the constant presence of three questions: “what is it?”, “who is it for?”, and “why does it matter?” These questions are the key to good design, and the question of balance between encouragement of play and feedback is answered by student progress and mindset: lead with experimentation and encouragement, follow with good design and critical feedback, and end with balance.

[5] See Rand (1965) for an interesting perspective on design + play.

[6] See Heller (1998) for an interview with Rand on the subject.

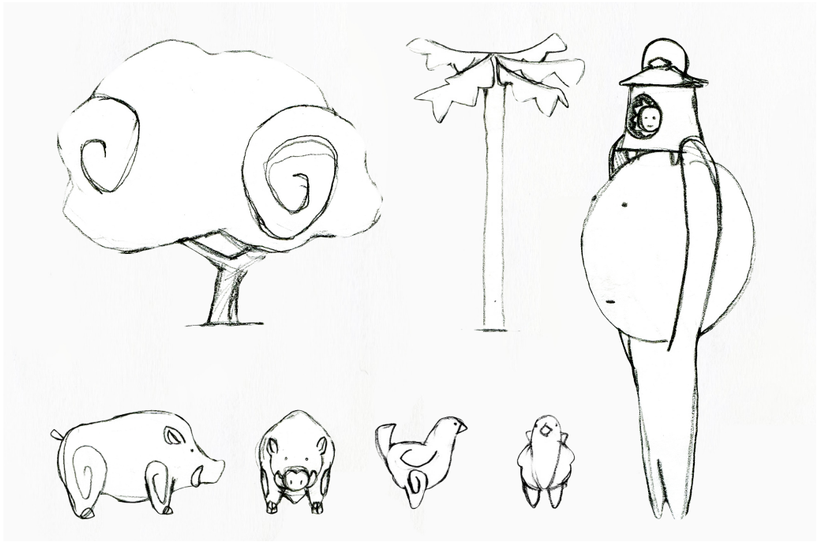






Good design is communication that is valuable, accessible, usable, and efficient. These are all qualifiers that you may notice are very similar to the core values of the digital designer. Value stems from interactivity, or reacting to someone’s choices to bring them an engaging solution. Accessibility is knowing that you cannot control someone’s technology, so the solution must be flexible. Usability is akin to walking a mile in someone’s shoes to make a friendly solution. And lastly, efficiency is understanding no one has all the time in the world, and that it is our responsibility to create a thoughtful solution. Good design understands the human condition, and the human condition is the core of communication.

I teach to share my enthusiasm for interactive media and its enormous potential for reaching this core. To guide students to a space where they can enjoy interactive digital media to a high level is to be a part of helping students solve current problems in ways that are engaging and meaningful. Academia is one of the few environments where research is well supported, where new media can become a driving force for a mixture of a new breed of hybrid designer equipped with interactivity and thoughtful visual communication.



Visual Communicators Made Through Play

A Game for Learning in Graphic Design

Problem

Nearly half a century ago, the concept of a “global village” was brought into media discourse by educator and communication theorist Marshall McLuhan (1964). He argued that all human cultures, regardless of location, are now part of a single entity, or global village, built by the instantaneous movement of information provided through modern technology. McLuhan understood that in time a single interconnected medium would develop to host the global village space, one that would naturally make physical geographic distances obsolete.

This medium exists and we have long since integrated it into the global economy. Jobs are awarded to those that can most efficiently, effectively, and flexibly handle the work, and the search for those individuals is not limited to the local area anymore. Regardless of physical location, it is generally known that customer service for a company may not be located in its country of origin. As David Williamson Shaffer points out, “In the very near future, the only good jobs left will be for people who can do innovative and creative work” (2006, p. 2). Though he is referring to good jobs remaining in America, these same jobs, requiring non-standardized thinking by creative professionals, are no longer requiring specific physical location either. Good examples of this are engineering and graphic design. Carlos Segura, founder of global-award winning Chicago-based design firm Segura Inc., claimed that the designers he works with are rarely, if ever, in the same room or even the same city (personal communication, September 28, 2011). Graduating students are in a global competition, and this has enormous implications for our responsibility as educators.

