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WHAT WORKS IN A DESIGN GAME?

Supported by student reactions to being made to play

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Abstract. For several years we have been using the metaphor of play to conceive and deliver our design teaching. We report here results of a qualitative evaluation study on the effectiveness of our approach. We used both a participant observer methodology and a formal survey to gather and interpret data from the classroom. The results show tentative support for a positive role for play in early design education and several insights into how to build play into the design classroom.

1. Playing in and with Design Learning

> Things done for fun may be disturbing to some adults, especially those permeated by the Puritan ethic, who see mirth as quickly gliding into sin. (*Bower, 1974,* p10)

Can engaging design learning with the metaphor of play lead to good learning outcomes? We have conducted a qualitative evaluation study that provides a tentative answer of "yes."

We have been developing, testing and using student-centred teaching resources with the aim of enriching the capacity for design in beginning students in architecture, landscape architecture and urban design. Students are engaged in a milieu characterised by self-directed play in a low-risk computer modelling environment. As they gain confidence, peer critique and collaboration become an intrinsic part of their learning.

Why "play"? First, as a metaphor play is widely used in the literature to describe "good" designing. Play seems to capture essences of designing—it is intrinsically engaging, both bounded and free, and open-ended. Second, play can breed confidence and build new skill, which many beginning students sorely need. The ability to invent, manipulate and describe form is a fundamental distinguishing skill in design students. Lack of confidence and skill in form-making is a debilitating handicap, leading to frustration and disillusionment. It supports a division between those who apparently "have"

and "have not" these skills, labelling students as "creative-imaginative-competent" or otherwise very early in their course. Such labels all too easily follow through to subsequent careers. Third, authors such as Schumacher and Radford (1997) and Cheng (1999) and our previous pilot evaluation study (unpublished) suggest that form-making can be learnt and refined through self-directed, structured play with form-making games.

We require students to *play* at *games*, typically on a *game board* comprising a professional CAD tool, mostly form•Z. Our games play on several metaphors related to play (Woodbury et al 2001) and are situated in a particular course structure. In 1999, this subject was called *Design and Form IB* (in 2001 we changed its name to *Composing Architecture and Landscapes*). The course comprises a lecture series, a tutorial series and three assignments. Structurally it is unusual in that it serves much of the role usually reserved for the design studio—it is the major venue in which 1st year students create and critique designs. Pedagogically it provides a series of lectures on compositional ideas expressed as experiential goals (not rules) and parallel tutorial and assignment series in which students engage the creation of compositions reflecting these goals. The tutorials and assignments are situated in highly crafted settings—*game boards* in play terms. Tutorials have a two-hour time to completion, whilst assignments vary from three to four weeks in duration. The aims of the game boards are to focus attention on a specific narrow range of issues, to simplify the technical skill required to play, to reduce the *risk* of play and to almost guarantee a good outcome in some measure at least. The main assessment voice was through experience: how would a viewer within the composition experience it? All work in the course was in digital media and all student submissions were to a world-readable web site (Woodbury, 1999). Students in the class were predominantly school leavers who had matriculated in the preceding year. Typically they were 18 years old and had completed 12 years of school education. The degree (Bachelor of Design Studies) has no prerequisites related to computing, hand drawing or modelling.

We evaluated the subject with a participant observer methodology and a formal anonymous written survey given near the end of the course. Participant observation is a common process in qualitative (educational) research. In it, the researcher becomes a valid *participant* in the researched (educational) setting. He or she is "immersed in the daily activity and social intercourse of the group" (Smith et al., 1990, p. 133) rather than residing in the (somewhat discredited) role of detached observer. A premise is that observer-independent accounts of the world are impossible: we are bound to the situations in which we find ourselves and the only responsible course of action is to acknowledge our situatedness in our reporting.

The researcher-as-ethnographer in the participant observer role conducts research in a dual and continuous process of data gathering and interpretation.

He or she uses structured observations of interactions, logging conversations, interviews, conversing, open-ended questionnaires, focus groups and document review and analysis to produce data. This is then interpreted through categorisation and codification, or the preparation of a *rich narrative* (also know as *thick descriptions*) describing the people, events and their practices in context.

Thick descriptions are long. We can only skim the surface here. We focus on five teaching practices relating to using games in learning design.

