Design Gaming, Designing Games

Learning Design through Game Playing and Game Making

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This is an ongoing effort to make design learning fun and constructive. The process of designing, in many respects, is very similar to playing games: exploring possibilities under certain constraints. Since 1999, the "designing as game playing" concept has been used in architectural design studios and related courses in my institution. In the early years, pre-existing games or games created by instructors were used. These games were played in a junior-year course that emphasized design decision-making and design collaborations. In recent two years, design game making has been used as a vehicle for senior-year student to strengthen their analytical skills. So far, students have developed games of Mario Botta, Le Corbusier (Villa Savoy), Aldolf Loos, Mies van der Rohe, and Richard Meier. Two more games are underdevelopment: the games of Isosaki and Tadao Ando. Some of these games have been used in freshman-year courses to introduce certain principles of form composition.

Playing design games enables students to gain design knowledge as well as to be able to view design constraints constructively as special characteristics on the game board that may turn to their advantages rather than as useless stumbling blocks. Designing games requires students to analyze existing designs in great details as well as to be able to organize certain relationships of these details into operable rules that could produce new designs.

The experience of teaching "games and design" to-date has been a very fruitful one. Future work will focus on design gaming for freshman students and game designing for senior students, as well as the interaction between the freshmen (game players) and the seniors (game designers).

Keywords: *Design Games; Game Design; Design Studio.*

Games and Play

Prensky (2001) describes the learners today are of the Games Generation. The Games Generation people are "accustomed to the twitch-speed, multitasking, random-access, graphics-first, active, connected, fun, fantasy, and quick payoff world of video games, MTV, and Internet" (Prensky, 2001, p. 64). I found these perfect descriptions of my students. They had seemed to have "attitude problems" in learning and responded poorly to conventional design studio teaching methods. Having understood and accepted the Games Generation's differ-

ences, I began an effort to make design learning fun and constructive starting from games and play.

The process of designing, in many respects, is very similar to playing games: exploring possibilities under certain constraints. In early design education, students are taught how to play the game of design by following a set of rules given by instructors. Gradually, the students are given less and less specified rules for later games of design. At graduation, the students are expected to have developed abilities to formulate their own rules to play new games. Students not only play games but also design games. Similar analogies are also described by Johnson (1994) and Woodbury, et al (2001).

Design Games

Design related games are abundant. However, games related to design education or activities are not easily available. Radford (2001) has rich experience in using games with students. He has employed role-playing games, form-making games and an adaptation of the form-making game to building construction. Woodbury et al (2001) use form-making games in early design educations. Habraken and Gross (1988) develop games of design decision-making and collaboration. Wyeld and Allan (2001) employ role-playing games in planning education.

The works to be explained in the following sections are inspired by many of the games mentioned above, particularly those by Habraken, Gross, Radford and Woodbury in the late 1980s and early 1990s.

Game Playing

In my institution, the "designing as game playing" concept was first introduced in a junior-year elective course in the spring of 1999. The course was about design methods. As a part of the course, simple design games, taken from Flemming (1987) and Habraken and Gross (1988), were played. Students enjoyed the exercises but was unable to understand the relationship between these design games and the process of design. In general, they were reluctant to accept that there are rules to follow when designing. "Design should be free," many of them said.

When the course was offered again in the spring of 2000, "game playing" was the main thread running through the entire course. The course started with an initial game of collaboration and negotiation, the Mars Game. This game uses LEGO blocks as game pieces. Game pieces are divided into five different types, each represented by a color. Several game pieces form a cabin that is basic building unit on the building site (which is on Mars). The building site is represented by a game board. Multiple players participate in the construction of the Mars site. Positions of building units and relationships between them are governed by certain rules. Players gain or lose points at each move (to put a building unit onto the site). Students were graded based on their points.

Along that course, the initial Mars Game was refined several times to account for different design constraints and detail spatial organizations. For their very last assignment, students were required to design a new set of rules for the Mars Games. Unfortunately, students performed poorly on that last assignment. Although they were able to formulate strategies of collaboration to gain high points, they could not relate game rules with game results or strategies of play.

