Games in Early Design Education

Playing with Metaphor

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Abstract: Play and design can be put into metaphorical relation. To do so is to let each inform the other. As part of a larger project, we have used the metaphor of play in creating and using learning resources for early design education. In doing so, it became apparent that the entailments of play, the other metaphors that both frame and are framed by play, needs to be better understood. We discuss seven metaphors related to play: games, exploration, balance of forces, tactility, intrinsic reward, embodiment and rules and how we use these in learning games.

1. INTRODUCTION

A society concerned with producing a fair number of creative and imaginative adults must protect the play modalities of thinking developed in childhood.” (Bower, 1974, p8)

As part of a nationally funded project, we have developed and used “games” as student-centred teaching resources to enrich the capacity for design in beginning students in architecture, landscape architecture and urban design. Students are encouraged to learn inter-actively in a milieu characterised by self-directed play in a low-risk computer modelling environment. This paper explores the cognate ideas around play—the aspects of play that make it an effective metaphor for early design education.

Traditionally, in design studios, students have designed manually at drawing boards, utilising their intrinsic skills of inventing, manipulating and describing form (which is used throughout this paper as the expression of
designed spatial structure) to move towards a design solution that satisfies the requirements of the project. For those students who lack confidence and skill in form-making, their inability to invent, manipulate and describe form is a debilitating handicap leading to frustration and disillusionment. In a traditional design studio, the passage of time is a major factor in gathering skills at inventing and manipulating form, whilst the skills to describe form graphically and orally gradually accumulate. For many students this process is fraught: some leave, some under perform for years.

In studios in which digital media dominate, these givens can be overturned, due substantially to the ability of the mechanism of CAD modelling to interpose into the process of making, inventing and describing form. Our contention is that bringing CAD-supported form-making operators to the fore in formal lectures and reiterating these lessons with practice in an enjoyable, low-risk social learning environment can build both the confidence to continue and the competence to perform.

2. WHY GAMES? WHY PLAY?

Games have good press. They are fun. They are social. The outcomes do not really matter in comparison with the joy of playing them — “It's just a game!” — “We're not playing for sheep stations here!” They are culturally universal. They are ageless. They are frequently rule-related—they pit the player against the rules to produce a good outcome. When rule free, they are open-ended, and encourage inventiveness either prior to or during play.

In developing the games that form the basis for the teaching and assessment tasks in this subject, we initially thought that "play" and "games" captured and developed the essence of “good” designing. Experienced designers engage play and reflection as principal tools in their designing repertoire, whilst frequently relying on informal rules for form-making, which results in recognisable styles of individual and collaborative work. Our hope was that we could bring these aspects of mature designers into the early learning fray. A pilot evaluation using a participant-observer methodology gave us confidence to continue. A comment from a student reads:

*It's the most enjoyable, relaxed (subject), but the work is fun to do, unlike some other subjects...*

This comment supports the assertion that the games are fun to play. Another commented on the use of games in the tutorials that:

*Games in Tutorials helped really understand what we were doing (not only how).*
This comment attests to our efforts to create games that are both intrinsically interesting and relevant to learning about design.

After several years of working with learning tasks we describe as games, we find that we are playing with wider aspects of play than are commonly received. The existing literature on the topic, for example, the large games in education literature that focuses almost exclusively on role-playing games, and, in architecture, that of Cheng (1999), Schumacher and Radford (1997) and Radford (1997) confirms this view. Cooke (1999) presents an initial exploration of other ideas. This paper unpacks some of these wider views supported by examples of student work.

3. THE METAPHOR OF PLAY

We use “play” as a metaphor and thus eschew defining it. “Play” gains meaning as a term from the other terms that it entails, the other metaphors that, cloud-like, surround it. Thus, we use a range of terms in conceiving our games. Similarly, we accept a wide variety of scenarios as “games.” In the next two sections we describe, first, some of the metaphors play entails and how they relate to learning design and second, some of the games that we have created.

