

Eleven programmers Seven Artists and Five Kilograms of Play-Doh

Games for Teaching Game Design

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ABSTRACT

Aristotle once wrote: *The things we learn to do, we learn by doing*. This is the motto of the Game Design Workshop subject I run at the University of New South Wales. The class brings together artists and programmers to learn about designing games. To do this, we play games. Then we reflect on why they work. Then we change the rules and play some more. Reflecting on this experience helps us to learn the principles behind designing good games.

In this paper I share some of the games we have played. I have deliberately chosen these games to illustrate key elements of game design, while also being fun to play, and easy to change. My experience shows that they provide an effective way to teach concepts which students can transfer to the analysis and design of more complex games.

1. INTRODUCTION

While games have been part of human culture for thousands of years, only recently has the art of creating them come under academic scrutiny. Other arts – such as literature, sculpture or music – have well established theories of criticism and composition, but the theory of game design is in its infancy. Yet with the rise of the computer, games have become an immensely popular pastime and hundreds of new titles are being produced every year. If these games are to reach beyond being dull and derivative works, we will need designers who are thoughtful and reflective about games and the underlying processes that make them work.

This presents a challenge to the teacher: how does one teach a subject when its foundations are still being laid? The answer, I think, is to return to the primary material. To learn about music, we listen to music. To learn about literature, we read literature. To learn about games, we play games

– and then reflect on the experience. What makes them work? Which aspects were fun? Which elements got in the way of fun? In this way we analyse our experience of play and begin to recognise the component features which made it work.

Furthermore, we modify games. Change the rules of the game and see what happens. Does the play become faster? slower? easier? harder? Small changes in the rules of a game can have a dramatic effect on play. By experimenting with variations, we can learn more about this relationship between rules and gameplay, a crucial concept in game design. Games are second-order creations: the designer controls the rules, but the players create the gameplay. The art of game design is to craft the rules so that a particular kind of play results. To do this, we need to be able to appreciate how players will interact with the rules we create.

Not all games are suitable for this task. Most modern computer games take a significant amount of time to master before you can evaluate their gameplay, and relatively few titles provide the possibility of changing the rules. Of those that do, significant effort and programming ability is usually required, which discourages experimentation, and makes such games less useful for classroom exercises.

The simplest solution is to abandon computer games altogether and play table-top games instead. These have the advantage that the mechanisms are usually fairly simple and changing the rules is as simple as communicating the change to the other players, so it becomes much easier to explore different possibilities. Many of the important elements of game design hold true regardless of the medium of play.

This is the approach I take in teaching game design at the University of New South Wales. My class contains a mix of students from computing and media design backgrounds. We play games together in class and then spend time reflecting on the experience. Wherever possible we experiment with changing the rules as we go and part of the post-mortem is always to discuss how the games could be improved. In this paper I discuss four of the games we play and how I use them to teach.

2. THE GAMES

There are four games that I shall describe, each one chosen to illustrate certain important aspects of game design:

Bartok A card game illustrating formal elements such as cooperation, conflict, resources and pacing.

Feedback Soccer Variations of soccer illustrating positive and negative feedback and their uses in balancing games.

Play-Doh Deathmatch An arena battle-game concentrating on avatar design and self-defining play.

Once Upon A Time A commercial card game for fairytale creation, to illustrate the concept of 'story-making' games.

I have collected these games from a variety of sources, from books, from friends, from online. One is a commercial game, one I designed myself. In this section I shall describe each in turn and outline some of the lessons that can be drawn from each.

2.1 Bartok

The first game we play is a simple card game known as *Bartok*. I use this game to illustrate some of the formal elements of gameplay, and to get students comfortable with the idea of experimenting with the rules of a game.