Designing Games

Also starting from spring 1999, many senior students have been encouraged to take on the subject of "architectural design and games" as the focus of their senior research project. To complete the project, each student has to analyze designs of a particular style or by a particular architect and develop games that when played could produce designs of the style or the architect. So far, students have developed games of Mario Botta, Le Corbusier,

Aldolf Loos, Mies van der Rohe, and Richard Meier.

All these games are form-making games that involve two or more players. Students (i.e. game developers) were encouraged to develop scoring schemes that could provide evaluations of the resulting forms and/or determine winners and losers. They were supported by a team of game evaluators (consisting of a faculty member and several master students) through weekly discussions and game playing. The resulting games are in various forms, such as board games, strategy games and 3D block games. Nevertheless, playing any one of these games will produce three-dimensional forms at the end.

In the following sections, I will elaborate on two games: the Mies Game and the Richard Meier Game.

The Mies Game (Chu, Y.-C.)[1]

This is a form-making board game created based on a particular style of houses designed by Mies van der Rohe (e.g., see Figure 1). In addition, the basic rules in this game are strongly influenced by Flemming (1987).
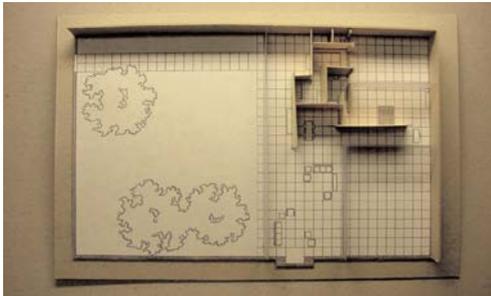
The initial game design is a solitary game that contains a game board and game pieces of varying lengths. The player pins a game piece on the game board one at a time. In each move, a game piece can be placed parallel or perpendicular to an existing game piece on the board (Figure 2).

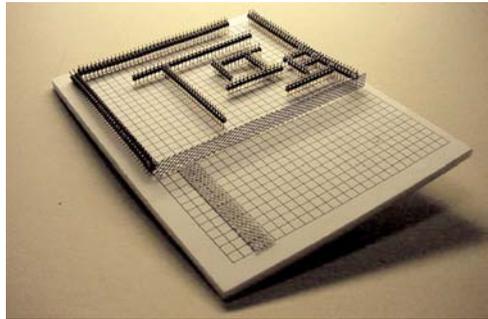The solitary game was revised into a two-player

Figure 2. Initial game board design of the Mies Game

game. A scoring mechanism was added to determine a winner and the termination of a game. Several game rules were also added to ensure that a game result might reflect characteristics of Mies designs. Furthermore, game pieces were discarded and replaced by colored lines (Figure 3).
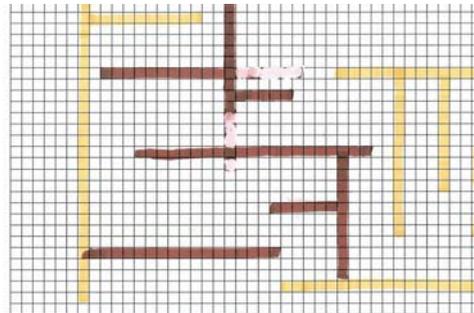

Figure 3. An example play of the Mies Game

Finally, the game was refined so that a game result can be converted to a three dimensional model that resembles a house. In this final game design, rules of positioning columns and curtain walls were added (Figure 4).

As an experimental effort to explore online interaction, a web-based Mies Game was implemented. The web interface allows players that reside at two different locations to play. All restrictions defined in the game rules and score keeping were done by the game system.