Roger Caillois, (1961) in his classic work, Man, Play and Games, describes the universe of play as a cylinder, which is divided into four main quadrants, which he calls agôn, alea, mimicry and ilinx. Agôn is competition, alea chance, mimicry simulation and ilinx vertigo. Games are placed within or between quadrants depending on which of the four principles dominates. The ends of the cylinder correspond to the poles of paidia and ludus. Paidia implicates turbulence, improvisation, gaiety and fantasy. Ludus implicates order, imperatives, rules and the necessity for strategy. Figure 1 diagrams Caillois’s system. His choices of words are practical: he sought the most effective terms and did not limit his search to the French in which he wrote. In doing so, he avoided loading his classification system with unintended meanings. He carries this further in his exposition, choosing different phrases at each explanation of the concepts. In addition to classifying types of play, Caillois also defines play as an activity that is free, separate from reality, uncertain, unproductive (in economic terms), rule-based and make-believe. Like him, we are concerned more with the qualities of play than with the things that set it apart from other activities. Our main concern is to understand how play and designing relate and, instrumentally, to conceive games (play scenarios) that are useful in learning about designing. We use the hermeneutical notion of a metaphor as a relation that simultaneously informs both things being related.
Metaphors put one thing in terms of another. They are ubiquitous in thought.

"Metaphor is a tool so ordinary that we use it unconsciously and automatically, with so little effort that we hardly notice it. It is omnipresent: metaphor suffuses our thoughts, no matter what we are thinking about." (Lakoff and Turner, 1989, p. xi)

One school of philosophical thought, hermeneutics, claims that thought itself is metaphorical.

Metaphor ... is no mere figure of speech, but a figure of thought. It is much more than a grammatical form or literary device; it is a cognitive structure which inheres within every transposition of concepts, whether between words or images, a text and its context, the parts and the whole of some gestalt of meaning, or between two networks of statements or two complex conceptual systems. (Snodgrass and Coyne, 1991, p.8)

![Figure 1. Caillois's classification system: agón, alea, mimicry and ilinx and variations along a spectrum from paidia to ludus.](image)

In hermeneutics, all utterances can be understood deeply only by considering their metaphorical play with other utterances.

Metaphors thus entail other metaphors. It is in through the exploration of entailment that understanding grows. We have found several metaphors particularly useful in understanding the nexus between play and designing.

### 3.1 Games

A game is a scenario within which play occurs. Games are contingent agreements about how play proceeds. They prescribe the choices and actions that can be made and the effects of these actions on the play of the game. Playing a game can be seen as an exploration of paths of choices and actions.
from all those available to the players. A session of design work is game-like in each of the features above. Designers often work within a constrained frame of an existing design and self-selected operations and work out consequences of these over time. Unlike many simple games, designers habitually change their frame and operations over time. In design, the agreement about how to proceed is not fixed.

3.2 Exploration

The so-called exploration metaphor names one of the principal enduring threads of research in design computing. It has many variants, but all share a common abstract symbol level comprising a set of potentially variable generative operators whose action traces out a space of related designs. For most of its proponents, the term “exploration” captures a sense of open-endedness, a contingent sense of both where you are going and what you might find when you get there. Playing a game can be seen in the same light. Playing a game traces out one path through all possible (potentially infinite) playings-out of the game. Taken together, all such paths trace out the space of potential game play. In some games, like Monopoly, the space is fixed—both the allowable moves and the end state of the game are given. In other games, particularly role-playing games, the space is fluid: it can change before or during game play.

In most games play focuses on the present. What is important is the immediate state of the game. The exploration metaphor accesses the previous states of a game as well, making it possible to pick up a game from any previously discovered state of play.