2.1.1 The game

Bartok (Wikipedia, 2007) is a card game similar to *Crazy Eights* or the commercial game *Uno* (by Mattel). It requires a deck of standard playing cards, or perhaps two. The initial rules are very simple: each player is dealt a hand of five cards, the remainder of the deck is placed faced down on the table and the top card is turned face up to form the pile. Taking turns going clockwise from the dealer, each player may either play a card from her hand or draw from the deck. A card can only be played if it matches either the suit or the number of the card on the top of the pile. So if the card on the top of the deck is a Jack of Spades, the next card to be played must either be another Jack or another Spade. Jokers are wild and can be played as any other card. The winner of the game is the first to get rid of all of his cards.

The complete rules of *Bartok* make some additions to these, but for teaching purposes I find this simple subset to be good. As it stands, of course, the game is quite boring. There are few interesting choices for the players to make. All cards are of equal value, only the Joker is particularly special. There is no real interaction between players and play tends to proceed mechanically until one player gets lucky and plays her last card. Sometimes it is hard to keep control of the class through this stage (they tend to start playing other games) but it is worth encouraging them to finish one or two games.

At this point we stop and discuss. What was that like? Usually the students are fairly disappointed at being made to play such a dull game. I encourage them to reflect on why it was boring. To address this problem, the following

rules are added, one by one, with a round of play for each new rule:

1. Draw Two

Rule: When a player plays a Two of any suit the next player in a clockwise direction has to draw two cards from the deck and misses their turn.

Effect: This adds an element of conflict to the game. Players can now affect each other's ability to win, and their progress towards winning becomes more unpredictable.

The player is given a new factor to consider when choosing the card to play. The choice is not particularly strategic – you cannot decide who is affected and timing is usually dictated more by circumstances – but still, many players find a vindictive pleasure in penalising their opponents in this way.

There is also a moment of pleasure the first time a player realises that the Joker can be played as a Two of any suit, so it can also act as a draw card. Such interactions continue to arise as we add more rules and is a deliberate feature of the game. Sometimes this will create ambiguous situations. I encourage players to negotiate their own solutions to these ambiguities as a lesson in design.

2. Cumulative Draw Two

Rule: The penalty from a Draw Two may be avoided by playing another Two. The penalty increases by two and is passed to the next player (who can play another Two, increasing it by another two, and passing it further on, and so on).

Effect: Now the Two becomes a very important card. It can be used both to attack your opponents and also to defend yourself from their attacks. The choice of when to play it becomes much more strategic. Do you use it to attack a winning player, or keep it to protect yourself from attack?

3. Last card revealed

Rule: When a player has only one card left in her hand, she must display it face up on the table.

Effect: Revealing this information changes the game for the other players. The player who plays immediately before can now deliberately select a card which forces the player to draw, preventing her from winning. The Joker becomes a very valuable card under this rule, because it can always be played. Keeping a Joker for your last card becomes a useful long-term strategy.

4. Out of turn play (The Snap Rule)

Rule: If a player has a card which has the same colour and face value as the card just played, he may play it immediately, even if it is not his turn. Play continues in a clockwise direction from that player.

Effect: The pace of the game changes dramatically. In previous versions you could afford to take your time choosing what to play, but now fast decisions are important. If you hesitate, another player may jump in

and you will miss your turn. So play becomes more frantic. This rule also interacts with all the previous rules in interesting and complex ways, making for a much more dynamic game.

5. *Team play*

Rule: With multiple small groups playing independent game simultaneously, the goal is no longer to be the winner or your particular group, but to be the group that first produces a winner.

Effect: All strategy is turned on its head as the game goes from being competitive to cooperative. Players must now find ways to coordinate their efforts and help each other to win.

The boredom resulting from the first game is rarely exhibited by the third or fourth. By the final game students are usually keen to start experimenting with their own rules and I encourage them to do so. After a couple of rounds of this, we reconvene as a class and discuss the things we have learnt.

2.1.2 *Lessons learnt – Formal elements*

I use this game to illustrate various formal elements of games: choices, player interaction, resources and pacing.