Any student seeking relevance in this global scope will need to be part of a class of individuals called “creative professionals”, i.e. people with the ability to process and respond to external information and situations in innovative ways. This ability stems from a mental framework for problem solving that is composed of the skills, knowledge, values, and identities of the professional. In his research across multiple studies, Shaffer (2006) has analysed the nature of this framework, calling it an “Epistemic” framework, and argues that through the use of game-based education it is very possible to teach this framework and have students internalize it at a high level (Shaffer, 2006; epistemicgames.org, 2012). Now not only do we need to educate students that understand and can expertly apply the concepts of a given profession, but we need to educate them to do it creatively. However, for nearly a century educators have been discussing the fact that students cannot use rote

knowledge and standardized skills taught by traditional teaching models to think in innovative ways (Dewey, 1902; Shaffer, 2006; Gee, 2007). This suggests that the fundamental principles of our learning environments need to change.

Background

In 1975, David A. Kolb and Roger Fry proposed a model of experiential learning, informed by the work of notable educational philosophers John Dewey and Jean Piaget, composed of four linearly ordered steps: concrete experience, observation and reflection, creation of abstract concepts, and testing these concepts in new situations. This model of learning through repeated generalization of feedback provided by concrete experiences, later tested and improved by Jarvis (1995) to address issues arising from realistic application, is now widely accepted as an optimal environment for learning.

Gee (2007), when discussing sixteen aspects of good video game design that contribute to good learning, outlines a very similar process he calls “Challenge and Consolidation”: players face challenging problems, create reusable solutions, integrate these solutions into their current mastery, and repeat. He also notes that, “This cycle has been called the “Cycle of Expertise” (Bereiter & Scardamalia, 1993); it is the way anyone becomes expert at anything worth being an expert in.” As noted earlier, experts of this nature are increasingly important in the global scope.

In response to growing Department of Defense interest in increasing the expertise of personnel, Richard Blunt (2006) performed a causal-comparative study on the results of three game-based learning studies to explain the differences in academic performance between students who used video games in learning and those who did not. His analysis showed that all else being equal, “classes using the game had significantly higher means than those classes that did not use the game.” These classes were tested on both the students’ understanding and application, and the game-based learning classes showed an average increase of up to two letter grades. Gary (2003), in a report to the Harvard Management Update, showed similar findings that game-based learning not only built real-world skills, but that it promoted workplace pride, positive relationships with co-workers, and significant motivation to work harder.

Critique

Supporters and skeptics alike have voiced concern about the claim that games have the potential to create improved learning environments. One such critique is that learning in a game is limited to learning to play that particular game better. Gee finds that this first critique, ironically, is partially correct, “A science like biology is not a set of facts. In reality, it is a ‘game’ certain types of people ‘play’. These people engage in characteristic sorts of activities, use characteristic sorts of tools

and language, and hold certain values; that is, they play by a certain set of ‘rules’” (2007, p. 4). Additionally, we might question reasons for the relatively faster rate of mastery of unfamiliar games exhibited by individuals who have played games compared to those who have not. The next critique stems from Sebastian Deterding (2011), who notes that current implementations of game-based learning largely confuse the aspects of games that actively improve learning with points and badges for activities, i.e. so far we have done it wrong. Lastly, there simply is not enough research to support claims of a positive relationship between games and learning (Cannon-Bowers, 2006).

Purpose

This project is intended to be an exploration in the area of game-based learning, as well as a catalyst for this area of research in the field of graphic design, through the pursuit of the following proposal:

> Endowing students with a professional mental framework in the field of Visual Communications can be done more effectively utilizing the optimal architecture of digital design and gaming than current teaching methods can achieve. As a result, students will produce work at a higher level, which will increase confidence and lead to higher retention rates, and ultimately improve their viability in the global job market.

The focus of this project is to design and begin development of a video game that shows players situated meanings for key visual communication concepts of grid and modularity in a way that allows them to create high level relationships between these and their creative work.