The Virtual Gallery (shown in Figure 2) is a generic online gallery system supporting four roles: curators, exhibitors, critics and viewers. It enables a form of exploration through its response exhibits. These permit a properly authorised exhibitor to post an exhibit in response to another exhibit. The result of many such postings is a tree of exhibits related to each other by the action of the exhibitors. At first glance, the Virtual Gallery appears to be simple threaded discussion board and it is, when its authoring roles, access, content, critique and survey controls are disabled. Its utility is the ability to structure a particular exhibit to the requirements of a particular learning situation, in essence a designed and structured conversation amongst learners and instructors. This is the argument long put forward for workgroup software—structuring conversation in an organisation is one of the main functions of information technology (Winograd and Flores, 1986, p. 159).
3.3 Balance of forces

In many games progress is easy, but completion is hard. In UNO, a child’s card game, the object is to place all of your cards. When you have lots of cards, this is easy. When you have few cards, it is more difficult and other players tend to force you to pick up more cards. Out of this balance between ease and difficulty comes most of the game’s intrigue.

Figure 2. An exhibition and exhibit in the Virtual Gallery.

The game entitled 125K Litres of Space (shown in Figure 3) demonstrates forces in balance. The aim of the game is to create two objects that collectively fill and are contained within a five-metre cube and whose volumes sum to 125 cubic metres, (that is, the objects have no intersection). Each object is to be a strong visual composition in its own right. Several different balancing acts are at play. First, the objects are utterly dependent on each other. A compositional change to one relies on a complementary change to the other. The balance trick is to maintain interesting compositional qualities in both objects simultaneously. Second, there are several implicit learning agendas here. Technically, playing the game requires simultaneous attention to the Boolean operators (union, intersection, difference and split), the allocation of objects to layers and to the manipulation of views. Each of these operations is relatively simple in isolation, but their putting together reveals and requires use of higher-level idiom in the particular CAD package used (form•Z). Co-existing with this technical agenda are the compositional issues for each of the objects.
3.4 Tactility

Many games are played with equipment. Chess, checkers, backgammon and go are played on a board. Cricket requires a pitch, stumps, wicket, ball and bat. Sailing needs a boat, water and wind. Froebel blocks are smooth, clear hardwood. In all of these the equipment itself is part of the game. The sound of stones on the go board, the ground and grass qualities of the pitch, the handling of the boat and the touch and weight of blocks all contribute to the pleasure and skill of play. Design is “played” in media and these effect both its process and product. Like learning a game, part of learning to design lies in comfort with the medium. Batting, bowling and fielding skills are the elements from which cricket strategy is formed. Drawing, model-making and computing are the media with which design abilities are learned. Design may be played out in media, but it is realised in wood, concrete, steel and other real materials. Sophisticated materiality is one of the recognised dimensions of mature practice in architecture, yet dealing with materiality is one of the weak points in many, if not most, schools of architecture worldwide. Like play, design is inherently tactile.

Figure 3. One state of play from the 125K Litres of Space game.

Tactility is tough with computers. The medium is abstract. There is a sound argument to be made that digital media reinforce an already alarming trend in architectural education: fewer of our students are “makers” and those that have “made” have made fewer things. Yet, if recent national and international design awards, (Anon 1997, 1998, 1999) are any indication, society places considerable value on architects who have profound knowledge of building construction and how it can be used to augment an architectural idea. Developed practitioners of design making can relate the
distinct domains of architectural ideas and a constructed reality. Beginning
students and other laypersons have particular difficulty with such discourse
between a world of ideas and a world of physical form.

Steps can be taken to connect digital media with the objects that they
represent and to assist students in becoming poetic design makers if that is
their choice. Mitchell’s recent championing of CAD/CAM in linking
architecture and construction is one such step in professional practice and
education. Full-scale computer-controlled building construction demands a
new engagement with questions of materiality. The recent construction work
on the Expiatory Church of the Sagrada Familia (Antoni Gaudi) is another
example of a close connection between digital media and the new forms
being created. These efforts though need to be seen more as the beginnings
of a new approach to materiality and less as redress for an impoverished
culture of learning about the physical in architecture.

We do three main things to help bring students in better connection with
the things they are modelling, all of which are demonstrated to some extent
in Figure 4. The first is simple, yet has wide effects. Our games have
carefully crafted surface styles, sometimes realistic, sometimes caricatured.
To work with the games is to continually experience one aspect of best
practice in representing materiality. The second is to use as case material
architecture that is expressive of construction. We have made wide use of
the genre lately known as Australian Lightweight Houses in the material we
give to students. The third is to use digital media to create deeper
expositions of construction systems and processes than are generally
available to students.