Interesting choices. As Sid Meier is often quoted: “A game is a series of interesting choices”. Fullerton, Swan and Hoffman (2004) elaborate on this to say that interesting choices are:

Informed. The player has a reasonable idea of likely outcomes of her choices. She is not asked to choose blindly.

Balanced. They are legitimate choices, not forced. There is some tradeoff between outcomes.

Consequential. Players are not asked to make a large number of choices that have no effect on the game.

Dramatic. Something important is riding on the outcome.

In its initial form the game of Bartok offers few interesting choices to its players. Often your play is forced by cards in your hand. Even when a legitimate choice is presented, there is not enough information to make a meaningful decision, and very few choices have any dramatic effect on the outcome of the game. As a result play ends up feeling more or less mechanical and meaningless.

The addition of the Draw Two and Cumulative Draw Two rules creates the possibility of interesting choices. Playing a two becomes strategic and dramatic, with a real and obvious affect on the game. The use of the joker also becomes an interesting choice as the rules develop.

Cooperation, competition and conflict. In a multi-player game, a lot of the experience of play is determined by the nature of the interaction between players. Are they cooperating or competing? If they are competing, what is the level of conflict between the players? Is it like a race, in which each player is trying to do his best against a fixed challenge, or is it more like a battle, in which each player

is directly opposed to the other and acting to deliberately hamper her chances of winning?

In its initial form, Bartok is competitive but offers no real opportunities for conflict. While one player’s action does affect what the next player can do, the complete lack of information really prevents any kind of deliberate conflict. The addition of the Draw Two rule changes this and allows players to begin to interact meaningfully. The Last Card Revealed rule also creates opportunity for more conflict.

The Team Play rule, on the other hand, turns everything around. Within your group, play becomes cooperative, and your opponents are now the other groups. Sometimes moments of cooperative play occur before this (e.g. spontaneous alliances to stop a player who is about to win) but now the whole dynamic is different. There is no way to interact with your opponents, so the only way to win is by playing quickly and avoiding playing anything which will hamper your teammates.

Resources. An important part of any game is the economy of resources. A resource is any asset that helps a player achieve her goals. These assets may be gained, lost or spent in a variety of different ways depending on the resource. Designing and tuning this system is an important part of constructing a game.

Cards are the principal resource in this game. In this case they are a negative resource: the fewer you have the better. The twos and the Joker become more valuable than other cards as the rules are developed. The Draw Two rule changes the supply situation and can result in abundance of cards. Another possibility not explored here is to add some kind of trading rule, allowing players to swap cards or entire hands. A poorly designed rule could make an unbalanced economy in which players gain card much faster than they can play them, making the game unwinnable. There are many ways in which you can explore this facet of the game.

The other important resource in the game is information, as the Last Card Revealed rule illustrates. Initially players are information-poor – they don’t know what is in others’ hands or what is in the deck – but with this extra rule they are given a crucial piece of information at a time when it really counts.

Pacing. The pace at which a game progresses is a significant factor in the experience of play. A slow thoughtful game feels completely different to a fast-paced action game. Time pressure makes decision-making harder, making a game more challenging. On the other hand, too much time with little to do can test the players’ patience, and may make a game boring.

The Snap Rule illustrates how a small change to the rules can make a big change to the pace of the game. Team Play increases the time pressure even further. They show how the same game can provide quite a different experience when time pressure is added or removed.

There are many more variations of this game that can be tried. The best exercise is to encourage students to play the

game regularly and learn from their own experimentation. I keep a list of interesting rules at: <http://cs4431.web.cse.unsw.edu.au/wiki/index.php?Bartok>.

2.2 Feedback Soccer

The next game is intended to illustrate the use of feedback loops as a mechanism for controlling the balance of a game.

2.2.1 The Game

In the first stage of this game the class is divided into two teams and we play a normal game of soccer. It is not important that the teams are evenly matched (in fact, it may be good if they are not) but the game should be set up so that scoring is relatively easy on both sides. Depending on the skill of the players, this may mean widening the goals or even forbidding goal-keepers. It works best if four or five goals can be scored in a 15 minute game.