Framework

Well designed video games not only directly stimulate the process of experiential learning, but also stimulate the process of rote or didactic learning, placing games as a point of convergence amongst two contrasting and at times opposing methods of learning. As others have noted, video games in-and-of themselves are not always a source of creative learning. Nor is the key to their success in the technology, though it does help with interactivity and immersion. What gives video games strong potential as learning tools is their ability to simulate challenging concrete experiences on demand in such a way that individual players can experiment, fail safely, reflect, master, and learn at a pace according to their abilities.

The framework used in this study is composed of good learning principles found through research in human motivation, education, and gaming. These principles are as follows: a system of rules, attainable goals, interesting challenges, safety in risk-taking, understandable feedback, engaging identities, and agency.

Rules are arguably what makes a game a game (Bartle, 2004; Shaffer, 2006), and what gives players reasons to explore creative pathways (McGonigal, 2011). Goals give players a sense of purpose, even more so when they are relevant and authentic (Keller, 1987). When we are challenged to the limits of our ability and can fail in safety, we can observe and reflect on our actions. This leads to mastery and “one of the most powerful neurochemical highs we can experience” (McGonigal, 2011, p. 33) called “fiero”. Mastery also inspires confidence, a quality which Keller (1987) found to be one of the sole factors controlling success. Comprehensible feedback, especially when positive, instills optimism and motivates us to continue pushing ourselves to face harder and harder challenges. Wrapping activity in a story, one that matters to players, creates a much more meaningful experience and builds community amongst participants (Deterding, 2011). Two examples of the positive influence of narrative are Bastion, developed by Supergiant Games, and Star Wars: The Old Republic (SW:TOR), created by Bioware. The latter is a massively multiplayer online game type, which are prone to highly repetitive gameplay, yet SW:TOR does not suffer from this problem, due to narrative driven progression. And when we voluntarily choose to face unnecessary obstacles and challenges through free play in a safe space, work that would otherwise introduce negative stress becomes an enjoyable learning experience. “Games make us happy because they are hard work that we choose for ourselves, and it turns out that almost nothing makes us happier than good, hard work.” (McGonigal, 2011, p. 28). And one of the most sought after qualities in a graphic design student or professional is a self-initiated desire to work hard.

In some ways graphic design education already employs aspects of the framework outlined above. Although an encouraging step in the direction of game-based learning, the core learning principles of graphic design education, like many other areas of education, have nevertheless changed little since their beginnings in the early twentieth-century Bauhaus (Swanson, 2005).

That said, is change necessary? Graphic design, also known as visual communication, is a field in which its professionals are called “Creatives.” As Swanson puts it, design is “synthetic and integrative” in that it has little subject matter of its own and exists in the joining of disciplines through innovative problem solving. By definition, education for this field should produce professionals able to approach broad contexts and disconnected disciplines in a creative, unifying, yet contrarian manner, but research shows that this is rarely the case (Poggenpohl, 1990; Swanson, 2005; Davis, 2005).

Modern graphic design education has established goals, such as teaching concepts of typography, grid, figure/ground, spacing, etc. These goals are consistently presented in this abstracted format, and this kind of generalization of concept external to the student is not conducive to learning. Gee explains this disconnect: “Recent research suggests that people only really know what words mean and learn new ones when they can hook them to the sorts of experiences they refer to” (2007, p. 8). In design education, students receive a definition of concept and are

asked to express it in a creative but equally abstract manner, giving it no situated, i.e. real-world, meaning. For example, as a way to explore the power of medium as message, or the concept that the method of communication can express an idea as powerfully as the idea itself, students may manipulate the letters in a word to demonstrate the meaning of the word through form. This has no audience, no context, and no concrete criteria of success, resulting in the same complaint that is commonly heard from a struggling math student: “How does this relate to real life?” To avoid this, we need locally relevant and authentic goals that have little mention of these abstract concepts. This can be accomplished through the method of instruction, regardless of content (Keller, 1987), in which the game-based learning principle of engaging identities applies.

