MORALITY AND MEANING IN VIDEO GAMES:

A NEW APPROACH TO CHRISTIAN GAME DESIGN

A Thesis

by

MEGAN RENEÉ BEDNARZ

Major Subject: Visualization Sciences

MORALITY AND MEANING IN VIDEO GAMES:
A NEW APPROACH TO CHRISTIAN GAME DESIGN

A Thesis

by

MEGAN RENEÉ BEDNARZ

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

Approved by:

Co-Chairs of Committee,	R. Yauger Williams
	Karen Hillier
Committee Members,	Vinod Srinivasan
	Stephen Caffey
Head of Department,	Tim McLaughlin

May 2011

Major Subject: Visualization Sciences

ABSTRACT

Morality and Meaning in Video Games:

A New Approach to Christian Game Design. (May 2011)

Megan Reneé Bednarz, B.E.D., Texas A&M University

Co–Chairs of Advisory Committee: Prof. R. Yauger Williams
Prof. Karen E. Hillier

A review of the history of video game design reveals an emphasis on themes of competition, survival, and combat. Game designers are now increasingly exploring other themes, including ethics, morality, and religious or spiritual subjects. This thesis analyzes the design of a 2D single-player computer game based on Christian principles, investigating morality, ethics, and meaning in video games. The game builds on previous games, examining the ethical relevance of certain video games as cultural artifacts and as personal inspiration, expounding on how games can be both inspirational and educational.

Though violent games can provide moral challenges and "ethically significant experiences," in this project, non-violent solutions are more conducive for a game based on Christian tenets. This thesis project reinterprets the idea of the "shmup" or scrolling shooter game by changing the game mechanics and win condition to express a non-violent process. The player takes on the role of an angel who has been sent to rescue birds from demons, presenting general subjects for wide audience appeal regardless of religious beliefs.

The thesis outlines the process used in the design, the philosophical approach, and the technical and artistic methods used to create the game. The game is evaluated subjectively with respect to the goals set forth in the design, based on informal player feedback. This thesis contributes to the exploration of games in a spiritual, artistic,

moral, and emotional context and the process outlined herein provides a practical example to other independent game developers in the design of a game based on spiritual themes.

To God, the Creator of all, be glory now and forever

ACKNOWLEDGMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

A great deal of research and thought have been applied to the technical aspects of video game design, but only within the last few years have scholars and game designers begun to explore the cultural, ethical, moral, and artistic impact of video games as a medium of creative expression [1]. The game designed for this thesis is created with the artistic intent of portraying Christian themes in a new way, transcending religious boundaries and expressing Christian ideas through a parable-like game design. This thesis explains the design process of the game from start to finish and elaborates the ethical, moral, philosophical and technical questions raised throughout its development.

Video games have intriguing applications in education, and raise new moral and philosophical questions about our actions in virtual worlds. The incredible variety of games makes considering all these questions difficult. Video games can be anything from an abstract challenge like *Solitaire* to a profound and moving aesthetic experience such as *Shadow of the Colossus*. Mainstream games created by large companies must generate a profit, whereas smaller independent games are often available for free. Some games provide players with a rigorous challenge, and others an environment which the player can explore without hindrance.[1] As simulations, games can be a testing ground for decisions and their consequences.

The journal model is *IEEE Transactions on Automatic Control.*

[1]The latter type of game is sometimes classified as a "toy" instead of a "game" since it does not have an explicit win condition.

Games allow players to train themselves in action and gain a working understanding of the system presented by the game. As John Heaford notes, "the most efficient, speedy, far reaching useful and permanent learning is derived from our doing things that we ourselves have decided to do" [2]. What one learns from a game is a factor of how the game system is designed — the virtual world of a game and its space of possibilities can teach not only practical knowledge but also give a player an ethically or morally significant experience [1]. It is in pursuit of this goal that this thesis was developed.

A. Statement of Artistic Intent

The game designed for this thesis is shaped by Christian principles presented in a universal way, intended to appeal to anyone regardless of religious beliefs. The game will have beautiful aesthetics that support this theme, appealing to emotions. In the game, the player takes on the role of an angel who has been sent to rescue birds from demons. The title of the game is *Free the Birds*.

1. Goals

1. Create a game shaped by Christian principles.

2. Provide the player with a moving experience that may give him new insight each time he plays the game.

3. Transform a familiar game genre, the space shooter or "shmup", into a non-violent, altruistic game.

4. Make the game accessible and appealing to a wide audience, aesthetically, mechanically, and technically.

2. Objectives

1. The presentation of the theme in the game will be simple but metaphorical, like a parable. Thus, it will appeal to a wide audience but retain an element of mystery.

2. The game will be accessible to a casual audience in its controls and difficulty: not too hard for non-gamers, but with nuances of control that provide even experienced gamers with a challenge.

3. The game will have a win condition in order to teach a lesson and provide some feeling of completion.

4. The mechanics and win condition will express Christian themes.

5. The main character will not be able to die, because to deal with death in a meaningful way in this genre would require more development time and is out of the scope of the thesis. Thus, the main character will be an immortal being, an angel.

6. The game will have graphics inspired by the American Sublime movement, including the qualities of dramatic lighting, grand scale, and detail to create immersion and awe, contributing to the emotional impact of the game.

7. Appealing character design will contribute to the game's accessibility.

8. The game will be easy to access, and work on most computers, so that it can be played by many.

B.   Personal Motivation

This thesis project grew out of an interest in the potential of games to express Christian themes and a desire to prove that games need not be inherently evil. Christian art in the past has striven to both inspire and teach. Historically, it has grown out of a life of faith, an artistic creativity echoing the creativity of God the Creator. If games are to be included among the ranks of other forms of Christian art, they should be able to convey themes resonant with Christian faith. If the theme is successfully generalized, the game will also appeal to non-Christians and, consequently, serve a Christian pedagogical purpose as well.

Beliefs about games and entertainment vary widely throughout Christianity.[2] Some people would contend that games are evil in general: they encourage stealing, violence, and selfishness [3]; they waste time and they can be addictive [4]. The ascetic view of Christianity holds that believers should strive for as few distractions as possible, even cutting out things like conversation.[3] For the Christian ascetic, games fall into the broad category of distractions, as would things like movies and sports events.[4] If such things have no higher purpose than entertainment, then they are useless for making spiritual progress.

However, Christians have also historically valued art as a way of teaching and expressing faith through images. The Eastern Orthodox Church and the Catholic Church, for example, use images (icons) to convey spiritual truths. Since early times,

----

[2]Attention here should be drawn to the difference between "gaming" and "gambling" since it is often gambling that Christian sources refer to when speaking of "gaming." For the purposes of this thesis, games and gaming will not refer to gambling.

[3]Christian asceticism is outlined in ancient writings such as The Philokalia [5] and The Ladder of Divine Ascent [6].

[4]For example, in the fourth century, John Chrysostom preached frequently against participation in popular "pagan amusements" of theater and horse races [7].

churches have used a theatrical style of worship, rich with imagery, incense, and beautiful music. The game designed for this thesis is not intended to be used in worship, but only as an edifying form of art. Video games are an artistic medium that should be able to convey Christian principles, if designed with that intent. Because, according to the writer's belief, all activities for a Christian should be centered on Christ, a game based on Christian tenets may have a greater value to Christians than would a similar game based on secular principles.

Art can also be a way to explain the Christian faith to outsiders. There is a modern trend in Christian evangelism towards the use of multimedia. Video games, as an artistic medium, are capable of expressing deep meaning and providing the player with new experiences, and could easily be incorporated into multimedia outreach. Video games could be used not only for evangelism, but also for inspiring and encouraging those who are already in the faith. From the designer's point of view, two major functions of Christian art are to inspire and to teach. The immersive and interactive properties of video games cater directly to these functions.

CHAPTER II

PHILOSOPHICAL BACKGROUND

A.   What is a Game?

Games are formal systems made up of choices, rules, and conflict [8]. Raph Koster calls games "iconic depictions of patterns in the world," though "the pattern depicted may or may not exist in reality." Sid Meier calls them "a series of interesting choices" [1]. Games can be both educational and inspiring.

In his book *A Theory of Fun*, Koster asserts that "[f]un is just another word for learning" [8]. He makes the point that players have the most fun when they are in the flow state. Rui Craveirinha and Dr. Licínio Roque comment on this: "for someone to feel 'flow', challenges' difficulty has to adapt dynamically to the skills of the practitioner, always being great enough to warrant improvement, but without ever seeming too hard to achieve" [9]. They later expound on the teaching capabilities of games: "it is partially because players have to acquire certain skills in order to play a game that games can become useful pedagogical instruments" [9].

Games allow players to gain a working understanding of the system presented by the game. John Heaford, in a short note about the current state of education, says "our capacity for intellectual growth is destroyed when we move from pure learning by discovery to being taught by 'education.' We instill in children a fear of being wrong during the schooling process. This in turn inhibits their enthusiasm for pioneering" [2]. He believes computers and interactivity will transform the educational system. Games may play an integral part in this transformation, since according to Raph Koster "[f]un is about learning in a context where there is no pressure, and that is why

games matter" [8].

But games are more than educational algorithms; games can evoke emotion, create a sublime experience, open the mind to new possibilities, and spark philosophical insight. The still-controversial question 'Can video games be art?' has been answered in many ways, and there are as many answers to that question as there are definitions of art and games. In response to Robert Ebert's article "Video games can never be art," [10] Jerry Holkins of Penny Arcade retorts: "[j]ust entertain this as a thought experiment: If a hundred artists create art for five years, how could the result not be art?" [11] [1] Jesse Schell, author of *The Art of Game Design* and professor at Carnegie Mellon University, shared some thoughts about games as art in an interview. "The games that feel more like art tend to have qualities in common. They do not pander to the player; they are mysterious; they feel more serious than most games; they have a complete, holistic feeling. Such games are rarities, but they exist, and as the form evolves, just as cinema did, more and more of them will appear" [13].

One of the main points against video games as an art form is that studies have not demonstrated their ability to evoke more nuanced and subtle emotions such as sadness, longing, despair, or empathy [9]. Even the games that get closer to evoking these emotions focus less on the challenge and win condition and more on the experience created by the game. The very "game-ness" of them (the ludic element) detracts from their expressive ability [9]. But many believe there is hope yet for games as vehicles of emotion and expressive artistic media. Jesse Schell laments the fact that "many people view games, in all their forms, as meaningless diversions," but affirms that, as game designers, "[o]ur goal is to create powerful experiences" [14]. Raph Koster observes, "[m]ere entertainment becomes art when the communicative

---

[1]For more information about this particular debate, Chris Fannon investigates both sides on his blog [12].

element in the work is either novel or exceptionally well done," [8] noting that the difference between art and entertainment is a matter of degree, not of type. While emphasizing the need for a cohesive, focused design to teach the lesson of the game, Koster also acknowledges "all art entails posing questions and puzzles — tough ones, ethical ones even. And games will never be mature as long as designers create them with complete answers to their own puzzles in mind" [8]. He says that, "for games to truly step up to the plate, they need to provide us with insights into ourselves" [8]. Books such as *Philosophy Through Video Games* [15] and *The Ethics of Computer Games* [1] draw a great deal of intellectual, philosophical, and ethical insight from electronic games. Personal experience has shown a wide range of subtle emotional reactions to games that perhaps the studies have not been able to capture. In addition to the attention to detail that marks a well-crafted game, truly artistic games will allow for player's interpretation and moral response; they will be games to which players can keep returning for new insight [8].

For the purposes of the thesis, video games will be treated as an artistic medium, with all the emotive and expressive capabilities described above. The win condition and play mechanics of the game are also integral elements of the game's lesson. Whether a game is meant to be art, education, or entertainment, games as a medium provide designers with an opportunity to both teach and inspire players. As games continue to evolve in complexity, more potential for artistic expression becomes possible. As more studies delve into the artistic capabilities of games, game designers will be able to create more games that push the boundaries of interactive expression.

B. Meaning in Games

In order to fully understand a game, one must not only understand the rules of the game and the context provided for those rules, but actually experience the game by playing it [1]. "The art of the game is the whole" says Koster [8], implying that both the aesthetic and mechanical aspects of the game are evaluated as part of a cohesive perceived reality. Video games place a special emphasis on interactivity because the game itself (as an experience) does not exist without a player [1]. Games may include different levels of player involvement; some require only a single player, others are multiplayer, and still others, such as massively-multiplayer online games, require the participation of hundreds or thousands of players at once. Some games include the possibility for player modification,[2] whereas others set the player on a pre-determined path where the only outcomes are success or failure. Each of these possibilities affords the designer with a different amount of control, and may allow the player to make more or less of the choices that influence the meaning of the game.

The game is a vessel through which an artist can share an experience or create an entirely new experience in the player's mind [14]. This provides a unique opportunity for the designer to share a particular worldview with players, rewarding players for following the rules of the game and halting their progress if they do not comply. In order to play the game, players must become willing subjects of the game rules as the designer presents them — players are unable to change the rules as they could in a board or card game [1]. This suspension of disbelief creates an ethical framework through which players can experience the ideal the game conveys and respond to it in their own ways.

Immersion in games requires the narrative and the ruleset to be consistent with

---

[2]For instance, a *Counter-Strike* "mod" includes user-created content.

each other [1]. When something the player must do does not make sense in comparison to the perceived motives or abilities of the player's character, this creates 'ludonarrative dissonance,'[3] a conflict between the message of the game's mechanics and its story. It is similar to cognitive dissonance in that it causes a vague discomfort for the player. While this dissonance can easily be dismissed by saying it is "just a game," it can detract not only from the immersion, but from the ethical, moral, and educational value of the game [1], [3]. To create a meaningful experience for the player, the theme and game mechanics must function together to create a coherent virtual world with which the player interacts.

The meaning of a game can also be determined in part by the artistic and cultural discussion surrounding it. For instance, the *Grand Theft Auto* series has generated a great amount of controversy because of its content, and it has become something of a rallying point for those who are convinced that games are a bad influence. The question of whether violent or immoral content affects players has evidence to support both sides [3], so the effect games have on players is still unclear. Regardless, discussion about the morality of the *Grand Theft Auto* series has increased the game's publicity and drawn attention to these games as valuable cultural artifacts. The media attention shown to the morality of games exposes these issues, influencing the meaning of games within our culture.

Even non-controversial games may have a subculture form around them by fans of the game and its fictional universe. For example, the popular phrase "The cake is a lie" comes from the game *Portal*. It is common practice for game developers to set up an internet forum in which players can discuss the game, ask for help, and share their experiences, but players often create their own communities outside the

---

[3]The term 'ludonarrative dissonance' was coined by Clint Hocking in his critique of Bioshock [16].

game.[4] Games may also be discussed on blog sites, in industry journals, and in books, discussing not only the process of game design but the meaning of games themselves.