Figure 1. A court house design by Mies van der Rohe

Figure 4. An example result of the Mies Game
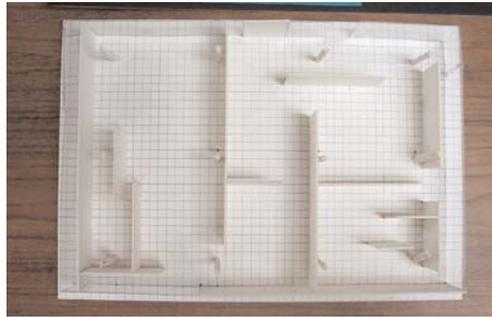
The Mies Game has allowed the student (game designer) to explore an aspect of design thinking that is rarely discussed in design education: *quanti-fying* design results. In order to develop the scoring mechanism, the student has to determine a "value judgment" of a game result (or a game state on the board). Furthermore, in order to implement the web-based game, the student has to translate game rules into a mathematical representation of constraints.

The Richard Meier Game (Li, C.-Y.)[2]

This is a form-making block game created based on residential houses designed by Richard Meier. The game designer abstracted from results of case analyses two prototypical configurations. On top if that, the game designer added three base shapes. These two decisions create a set of basic permutations of the Richard Meier Game (Figure 6).

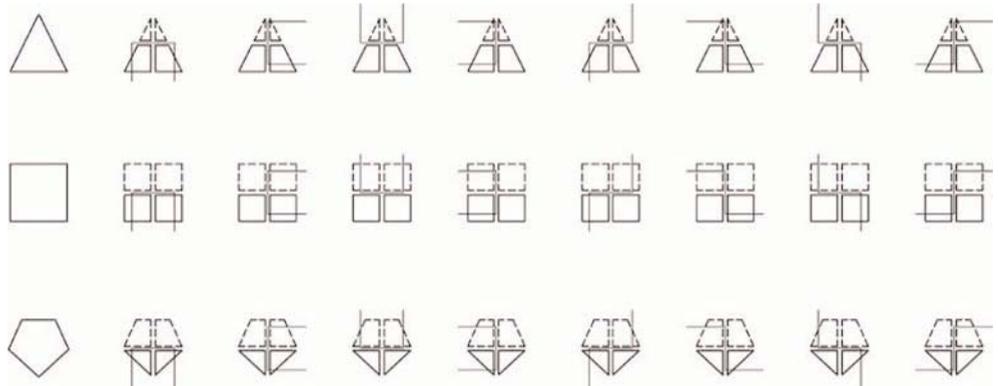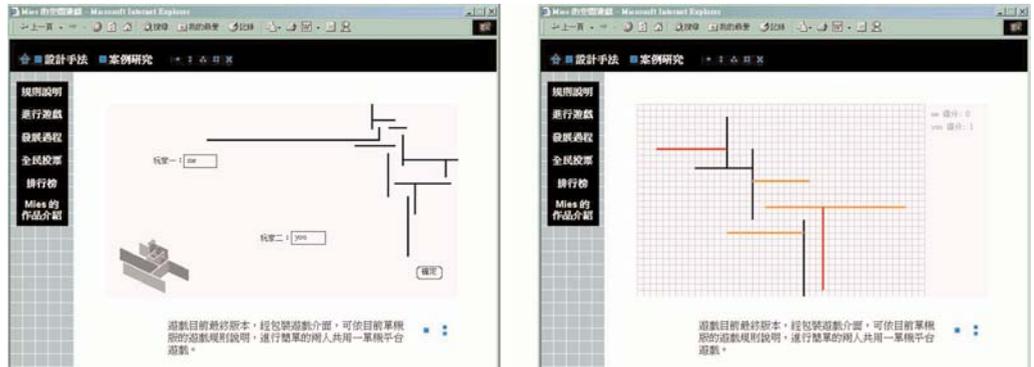
Figure 5. An implementation of web-based Mies Gam

Figure 6. Basic Permutations of the Richard Meier Game

Summarized from these basic permutations, the game designer identified three types of game pieces (or blocks, see Figure 7) and explored possible results of the game. Later one, a scoring mechanism was added and several alternatives of quantifying game results were explored. Figure 8 illustrates one alternative that includes a game board representing site forces.