When we establish engaging identities, we have helped students build a bridge to travel between concrete experiences and generalizations of problem solving methods. In the previous example of medium as message, we may start to approach this principle by adding two things: first, a story the students care about, and second, a safe space to play. As an illustration, let us imagine a scenario in which these students are not students, but are newly hired entry-level junior book designers at a prestigious design firm. Although entry-level employees are known for getting stuck with the most unpalatable jobs, just before their arrival, all the senior designers caught a nasty virus, and that has left the firm with a lot of angry clients holding paid-for but unfinished design jobs. One such client, a Children’s Research Hospital, would like to create a book that teaches children to connect the meaning of words to the actual object the word describes. This gives students a real-world identity to adopt and an authentic goal to guide their learning of medium as message.

A safe space for creative play is crucial to student success and learning, and this is an unfortunate failing of graphic design education. The stance that a student’s success is entirely reliant on their own ability and work-ethic (Swanson, 2005) creates such severe punishment for student failure as to remove all notion of free play or safety in risk taking. Can innovative thinking occur when in an environment where risk taking is paralyzed? According to Jane McGonigal, when we do creative work in games, “we get to make meaningful decisions and feel proud of something we’ve made… For every creative effort we make, we feel more capable than when we started” (McGonigal, 2011, p. 31). It seems evident that we should help our students feel more capable by designing an environment where students are given a choice of authentic problems to tackle, and the freedom to take creative risks with their own decisions to learn from failure instead of being crushed by it. This gives them a fair chance to develop situated meanings and understand applications for the principles of graphic design.

Implementation

This project seeks to utilize the good principles of game-based learning in the form of a video game called Kai ‘Opua that has the player adopt the identity of a Pacific Islander, lost at sea, who finds a home aboard the most unexpected of creatures by learning the ways of taro farming. The player, a young boy lost at sea in his canoe, is found by a dying whale and offered a deal: he may live happily on the whale, but in return must cultivate plant life on the whale’s surface to return the whale to health. Players live through a series of days, where each day they have a limited time to heal a neglected area, or field, on the whale’s surface. It’s like the popular game Tetris, where a player has to quickly create horizontal lines of squares using different modular pieces and make sure the grid space never fills up completely. However, in Kai ‘Opua, the goal is to use the modular pieces (plants) to complete the entire grid-based space of a field, and eventually all the fields on the whale’s surface.

Initial target audience ranges are teenage students, roughly ages 10 - 14, and college level undergraduate students, ages 18 - 22, of all genders. These will be individuals who do not approach their world like a designer of interactive virtual media does, but should have an interest in solving problems and role-playing new identities. These individuals use computers to get information, and may be proficient in using digital tools, but struggle to connect abstract design concepts to real solutions. Additionally, a wider play audience from ages 10-30 may be considered as a secondary range, but primary focus will be placed on the core audience ranges. Players will have at least basic knowledge of computers and internet navigation.

The game-play of Kai ‘Opua consists of a third-person journey through an interactive 3D world built on the open source web platform of HTML, CSS, Javascript, and WebGL. The player can explore by pressing and holding the WASD or arrow keys to move, while using the mouse to select and interact with objects. The game takes place on a moon sized creature named Kai ‘Opua that combines the forms of a planet, an island, a person, and a whale. The player is attracted or attached to the surface of the creature throughout the majority of the game, giving it the feel of a small planet. The setting and story are shaped by Hawaiian and Pacific Islander culture. The name Kai ‘Opua comes from this culture, and translates to the ‘Opua or pink cumulus cloud formations that hang low over ‘Kai’, the ocean. These clouds are regarded as omens of good fortune and good weather.

The player begins each day with a conversation with the whale, who may let the player know of any developments in the game environment, and give the player hints as to their next step. Each day has a limited amount of time, wherein the player begins at sunrise and must complete at least 1 field by sundown. Each field is constructed by a modular grid of square units that lie along the surface of the creature, and to begin a field the player must place a water source. The source is a unique element that activates the mana, or energy, of any plant close enough to it or any connected irrigation channels. The plants of a field may be destroyed by

enemies until enough plants activate their mana to create a beacon for that field’s lost tiki spirit guardian. The challenge for the player is to use just enough irrigation to activate as many plants as possible.