Games, like all art, are artifacts of culture. As such, games engender community through a sense of shared experience. Because that shared experience is often inherent to the game, the culture surrounding games can be quite strong. "It takes a lot of trust to play a game with someone," says Jane McGonigal in her TED talk [18]. "Playing a game together actually builds up bonds and trust and cooperation, and we actually build stronger social relationships as a result." The cultural understanding that grows around a game may draw from individual player experiences, media coverage, and industry critiques, and is elaborated through discussion by the culture that receives the game.

Certain games hint at deep meaning — a "resonant theme," Jesse Schell calls it [14]. These are themes that touch on the cultural zeitgeist or innate desires of every human being. "When you manage to tap into one of these resonant themes," he says, "you have something deep and powerful that has a true ability to move people and to give them an experience that is both transcendent and transforming." He says that in addition to "experience-based" themes, games can contain "truth-based" themes which can make powerful statements, expressing commonly held personal beliefs such as "[l]ove is more important than life, and stronger than death" [14].

Resonant themes can sometimes cause players to reflect upon their own core values and worldview, and even spark philosophical insight. Jon Cogburn and Mark Silcox address this in their book *Philosophy Through Video Games*, observing "the appeal of many video games is closer to that of great poetry than it is to the transparent

---

[4]For instance, the *World of Warcraft* wiki has around 87,700 articles, all player-created documentation, at the time of this writing, and is ranked 96th on the list of largest wikis [17].

and forgettable charms of push-pin," (an English children's game) [15]. These authors even go so far as to speculate that "[t]he idea that our lives acquire their meaningfulness from our leisure-time activities" means that "[f]ar from being a frivolous pastime, gaming might turn out to be one of the most important things we human beings do." Raph Koster hypothesizes that a truly artistic game might be thought-provoking and revelatory, contribute to the betterment of society, force us to reexamine assumptions, allow each of us to approach the game in our own ways and in a different way each time we play it, and forgive and even encourage misinterpretation [8]. Resonant themes contribute to the appeal of games as art, tapping into deeply held beliefs that span all of the human experience.

The meaning of the game is crafted by a designer and experienced by a player. In order to avoid ludonarrative dissonance, attention must be paid to both the story and game mechanics and how they interrelate when designing the game. The meaning of the game is influenced not only by individual players and their experiences, but by the culture that grows around the game and the experiences players bring to the game from the surrounding culture. Games have the potential to inspire the player, creating a transcendent experience through the use of a "resonant theme."

C.   Morality in Games

Games are often a target of media aspersions, blamed for influencing players to commit violent acts. There are some convincing cases where violent behaviors have been linked to video games. Several accounts exist of soldiers who unblinkingly shot other human beings in the field of battle because of their experience with video games. The games trained them to respond in a combat situation with swift, decisive violence [3]. Other ethical issues in games have been raised by the public, such as the recent outcry

against being able to play as a member of the Taliban and kill American soldiers in the upcoming *Medal of Honor* game. Was it immoral to include the ability to play as the 'Taliban' in the first place, or does the removal of the name from the multiplayer mode remove some of the ethical impact of the game [19]? Questions such as these are best answered through public discourse and debate.

Games have the potential to influence our knowledge and skills since they are teaching tools, so to deny the possibility that they can influence other behaviors would be to commit the Virtuality Fallacy [3] by assuming a virtual act can have no real effects. Most gamers would say that video games have no effect on violent behavior, since most people who play violent games do not go and become serial killers because of the game. In fact, Miguel Sicart makes the case that players retain their moral agency while playing the game instead of passively absorbing the views presented in the game [1]. However, as Don Gotterbarn and James Moor explain, one cannot assume that because an event happens in virtual space, it has no real life effects. "A promise made in an e-mail is made in virtual space but is a real promise" [3]. To say that games have no effect on players would deny their potential as teaching tools and their ethical and moral significance. Ethics and morality in games must be treated with care, since games can be so influential.

But what defines the ethical value of the game? Can even violent games teach us moral lessons? Miguel Sicart makes the claim that games such as *Grand Theft Auto IV* are "morally significant" because they allow players to self-evaluate when confronted with the ethically challenging situations in the game [1]. Considering the moral implications of virtual actions raises some underlying questions about morality itself. Do consequences define the morality of an action? Does removing the finality of death affect the moral implications of killing? For example, in many games, death is not permanent; the player's avatar can "respawn," thus removing some of the moral

and ethical associations of death within the context of the game world. Sometimes, killing someone in a multiplayer game can even be beneficial to that player, allowing him to respawn with full ammunition and at full health. The concern here is that gamers will be taught an action that has different game-world consequences from those in real life, but then apply that action to real life.

Don Gotterbarn and James Moor provide a useful solution for considering ethics in virtual worlds: Just Consequentialism [3]. Just Consequentialism consists of valuing decisions based not only on their consequences, but also with concerns for rights and duties, especially considering the impact of one's actions on others. People base their everyday decisions on a set of diverse and often competing standards that define what the result of the decision should be. Because the virtuality of a game cannot be used as an excuse to justify one's lack of consideration of the morals of a game, decisions in the game need to be evaluated by some standard. The morality of an action in the game can be considered in a way similar to real life using the model of Just Consequentialism.

According to Raph Koster, games are about teaching patterns through their mechanics. Players will strip away the story of a game so that even acts that might seem wrong in the real world may be seen as just a "power-up"in the game world [8]. The goal of a game is to win, even if doing so destroys some of the ethical meaning of the game experience (which can happen if the game's content and mechanics are at odds, i.e. ludonarrative dissonance). It is important to consider the game world, the actions the game allows or requires the player to perform, and their consequences, as components of the moral lesson of the game.

Even if a game does not teach violence, most games encourage selfishness or greed. For example, in the relatively non-violent game *The Legend of Zelda: Ocarina of Time*, the player is able to enter the houses of the residents of the game world and

take their valuable items; the inhabitants do not even notice this behavior, in effect validating the player's selfish decisison by removing its consequences. The player can justify self-focused decision-making because he is aware that since he is the only real human being in the game world, "what's good for me is the good" [3]. Most games do not factor in the human values of decisions in the game, assuming that players will only act in their own interests. Game design can encourage players to think unselfishly by manifesting lasting consequences for their actions or factoring in the value of other characters in the game.

The fact that games can teach useful life skills means that they have value to society educationally. Games can provide us with certain benefits aside from moral considerations: they teach us to trust our fellow players [18]; they provide us with fun and release from stress; they enable us to keep our minds sharp by solving problems [8]. Don Gotterbarn and James Moor, while warning of the negative effects of games, say "video games with a plausible and realistic ethical basis have the potential of offering effective ethics education" [3]. Miguel Sicart also points out that even violent games can provide ethical insight for the mature player, making them valuable ethical objects. While this point is debatable, games nevertheless have the potential for a positive ethical and moral impact on players. However, not all games provide the same ethical interest. Tetris may be fun and engaging, but does it give us any insights into the spiritual or moral realities of the world? Miguel Sicart says that abstract games are ethically irrelevant because they "do not afford any kind of ethical values that have to be enacted, interpreted, or experienced when playing the games" [1]. They may be interpreted metaphorically for some kind of moral lesson, but that is extrinsic to the game experience itself. But even abstract games have value to society in allowing players to exercise problem-solving techniques, relieve stress, and bond with other people.

Games, as simplified systems abstracted from real life, contain their own sets of rewards and consequences, from which players draw their own conclusions about meaning and morality. While the system of morality in the fictional universe is separate in some ways from the system of morality in life, the real impact of games cannot be dismissed. Games can be influential teaching tools, with the possibility of valuable ethical education if the challenges of the game and their consequences are appropriately designed.

CHAPTER III

PRIOR WORK

In addition to the philosophical, moral, and ethical ideas that influenced this thesis work, the aesthetics and mechanics of certain games provide a basis for *Free the Birds*. This chapter considers selected case studies that give context to the ideas in *Free the Birds* and highlights the ways in which they influenced the development of the thesis work. *Free the Birds* is meant to be a game based on Christian tenets that addresses some of the quandaries about morality, meaning, and art in games explained in the previous chapter. Here are a few examples of other games addressing the same issues and specific sources of inspiration that guided the process.

A. Games Exploring Morality or Philosophy

One of the earliest games that quantifies the nuanced aspects of morality is *Ultima IV: Quest of the Avatar*. The entire goal of the game is for the player's Avatar to achieve enlightenment through the pursuit of virtues and to be an example of moral purity to the inhabitants of the game world. The game splits up the morality system into eight different virtues. It allows the virtues to be attained by different means; any action can contribute to a variety of virtues and detract from others. For instance, valor requires one to fight attacking monsters, but justice demands that the player fight only the ones that are evil. One can easily excel in a few of the virtues, but to master all of them is very difficult. The developer Richard Garriott based the system on the 16 Hindu ways of purification [20]. The game is set in a fantasy version of medieval Europe, borrowing from Judeo-Christian background

material, portraying a Hinduism reinterpreted through a western lens. Subsequent games expound on the virtues in different ways, with different sets of virtues based on different principles [20], developed through dialog as well as through the player's actions. This game represents one of the earliest attempts in the game design world to create a game with deeper meaning addressing moral issues.

A common modern method game designers use to quantify moral choices allows the player to amass "good" or "evil" points (sometimes called "Karma points" as in *Fallout 3*), which will affect the player's character in various ways. For example, in *Fable*, they will change the appearance of the player's character, and in *Black and White*, they will change the appearance and abilities of the player's pet-like representative in the game world [15]. Sometimes, as in *Star Wars: Knights of the Old Republic* or *Mass Effect*, gaining a certain number of points in either the 'good' or 'evil' categories will open up new dialogue options, sometimes enabling the character to perform actions he or she would not otherwise be able to do. In *Mass Effect*, the dialog options can usually be classified as diplomatic, violent, or inquisitive, but unfortunately they often do not permit more nuanced human interactions.

Miguel Sicart calls these types of games "failed attempts" at ethical game design, saying they reduce the ethical choices in the game to mere statistics [1]. "The problem arises when the player is bereft of her creative capacities, leaving a system that evaluates and labels her actions according to moral standards that are external to those the player has created." These labels draw attention to the way the system is designed, in some cases reducing immersion as the player attempts to determine what the designer meant. In this case, an improvement to this system may be to allow the player to create choices of his own on the fly, making the decisions much more personal. However, the fact that the dialog options can be classified means that the player is made aware of the type of choice the developers have placed in the game

and the possibility that options in real life may also be limited. Such a system may provide a valuable feedback mechanism when considering questions of ethics, and cause players to consider the meaning of the moral system embodied by the game.

Another approach to meaningful game design is called 'procedural rhetoric,' a term coined by Ian Bogost [21]. These simple simulations use game mechanics to convey a point of view or message. One example of this is *September 12th*, which confronts the issues behind the "war on terror." The player is given a crosshair and a view of a Middle Eastern town in which terrorists are scattered amongst the citizens (Fig. 1). The assumption that the crosshairs control a sniper rifle is disproven as

Fig. 1. Screenshot of the game *September 12th*.

soon as the player fires; instead of a bullet, a missile crashes down into the city, destroying buildings, civilians, and terrorists alike. Civilians gather and mourn the dead, then transform into terrorists. Through the mechanics of the game, the designer presents a strong message about the "war on terror;" there is no way to win this game and the best strategy is not to play, even though it means letting the virtual

terrorists "live." Another game designer, Ze Frank, created simplified simulations of Buddhism, Christianity, and Atheism which use similar presentations to allow the player to test choices and their consequences using systems that represent each religious belief. Each character will say different things when the player presses a button, representing an insight into life. They do not address complicated doctrinal issues, but give simplified, even comical insights into the worldview of each religious group. For instance, Christianity in Ze Frank's game is portrayed as two elevators, one going up and one going down, which the player may choose between, then wait for the end of the "second coming," which is "a random number between 1 and 500,000,000" [22]. Despite the absurd presentation, each game makes the player think a little bit about each worldview. Just as in *September 12th*, the simulation goes on as long as the player wants it to. While *September 12th* and Ze Frank's simulations are not necessarily defined as "games" (*September 12th* claims specifically *not* to be a game) because they lack win conditions, they are presented using the same interactive format and syntax as games. Procedural rhetoric uses the mechanics of games to convey a message.

Other games utilize Resonant Theme and introspection to explore different worldviews. *Gravitation*, "a video game about mania, melancholia, and the creative process" uses symbolic elements to portray something that in real life is enigmatic and hard to explain. The game presents a pattern of action that can metaphorically represent a variety of real-life situations. Part of the challenge of the game is figuring out what the metaphor means. The interpretation of the game may vary from player to player and sitting to sitting, and the player may leave the game having discovered something about himself. *The Majesty of Colors* enables the player to experience another point of view, that of a giant sea monster, and proceeds to explore the nature of human existence from that perspective. It is a short, though thought-provoking,

game. A game called *Today I Die* by Daniel Benmergui explores the use and meaning of words in a poetic, expressive experience, offering new perspectives on life through gameplay. These are all good examples of the use of "resonant theme", as explained by Jesse Schell [14].

B. Non-Violent Games

The Sims, a life simulation game originally produced in 2000, remains the best-selling computer game in history, receiving numerous awards. Its non-violent gameplay appealed to casual gamers and females (over 50% of players were female [23]), and because most game players were previously male, it opened up a whole new market. Its success is echoed in newer social networking games like Farmville that appeal to the same demographic. The game has no stated goals for the player to achieve, so players set their own goals. The implied goal of the game is to "keep up with the Joneses," [15] but players are free to explore human motivations and social structure as presented by the game. For example, Miguel Sicart decided to try making a character modeled after Kurt Cobain, who would "have a large amount of money and a big house, but he would do nothing at all except lie on the sofa, play guitar, eat junk food, and drink alcohol." He describes the results of this experiment in the following way:

> "At some moment during this experience, my avatar refused to comply with my instructions. He started cleaning the house, adopted a healthier diet, and slept more. In the world of *The Sims*, the rules are there to enforce a certain ethical system behind the simulation, to the extent that the player is relieved of her interactive duties if the avatar's simulated existence cannot be accepted as part of what the simulated environment ought to be, according to the rules and their ethical affordances." [1]

In essence, playing *The Sims* may be an interesting ethical experience because of the limitations of the simulation. What may be considered a flaw in the game design

can give insights into the way things work in the real world [15]. *The Sims* can be approached with a wide variety of attitudes, anything from mundane mouse clicking to setting before oneself an interesting ethical challenge.