After 15 minutes of play, we stop and change the rules. There are four variations we play:

1. *Negative Feedback*

Rule: Whenever a team scores a goal, the scoring player changes to the other side.

Effect: This quickly balances out the game. As the losing team gets bigger it gains an advantage over the winning team and begins to score more points. An equilibrium is quickly established and the scores tend to equalise.

2. *Positive Feedback*

Rule: Whenever a team scores a goal, they get to choose a player from the other side to join their team.

Effect: This quickly unbalances the game. A small lead is amplified as the winning team gets bigger and bigger.

3. *Three-Sided Soccer*

Rule: The players are split into three teams with goals equally spaced around a circular field. The aim is now to minimise the number of goals scored *against* you.¹

Effect: This provides a different kind of negative feedback. As one team pulls into the lead, the other two tend to ally against them, restoring the equilibrium. The process is more chaotic as alliances are made and broken on the fly.

4. *Three-Sided + Positive Feedback*

Rule: A combination of both (2) and (3) above.

Effect: We now have two competing equilibrium mechanisms. The winning team gets bigger, but invites the opposition to join forces. As long as less than half the players are on the winning team the net effect is generally negative, but if this threshold can be overcome, the positive feedback will dominate.

¹Counting goals scored *by* a team is both unfair and unmanageable. It would require keeping track of which player was the last to touch the ball before it entered the goal, which is open to dispute and may have very little to do with which team put the effort in. Accounting for 'own goals' also becomes very messy. Minimising goals *against* is much easier to track.

The first two of these variations are based on exercises described by Salen and Zimmerman (2004) (although they use basketball rather than soccer as the basic game). Three-sided soccer is described by Laver (1997) as an exercise in learning about coalition formation. The final combination is my own idea.

2.2.2 Lessons learnt – Game Balance

Adams and Rollings (2007) suggest that the ideal game progression is one in which the lead changes hands several times in the early stages, but eventually the superior player takes the lead and wins with a dramatic finish. Positive and negative feedback loops give the designer power to control this progression, as this game illustrates.

Negative Feedback. In the first variation we see how negative feedback can be used to reign in the winning player, by deliberately penalising her power. Negative feedback brings about equilibrium which can make a game more balanced. LeBlanc (2007) cites this as a source of uncertainty which sustains the dramatic tension of a game by preventing early victories. If negative feedback is too strong, however, it can cause stagnation.

Positive feedback. The feedback in the second variation has the opposite effect. It rewards success with more power, promoting further success. It discourages stalemate and brings a game to a rapid and conclusive end. LeBlanc calls it an "aid to denouement" which provides a sense of finality and closure. If it is applied too early in the game it makes for a disappointingly one-sided game.

Accidental Feedback. The third variation serves as an example of how feedback loops can arise in a game inadvertently, as a side-effect of other rules, in this case the addition of a third team. It is important for designers to be able to identify these loops when they arise and know how to counteract them if they are detrimental to play.

Opposing Feedback The fourth variation shows how two different feedback loops can be created to act in opposition. In the early game the negative feedback loop dominates and the play remains balanced, but if one team manages to gain enough of a lead then the positive feedback loop reinforces that lead and produces a dramatic conclusion.

The multi-team variation also adds many avenues for exploration. Laver (1997) suggests having a fixed divisible prize for the winning team, and allow team captains to trade players as they see fit. Gaining players becomes a mixed blessing. Having a larger team may give you a winning advantage, but each member will receive a smaller share of the prize. We have not yet played this game in class, but I imagine it would produce quite complex play.

2.3 Play-Doh Deathmatch

Play-Doh Deathmatch is a game of my own invention,² as an example of a game which encourages creative expression.

2.3.1 The Game

²Based on an idea I read in *Dragon* magazine in the 1980's. I have been unable to track down the original.