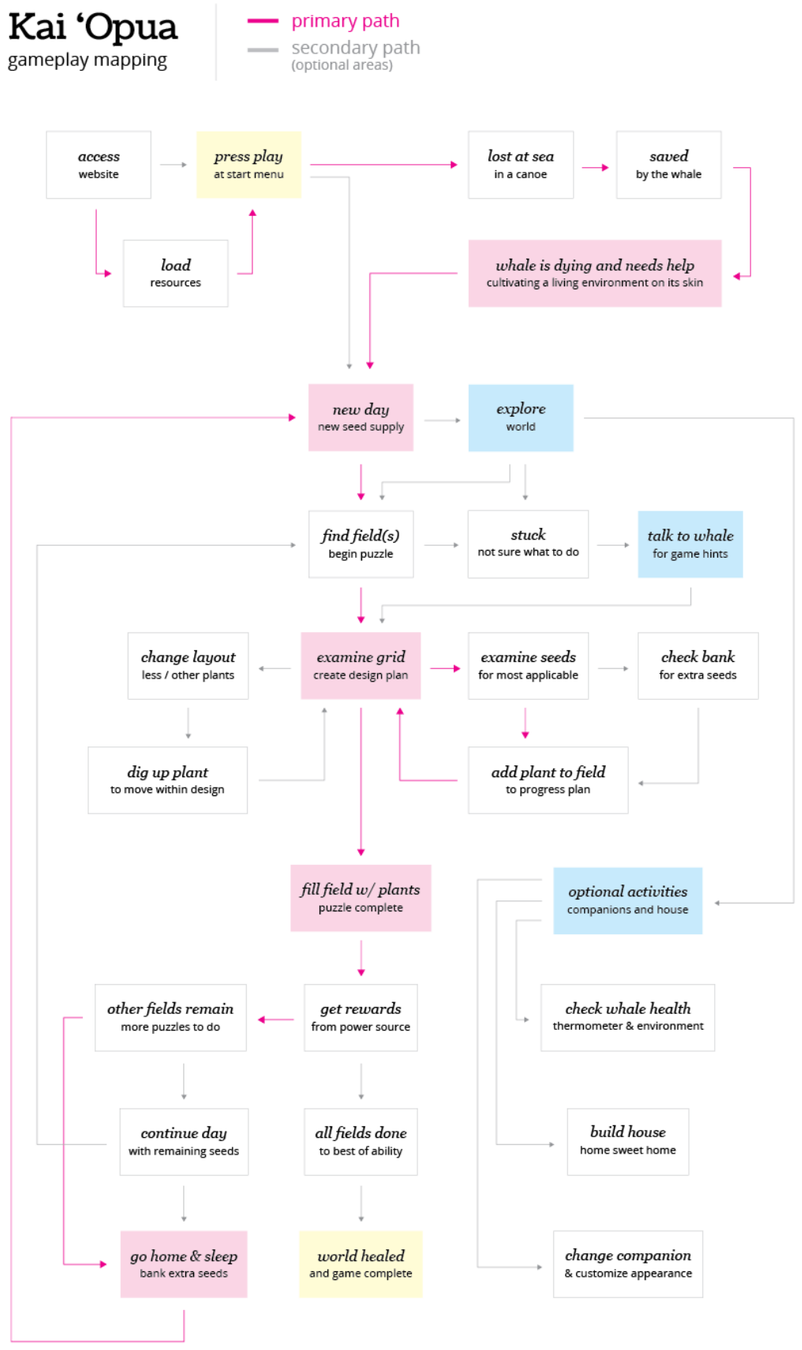
The tutorial field begins as simple exercise in the planting process: starting the field, selection of plants, placement, rotation, and redesigning to balance plants and irrigation. After the first field, new field terrain types, plant functions, and enemies are introduced. Terrain types are used within fields to only allow certain plants to be placed in that location. As the player progresses, fields shift from geometric to increasingly organic in shape, add increasing types of terrain, and attract increasingly difficult enemies.