2. Simultaneously Situate and Abstract Learning Tasks

Our initial efforts (Woodbury 1993; Woodbury 1997; Oxman et al. 1987, ; Schumacher and Radford 1997) played on several aspects we perceived as play-like. We isolated parts of larger design tasks into scenarios we hoped were intrinsically interesting and revealing of important (to us!) architectural ideas. We cast work with our *games* as being relaxed and social. We reduced the risk of assessment by using criteria-based continuous assessment and by reducing the range of criteria to suit the game at hand. We prepared and informally tested game scenarios that would bring students to the point of the intended form-making task. In hindsight, our games move towards two extreme positions of situating and abstracting learning. A game provides a rich *game board*, a representation of a place in which students will work. Typically, it is a highly crafted CAD model with materiality, lights, views and information structures created to reveal and focus on the phenomena at play. The task is situated within and related to a series of lectures on explicit form-making principles. In the tutorial following a lecture students are asked to make compositions that reflect the lecture content. An example, shown in *Figure 1*, is the game we call *Balance and Contrast*. The task of this tutorial is as follows (Woodbury 1999):

> The task of this tutorial is to use the model provided with the tutorial to create four images, each demonstrating a different experiential quality as labelled by the views “balance”, “contrast”, “balanced contrast” and “contrasting balance.” The four images are to be taken from the predefined views given in the model (you may change these slightly if needed).
>
> The object provided is a rectangular courtyard with a partial roof stucture. Under the roof structure is a cubic sculpture.
>
> You are to change the model so that each of the four provided views (as specified above) demonstrates its labelled quality. Your palette includes making new objects, altering existing objects, changing surface styles and changing lights, that is, the full palette of form•Z possibilities. This tutorial can, and should, be achieved by making relatively small changes to the model.

> "Balance" and "Contrast" are subtle phenomena and can be amply demonstrated with modest means.

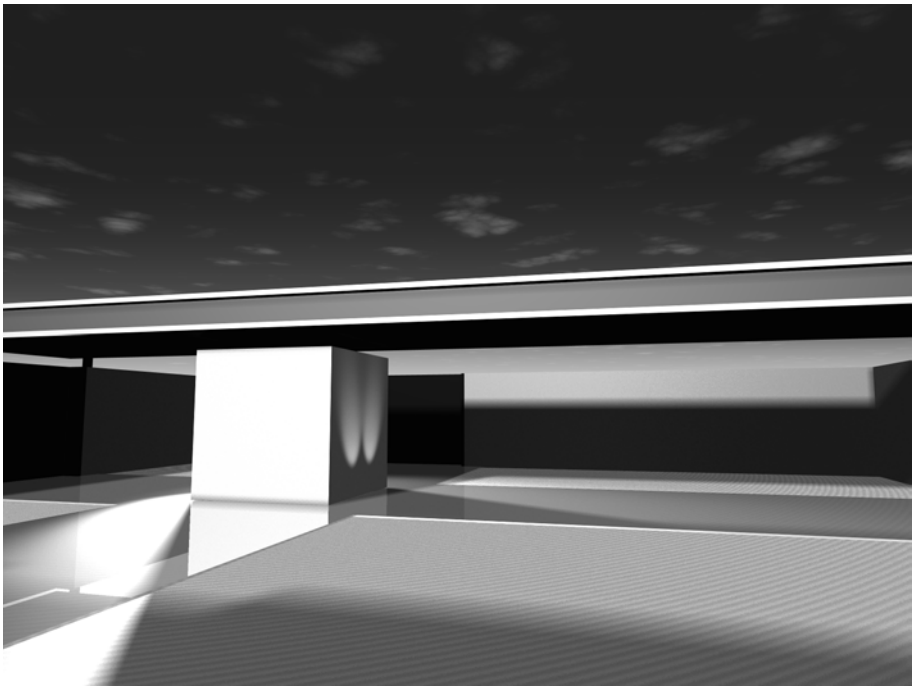

Figure 1. A rendering of the game board for the Balance and Contrast game.

The task it thus highly situated, within both a world of ideas and a miniature world within which to work. It is also highly abstract—it addresses a fragment of a typical design problem. It meets five of the six necessary conditions that Caillois (Caillois, 1961, pp.9-10) puts on games: it is separate from life, uncertain in outcome, unproductive in the usual terms of designing, governed by rules and requires a suspension of belief. The single condition it does not meet is freedom of choice to play: it is an obligatory part of the course and it shares this exception with all of the uses of the play metaphor in education. It also shares the typical solution to the exception: learning games work if they have an intrinsic interest that acts as a functional substitute for freedom of choice.

The paradox here is that the task is also abstract. It situates students in a visually realistic but otherwise unreal and simple world. It is removed from everyday life and the complexities of "real" design projects.

Students mostly tell us that this is a good thing. A comment from a student on the structure of the subject reads:

> It's the most enjoyable, relaxed [subject], but the work is fun to do, unlike some other subjects e.g…

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).