3.5 Intrinsic rewards

Scholars of play such as Bower (Bower, 1974, p8) and Caillois (Caillois,
1961, p6) are emphatic on certain qualities of play. It is its own reward. It is
voluntary. Caillois (Caillois, 1961, p6) argues further that these two
qualities create a separate world in which play occurs, a world isolated from
the constraints and confusions of ordinary life. When either of these two
conditions ceases so does play. An athletic scholarship for a high rank in an
event, a parent pushing for academic achievement, the social hierarchy on
the surf-beach are all things that detract from the intrinsic reward of play.
The direct rewards of play are play itself and the successful conclusion of
play, however that might be conceived. In architecture, Archea (Archea,
1987) for example, connects to the play metaphor through these qualities of
intrinsic delight and separateness from the world. Play and designing are
both states of being absorbed in action for its own sake. At first, the intrinsic
reward, voluntary participation and separateness required of play seem
antithetical to the idea that play might be harnessed for something so purposeful as learning to design. Can a person be made to play? Does the requirement to play a game in order to learn an idea or skill destroy the illusory world so essential to sustaining interest in a game? The answer to this from the large literature on games in learning appears to be that intrinsic interest is self-fulfilling. If an activity is sufficiently interesting and relevant then learners will enter as they would a voluntary game. In learning, games are about being involved.

Figure 4. A model of an Australian Lightweight House, the Pittwater House by Richard LePlastrier.

While we aim at creating high levels of intrinsic motivation in all of our games, some are better than others. One of these is *The Nightclub*, a game to design a nightclub within a prescribed envelope (*Figure 5*). The student research for this game is serious fun! The game stresses a presentation along three themes: experience, explicit composition and the linking of these two—exactly the themes of the course it culminates.

### 3.6 Embodiment

Game play often has an “I,” an identity through which the player participates in the game. In Caillois’s terms, mimicry is pervasive. In athletics the “I” and the player are one. Even a game so abstract as chess preserves a role for the “I” in the king of each side—the player on whose security the game is won or lost. Designing suggests several “I’s.” There is
the “I” of the designer creating a work and the “I” of any of several putative users of a proposed building.

The game, *The Children’s’ Playground* (shown in Figure 6) embodies an “I” both familiar and foreign. The aim of the game is to design a playground in two parts having a formal “conversation” with each other. The playground is for three-to-five year olds and is presented largely through animation of a child’s experience at play. The “I” is a child, usually the student as a child—from our point it is great fun to watch and listen as students place themselves, both imaginatively and physically in the child’s world. In this game the students wrestle with dualities in form-making and the playing out of those dualities in the experience of form through play. Technically, this is their first animation. The task of creating an animation provably taken from a child’s perspective is intended as a technical discipline, and, more importantly, a lesson in deliberate communication as part of designing.

![Image](image.png)

*Figure 5. A slide from a student presentation of The Nightclub.*

### 3.7 Rules

Games have rules. Most often these are positive statements about how a game is to be played. In established games the rules are formalised: “a knight can move, ignoring any intervening obstructions, in any L-shaped pattern having one side of two squares and the other of one square.” In some games, particularly those of children, rules are often negotiated at the outset: “…let’s play go-broke Monopoly” (in which the object of the game is to lose all money and property and most of the rules are reversed)(Woodbury 2001). Caillois points out that even in direct role playing, there are rules—
the rules that govern the role being played (Caillois, 1961, p. 30). Caillois
associates rules with the ludus end of the paidia/ludus continuum in his
classification. For Caillois, ludus is the order or discipline that develops
from the tumultuous and open play of young children. The rules that bound
a game give it its intrinsic interest—players seek the skill needed to navigate
the landscape of choice created by the rules. The exploration metaphor in
design trades heavily on rules as the generative operators for a design space.
Like children’s’ games, the rules in exploration are meant to be broken or
replaced by other rules. This feature is taken as definitive, effectively
separating exploration from the putatively simpler process of search.