Guitar Hero is another popular non-violent game. It spawned a new genre of games based on playing musical instruments. Despite their reliance on expensive peripheral hardware, this genre remains one of the more popular genres to appear recently. The forerunner of the whole rhythm games genre is called *Dance Dance Revolution (DDR)*, which is still one of the most popular games in arcades. While these games are non-violent, they occasionally contain music with lyrics which are objectionable to a Christian audience. Owing to this fact, and the success of Christian pop music, specifically Christian versions of these games have been made. *Dance Praise* and *Guitar Praise* mimic the style of *Guitar Hero* and *DDR*, replacing the secular music with Christian pop songs. Though their appeal does not reach much further than Christian audiences, they have received good ratings from both Christian and secular reviewers [24].

A recent independently-developed game with a non-violent narrative approach is *Knytt*. In this game, an alien abducts the main character, only to crash land on a strange planet. The player's first inclination may be to be angry at the alien, but in order to win, the player must help the alien, collecting parts for the crashed ship. The emphasis in the game is the sublime and beautiful experience of exploring the world. Most of the creatures the player encounters are harmless, and one can sit and watch their behaviors or continue exploring for as long as desired. The main moral principle to be learned from this game is that helping one's enemies is better than harming them, and sometimes may be the best option for one's own good. *Knytt*'s presentation focuses on an experiential Resonant Theme through the beautiful game world depicted, and the mechanics, which focus on navigating space, allow the player

to experience the game world.

There are many other types of non-violent video games. One needs only to look at casual games, puzzle games, some physics-based games, educational games, adventure games, and computer-based versions of physical board and card games to see that non-violent approaches to problem solving are well represented in the world of video games. The success of *The Sims*, *Guitar Hero*, and others illustrates how non-violent gameplay can be even more interesting and appeal to a larger audience than its violent counterpart. This provides a starting point for designing a Christian video game.

C.   Artistic Inspiration

1.   Aesthetic Influences

The aesthetics of *Free the Birds* were inspired by several sources; the American Sublime art movement, the painterly style of games such as *Aquaria* and *Braid*, and the photomontage technique used both in 3D texturing and the 2D game *Samorost*.

The artistic direction for this project was inspired largely by 19th century American landscape painting that exhibited under the title "American Sublime" [25], including paintings of artists such as Albert Bierstadt, Frederic Edwin Church, and Thomas Moran. This art movement is examined in great depth by Andrew Wilton and Tim Barringer in their book *American Sublime* [25]. Grand vistas portrayed in large scale showcase the dramatic beauty of nature with highly detailed, often exaggerated, landmarks. Various artists and philosophers attempted to pinpoint exactly what it meant for something to be "Sublime." According to Wilton and Barringer, the writers of *American Sublime*, Immanuel Kant described it succinctly as "a sort of delightful horror, a sort of tranquility tinged with terror," [25], but they also say

Fig. 2. Study of the American Sublime style. Digital painting done by Megan Bednarz after the painting "Mount Rosalie" by Albert Bierstadt.

"the concept of the Sublime incorporated a further dimension: the imagination has an important part to play in our perception of what is immense, nebulous, beyond exact description. This idea was central to the Romantic response to nature." The artists who started this movement believed in seeing the glory of God in the natural world, and wanted to portray the American West to people who had never seen the grandeur of the wilderness. The paintings themselves encouraged a great number of people to move out into the western United States. The American Sublime movement was preceded in England by J.M.W. Turner, a British artist who painted dramatic atmospheric effects in ocean scenes, whose work also influenced the visual style of *Free the Birds.* Though this project does not draw ideas from the concept of Manifest Destiny, the visual style and drama of the American Sublime movement make it an

important source of inspiration. Painting studies were done emulating the style of the American Sublime movement (see Fig. 2), becoming the foundation for the style found in *Free the Birds*.

The visual style in *Free the Birds* is also inspired by other games, most notably *Aquaria*, *flOw*, *Braid*, *Ikaruga*, and *Samorost*. *Aquaria* is executed in a beautiful painterly style, with rich detail, lush environments, and schooling fish in a vast underwater world. This watery world is filled with creatures and locations that inspire feelings of awe, terror, and joy. The game provides a sublime aesthetic experience in its dramatic visuals and encounters with creatures great and small, progressing from simple, peaceful environments to the bright waters of the ocean's surface to the strange and frightening recesses of the Abyss. Strangeness can also contribute to a
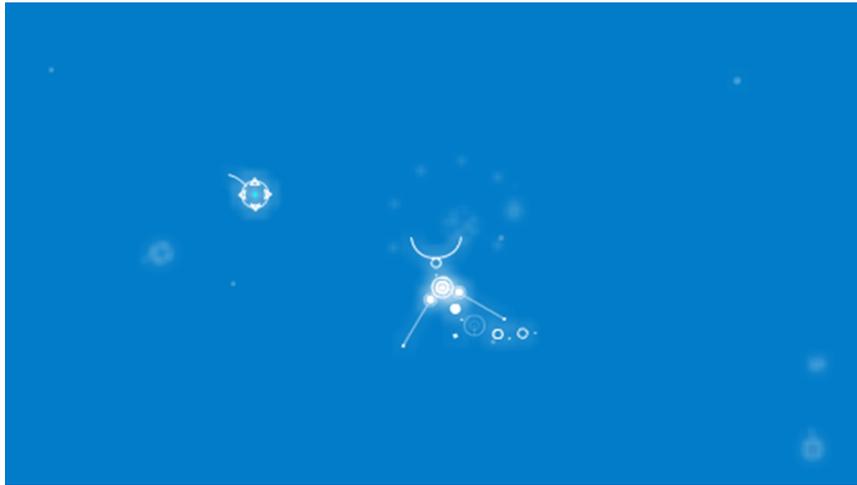
Fig. 3. Screenshot of the game *flOw*. The creature in the center is controlled by the player.

sublime experience, as in the game *flOw* (Fig. 3). The creature designs in that game are abstract and mysterious, and the game progresses from a bright open space to darker levels, representing a descent into the ocean depths. Another game, *Ikaruga*,

utilizes light-dark contrast, both aesthetically and mechanically. Beautiful curving motion, bright laser beams and bullets, and dynamic patterns all contribute to the fluid beauty of the game (Fig. 4).
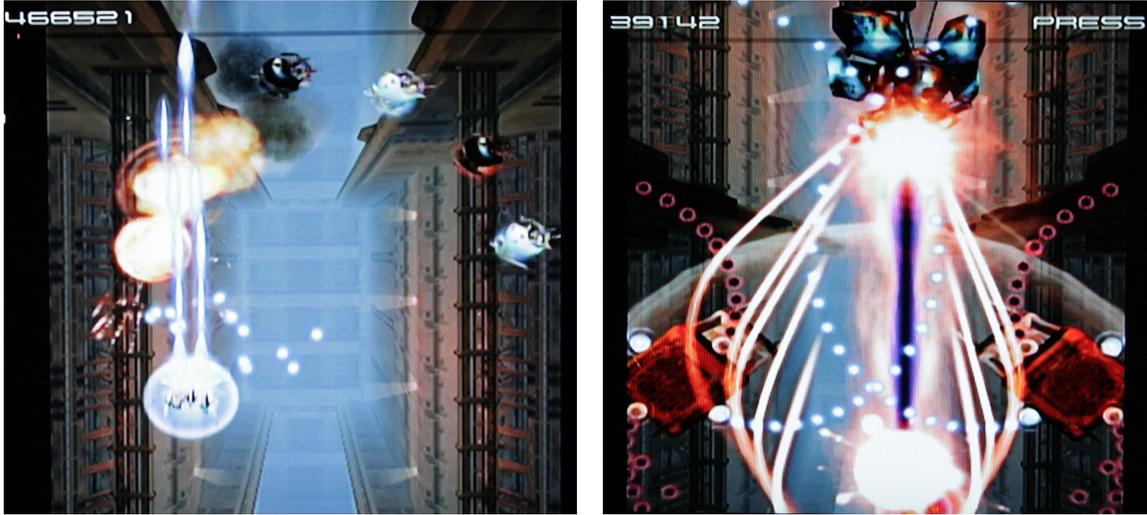
Fig. 4. Screenshots of the game *Ikaruga*.

The game *Braid* also showcases a beautiful, painterly style, with dramatic lighting and impressionistic environments. Even the title screen (Fig. 5) of the game contains elements of the Sublime with its dramatic silhouette of the character and foreground elements against a background of moving fire.

Another method to create visual interest is by using photographs to texture the game world. For example, the game *Samorost* employs photographic sources for many of its graphics (Fig. 6). With photomontages as backgrounds, composite photos for characters, and 2D vector animation for most of the moving objects, the game has a surreal yet realistic quality. The result is a highly detailed environment that recontextualizes objects in a creative way. Similarly, 3D games incorporate photographic sources and digital painting techniques to create a single image that is

Fig. 5. Screenshot of *Braid* title screen.

then applied to a 3D object, the photographic sources enhancing the realism of the objects and the digital painting serving to unify them in the game world. *Free the Birds* emulates this method, utilizing photography and digital painting in its aesthetic approach to create a sublime experience.

Free the Birds utilizes the dramatic value contrast from *Ikaruga*, the digital painting style found in *Aquaria* and *Braid*, the religious grandeur of the "American Sublime" landscape paintings, the photographic realism of *Samorost*, and the mysterious otherworldly experience of *flOw* to create feelings of awe, mystery, fear, and joy through the game's aesthetics. *Free the Birds* will use the same light and dark contrast as *Ikaruga*, expressing instead of dualism the functional differences between good and evil found in Christianity. The glowing auras used in *Aquaria* and the moving backgrounds of *Braid* are used to create visual interest in *Free the Birds*.

Fig. 6. Screenshot of *Samorost.*

2.   Mechanical and Gameplay Influences

The motion and mechanics of *Free the Birds* are based on 2D space shooter games ("shmups") like *Ikaruga*, and specifically free-roaming games exemplified by *Aquaria* and *flOw* (though the latter two do not fall squarely into the "shmup" genre).

Ikaruga is a space shooter game that enables the player to switch between dark and light colors in order to absorb dark or light energy bolts, or fire light or dark energy shots. It requires careful timing and motion in order to avoid the enemies' bullets and return fire. Sometimes the screen is so full of projectiles that there is almost no room for the ship to move; this kind of game is categorized as a "bullet hell" game. Unlike *Aquaria*'s open world, the scrolling shooter gameplay does not allow for much exploration but gives the player a feeling of scripted progression. *Ikaruga* also allows

the player to win non-violently — each level and boss battle is timed, and all the player needs to do is survive. The player will get a bonus for completing the levels this way, and it is much more difficult to achieve than a normal victory. *Ikaruga*'s setting contains a very detailed backstory, and the theme of dualism can be found throughout the game in both mechanics and content [26].

In *Aquaria*, the main character is an aquatic humanoid, named Naija, who can sing and float around freely in a 2D ocean environment. Certain songs will give her different abilities, and by singing, certain creatures will flock around her. The motion of the main character and the schooling fish adds to the beauty of the digital world. The non-violent songs and interactions present an example of beneficent mechanics.
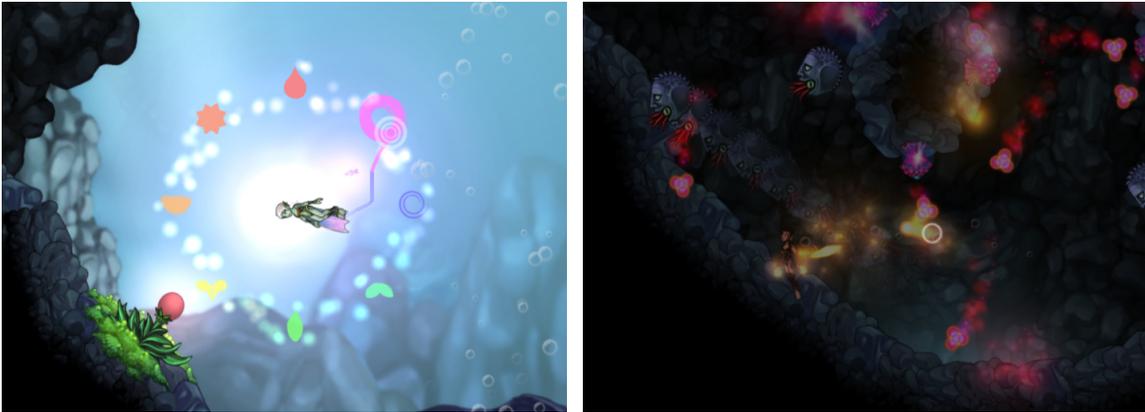
Fig. 7. Screenshots of *Aquaria*, showing story progression. Singing causes certain objects to glow, and fish to flock around the main character, Naija. Later, Naija must destroy creatures to survive and progress.

The possibility of interesting nonviolent interactions, though, is quickly disregarded as the game forces Naija to take on an "energy form" to shoot energy bolts in order to defeat bosses and progress (Fig. 7), with new forms acquired later that enable other

violent abilities.[1] The vast game world encourages exploration, and even the hostility of the creatures enhances the sublime experience with the feeling of danger. *Aquaria* focuses on exploration and, while the motion style is similar to a scrolling shooter, the game does not initially employ shooting mechanics.

The game *flOw* approaches the game design in a much simpler way. Abstract representations of aquatic creatures float around the space, which is almost 3D: the player can move in a 2D plane and go up or down in depth. The minimal designs and mesmerizing motion combined with the atmospheric music create a very mysterious experience. The game focuses on exploring the mysterious game world and interacting with the creatures in it. These interactions usually involve a predator/prey relationship. *flOw* does not use shooting at all, but relies on collisions for combat, and it incorporates a freely scrolling screen in which the player-controlled entity follows the mouse.

Free the Birds incorporates the timing and position elements of *Ikaruga* with the mouse-controlled motion and directional freedom of *Aquaria* and *flOw*. The backgrounds and levels in *Free the Birds* echo the vastness of *Aquaria*, though there is not as much space to explore.

---

[1]This increase in violence reflects one of the main themes of Aquaria: loss of innocence as one gets further from home.