Others commented on the tutorial games that:

> The tutorial exercises were helpful in looking at different ways of designing and form-making.

and

> [Being] [G]given a set task and time limit made me have to act quickly which meant my work took interesting turns.

The lecture series focussed on principles of composition as *goals*, rather than strictly as *rules*, in the form-making of notable built form and landscape as produced by experienced designers. One student said about the lectures:

> The lectures helped a lot to discover form-making ideas. It was good that we could explore the new ideas by using form•Z, and increased the skills in using the program.

Another commented about the teaching and learning structure:

> Ít's a very exciting subject, it's terribly challenging which makes it that much more interesting. I think I have improved a lot because I have been able to understand the concepts behind the set tasks, as a result of lectures and not just tutorials[, as in Semester one.]

It is uncommon to present a course for beginning design students that selects elements from the repertoire of experienced designers (rules, expressed as compositional goals) and develops tools (games) specifically to apply these rules. One student wanted even more of this link to be exposed, writing that the subject could be further improved by:

> relat[ing] lectures to more real-life examples and practical examples.

Another student wrote that

> I don't entirely see the connection between the assignments and the lectures/tutes - [they] seem a bit detached.

Typically the vehicle for developing a familiarity with the application of the rules, essentially a corpus of form-making knowledge, is a brief about a client's needs. This requires the beginning student to deal with many differing agendas simultaneously. By focussing solely on the rules in games which had no other agenda than to act as a vehicle for demonstrating facility with the rules, beginning students could focus their attention on compositional issues through game play. Therefore the games became a deceptively simple tool for teaching a substantial core curriculum without the negatives associated with

designing context-less buildings to reduce the level of difficulty with form-making for beginning students.

A student commented that the best aspect of this subject was that it

> …incorporated imagination and fun into the projects instead of just technical skills

3. Push Tool use into the Background

We spend a great deal of time reducing the amount of skill required to play our games. This is not "dumbing-down." Though excellent results can be achieved with the minimal means we require, students play at their personal level of skill and extend their skill level informally through game play. We encourage such boundary breaking. We tell students that the game provides a starting point—they can play within the rules or invent their own within the intentions of the game. In this minimal policy students can achieve good results almost irrespective of CAD skill level. It pushes the tool into the background of the composition task, but requires engagement at the student's own level. We contend that success breeds confidence, that confidence breeds risk-taking, which in turn breeds skill acquisition.

Students at both ends of the spectrum appear to benefit from this policy.

A very technically competent student, James, often got up from his computer and roved around the classroom as a self-styled fix-it "tutor." His fellow students clearly appreciated the help. James had earned poor results for the core design subject in Semester 1, so it was notable that in a milieu where he possessed excellent skills, he had the confidence to help his peers. He was clearly learning (and gaining kudos) from becoming a teacher.

Another student, Erica, struggled with every tutorial. She had struggled in the prerequite basic computing subject and carried a skill deficit into this subject. She was able to achieve a reasonable outcome in each game, though it took perseverance and some stress in working against the two-hour time limit (which we relaxed if needed). Her final result for the course was above the class average. For her, the games were achievable milestones that kept her on task in a process in which she otherwise might have lost her way.

4. Privilege Peer Communication

The tutorial games were played and submitted within a single two-hour tutorial. To play, students had to be present in the computer lab. Two of the assignments had preliminary submissions which students discussed in the tutorial sessions. Student submissions were all online and we encouraged students to look up other work in the class. Finally, we would often engage

nearby students when helping a student with a query. In short, we did everything we could think of to encourage peer-to-peer communication.

It is no surprise that many of the best students were also the most engaged with their peers. It was further notable that many of the students who were successfully tackling and therefore completing the task spontaneously worked in groups of three. For example Helen, Peter and Graham came into the computer lab as a group of friends who had met in the Semester 1 tutorial classes. They sat adjacent to each other. Peter and Graham told me that they asked Helen to sit by them. Helen and Peter said that whilst they would always try to "do things" (that is, complete technically difficult tasks) for themselves, Graham, who was very competent with form•Z, would give them as much help as they asked for.

Other students played in groups. John, Paul and Jack, a group of three school leavers, were actually playing the Symmetry game. They were laughing and pointing to each other's screens. They also attended both tutorial sessions on consecutive days. When we asked Paul why they were there on the second day, he said:

> I don't mind CAD

To put it negatively like this suggests that he can't say "I like CAD" for some reason. Possibly, their confidence and competence breeds the typical Australian aversion to being a "tall poppy." Out labs and website constitutes a very public learning milieu, where not only can everyone see everyone else's screen, but they can also click onto any one else's submitted work in the class. Byard (1989, p.50) also suggests the following:

> Although in peer critiquing the authority figure—the teacher—is not immediately present, it would be a mistake to think that the amount of rule exercised in the classroom is therefore reduced. The importance that students ascribe to their peers' opinions is clear...and John Clifford (1981, p.6) has proven empirically that "feedback from an immediate, socially appropriate audience, [specifically peer groups] seems to [provide] a more compelling impetus to change than the abstract grade rewards of the current-traditional paradigm."