The rules of Play-Doh Death Match cover both the creation of creatures and their battles in the arena. In the explanation below, paragraphs in *italic* are offered as examples.

2.3.2 Creation

In the first phase of the game, players model creatures out of the Play-Doh and decide on their attributes.

1. Making Creatures

Play-Doh Deathmatch is a game for 4 or 5 players. Each player receives 500g of Play-Doh (a chunk about the size of a fist) and is instructed to model a creature for the battle arena. The creature is to be given a name and an identity (eg "*Slitho - Lizard King of Slub*" or "*The Outback Cowboy - Menace of the South-by-Souwest*") which the player is to record on a sheet of paper.

The Outback Cowboy is a fat squat human figure with a lasso and a large cowboy hat.

2. Ammunition

Some of the Play-Doh should also be reserved for making ammunition. Ammunition comes in three sizes: small, medium and big. Small pieces do 1 point of damage, medium 2 points and large 4 points. Players are free to negotiate what they consider small, medium or large. Ammunition supplies are limited to whatever is created at the beginning of the game.

3. Speed and Strength

Each creature has two attributes: *speed* and *strength*. Speed determines how quickly a creature can move around the area. Strength determines how many times it can be hit before it dies. These scores are determined as follows:

- Start with 20 ability points.
- Estimate what proportion of play-doh was used for ammunition, and subtract this from your ability points.
- Divide the remaining points as you see fit between your two abilities, based on the nature of your character.

The Outback Cowboy is big. He used only 25% of his dough as ammo, so he loses 25% of his ability points, leaving him with 15. We decide that he is strong but kind of slow moving, so his 15 points are divided into 12 strength and 3 speed.)

4. Special Powers

Each creature has a *Special Power*, which the players may choose as they see fit. The Special Power is an ability that give the creature a particular advantage. It can be used at any time in the the game, but is limited to only two uses. Players are encouraged to make up any power they desire with the proviso that it should be in keeping with the creature's identity, and it should not ruin the game.

The Outback Cowboy's Special Power is his lasso. If he hits another player with it, that player is temporarily tangled and cannot move for 1 turn.

5. Achilles' Heel

The Achilles' Heel is a special weakness for this creature. It is a particular disadvantage that other players could exploit. Once again, players are free to choose whatever weakness they like but are encouraged to make something appropriate to their character and not too difficult to exploit.

The Outback Cowboy's Achilles Heel is his hat. Any shots that hit him in the hat cause double damage. If he loses his hat somehow, he dies.

Once each player has decided on a creature, it is to be introduced to the other players and with all its details (so there are no secret powers). Then they enter the arena and the battle begins.

2.3.3 Battle

Play starts with each creature entering the arena and proceeds in a turnwise fashion. On each player's turn their creature may move and shoot.

1. The Arena.

An arena space is chosen (about 1.5m by 1.5m is appropriate) and the empty Play-Doh bucket is placed upturned the middle. Players may choose their starting places anywhere in the arena, except on the bucket.

2. Movement

Each turn a creature may move a maximum of 10cm per speed point, in any direction. Several short movements may be made, interleaved with other actions if desired, provided that the total distance travelled does not exceed this value. It also costs one movement to climb on or off of the bucket.

The Outback Cowboy has 3 speed points so can move a maximum of 30cm per turn. On his first turn he uses this to move closer to the shelter of the bucket.

If a movement brings the creature into collision with another, the target creature loses one point of strength. If the moving creature is stronger than the target, it can also push the target around the arena. If a creature is pushed outside the arena, it immediately dies and is out of the game.

3. Shooting

A creature may fire up to three pieces of ammunition per turn. Shooting is done by holding your hand directly above your creature and tossing play-doh pellets at the other creatures. No arm-movement is allowed. If a pellet hits another creature then that creature loses strength depending on the size of the pellet, as described above.