CHAPTER IV

WORKING PROCESS

A.   Main Goals

1.   Christian Game

The first goal is to create a game shaped by Christian principles. The game is meant to encourage altruism, embodying the principles "Do unto others as you would have them do unto you" and "Love your enemies". Specifically, *Free the Birds* draws from the Parable of the Sower, which is as follows:

> "A farmer went out to sow his seed. As he was scattering the seed, some fell along the path, and the birds came and ate it up. Some fell on rocky places, where it did not have much soil. It sprang up quickly, because the soil was shallow. But when the sun came up, the plants were scorched, and they withered because they had no root. Other seed fell among thorns, which grew up and choked the plants. Still other seed fell on good soil, where it produced a crop–a hundred, sixty or thirty times what was sown.[...]
>
> "Listen then to what the parable of the sower means: When anyone hears the message about the kingdom and does not understand it, the evil one comes and snatches away what was sown in their heart. This is the seed sown along the path. The seed falling on rocky ground refers to someone who hears the word and at once receives it with joy. But since they have no root, they last only a short time. When trouble or persecution comes because of the word, they quickly fall away. The seed falling among the thorns refers to someone who hears the word, but the worries of this life and the deceitfulness of wealth choke the word, making it unfruitful. But the seed falling on good soil refers to someone who hears the word and understands it. This is the one who produces a crop, yielding a hundred, sixty or thirty times what was sown."
>
> (Matthew 13:3–8, NIV)

The other aspects of Christianity that specifically influenced the game design are:

1. Parable of the Weeds (excerpt): "The owner's servants came to him and said, 'Sir, didn't you sow good seed in your field? Where then did the weeds come from?' 'An enemy did this,' he replied. The servants asked him, 'Do you want us to go and pull them up?' 'No,' he answered, 'because while you are pulling the weeds, you may uproot the wheat with them. Let both grow together until the harvest.' " (Matthew 13:27–30, NIV)

2. "[L]ove your enemies, bless those who curse you, do good to those who hate you, and pray for those who spitefully use you and persecute you," (Matthew 5:44, NKJV)

3. "If your enemy is hungry, feed him; / If he is thirsty, give him a drink; / For in so doing you will heap coals of fire on his head." (Proverbs 25:21–22, NKJV)

4. "Even so it is not the will of your Father who is in heaven that one of these little ones should perish." (Matthew 18:14, NKJV)

5. "Yet even angels, although they are stronger and more powerful, do not bring slanderous accusations against such beings[1] in the presence of the Lord" (2 Peter 2:11, NIV)

6. "But even the archangel Michael, when he was disputing with the devil about the body of Moses, did not himself dare to condemn him for slander but said, 'The Lord rebuke you!' " (Jude 1:9, NIV)

7. "And the light shines in the darkness, and the darkness did not comprehend it." (John 1:5, NKJV)

---

[1] "such beings" is interpreted to mean demons

8. "For everyone practicing evil hates the light and does not come to the light, lest his deeds should be exposed." (John 3:20, NKJV)

9. The spiritual life starts with practice. (*The Philokalia* [5], *The Ladder of Divine Ascent* [6])

The themes are presented in the form of a "virtual interactive parable," which is simple but metaphorical. Some of the most complex lessons in Christianity are conveyed via parables, which portray spiritual meaning through metaphors using things the average person in the audience would understand. Gamers are accustomed to exciting or fantastic creatures and stories, so the game draws on the Christian view of demons and angels, adding in the curious-looking birds for character appeal. Instead of making the story of the game more like real life, *Free the Birds* is abstracted into something more similar to other games, with the goal of making the lessons more intelligible to gamers. It is also easier to create believable AI for simpler creatures such as birds than for humans. Meeting the expectations for realistic human behavior would require an extremely sophisticated AI, which even modern day games have not been able to achieve. In the game, birds metaphorically represent humans, creatively avoiding this problem.

In *Free the Birds*, the player is only allowed to do good, removing the complexity of temptation. A simple story makes it easier to focus on fewer lessons and themes, and prevents the introduction of an unmanageable amount of complexity. Many games have simple good-versus-evil themes, which apply to the Christian point of view. Good and evil are often expressed metaphorically in the Christian world as light and dark, and that symbolism is used in *Free the Birds*. The main character will also not be able to die, because death is something that is often trivialized in games. To deal with it in a more meaningful way would require more attention to

the sequence and structure of the game world, integrating death into the story itself, which is out of the scope of the project.

2. Emotionally Moving, Introspective Experience

The second goal is to provide the player with a moving experience that may give him new insight each time he plays the game. The game should encourage the player to care about the birds. The aesthetics should express emotionally compelling consequences to the player's actions (or inaction) [15]. As a work of art, the game draws from several sources of inspiration in order to inspire the player. The aesthetics of the game will incorporate elements from the games *flOw*, *Aquaria*, *Samorost*, *Ikaruga*, and *Braid*, with the dramatic style of American Sublime paintings. The hypothesis is that sublime aesthetics will contribute to an emotional, inspiring experience.

3. Non-violent, Altruistic Game

The third goal is to transform the space shooter or "shmup" genre into a non-violent, altruistic game. *Free the Birds* is a non-violent game based on violent game style: it transforms the "shmup" genre by changing the mechanics and rewards. Space shooter mechanics incorporate on-the-fly decision-making unlike dialog boxes in role-playing games (RPGs), perhaps more appropriate for creating an ethical experience because in real life we make ethical decisions quickly and intuitively [3]. *Free the Birds* appeals to intuitive learning, and attempts to make players more aware of the impact of their quick decisions.

4. Accessible, Appealing, Easy to Play

The fourth goal is to make the game accessible and appealing to a wide audience. The game should work well, be as bug-free as possible, and be easy for any player

to pick up, but at the same time difficult to fully master. Simple mechanics enable the game to be produced in a shorter amount of time, as well as making it easy to play. Two-dimensional motion is chosen because more attention can be focused on perfecting the mechanics of the game, which is what teaches the lesson. Attention is paid to the aesthetics, story, and mechanics to blend them cohesively and support the Christian themes of the game. Parables appear in other sacred narratives, and appeal to those outside Christianity as well. *Free the Birds'* use of a parable-like narrative reinforces its broad appeal, conveying universal truths that resonate with a wide audience.

B.   Previous Designs

A couple of initial projects provided the impetus to create this game in its current form. The first design that inspired *Free the Birds* was an unfinished space shooter design called *Zion*, with prototypes created in Game Maker 7 by Sean Choate. The game design was heavily based on *Ikaruga* and the visual style was inspired by *Metroid Prime*. The enemies designed for the game were strange glowing machines that flew through the clouds. They would be nearly invisible when outside the clouds, but would emit a glow while inside the clouds, so that the player could only see them when they were in the darkness (Fig. 8). The goal of the player was to destroy these machines by shooting them with a light beam which would defeat their invisibility, and then to shoot a laser at them. Production on the game did not get very far because the earlier version of Game Maker 7 did not enable alpha blending, which would be necessary to make realistic looking clouds. Perhaps the biggest obstacle for development was the divergent visions of the game's two creators. Overall, the game was not very well thought out, the name was inappropriate to the theme of the
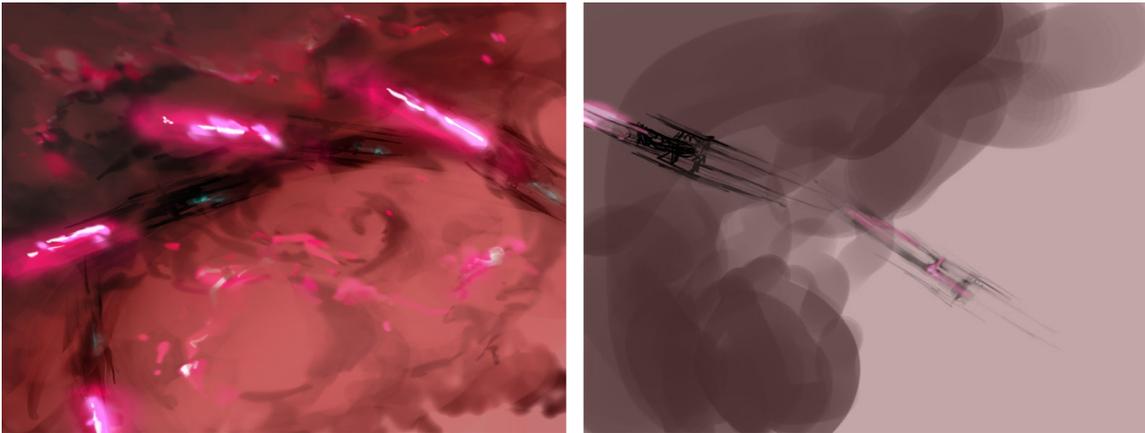
Fig. 8. Concept art for *Zion*. Enemies would be transparent while outside the clouds, but glow while inside the clouds.

game, and the plot had many holes in it. However, the overall light/dark theme and aesthetics inspired *Free the Birds* considerably.

The second predecessor to *Free the Birds* was a game design called *Paper Dragon*. The art of the game was inspired by collage-style graphics, and the mechanics were based on the scrolling space shooter genre (Fig. 9). The enemies in the original prototype were bugs that would fly around, and the player controlled a paper dragon which could shoot fireballs. If the player shot the bugs, they would turn into explosions that would harm anything they touched, but otherwise the bugs were harmless. If an explosion hit another bug, that bug would also explode, causing a chain reaction and giving the player combo points. The best strategy was to wait until a large number of bugs appeared on screen then try to create as big a chain reaction as possible. If the player waited until too many enemies were on screen, it was very difficult to escape the resulting explosion. The lesson of this version was that by harming others, one only harms oneself. However, it did not teach pacifism, but merely a balanced approach to violence, because to get a high score, the player had to shoot the bugs.
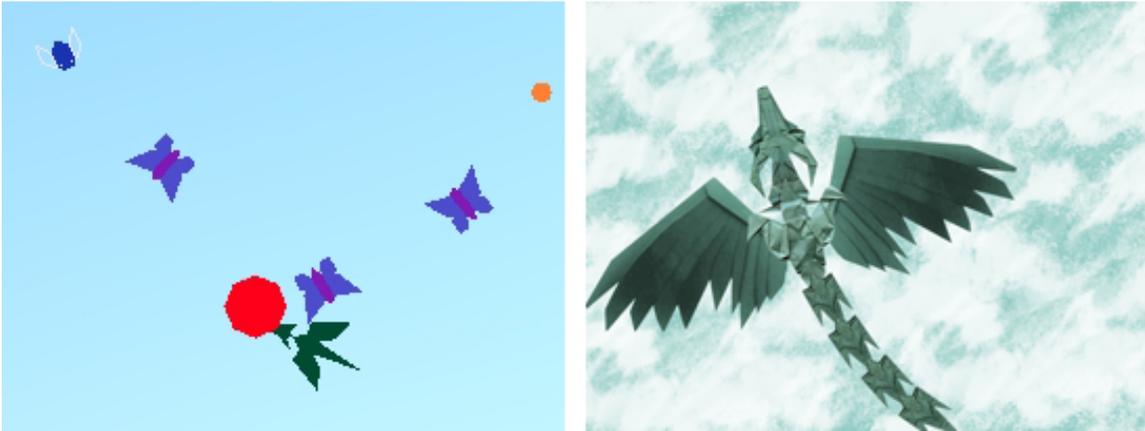
Fig. 9. Screenshot and concept art for the original *Paper Dragon* prototype.

Mary Saslow, a professor at A&M, asked the question "Why do you have to shoot the bugs?" and this question became a central theme in the project's future development. From the question arose a dichotomy: the temptation to do violence and be an awesome dragon versus the ability to be kind and treat others with compassion, rejecting the violent "dragon's solution" (Fig. 10). An epic story grew out of this gameplay dilemma, addressing temptations such as greed, selfishness, and anger, and values such as compassion, mercy, and self-sacrifice. Successive prototypes of the game were created using Game Maker 7 and 8. The challenge of making the creatures seem real or valuable in themselves (and not just as cannon fodder) led to increasingly complex AI and interaction methods. Eventually, trying to determine the sources and consequences for temptation made the design of *Paper Dragon* morally and philosophically unsolvable. In order to score the player, a game must judge the player's performance, and placing morality into the game's evaluation system meant that judging player intent became even more important than normal.[2] Even if it was

---

[2]For an action game, judging the player by what he intends to do and not just by

Fig. 10. Concept art illustrating temptation in *Paper Dragon*. Power-ups enable the player to harm other creatures.

possible to implement a system to judge player intent, it was also not clear whether the player's moral actions in the game should be judged by the game system, or whether the player should only be able to judge the morality of his actions himself. The game was no longer within the scope of a thesis project, and had to be condensed. The necessity for simplification led to the creation of *Free the Birds*, with the hope that a more focused design could help resolve some of the complexities in *Paper Dragon*.

C. First Design

The original design of the game was best summarized as "a space shooter game about saving small creatures from possession by evil darkness." The theme and visual style were originally extended from the *Zion* game, but subsequently grew in their own direction. A design document was developed in early March, 2010, to detail the various aspects of the game and lay the foundations for the design. These aspects

---

his actions is not a trivial task.

are presented here as they were originally designed. The game was tentatively titled *Luminescence.*

The player controlled an angel whose goal it was to save the creatures in the game from dark demons. The goal was to free all the creatures before a timer reached zero. The player was given two weapons: a laser beam and a ring of light. The ring would expand outwards from the player, banishing away darkness and freeing the creatures. Creatures that were encased in a robotic exterior would need to be first freed using the laser beam before they could be saved by the ring of light from possession. The laser beam could also be used to destroy the demons.

(a)	(b)	(c)	(d)
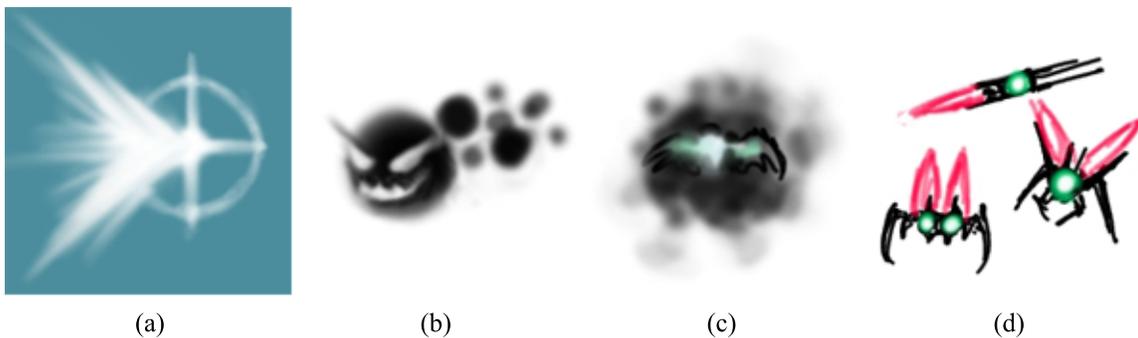
Fig. 11. Concept art of the characters in *Luminescence.* The main character is (a), (b) is a demon, (c) is a possessed creature, and (d) illustrates the techno-creatures.