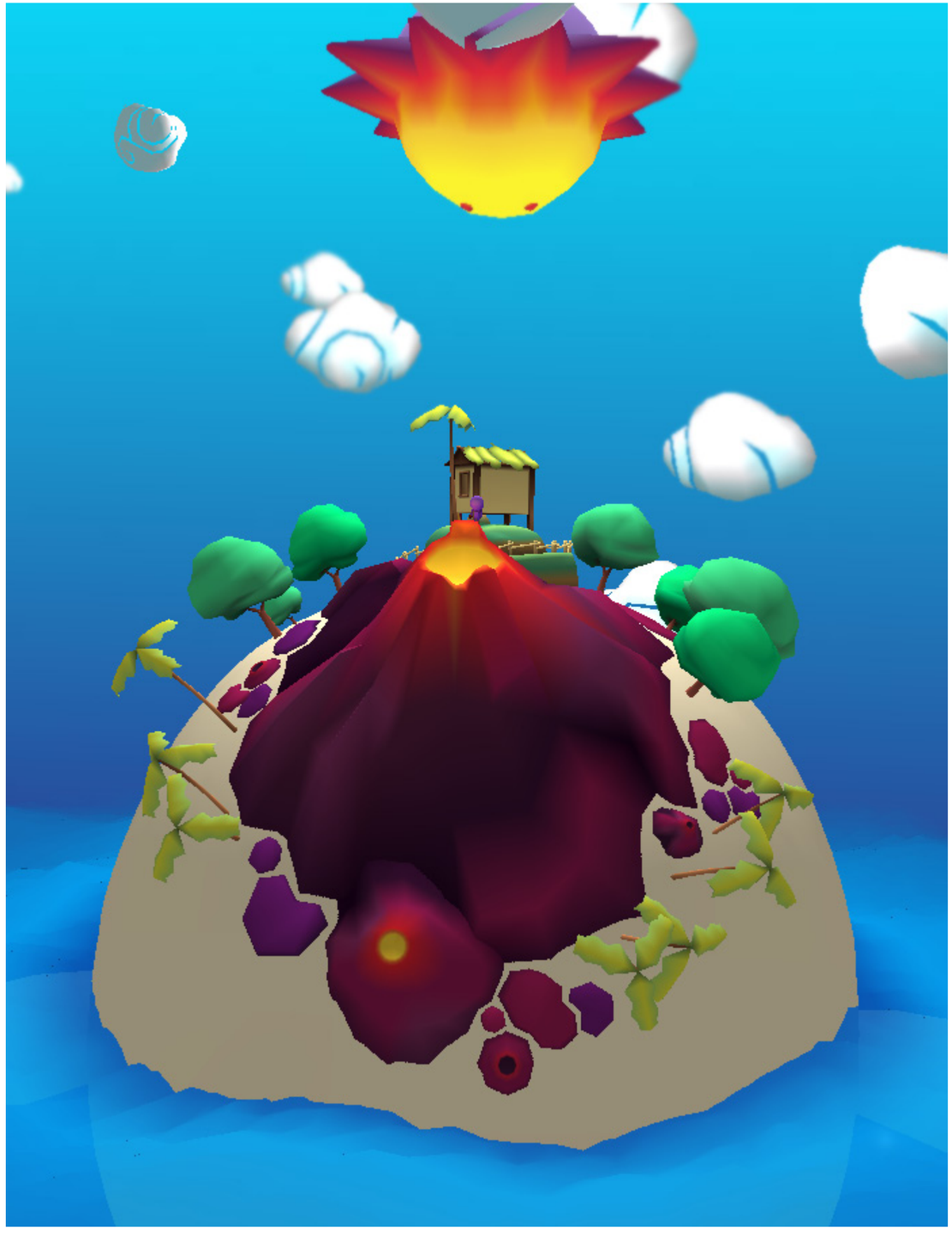
Seeds grow instantly into plants when added to a field, and plants occupy space in terms of the field grid units. The water source and basic plants occupy only a single space, while intermediate plants occupy multiple connected spaces (ex: a box of four spaces, or a line of four spaces). Advanced plants occupy multiple disconnected spaces (ex: a diagonal line of three spaces) or unlock spaces and give special properties to other plants (ex: use a fire plant to melt a frozen area of spaces for other plants). Each plant, including the beginning set, will have a function within the field, whether it be to ward off enemies, channel water, or modify terrain.