We have observed increased peer interaction in the game-play milieu, both in co-operative learning and peer support. It is this supportive role that we seek to foster in and beyond the classroom.

5. Bring Tool Capability Forward

Our games showcase what tools can do. We forefront those aspects that we believe are most gratifying. Rendering. is a prime example. We supply refined materials, lights, views, rendering settings and animation paths. The hope is

that students can quickly see what is possible and can experience their own work presented with power and effect. Yet, in evaluation, we push these aspects to the background, looking instead at the experiential aspects of student work. One student cited that the best aspect of the course was:

> Learn[ing] in a simple way how to manipulate a complicated program

but that the concepts of form-making were more challenging. S/he believed that the subject could be improved by:

> More form-making games. Quick tutorials to create small yet more complex forms.

6. Maintain a Teacherly Role

In all of this play and gaming, the teacher does not disappear.

In order to play the games a substantial facility with a computer-aided design package is required. We had introduced form•Z to the students in Semester 1 through structured teaching in CAD 1, a compulsory Level 1 semester length subject which brought students into the computer aided teaching suite (CATS) for 3 hours every week. The 10 exercises used in CAD 1 themselves have game-like aspects.

Within the class there was a wide variation of ability and outcome from the Semester 1 prerequisite subject. This difference created a dynamic in the computer lab which was a feature of the games playing, as the adjacency of variously talented and computer-literate classmates encouraged collaboration. Some students struggled all Semester 1 with form•Z, feeling little mastery even at the end of the semester. Conversely, other students commenced Semester 2 with such mastery of the tool that their creative efforts could be fully expressed in the manipulation of the games.

Despite the clear focus of the curriculum of Design and Form 1B being skills with making and critical thinking about composition, there was a definite sense, expressed by many students, part-way through the Semester, that they were unable to manipulate the form•Z tool with sufficient dexterity to create what they had imagined, and were therefore obstructed in making, critically examining and then remaking a form to the given compositional goals. This concern was clearly expressed by a male school leaver student, Des, in the first tutorial when the class was working with its first game[1]. In Shannon's role as participant observer, she had noted that half the class had left the CATS Suite

[1]The Experience Game concerned creating an experience in serial revelation to a view of a focal point. The larger learning goal was reading the experiential implications of form-making, whilst the tutorial task concerned arranging enormous panels (7200 x 2400 x 300) to gradually reveal a view of a focal point.

after one hour of the two-hour tutorial had elapsed. Regrettably there was a strong correlation between those who left early and those seated in the front two rows which were designated for students who had self-selected that they needed more tutorial assistance as a result of their Semester 1 results, and their poor mastery with form•Z.

Shannon observed this poor time-on-task feature to Des. He said that he believed the problem with students leaving early was that they were frustrated with the computer as a tool.

> I can see what I need to do: the computer stops me from doing it.

Another student commented at the end of Semester about the selection of form•Z as the CAD package:

> form•Z is harder to use if the idea of what you are trying to make does not exist.
>
> It is also harder to make the idea using form•Z.

As we had repeat tutorials each week on consecutive days we immediately tried to address the time-on-task problem—knowing that student time on task is critical to success. In the second tutorial, we reinforced the need to stay on task and, in an expanded session of "teacher-talk," described in more detail the tutorial exercise. It was notable that after 3/4 hour all the class was working steadily on task with few requests for tutor assistance. Apparently, the more fulsome task description had obviated many repetitive questions of clarification and had brought necessary extra context to bear. Teacher talk is also the teaching style to which the students are accustomed. It is a welcome invariant.

7. Conclusions

Our interpretations are tentative. They support our approach of engaging beginning design students in playful social settings. They have been useful as an explicit tool for formative assessment and continuous improvement in our teaching. What comes next is more of the same, but with richer data and interpretation, the frame for which comes from this study. We are presently designing, refining, delivering and evaluating the pair of courses (*CAD I* and *Composing Architecture and Landscapes*) of which the course reported here has historically been the second. Like our teaching, the evaluation methods we use are situated and interpretive. Each cycle of action and interpretation produces new forms of and insights on student learning. What motivates us to write is the hope that the forms of learning and evaluation methodology are, of themselves, interesting and useful to others.

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