The creatures were designed to look like small birds, bats, or bugs (something cute that flies). They metaphorically represented humans, while the player would take the role of an angel. The form of the creature was not intended to specify a particular function; the different types were just for variety. Laser light would kill only those that you had not yet freed, and the ring would free them from possession. Freed creatures would circle the player, emitting a glow which would dispel dark clouds. The player could also send them out in a direction to dispel dark clouds, and

after a certain time they would return.

The demons were essentially blobs of darkness with eyes and a mouth, with dark blobs of smoke trailing behind them (see Fig. 11 (b)). The rings of light would drive them away, but if they took hold of a creature for long enough, they would transform it into a techno-creature (similar to the enemies in *Zion* — see Fig. 11 (c) and (d)). Since they could be killed with the laser beam, more of them would need to be generated to present a constant threat. For this purpose, dark orbs would generate demons, and the player could only stop this process by destroying the orb with the laser beam.

The techno-creatures, based on the enemies in the *Zion* game, were mutated forms of the natural creatures, caused by prolonged contact with the demons. They were encased in a hard dark shell, and glowed red through the dark clouds. They would actively attack the player, and were unaffected by the rings of light. To free the creature inside, the player must destroy the outer shell with the laser beam then use the ring of light to banish the demon inside.

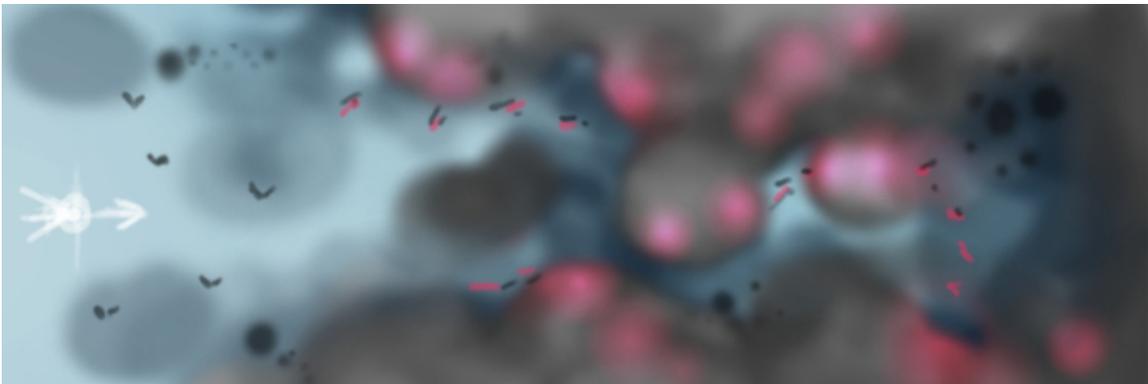Fig. 12. Original level concept art for *Luminescence*. The level goes from left to right, light to dark. Clouds and enemies increase in number as the player travels rightwards.

The levels were designed to allow players to roam freely, exploring and back-tracking as much as they want. Demons would be generated over time by the dark orbs, and there would be a set number of creatures to save. The game would start out light and open, making it easy for the player to see both the creatures and the demons. In later levels, dark clouds would increase the difficulty by reducing visibility (Fig. 12). To dispel the dark clouds, the player must either send out glowing creatures or shine the ring of light in the clouds. Levels would get darker as the player descended into the dark core, finally entering the demon stronghold and defeating the darkness forever.

D.   Design Process

The development process of *Free the Birds* used iterative design. This process resulted in visible progress that could be modified easily, based on feedback and changes to the design. Prototypes were created sequentially and brought to the committee, and a few close friends, to get feedback. Each new version would incorporate changes based on the review sessions, moving the design towards the finished product. As major changes were made to the game, each new version of it was saved as a separate file. This helped near the end of the development process, when being able to look at two different versions simultaneously helped to debug several errors. One error near the end of the development process required comparison of the latest version with an older working version in order to properly determine the cause of the error.

The versioning scheme also helped track progress of the game through its development. If two options needed to be tested, such as the early version with violent mechanics and the version with no violence, each of those options was saved as a separate "branch." This concept was borrowed from source control tools commonly

used in software development. Though no catastrophic data loss occurred during the development process, regular backups were stored in three separate places as a precaution.

E. Technical Specifications

The technology used to make the game needed to have several features. Controller support would be useful for a simple presentation of the mechanics. The game engine also needed to support alpha blending for the semitransparent clouds and additive blending for the lighting effects. Ideally, the game was to be developed for multiple platforms or operating systems. It would also need to be possible for one person to create within a few months.

A few platforms were considered for the project: XNA, Game Maker, Flash, Unity 3D, and C++. XNA would require more programming, though it supported everything required for the game. Using XNA would make it possible to port the game to Xbox, though it would not be simple to do so. It would otherwise only allow the creation of games for Windows. Game Maker would be easy to use since it was the technology used for both *Zion* and the later versions of *Paper Dragon*, and also because it is a drag and drop game design tool. This would make it easy to begin creating the game, but not as malleable as a pure programming environment. Game Maker is also for Windows only, but the new version, Game Maker 8, added support for alpha blending and additive blend modes required for creating transparent clouds. Another option would be to use Flash, which was cross-platform, and enabled programming using Actionscript 3. However, that would have required having to learn a new tool and add time to the process. Other possible options that were considered were Unity 3D and C++. Unity was dropped quickly on finding that it

did not do 2D design very well.C++ had been used for the original *Paper Dragon*, though the challenges with finding a library that supported PNG alpha blending and programming the game from scratch were too daunting to consider it a viable option for the purposes of the thesis.

Game Maker 8 was determined to be the development platform for the project because of the ease of entry and the fact that it supported the graphics needed for the game. This decision also prompted the exclusion of the requirement for a joystick or game controller. Mouse control can be even simpler than using a game controller, and mouse and keyboard controls are more accessible to a wider audience on the computer. In order to distribute the game, Game Maker had two options; publishing the game for play inside a browser using a plug-in, or creating an executable file which the user would download. It was determined that allowing the game to play in a browser would put it in the context of a lot of visual clutter such as window edges and toolbars, as well as limit the size of images that could be used. A downloaded file would allow the player to download it only once and play it as often as desired, allowing the game graphics and visual presentation to be of much higher quality, so it was decided to distribute the game on the web as an executable file.

Game Maker already includes many tools necessary for making games; it automatically handles sprites, objects, backgrounds, levels, and has variables for things such as image rotation, speed of motion, animation, and even built-in collision checking and response. For the purpose of this game, Game Maker provides the basic functions necessary to achieve the requirements of the original design.

The exact qualities that make Game Maker so useful for creating quick prototypes also make it inflexible when the requirements of the game design conflicted with Game Maker's preconstructed framework. Collisions are handled by Game Maker, so it is not possible to tweak the way they work to improve performance. The way Game

Maker handles layers for the background and foreground elements also means that no object can appear on top of a foreground element. These technical constraints meant that creative solutions had to be found to some of the challenges posed by the project. Creating a test level in the game allowed the technical boundaries of Game Maker to be tested without impacting the rest of the project. Basic stress tests to determine things like how many objects can be displayed on the screen at once or how many collision events cause the game to slow down, could be performed using the test level. Stress testing, though it happened fairly late in the process, helped determine what aspects of the game would need to be changed to reduce lag during gameplay.

F.   Chronological Changes

1.   Version 1

The first prototype created for the project started with the original design as detailed above, made in Game Maker in two or three days. This version contained birds that flew around the screen in random directions; the player could gather the birds by hitting them with a ring of light. This would cause them to glow and follow the player. The demons designed for this version moved towards the closest bird, unless the player was closer, in which case the demons would flee. If a demon caught up to a bird, that bird would lose its glow and leave the flock, and the demon would continue hovering around it. This initial version employed simple graphics as a means to focus work and feedback attention on the core mechanics.

Two variants of this version were made, one in which the player could only scare the demons away, and another (as per the original design) in which the player could shoot and destroy them with a laser (see Fig. 13). Based on early feedback, the

variant of the game in which the player could not harm anything made gameplay more interesting because the demons remained in the level, providing a challenge to the player even after he or she had collected all the birds. The variant in which one could

Fig. 13. Screenshots from *Luminescence* Version 1. These demonstrate the player's beam and ring of light.

harm creatures caused some frustration, since it was easy to unintentionally kill birds while trying to save them from the demons. The laser mechanic seemed to contradict the premise of the design, so the non-violent variant became the basis for subsequent versions. This omission also simplified the mechanics a great deal and made the technologically enhanced creatures irrelevant. It also enabled the designer to place more emphasis on the interactions between angel, bird, and demon in greater detail. The prototype's win condition was implemented by adding a timer and explained through the inclusion of an instruction page at the beginning of the game. This version was then shown to the committee members for feedback.

The first round of reviews revealed problems with visual cues, challenge level, and consistency across different computers. First of all, it was hard to tell where the birds were that the demons were hovering over. There needed to be some way of telling that

there was a bird there and that a demon was attacking. The demons were also hard to identify because of their nebulous shape and high speed of movement. Reducing the speed of the demons made the game much less challenging, which inspired a method of later varying the challenge level for the sake of progression. There were some semantic issues with the instructions; finding a word to describe the action the player could perform to both scare away the demons and save the birds proved to be a challenge. The text for the user interface showed up differently on a couple of different computers also, which made clear the need for testing on multiple systems, an issue that would resurface later when optimizing frame rate.

One major design problem was that the demons seemed to be no different mechanically from the angel: both were trying to gather birds for themselves, and because the demons did not harm either the player or the birds, it was not clear from what exactly the player was saving the birds. In this state, the game was clearly provocative, but fell short of its goal; Christianity is not dualism. The committee members also all agreed that it needed more complexity. One suggestion was to make the player able to only capture the birds coming towards him, giving the birds some metaphorical free will to choose between good and evil; each one starting with an affinity for the darkness or the light. Another suggestion was to make the birds approach the player only if he was still, illustrating the concept that stillness brings one closer to God, and making the player an exemplar for the birds. However, the designer felt that this would undermine the beauty of the motion inherent in the genre and the metaphor of constant motion equating with spiritual progress. One other concern was that the light and dark metaphor would be misinterpreted as a racial statement. This led to the design decision to make the birds different colors since they metaphorically represent humans. This idea fit well with the idea of self-actualization and freedom, since the colors could represent the birds' "true selves." The birds would get brighter

and more vibrant when they were rescued, and conversely would become grey and dull when influenced by the demons. This would be one way to show that they were harmed by the demons.

2.   Version 2

In the second version, graphics for the birds and demons were improved, so that the player could see and interpret their interaction (Fig. 14). The code objects in the game were rewritten to accomodate future expansion; scripts were created to generate birds and demons automatically, and a user interface object was created for controlling things such as the timer and score. As determined from feedback on the previous version, birds were made different colors; they started off a dull shade of a random hue, which would become brighter and more saturated when they were "enlightened" and darker and duller again when the demons attacked them.
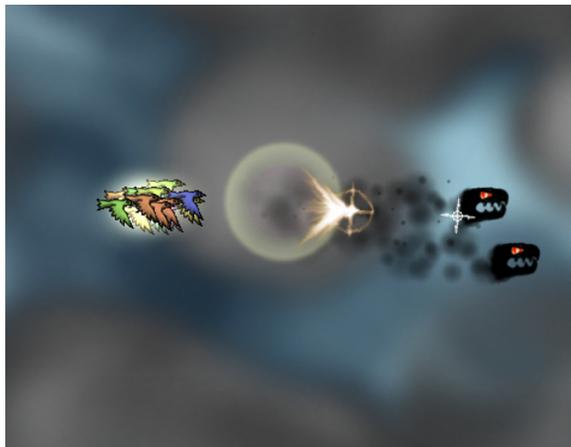
Fig. 14. Screenshot from Version 2. Graphics of the demons, birds, and light ring have been improved. Birds display a multi-frame animation and different colors determined in code.

Upon review, most of the committee said the colors made the game more vi-

brant and interesting, though the birds needed more diverse behaviors as previously discussed. The threat imposed by the demons was still unclear even though they now effected a visible change in the birds. Despite the graphical improvements to the birds and demons, Karen Hillier pointed out that the graphics were inferior to previous work created for *Paper Dragon*, and encouraged the incorporation of the *Paper Dragon*-style graphics into *Luminescence*.

3. Version 3
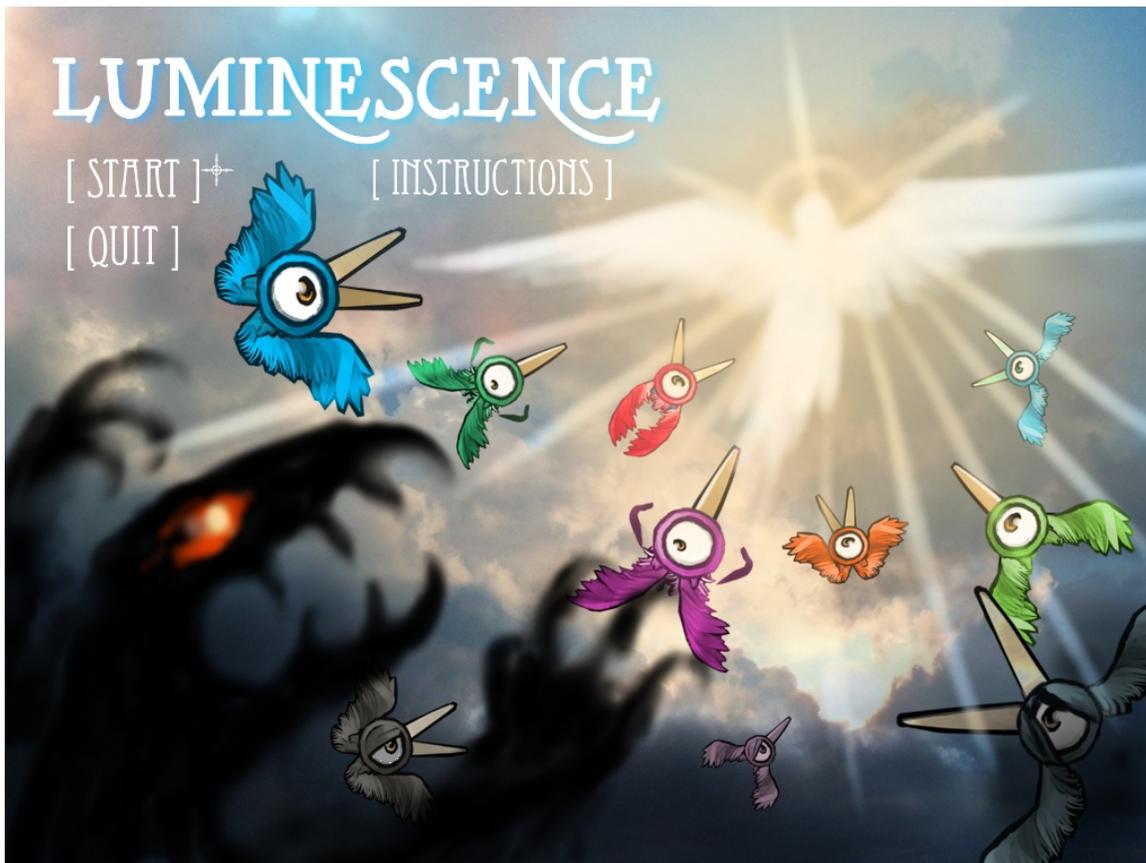
Fig. 15. Version 3 title screen. This art was developed in order to define the direction for the rest of the game art. It features the cute, iconic scissorbirds originally developed for *Paper Dragon*.