On his second turn, the Outback Cowboy decides to attack. He takes one 10cm step around the bucket to get a clear shot at his enemy Slitho. He throws a small pellet but misses. He throws a second pellet, a medium one, which hits. Slitho loses 2 points of strength. Aware that his ammo supplies are small the Cowboy elects not to try a third shot. Instead he retreats, taking two 10cm steps to hide behind the bucket.

4. Death

A creature dies when it is pushed out of the area or when its strength falls to zero. When this happens the player who imparted the killing blow may squash or dismember the defeated creature as she sees fit. A small part of the defeated creature's dough must be taken and added to the victor. The player may assign 2 more ability points to her creature, dividing them between speed and strength as she sees fit.

Later in the game, Slitho is almost dead with only 1 strength remaining. The Cowboy is out of ammo, but he is near enough for a ramming manoeuvre. He moves forwards 30cm, colliding with the lizard. Slitho loses his last strength point and is dead. The Cowboy takes the lizard's tail and adds it to himself. He also adds 2 points to his speed, bringing it up to 5.

5. Victory

The last creature standing, when all others are dead, is declared the winner.

I've not yet played this game in a large class. My plan would be to play in several small groups each in its own arena. The winner from each group would then move into the final arena, with all its strength and ammo restored. I imagine creatures in the final arena would be generally oddly shaped and multicoloured with the trophies they have picked up along the way.

2.3.4 Lessons learnt – Creative Expression

Self-Defining Play. This game is intended to be light-hearted and fun, with an emphasis on creative character design. It is an example of self-defining play. Each player gets to decide what avatar they will use to represent themselves in the game, choosing a name, an identity and a physical form. Play-Doh is chosen as a deliberately childish medium, so that nobody needs to be particularly embarrassed by their lack of artistic skill. It also encourages players to be more wildly imaginative in their avatar selection, as any kind of realism is frankly impossible.

Functional and cosmetic attributes. The character design deliberately includes both functional and cosmetic attributes (Adams & Rollings, 2007) along with some that exist in between. Name and identity are purely cosmetic and have no effect on gameplay. Strength and speed, on the other hand, are highly functional and directly affect how a creature performs in the arena. The size and shape of the creature lies somewhere in between. It is mostly cosmetic but indirectly affects the other attributes by determining the number of ability points and the size of target that the creature represents.

Styles of play. The rules for movement and shooting are deliberately designed to encourage a diversity of creatures. Some may choose to be big and strong but slow and with little ammo. Others may be small and weak, but hope to present a small target to prevent damage. Other still may prefer to use speed as their primary means of attack, ramming their opponents and then running away. Players

are thus encouraged to combine cosmetic and functional attributes with particular styles of play to construct a strong identity for their creatures.

The Special Power and Achilles Heel are also provided to give each creature a unique identity, and it is important that they should be in keeping with the creature's character. These rules also exist to give the players opportunity to contribute some rules of their own to the game and see how they play out.

Ongoing creation. Character development continues as the battle proceeds with the victory bonuses. A piece of the slain creature is added as a cosmetic trophy to the attacker and the extra ability points provide a reward which helps them progress in the game (positive feedback). Creative players enjoy combining the two, stealing the opponent's wheels for extra speed or his arms for extra strength.

2.4 Once Upon a Time

The last game I shall describe is a commercial game called *Once Upon a Time* designed by Richard Lambert, Andrew Rilstone and James Wallis and published by Atlas Games³. I use this game to illustrate ideas about the relationship between games and stories.

2.4.1 The Game

Once Upon a Time is a 'story-making game' (Wallis, 2007). That is, it does not *tell* a story of the designer's invention, but it offers a mechanism to allow players to *create* a story of their own. It is a card game, using a specially published deck of 'Once Upon a Time' and 'Happily Ever After' cards. 'Once Upon a Time' cards represent a wide variety of standard fairy-tale tropes:

- Characters (the Queen, the Wolf)
- Items (a Sword, a Spell)
- Places (a Palace, a Forest)
- Aspects (Happy, Disguised)
- Events (An Argument, People Meet)

'Happily Ever After' cards provide possible endings for a story ("And he listened to his mother's advice from then on" or "The farm was returned to its rightful heirs").⁴

Each player is dealt a hand of story cards and a single ending card, and they take turns narrating a simple fairy tale, using the elements from their hand. As a particular element is mentioned in the story, that card is played. The aim is to use up all the story cards in your hand and shape the story so that it finally reaches the ending dictated by your ending card, at which point you win the game.