![Figure 6. A child's eye view of a Children’s’ Playground.](image)

We have long traded on the notion of rules in correspondence with the
“moves” designers make in their work. We present to students the notion
that a few ways of making form (often one!) interpreted and applied
throughout a form-making process is an aid to creating spatially and
experientially coherent places. Many of our games have relied on rules in
one form or another. Though we have used formal grammatical rules
directly in our teaching, we have tended to use the metaphor of the rule itself
metaphorically—our interpretations for students have stressed effect more
than formal machinery. In this genre, games typically provide a site (a game
board), a set of physical or spatial components (the game pieces) and some
preferred spatial relationships which students use to explore a world of
possibility. We encourage particularly those who need extension to break
the rules by changing the site, the pieces or the spatial relations. We have played such rules games in both physical and virtual media.

We show in Figure 7 one such rule-based game, *Tactile Objects*, which has, for two years, been the first game in the first computing subject taken by our first year students. The game comprises a grid, a collection of related objects and the directions to use the snap options in move commands to relate objects to each other and to have realisable, that is, face-to-face, relations with no spatial overlap. The design aim of the game is to create a composition that would be pleasing to hold in your hands. Technically, this game presents, for most students, the first time they have used the particular CAD system (form•Z) and, for many, the first time with any CAD system. The aims here are to learn to move objects in three-dimensions and to move objects precisely using object snaps. The objects use the square root of two widely in their dimensions. This prevents any possibility of using a grid or direct number entry to locate objects.

*Figure 7.* The board for the game Tactile Objects,

4. DOES PLAY "WORK"?

In this paper we have presented some of the ideas pushing along our play with learning. We have not discussed the serious question that any of this actually works in helping students be more confident and competent makers of tactile architecture. As part of our project we are conducting formal
evaluations of our practice of play in learning in early tertiary design education. Our methodology is mixed but trades heavily on the use of trained participant-observers to tease out what actually occurs in the classroom and studio (Shannon, 1995). We can report with some confidence positive effects on student confidence and self-assessed competence with form-making. We can also report some specific changes that we have made based on our findings. Streamed tutorials based on accomplishment in previous courses have allowed us to take advantage of the different learning styles that correlate with differing levels of achievement. Accommodating those learning styles in our instruction created this year the bizarre situation that the group containing the previously under-performing students achieved a higher overall mean score than the previous high performers in our introductory form-making subject. We also know that encouragement of active collaboration in class and evaluation processes can aid better linking of design and its criticism. These and other results from our project in progress await future publication.

5. SUMMARY

The cloud of metaphors around play is much denser that our sketch here describes. In reading the extant literature, examining our existing games and working to construct new ones we have touched on a fraction of the metaphors we suspect are “out there” in the play of conversation. Archea writes of puzzle-making in architecture (Archea, 1987) and, though his usage is unconventional, his puzzles are a powerful symbols for events at the core of designing. Effective learning has much to do with taking risks, and universities with sheltering students from the effects of intellectual risk-taking. Alexander and other have played out pattern as metaphor and a practical tool for thought in design. The dual ideas of choice and constraint temper much thought about designing. Writers on both games, for example, (Caillouis, 1961), and design, for example, (Archea, 1987), point to a protected place at the heart of play. This world apart which invokes a mystery or secrecy about play seems to us both crucial in understanding play and design, and the source of considerable mischief about inherent and mysterious “talent.” Though we known of many others, we conclude our short list here with the idea of winning and its converse losing, arguably the dominant contemporary conception of games, though only one of Caillouis’s four principal qualities of play. The university experience too is often distorted by this metaphor in the form of competition amongst students. Countervailing metaphors are collaboration and co-operation. Play upon these can build the culture of peer learning that is the goal of much current
learning theory. Dr. Seuss had it right about the folly hidden in a competitive view of play (Seuss, 1990):

I’m afraid that some times
you’ll play lonely games too.
Games you can’t win
’cause you’ll play against you.

6. REFERENCES


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