This version included many graphical and mechanical updates. The birds were replaced with the original "scissorbirds" from *Paper Dragon*, implemented in three parts: the bird head, the wings (which could animate separately), and the glow object. A painting made for the opening screen solidified the vision for the game, and provided direction for the art (Fig. 15). Once this was in place, an instructions screen was added, and work began on the levels themselves. The first level used the sky background created for *Paper Dragon*, and further levels were developed based on the photomontage style and the intended level progression from light to dark. Four

Fig. 16. Screenshots from Version 3 showing level progression.

levels were fleshed out: The Open Sky, Cloudhaven, The Storm, and The Dark Core (see Fig. 16). Dark clouds were added in the Storm and Dark Core levels that could be dispelled by the light, and the speed of the demons was increased in later levels. The four types of birds based on the Parable of the Sower were introduced to the game at this point. This is explained in more detail in the Final Product section.

The different reactions of people represented by the parable were translated into game terms and used as a basis for the bird behaviors. To allow the player time to learn how to interact with each different type of bird, they were introduced one by one throughout the levels. Music and sound were also added to the game, and the four levels were finished up with a credits screen and high score table at the end. The game was ready for the next round of reviews.

First, some friends who had helped with the project previously were asked to play the game and review it. They were very impressed by the graphics and the feel of the game, but also revealed some problems with the game. No one could really figure out how to interact with the "Stubborn Birds," and there was some confusion over what effects the demons had on them. Otherwise, the level progression worked well, and the message seemed consistent with the mechanics. The one problem remaining from previous versions was that the demons still seemed to pose no threat to the birds or to the player, since they did no actual harm. A few other practical problems, such as the interface being hidden at times by the clouds and some lag on the last level meant the game needed another round of refinement before showing it to the committee.

4.   Version 4

In order to make clear the difference between demons and angels, this new version enabled demons to damage the birds they come into contact with (Fig. 17). In the

Fig. 17. Screenshot from Version 4 showing demon damage. The blackened pieces of killed birds remain in the level, instead of disappearing as dead creatures in games usually do.

first iteration of this addition, demons could damage birds all the time, no matter

where they were. Because the levels were so large and birds were not generated as the player moved through, this meant that it was literally impossible to save all the birds. This mechanic posed a dilemma. On one hand, it expressed the inevitability that some people will (and have) died without ever hearing about the Christian God and the Gospel.[3] However, a prevalent belief in Christianity is that God will give everyone a chance to be saved. The inability of the angel to reach the birds in time before they were destroyed did not seem to match the principle that God desires and enables all to be saved if they are willing. If birds wished to turn away, they could, but they should at least be given a chance. It was also very discouraging to play the game with no hope of getting a perfect score. Thus it was decided that the demons would only damage birds while they were on the screen which would give the player a chance to interact with them all.

The ability of demons to damage birds added new meaning to the game; now it was clear that if the player did not help the birds, they would die. In response, some players chose to chase after them frantically and leave the flock behind, making it obvious that a balanced approach was the optimal strategy. One of the remaining problems was that at times the clouds would hide the user interface, due to the constraints of foreground layering in Game Maker. The two most obvious ways to fix this would be to either reduce the amount of foreground clouds or to make them more transparent; both of these solutions were implemented in the final product. Other problems included the player sometimes accidentally clicking past the score screens, a few sound issues, and the game crashing while loading on a few older computers. However, the main problem discovered in this version was that people who sat down to play the game for the first time almost invariably asked "so what am I supposed

---

[3]This dilemma in apologetics is known as the problem of the "noble savage."

to do?" and wandered around aimlessly through the first level, not knowing how to interact with the birds. Clearly the game needed instructions. Close attention would have to be paid to how the player's task was presented, but players at least needed some basic context in order to make sense of the game world. Finally, the title *Luminescence* was deemed too obscure, so the title was changed to *Free the Birds* in order to clarify the game's goal.

G.   Final Product

In the final version, the player is able to move around using the mouse and to create rings of light that expand outward from the angel. The angel's motion and the mouse are linked; the mouse cursor is a crosshair on screen which the angel moves towards. It would have been possible to play this game using only the mouse, except that controls switch to keyboard for the intermediate score screens after each level to keep players from clicking through them unintentionally. Functionality for pause and quit are included in the game and detailed on a controls screen that is accessible from the main menu. A simple UI and clear goals make the game more immersive because the player has to worry less about dissonant details. The angel emits subtle glow particles that both heal birds and disperse dark clouds.

The small creatures in the game are the scissorbirds, which metaphorically represent humans. These creatures and their sounds are taken directly from prior development on *Paper Dragon*. They use the inheritance model that Game Maker provides: a single bird object formed the basis for all four types, which reduced the repetition of code. Each bird consists of a head which controls its behavior, wings which flap behind it and express the color, and a glow object which is either visible or invisible depending on whether or not it has been "freed." The glow object contained behav-

iors such as the effects of contact with the demons and the rings of light, the motions in general, health, and color, onto which new behaviors were added for each type. The four types of birds, inspired by the Parable of the Sower,[4] are:

"Scaredy Birds" – these get scared and run away quickly whenever demons attack. In the terms of the parable, they are the seeds sown on stony ground. They represent people with a shallow faith who flee as soon as trouble strikes.

"Lazy Birds" – these get bored and leave the flock if you get too far away. The parable calls these the seeds sown among thorns. They represent people whose attention gets distracted by the cares and worries of the world.

"Stubborn Birds" – these have an affinity for the demons, and react at first to the rings of light by backing up suspiciously. These are the people the parable represents as seed that falls by the wayside and quickly gets snatched up by crows. As a concession to the style of gameplay and a modification of the parable's approach, these birds can be saved too. They will start moving towards the player if they are in contact with the light trail particles for long enough, following the player's example, at which point they will react positively to the rings of light and join the flock. These represent the people who do not accept the words of salvation, but in this case they will instead be receptive to a good example. This group was expanded upon from the simple portrayal in the parable in order to express the belief that everyone is given a chance, even multiple chances, to be freed from deception.

"Saintly Birds" – these chase away demons from the flock and cannot be hurt by the demons. Some of them generate light trails which will help the "stubborn

---

[4]Matthew 13:3-8, 18-23

birds." These are the seeds that fall on fertile ground in the parable. They represent people who accept the message and live by it, leading others to the light by their own example.

The types from the parable have been adapted in order to integrate them into the game context. In games, the player learns by doing things, so the player needs multiple chances to interact with the birds. It is possible to save all of the birds if the player can prevent the demons from destroying them.

The demons are represented by dark shadowy dragon-like heads that move towards the nearest bird, unless the player is closer, in which case, the demons run away. If they come into contact with the rings of light, they change their appearance to a "scared" sprite and run away for a short amount of time without chasing birds or damaging them. The demons also leave a smoky trail in their wake. While the demons are in contact with birds, they become invisible, allowing the player to clearly see the bird with only the smoke particles trailing behind it to indicate the presence of the demon. While a demon is affecting a bird, it does not control it, it merely lets the bird continue to act freely while it causes harm. The fact that the demons themselves are invisible except for their smoke trails serves a dual purpose. Primarily, it makes the birds easier to identify. The less obvious but equally important reason is that it represents the subtle nature of the demon's influence, and that the bird which is affected cannot see its own plight. The demons are only able to damage birds while they are on the screen, which gives the player a chance to save the birds before they die.

The game's premise is explained by a single screen of text shown to the player before the game begins. This screen was shown to the player automatically because most players skipped the instructions button and then expressed confusion about the

Fig. 18. *Free the Birds* instructions screen.

game's goal. This screen uses poetic language to give players an idea of their task (Fig. 18). The text hints at the characteristics of each of the different types of birds. The controls are simple enough for players to discover on their own, so they were separated into an optional screen in the main menu.

The story is presented over the course of 4 levels through aesthetic tone and character interactions, becoming not only darker, but more difficult as the player progresses. The increase in difficulty is created by a combination of more complex bird behaviors, faster and more numerous demons, and darker clouds that decrease visibility. Bird types are introduced successively (see Table I); the easiest to deal with are the "Scaredy Birds" and the "Lazy Birds," which are easy to add to the flock, but require protection and attention in order to keep safe. These are found in the first and second levels. The last two bird types, the "Stubborn Birds" and the

Table I. Bird - level distribution.

Bird Types	Scaredy	Bored	Stubborn	Saintly
Level 1	20	10	0	0
Level 2	10	17	3	0
Level 3	5	10	12	3
Level 4	5	5	15	5

"Saintly Birds," are introduced minimally in the second level and play a larger role in the third and final levels. Because the "Stubborn Birds" will actively seek out the demons, "Saintly Birds" are almost indispensable in helping to free them, especially in the chaotic and shadowy confines of the final level.

Between each level, the score is shown on a screen that also gives a taste aesthetically of what the next level will be, making the progression less abrupt. The final credits screen shows the total score and concludes the story by showing all the birds the player freed flying up to the skies above.

The color scheme in the final game focuses heavily on dramatic light and dark in both the backgrounds and the creatures, with inspiration drawn from the chiaroscuro painting style. The photographic backgrounds include high detail and impart some realism to the otherwise symbolic game graphics. Large backgrounds increase the game's file size, but grand vistas and vast areas to explore are essential to creating the sublime experience. Birds, demons, and angel are all symbolic in appearance; the demons are no more than chomping dragon heads, the angel is not much more than a triangle shape, and the birds are viewed from a strange hieroglyphic-like angle in which both wings can be seen but only one eye. The angel is roughly arrow-shaped so the player can tell the direction it is facing. The demons are viewed from side-on

also to make it clear which direction they are moving as well.

The music for the game was created by Devon Motola, and most of it was initially developed for *Paper Dragon*. Throughout the game, the songs provide an atmospheric tune with a quick tempo in order to set a contemplative mood yet encourage tireless action. Each piece gets progressively more dissonant until the end of the game where it resolves into the same music as the title screen. Bird sounds were also reused from *Paper Dragon* with a few minor changes. These sounds were originally created by altering voice recordings in Audacity.

CHAPTER V

EVALUATION

A formal evaluation is out of the scope of this thesis, but a subjective self-evaluation will be used to determine if the game has achieved the goals set forth at the beginning.

A.   With Respect to Goals

1.   Christian Game

The game was intended to incorporate Christian themes into every aspect of the design: artistically, mechanically, technically, and narratively. The main aesthetic feature of *Free the Birds* is the use of light and dark as a metaphor for spiritual enlightenment. Inspiration for the light and dark theme was drawn not only from the Biblical metaphors, but from *Ikaruga* and the unfinished game *Zion*. In *Ikaruga*, light and dark are just two sides of the same coin; other than their color, they do the same thing. In *Free the Birds*, the demons and angel not only act differently, but they look different. The angel looks like a stylized arrow, as if to point out the right way, and the demons look like chomping dragon heads, to show that they only want to consume and destroy. One of the reasons to make them look different is that the player's character, as an angel, has the spiritual perspective and discernment to tell where the harmful demons are, whereas the birds do not. Unlike the demons and angel, the birds all look the same except for their color. Since they represent humans, this expresses the equality of people, but through their different reactions they express the idea that each of us must choose between good and evil. The unknown information for the angel, then, is how the birds will react to the light, reinforcing the idea that

the birds have some kind of free will. This visual equality encourages the player to try interacting with all of them, rather than to immediately dismiss one kind based on appearance, following the Christian principle of avoiding favoritism[1], and following the method used by the sower in the parable.

In the final result, it is clear that the demons are different in mechanics from the player (an angel); they can destroy birds, whereas the angel cannot destroy anything. The Christian premise is that the light imparts freedom, but the darkness captures and destroys. In the game, freedom is demonstrated by the ability of both the "Saintly Birds" and the "Lazy Birds" to leave the flock at will, and the "Stubborn Birds" to refuse it entirely (or at least make the player work to persuade them).

Originally, when the demons did no damage to the birds, it seemed like the angel and the demons were doing the same thing, but according to the Bible, demons use violence and force, whereas angels guide and protect. When the game was changed so that the demons would eventually destroy the birds, the threat they posed became apparent and differentiated light from dark not only in form but in action. Enabling the demons to kill the birds despite the player's inability to harm anything created an immediate and persistent threat that made the game challenging and urged players to free birds quickly from the demons' influence. The fundamental difference between the violence of the demons and the non-violent approach required of the player expressed the principle of doing good to one's friends and enemies alike; the player uses the same action to scare away the demons as he does to save the birds. In total, these differences in the mechanics between the angel and the demons expressed the need to save the birds and fulfilled several of the original Christian principles in the design.

---

[1]This principle is found in several places throughout scripture. As an example, in Acts 10, St. Peter says "I now realize how true it is that God does not show favoritism but accepts from every nation the one who fears him and does what is right." (NIV)

The simplified bird AI in *Free the Birds* represents human reactions to the spiritual message, with classifications based on the Parable of the Sower. However, they are modified from the original parable to fit into the game and encourage procedural learning. From the developer's perspective, a repeated interaction instead of a one-time event seems to be a more complete expression of the human condition. In games, the best way to teach a player a skill is by letting him try until he succeeds, and since the angel cannot die, another method needs to be employed for giving the player multiple chances. Mechanically, the game makes it possible to save every bird by preventing off-screen damage, echoing the idea that God desires the salvation of all. Thus, in the game, it is possible to free all the birds, and not just the ones that are easy to win over, encouraging the player to be patient and persistent.