This process can be interrupted in two ways. If the storyteller falters and cannot go on then he must stop and draw

³<http://www.atlas-games.com/onceuponatime/>

⁴The *Dark Tales* expansion provides grimmer elements (Haunted Graveyards, Evil Stepmothers) and endings ("His wound was healed but his heart remained broken forever").

a card. The next player takes up the tale where he left off, playing cards from her own hand. Alternatively, if the storyteller mentions an element in another player's hand, that player may interrupt, playing the card and continuing the story from that point. There are also special Interrupt cards which allow a player to interrupt at any time.

2.4.2 Lessons learnt – Story

Story-telling vs story-making. There are lots of computer games on the market that attempt to tell a story, and students are usually quite familiar with the various mechanisms they use (cut scenes, briefings, dialog, etc). Usually these games offer little ability for players to be involved in the creation of the story; it more or less unfolds the same predetermined way every time. I use this game as an example of the opposite end of the spectrum. The elements and endings in this game can be combined in a wide variety of ways, with little coercion by the designers, except to stay within the fairy-tale genre.

The structure of the game exists to encourage the process of creation. The elements in your hand suggest paths that you could take; the interruption mechanism provides an escape when one player gets stuck; and the fairy-tale genre is familiar enough to most people that they do not have too much trouble making it up. Thus this game provides another vehicle for creative expression, although in a rather different manner to the last.

I use this game to get students to think about the relationships and tension between “story” and “game”, and whether there might be a middle ground where the designer's story and the player's creativity can meet. This is a question that is still hotly debated by ‘ludologists’ and ‘narrativists’ within the game scholars community (Jull, 2001; Frasca, 2003).

3. EVALUATION

It is hard to formally evaluate the success of a teaching strategy such as this, but my experience in class is that these games fulfilled their purpose. The students enjoyed playing them and in the later stages of guided reflection showed that they were able to discern the design elements they illustrate and recognise these elements in other games they have played.

To test their understanding, I set the students three assignments, each of two or three week duration. The first task was to analyse an existing game of their choice, and this was followed by two tasks designing and prototyping original games of their own imagining. The analysis task went well, showing that their understanding was strong with a good ability to transfer concepts from the games in class to much more complex commercial computer games.

Taking the next step, turning analysis into construction, was more demanding and their ability to critique their own work was not as strong. Nevertheless some of the games produced were quite impressive, especially given the time frame in which they were built. In future years I plan to include more small design problems (perhaps based on one of the games above) to encourage players to experiment more with their own mechanisms.

4. CONCLUSIONS

We learn about games by playing games. Here I have presented simple games with illustrate the use of competition, cooperation, pacing, resources, balance, creative expression and story in games. These games are fun to play and easy to understand. Changing rules on the fly illustrates the relationship between rules and gameplay. This would be much harder to achieve with computer games.

Much of the discipline of good game design is the same regardless of the medium, be it a card-game, a sport or a computer game, and students have shown a strong ability to transfer the concepts learnt from these example games to analyse other more complex titles.

Turning analysis into design is harder. I believe these games can facilitate this process by providing students with a freedom to experiment with the rules at minimal cost, encouraging exploration and giving rapid feedback on its outcome, without the need of hours (or days) of programming.

There are still many more design concepts that could be illustrated in this way. I offer these for others to use and to modify. I would be grateful to hear any feedback you have on how they worked and variations that you found helpful.

4.1 Acknowledgments

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