Succeeding at completing a field activates the tiki spirit guardian statue, which locks down the field and rewards the player based on their efficiency in completing the field in tiers: low scores receive a seed, mid range scores a piece to help build the player’s home, and maximum scores a companion animal. Players may revisit and redesign fields after completing them to acheive a higher score. Feeding the seed to the whale causes the whale’s health to improve visibly and grants the player use of a new plant in further days. Players may receive multiple modular parts for their house that fulfill the same purpose, such as a banana leaf door and a wooden door, and they may add to and swap parts from their house at any time. Companion animals follow the player and act as vanity items (visual modifiers to the character or game’s appearance), and a player may have one companion animal present at a time. Failing to complete a field within the time of any day causes the whale’s health to decline. The game ends in victory when the player has completed each field on the surface of the creature, or in defeat if the creature’s health declines too far.

Connections

The previously outlined framework gives us a set of rules to design and develop both physical and digital learning environments with which to explore the potential of games in the creation and adoption of key visual communication concepts such as grid and modularity.





The primary goal of within Kai ‘Opua is to fix a broken system that takes the form of a creature, by designing solutions to a series of time-sensitive puzzles/sub-systems. These sub-problems shift from orderly to organic and small to large, and even include unique non-modular obstacles as the game progresses, all of which diminish the relative time-per-decision afforded to the player as they progress. Additionally, players must solve these problems with an increasingly complex pool of resources, and by knowing the many ways in which these objects interact they demonstrate an understanding of patterns of creative logic vs. specific use cases as well as system-based thinking.

The goals and challenges of the game are made authentic through the exploration of a story that transports players into the life of a young boy who finds a friend, builds a home, and saves a life while adventuring in an unknown universe. This adoption of a new identity is key because, “No deep learning takes place unless learners make an extended commitment of self for the long haul. Learning a new domain, whether it be physics or furniture making, requires the learner to take on a new identity” (Gee, 2007, p. 4). Players experience many aspects of Hawaiian culture, such as customs, native plants and animals, ocean and island environments, and language as they progress through the story.

As they play the game, the world will change physically in color and shape: from dark, anemic, and negative to light, flourishing, and positive. These changes provide extensive understandable feedback and a constant visible reminder of what the player has built. They have the ability to customize their character, home, and companions, as well as taking creative risks while problem solving in this space. Creative problem solving, as suggested by Jane McGonigal and supported through real-world results by the game Minecraft, allows players to feel high levels of ownership and pride towards their solutions. Especially, as in Minecraft and in Kai ‘Opua, when the creative solutions exist physically in the game world and persist so the player has a visual record of their progression. All negative consequences are bound to the game’s sandbox space, and players may enter or leave at will to ensure a self-initiated positive experience.

To overcome the game’s challenges, players increase their ability to plan ahead in a modular environment and are able to make decisions more efficiently, building mastery of grid and modularity. In succeeding, the player has built a playful and vibrant creature, much like a web designer develops a website or a engineer creates a robot, and they have participated in applying modular elements to problems in a grid-based format.

Conclusion

On its own, a well designed game built with the right content can be a formidable educational tool in learning environments. However, on its own such a game is not enough to educate creative professionals able to compete at the global level. In addition to using games, one need to build classes like good games are built, by “building the good learning principles in good games into learning in and out of school” (Gee, 2007, p. 21). And although there are some attempts to apply the principles of good games to learning or doing in various sectors, such as the popular “Gamification” movement, often these implementations confuse the aspects of games that actively improve learning with points and badges for activities (Deterding, 2011).

Although there is research that points to a positive relationship between gaming and learning with respect to some disciplines, such as Business or Mathematics, such research is as yet lacking in the field of Graphic Design. Because there is not yet sufficient support to know if game based learning works or not in the graphic design classroom (Cannon-Bowers, 2006), this game provides a good opportunity. In a future study, I hope to play a role in research that will examine differences between visual communication students in current non-game-based graphic design classes and modified game-based classes.

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