However, only the perfectionists will try to free every bird. Much more frequently, when players encounter the "Stubborn Birds," they will turn away and ignore them to seek the birds that are easier to win over. From the perspective of teaching the player about God, this is not a very good message, since God will continually seek the lost, as illustrated in the Parable of the Lost Sheep:

> "Suppose one of you has a hundred sheep and loses one of them. Doesn't he leave the ninety-nine in the open country and go after the lost sheep until he finds it? And when he finds it, he joyfully puts it on his shoulders and goes home. Then he calls his friends and neighbors together and says, 'Rejoice with me; I have found my lost sheep.' I tell you that in the same way there will be more rejoicing in heaven over one sinner who repents than over ninety-nine righteous persons who do not need to repent." (Luke 15:4–7 NIV)

Instead of giving the player an insight about God, this game mechanic is intended to represent human evangelism, where sometimes the only way to help someone is by being an example rather than preaching. Then again, it does give some insight about God, because the player who desires perfection will attempt to free every bird, even those that are stubborn.

Free the Birds also conveys a few appropriate, though unintentional, spiritual messages. Because it is difficult to see anything in the last level, the "Saintly Birds" are indispensible for helping free the "Stubborn Birds." Having both of these bird types appear so late in the game seems to say that by that time the battle has intensified, and perhaps that only in difficult times do people show their true colors. One of the ideas brought up by the game was the observation that as the darkness increases it becomes easier to see where the light is. This echoes the spiritual theme that persecution tests and strengthens faith (a concept found throughout the Bible) and makes us more aware of our spiritual condition. The necessity of relying on the "Saintly Birds" to help chase away demons speaks of the need to trust others for help, a great relief in the last dark level.

Many people ask why God allows evil to happen, and though *Free the Birds* does not address this issue, the development process hints at it. In the game, since demons cannot be destroyed, they will keep returning, so the flock must be protected. Why can the player not just destroy demons and prevent evil from happening? That question is answered most directly by the original prototype version of the game in which it was nearly impossible to destroy the demons without accidentally destroying some of the birds, reflecting the message of the Parable of the Weeds (as outlined in the Main Goals section of Chapter IV). Because the player can no longer damage anything in the final version of the game, this particular lesson was removed from the game, focusing the player's efforts on doing good to all.

In *Free the Birds*, the player takes on a heroic role, not a humble one. This was done to appeal to many game players who expect to play as a hero. The game attempts to show things from the perspective of an angel, so as to encourage the player to do good. Because of this, the perspective is such that oneself is seen as good and others are seen as evil. Perhaps that's a flaw in the game design, because

the idea exists in Christianity that the closer we come to perfection, the more we perceive the sinfulness of ourselves and the righteousness of others; humility is the key. The current game design does not encourage humility, but this is an inevitable result of choosing an angel as the main character.

2. Emotionally Moving, Introspective Experience

One of the main ideas for *Free the Birds* was that aesthetics based on the American Sublime movement would create an emotionally compelling experience. The light and dark theme made the visuals of the game dramatic, emulating the chiaroscuro style that brought so much drama to Renaissance painting. While the style of *Free the Birds* departed from the American Sublime in its use of photographs, its separation from the idea of Manifest Destiny, and its use of no particular American landmarks, it retained many of the qualities of the art movement. The viewer immersion which was created by the grand scale of the paintings of the art movement was implemented in the game by allowing the player to move the angel throughout the level. Having a scrolling background adds to the feeling of mystery, since one cannot see the full level at once. Actual photos of clouds gave the game a lot more realism than anything that could be painted in as short a time. Not as much digital painting was used as in games such as *Aquaria* or *Braid*, but digital photomanipulation techniques helped blend the backgrounds together and add some character to the birds. The dramatic lighting effects, swirling clouds, photographic backgrounds, and vast levels all added to the feeling of awe and the beauty of the motion. The game successfully combines the styles of the American Sublime, digital painting, and chiaroscuro to create dramatic visuals.

However, the use of the American Sublime art style was not the main contributor to the emotional impact of the game. The fact that the player must so frantically

chase after the birds meant that he or she was almost always too distracted to notice the backgrounds, there was no moment to wait and simply observe. The player's required actions actually detract from the feeling of sublimity, and when focused entirely on winning, the backgrounds become just "window dressing." This observation may prove the theory of Rui Craveirinha and Dr. Licínio Roque that the 'ludus' element (the challenge of the game) detracts from games' abilities to express deeper emotions [9]. The use of the American Sublime art style was not as effective as originally intended. It was noted, however, that even though the person playing the game did not have time to pay attention to the graphics, the beautiful game world made watching the game an enjoyable experience for spectators. This itself may make it a game that encourages friendship. Also, parents may be more likely to watch a game like this when their children play it, offering hints or encouragement. Perhaps it is more of a sublime experience for spectators than for the players themselves.

There were hints, though, that the main emotional influences lie in the game mechanics themselves. The most saddening things in the game were the blackened, spinning pieces of destroyed birds after the demons had gotten to them. The appearance of the birds created an emotional appeal that affected this reaction: many players thought the birds were cute and wanted to play the game just because they liked the birds. We do not normally see people's souls as cute little things with googly eyes, so their appearance expresses the angel's perspective of the value of every person's soul. Frequently players expressed sadness at seeing the floating remains of the birds — nothing could be done to save them, they represented people lost to sin. If one could feel so much alarm for the loss of a bird, how much more so for the loss of a human soul? Christ says, after all, "you are worth more than many sparrows." (Matthew 10:31 NIV) The blackened husks were left in the game precisely to create this emotional effect; the authors of *Philosophy Through Video Games* note

that games may be more ethically effective if the human cost of the player's actions is made manifest [15]. Though the attempts to create sublime visuals may not have been as effective as previously hoped, the fact that the mechanics of the game could cause players to feel sadness hints at the potential emotional impact of game mechanics in general. Players felt other emotions than sadness while playing the game, some expressed surprise, joy, curiosity, frustration, and excitement. In order to fully understand the emotional impact of the game, a formal study would have to be conducted, but that is out of the scope of this thesis.

Throughout *Free the Birds*, the music provides another method of enhancing emotional impact. The music starts upbeat but gradually progresses to a more somber tone as the dark clouds coalesce. By the end of the game, the player is intended to feel only a small glimmer of hope amidst a seemingly hopeless situation, but the last level's theme resolves into more major key tonality in the ending screens as the dark clouds float away. The music echoes the graphics and the level progression from start to finish.

Each player has a slightly different approach to the gameplay. Some players go out and try to save as many birds as they can as quickly as possible, but end up leaving the flock behind. Other players are timid and almost afraid to go near the demons, thus not freeing many birds. One interesting benefit of allowing players such freedom in action and interpretation means that the game might give each player a different lesson from each play session. Players may learn through subsequent play sessions to apply these lessons not only to the gameplay but to their own lives. Would timid players be encouraged if they knew they could not be harmed by the demons, becoming bolder in their real-life struggles? Would outgoing players be reminded to take care of their responsibilities by having to protect the birds they had freed? These different play styles may say something about each player, giving players the

opportunity for introspective thought in struggling with how to approach the game.

Gameplay in *Free the Birds* appeals heavily to intuition. The fact that choices are presented in a continuous rather than discrete fashion requires the player to act more on feelings than on any conscious decision. We do not often have time to think about the right thing to do, but we make moral and ethical choices each day through our actions and words [3]. The hope was that a real-time game would draw more attention to these real-life fast decisions and enable players to consider everyday actions more closely.

3. Non-violent, Altruistic Game

Free the Birds reinterprets a classic game genre, the scrolling shooter or "shmup." In many ways the *Free the Birds* remains similar to its source genre; the player moves in two dimensions around the screen following the mouse, the method of interaction revolves around actions not dialog, and the creatures move freely in two dimensions reacting to the player's actions. *Free the Birds* utilizes the free-roaming mouse-controlled motion style of *Aquaria* and *flOw* while incorporating the projectile-based interactions of a typical scrolling shooter. The main innovation mechanically is the use of a radially expanding "shot" in the form of the light ring that does not cause damage to other creatures. The game provides the player with only a non-violent method to resolve the conflict, and while this may be frustrating to some players, it retains the challenge necessary for an interesting game while expressing the values stated in the original principles. Unlike *Aquaria*, *Free the Birds* focuses less on exploration and more on character interactions, more true to the movement and level style of *flOw* or a typical shmup such as *Ikaruga*. This removes a little bit of the sublime element of *Aquaria*'s vast world, but creating such a large world was out of the scope of the game to begin with. While *Free the Birds* departs from a typical

scrolling shooter in several key ways, it retains enough similarity to be classified in that genre.

Despite the similarities to a "shmup," *Free the Birds* is a different kind of game altogether. Instead of shooting and destroying things without even thinking about it (as in most space shooter games), the player is emotionally affected by the birds' destruction even if he did not cause it. The actions of the demons and angel can almost be seen as a role reversal; the demons act as a player in a normal "shmup" might, destroying everything in sight. This is an intentional parallel, drawing attention to the different approach the player needs to take. The fact that the player cannot die draws attention away from the challenge of survival that is present in most games, redirecting the player's attention to saving the birds. However, since the player's invincibility may not be obvious to experienced gamers who are used to having health and enemies in a game, perhaps something needs to be done to make the differences between *Free the Birds* and a typical "shmup" more obvious.

4.   Accessible, Appealing, Easy to Play

Even if the style of game is not familiar, players of any type and background should still be able to pick it up with relative ease. Even non-players can pick up the basic workings of the game easily, as demonstrated by the fact that the designer's mom (a complete non-gamer) played the game about as well as anyone else. Instructions and a controls screen were included to give the player some direction, but most of the time, despite initially asking "what should I do?", most players were able to figure it out. The sounds of the birds contributed to the playability, alerting the player when a bird has incurred damage or reacted to the player.

Difficulty in the game is sloped so that at the beginning it is easier to see what is happening and respond to it. In Level 1, there are only "Scaredy Birds" and "Lazy

Birds" to deal with, both of which wander off if the player is not watching after them, becoming prey to the demons again. The fact that birds lose their way if the player gets too far away provides an incentive for players to learn patience and to watch after those they have rescued. Later in the game, certain birds have an affinity for the light or darkness that manifests in their initial direction of motion and their reaction to the player's light. The introduction of the more difficult interactions was supposed to be gradual, but because of the limited amount of time in each level, the new mechanics confused most first-time players.

None of the observed players understood how the "Stubborn Birds" worked. It seemed counter-intuitive and needed explaining every time a new person played the game, even if he or she was an experienced gamer. Even if players guessed the correct strategy after playing the game, there was so much else going on in each level that it was difficult to figure out how to implement it while playing. It was not determined whether the instructions screen aided the player in figuring out the nuances of this interaction, but that would be a subject of future study. Though the basic mechanics of the game were easy to grasp, the inscrutability of the behavior of the "Stubborn Birds" is one example in which things that seem clear in the designer's mind are not successfully communicated to the player.

Several people complained about not being able to learn how to play the game quickly enough. The time limit for each level made it so players were forced to act even when they did not know what to do yet. This made it so that to master the game, one must play it repeatedly. Because the game only has one difficulty setting, it may start off as too hard for beginners while being too easy for expert players. Most people found the game to be very hard; even expert players (including the designer) found it impossible to get a completely perfect score. People tended to want to quit at the end of the third level. Ideally, the game difficulty should increase gradually, so

the game may need to be tweaked in regard to the learning curve.

Though the art in *Free the Birds* is detailed and dramatic, the color scheme and motion in the game could use some refinement in order to be more appealing. Despite the fact that the multicolored birds add some flair to the game, the brightly-colored user interface elements and color scheme of the game seem at times unrealistically colorful. The flock of birds following the angel ends up looking like a glowing mass of eyes and wings, and while this evokes the strange Biblical image of the cherubim, it doesn't seem as graceful as it would if the birds used an actual flocking algorithm. The demons also end up clumping together, and it is also hard to determine how many are in one spot. In order to improve this, a more efficient collision checking algorithm would be needed, because Game Maker's built-in process causes the game to slow down drastically if too many objects are colliding.

The motion of creatures in the game is not as graceful as those in *flOw* or *Aquaria*. In *Paper Dragon*, the motion of the main character was designed to be graceful, but in *Free the Birds*, this was trimmed down to merely be something practical and easy to create and control from a design standpoint. Adding complex motion would have further increased the complexity of the game design and code, and that was one of the main obstacles in the design of *Paper Dragon*. Though the multicolored birds and their motion detract somewhat from the overall grace of the game, the spinning clouds and atmospheric effects help bring everything together with neutral tones. Overall, though, the aesthetics of the game could be improved by more graceful bird motion and more coordinated colors.

User accessibility was another goal. Originally the game was meant to be cross-platform so that Mac and maybe Linux users could play it just as well as Windows users. However, Game Maker, the chosen development platform, does not support either Mac or Linux, so the game was created for Windows only. At the time of

this writing, according to W3Schools, almost 90% of all computers use a Windows operating system, [27] so this was not a real problem.

Sound is also an integral part of the gameplay. This may make it hard for people without good speakers or hearing to play it. Not only does music contribute to the feel of the game and the emotional progression, but sound effects notify the player when birds react in different ways. This is especially useful in the third and final levels where visibility is reduced dramatically. It may be difficult, though not impossible, for people to play the game without sound, and the lack of music would certainly detract from the feel of the game.

B. With Respect to the Process

A couple of major technical setbacks were encountered during the process due to a lack of planning and testing in these areas.

The limitations of Game Maker caused problems; both the large background size and large number of objects on screen caused performance issues. At first it was assumed that any size of background could be used without trouble, since it worked perfectly on the developer's high-end computer. When the game was tested on systems with older graphics cards, the game crashed because a couple of backgrounds were too large. The maximum image size to get the game working on the older system was determined to be 2048 x 2048 pixels. The specifications in the Game Maker help file say that to get full support for old systems, no graphic beyond 1024 x 1024 should be included, but to make images that small would remove some of the interesting detail in the level, so 2048 was kept as the largest background dimension since that worked on even the older systems. Though originally the design failed to take into account system requirements, the game was quickly and effectively modified

to accomodate them.

Another problem arose in the third and fourth levels of the game; the screen would lag if too many of the dark rotating clouds appeared on screen. This resulted from too great a number of collision calculations occurring at once. In order to optimize this, the number of clouds was reduced and their size was increased, reducing the number of objects on screen. Collisions between the clouds and the glow particles were removed altogether, drastically improving performance. Other lag was caused by the collisions between birds and the glow particles once they were all grouped together, but this was not a large problem, as far as the goals of the game are concerned. Because of Game Maker's modular approach to objects and events, allowing for quick reworking of game mechanics, most of these problems did not take a very long time to correct. In all, despite the time spent to fix these problems, the game currently performs according to the standards set forth in the original goals.

CHAPTER VI

CONCLUSION

A.   Future Work

1.   User Studies

Unfortunately, conducting an in-depth user study was out of the scope of the thesis, though that would be an immediate future goal. Ideally, the study would get participants from a variety of backgrounds and ages, to see how they react differently to the game, especially people from different cultural backgrounds and religious groups. For this purpose, monitored play sessions and follow-up interviews would be the best method of gathering information. A few essential questions to answer with the study are:

1. Does the game encourage introspection or deeper thought about its meaning? How is this achieved?

2. Do participants want to play it again? Do they want to share it with friends? This speaks of the appeal of the game.

3. What do players learn from the game? Are they able to figure out how to deal with the different types of birds?

4. What are players' interpretations of the meaning of the story? How does this fit in with their religious views? What are players' attitudes towards the story?

5. Does the player have any questions about the game? Or are there rhetorical questions raised by the game experience? An open-ended question may allow

participants to express their thoughts more freely.

6. What, if anything, is unexpected about the game? Surprise is one of the main elements of fun [14], but it can also be frustrating. The answer to this question could help the researcher understand what differences lie between the worldview of the game and that of the player.

7. What was the main challenge of the game? Answers to this question may tell how players interpret the game and its central theme, and what lesson they learn from it.

2.   Future Versions

In order to take into account some of the feedback and evaluation of *Free the Birds*, new versions could be created to explore a wide range of possibilities.

New versions could address the learning curve and unintuitive mechanics that players had trouble with in this version. Possible solutions include adding a slower first level with fewer birds so that players can become accustomed to it, enabling the player to retry levels, using a tutorial to guide the player through interactions with each type of bird, or removing the timer so that players will not be so pressured by it. Most of these options would fundamentally alter the game design, and several iterations would need to be made in order to test them. Additionally, the types of birds and their reactions may be able to be refined and explored to the fullest of their potential, possibly illustrating some spiritual lessons point-by-point. Explicit instructions or a tutorial, while allowing players to grasp the game mechanics more easily, might detract from the mysterious introspective qualities of it. At this point it is unclear which of these strategies would make the game more effective, so it would require further testing.

Other versions could be made to address other Christian themes. The game does not portray the spiritual situation from a human's perspective, since the birds which represent humans are non-player characters. The game could encourage humility by showing that as the player becomes more and more righteous, he perceives himself as more and more evil because he notices more and more flaws in himself and not others. This would require a different approach to the symbolism, and would be a completely different game entirely, but it would be an interesting theme to expound upon.

Ideally, a shorter time between when a feature is finished and when it is tested would allow for quicker development of the project. For this, it would also be better to include a greater variety of people in the testing process, and test on a variety of different computer systems. Formal, observed playtesting of the game would generate useful data for the game development and allow the process to be studied in greater depth. A non-interpreted programming language might also get rid of some of the limitations of Game Maker's graphics and implementation, and once the prototyping phase is over, would allow for the creation of a more robust and optimized final product. The game could also be developed in either XNA or Unity in 3D. Prototypes and studies might be needed to determine if the game and theme would benefit from a 3D presentation, since 3D entails more work than does 2D. If future versions of the game were created in a different development environment, expanding for cross-platform support should be considered because it would allow for wider distribution. Development for iPhone or another portable device would allow the game to be played anywhere, and conceivably encourage word-of-mouth marketing. More attention could be paid to a marketing strategy for the game, and this could be informed by in-depth user studies throughout the process.

As previously mentioned, one direction for future development would be the

completion of the larger original project, *Paper Dragon*. The creation of *Free the Birds* has given the developer insight into how to deal with some of the complex issues that plagued the development of *Paper Dragon*, both practical and philosophical. Finishing *Paper Dragon* may also contribute to some of the philosophical questions raised by *Free the Birds*. Instead of being able to see the spiritual realm so clearly as in *Free the Birds*, the player would be limited to the birds' point of view, better expressing the human condition. In *Paper Dragon*, the player would have the ability to choose whether to do good or evil, and at many times it would not be as clear which is which. Other games tend to make it clear when the player must make a choice, and which choices are good or evil, but in life choices are rarely presented in such a clear-cut way. The idea of temptation and morality in *Paper Dragon* builds on that shown in *Free the Birds*, in that every action is a choice. *Free the Birds* revealed that characters should be given multiple chances to make important choices if this kind of intuitive moral problem-solving is used. *Paper Dragon* could address issues such as temptation, warring motivations, and incomplete information in a fuller way than the simplified system in *Free the Birds*.

B.   Benefits to the Game Design Community

Several design criteria emerged from the development process. Many lessons were learned throughout the process, but four major lessons are highlighted here which may be useful for future designs.

1. Games get harder quickly when more complex behaviors are added. This ne-
   cessitates adding challenges and creature types to the game one by one, so that
   the player is not overwhelmed by the complexity of the game initially. The
   designer should ideally prototype sets of game mechanics as part of the whole

system, because as complexity increases, the challenge required to interact with the whole system increases. In order to balance and refine the level progression, the designer must take into account not only the strength of the enemies but the skill required to deal with the challenges presented. In *Free the Birds*, the major challenges are the types of creatures, the time it takes to win them over or keep the demons from destroying them, the speed of the demons, and visibility, all of which had to be balanced in terms of level design and progression.

2. Sometimes things that seem like aesthetic improvements can also be technical challenges. A good example of this is the dark clouds in the final level which caused a large amount of lag and had to be optimized. Stress testing the system before creating art assets will show where both the artistic and technical boundaries lie, to more efficiently streamline the design process.

3. Design decisions that seem purely technical may have philosophical implications. During the testing phase, it is important to ask a variety of people to test it not only for functionality, but also to see if the correct message is conveyed. The mechanics of the game are what teach the lesson of the game.

4. Story is necessary even in simple games, especially in unusual ones. Most people have to have a reason to play the game and must know the goal of their character. Having some context for the game elements gives players a way to interpret and assimilate the game playing experience. Players must know what the symbols in the game mean to make any sense of what the game is about, even if the story is as simple as that of *Space Invaders*. It is especially important in a more experimental game, because standards for user interface and goals have not yet been established.

The development of *Free the Birds* has several other benefits for the game design community. It provides an example of how to create a game based on Christian principles that appeals to a wide audience. It approaches the issues of morality and ethics in a different type of game system; it does not present choices using dialog boxes, nor does it include the concept of "morality points." The player must evaluate his own actions, based upon the context presented by the game, but the game itself is designed to ellicit an emotional and moral response. The approach used to create *Free the Birds* could be extrapolated to illustrate other Christian principles or those of other belief systems.

As a contribution to the recent growth and interest in the morality and ethics of video games, *Free the Birds* provides a working example of such a design, rather than just a philosophical discourse. It has given the designer some interesting philosophical and moral insights into the game development process and its connection with meaning in the real world, and hopefully will do the same for others. It has brought up many questions central to the realm of gaming and morality, outlining possible ways these may be explored further in games. Hopefully, the exploration of video game meaning and morality in this thesis will allow game designers, critics, and players to place a greater value in the conscious play and development of video games as tools for understanding the world and ourselves.

REFERENCES

[1] M. Sicart, *The Ethics of Computer Games.* Cambridge, MA: MIT Press, 2009.

[2] J. M. Heaford, *Myth of the Learning Machine: The Theory and Practice of Computer Based Learning.* Wilmslow, Cheshire, UK: Sigma Technical Press, 1983.

[3] D. Gotterbarn and J. Moor, "Virtual decisions: video game ethics, just consequentialism, and ethics on the fly," *SIGCAS Comput. Soc.*, vol. 39, pp. 27–42, December 2009. [Online]. Available: http://doi.acm.org/10.1145/1713066.1713068

[4] N. E. Turner, "A comment on 'problems with the concept of video game 'addiction': Some case study examples'," *International Journal of Mental Health and Addiction*, vol. 6, pp. 186–190, April 2008.

[5] Trans. G.E.H. Palmer, P. Sherrard, and K. Ware, *The Philokalia.* London, UK: Faber and Faber Limited, 1983, vol. 1.

[6] T. Archimandrite L. Moore, *The Ladder of Divine Ascent*, 3rd ed. Brookline, MA: Holy Transfiguration Monastery, 2001.

[7] T. Rev. Sir G. Prevost, "The homilies of St. John Chrysostom, Archbishop of Constantinople, on the gospel of St. Matthew." in *A Select Library of the Nicene and Post-Nicene Fathers of the Christian Church.*, D. Rev. M. B. Riddle, Ed. Grand Rapids, MI: Christian Classics Ethereal Library, 2005, vol. 10. [Online]. Available: http://www.ccel.org

[8] R. Koster, *A Theory of Fun.* Scottsdale, AZ: Paraglyph Press, 2005.

[9] R. Craveirinha and L. Roque, "Looking for the heart of interactive media: reflections on video games' emotional expression," in *Proceedings of the 3rd International Conference on Fun and Games*, ser. Fun and Games '10. New York, NY, USA: ACM, 2010, pp. 8–17. [Online]. Available: http://doi.acm.org/10.1145/1823818.1823819

[10] R. Ebert, "Video games can never be art," *Chicago Sun-Times*, April 2010. [Online]. Available: http://blogs.suntimes.com/ebert/2010/04/video_games_can_never_be_art.html

[11] J. Holkins and T. Brahe. (2010, April) Again with the art stuff. [Online]. Available: http://www.penny-arcade.com/comic/2010/4/21/

[12] C. Fannon. (2010, April) Ebert and the games vs. art thing. [Online]. Available: http://blurredproductions.wordpress.com/2010/04/21/ebert-and-the-games-vs-art-thing/

[13] S. Murphy. (2010, September) Can video games be art? [Online]. Available: http://www.newscientist.com/blogs/culturelab/2010/09/can-video-games-be-art.html

[14] J. Schell, *The Art of Game Design*. Burlington, MA: Morgan Kaufmann Publishers, 2008.

[15] J. Cogburn and M. Silcox, *Philosophy Through Video Games*. New York, NY: Routledge, 2009.

[16] C. Hocking. (2007, October) Ludonarrative dissonance in Bioshock. [Online]. Available: http://clicknothing.typepad.com/click_nothing/2007/10/ludonarrative-d.html

[17] Wikimedia. (2010, November) List of largest wikis. [Online]. Available: http://meta.wikimedia.org/wiki/List_of_largest_wikis

[18] J. McGonigal. (2010, March) Gaming can make a better world. [Online]. Available: http://www.ted.com/talks/

[19] I. Bogost. (2010, October) Persuasive games: Free speech is not a marketing plan. [Online]. Available: http://www.gamasutra.com/view/feature/6158/persuasive_games_free_speech_is_.php

[20] S. Addams, *The Official Book of Ultima.* Greensboro, NC: COMPUTE Books, 1990.

[21] I. Bogost, *Persuasive Games: The Expressive Power of Videogames.* Cambridge, MA: The MIT Press, July 2007.

[22] Z. Frank. (2004, February) Ze Frank's nerdcore comedy. [Online]. Available: http://www.ted.com/talks/ze_frank_s_nerdcore_comedy.html

[23] T. Walker, "The Sims overtakes Myst," *Gamespot*, March 22, 2002. [Online]. Available: http://www.gamespot.com/pc/strategy/simslivinlarge/news_2857556.html

[24] Wikipedia. (2010, October) Guitar praise. [Online]. Available: http://en.wikipedia.org/wiki/Guitar_Praise

[25] A. Wilton and T. Barringer, *American Sublime: Landscape Painting in the United States 1820 – 1880.* Princeton, NJ: Princeton University Press, 2002.

[26] T. Cantler. (2007, December) The thinking man's Ikaruga: Stop and smell the duality. [Online]. Available: http://www.destructoid.com/the-thinking-man-s-ikaruga-stop-and-smell-the-duality-60929.phtml?=

[27] W3Schools. (2010, September) Os statistics. [Online]. Available: http://www.w3schools.com/browsers/browsers_os.asp

APPENDIX A

GAMES REFERENCED

Amanita Design. 2003. *Samorost.*

Bethesda Game Studios. 2008. *Fallout 3.* Bethesda Softworks/ZeniMax Media.

Bioware. 2003. *Star Wars: Knights of the Old Republic.* LucasArts.

Bioware. 2007. *Mass Effect.* Microsoft Game Studios.

Bit Blot. 2007. *Aquaria.* Bit Blot.

Danger Close/Digital Illusions CE. 2010. *Medal of Honor.* Electronic Arts.

Daniel Benmergui. 2009. *Today I Die.*

Digital Praise. 2005. *Dance Praise.* Digital Praise.

Digital Praise. 2008. *Guitar Praise.* Digital Praise.

Gregory Weir. 2008. *The Majesty of Colors.*

Harmonix Music Systems. 2005. *Guitar Hero.* RedOctane.

Jonathan Blow. 2008. *Braid.* Microsoft Game Studios (XBLA).

Jason Rohrer. 2008. *Gravitation.*

Konami Computer Entertainment Tokyo. 1999. *Dance Dance Revolution.* Konami
    of America.

Lionhead Studios. 2001. *Black and White.* EA Games.

Lionhead Studios. 2004. *Fable.* Microsoft Game Studios.

Maxis. 2000. *The Sims.* Electronic Arts.

Newsgaming. 2003. *September 12th.* Powerful Robot Games.

Nicklas Nygren. 2007. *Knytt.*

Nintendo EAD. 1998. *Legend of Zelda: Ocarina of Time.* Nintendo.

Origin Systems. 1985. *Ultima IV: Quest of the Avatar.* Origin Systems.

Retro Studios/Nintendo. 2002. *Metroid Prime.* Nintendo.

Rockstar North. 2008. *Grand Theft Auto IV*. Rockstar Games/Take-Two Interactive.

Sony Computer Entertainment. 2006. *Shadow of the Colossus.* Sony Computer Entertainment.

Taito Corporation. 1978. *Space Invaders.* Midway.

ThatGameCompany. 2006. *flOw.* ThatGameCompany.

Treasure/G.rev. 2003. *Ikaruga.* Treasure.

Valve Corporation. 2007. *Portal.* Valve Corporation.

Wes Cherry. 1989. *Solitaire.* Microsoft.

Ze Frank. 2004. *Atheist.*

Ze Frank. 2004. *Buddhist.*

Ze Frank. 2004. *Christian.*

VITA

Megan Reneé Bednarz

Dept. of Visualization

c/o Yauger Williams

3137 TAMU

College Station, Texas 77843-3137

dragon.flame.meganite@gmail.com

Education

B.E.D., Texas A&M University, May 2007

M.S. in Visualization Sciences, Texas A&M University, May 2011

The typist for this thesis was Megan Reneé Bednarz.