The Richard Meier Game design requires the student (game designer) to explore and abstract design constraints imposed by a site. The abstraction of design constraints into a different representation (the game world) became the greatest challenge in this case. Due to the time constraint, the student was not able to resolve all issues in this aspect.
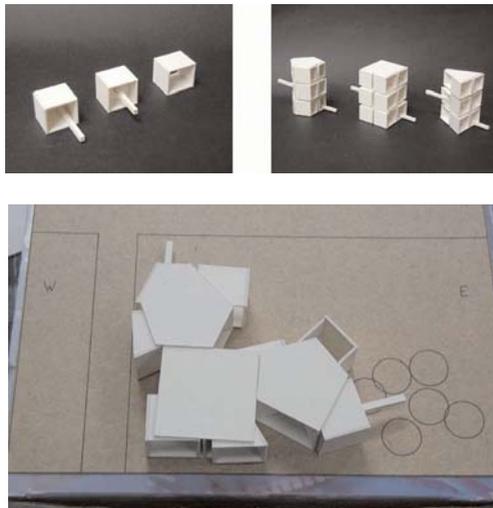
Design Gaming

The "designing as game playing" concept, although introduced into courses in 1999, was not used for design studios until the fall of 2000. In the freshman design studio, two design games were experimented: The Community of Blocks and The Blockland. The Blockland is an adaptation of Radford (1997). The Community of Blocks is a game of form making

with volume restrictions and height controls. These games turned out not so playful as expected, in part because there were no clear objectives to achieve.

At the end of fall of 2000, the Mies Game was used as a two-day exercise in the freshman design studio. Through the game, freshmen were able to learn certain compositional styles of Mies van der Rohe and practice model construction (e.g., see Figure 4). On the other hand, the game designer (a senior student) was able to evaluate the design of this game in a large scale. Aside from the game playing, the interaction between freshmen and senior students in the design studio setting was very well received.

The Mies Game was played again in the "Introduction to Architecture" course in the fall of 2001. Some students improvised the game by turning it into a three-person game. Some students developed interesting gaming strategies. Figure 9 shows selected game results of 39 freshman students from this exercise. The gaming activities of this exercise were recorded. Unfortunately, due to the large amount of the audio and video information, it is still under analysis.
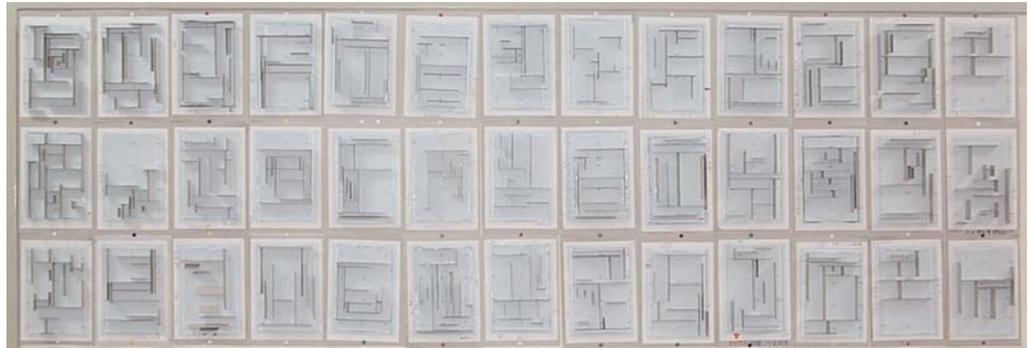
Discussions

The experience of teaching "games and design" to-date has been a very fruitful one. Playing design games enables students to gain design knowledge as well as to be able to view design constraints constructively as special characteristics on the game board that may turn to their advantages rather than as useless stumbling blocks. Designing games requires students to analyze existing designs in great details as well as to be able to organize certain relationships of these details into operable rules that could produce new designs. Current work continues to focus on design gaming for freshman students and game designing for senior students, as well as the interaction between the freshmen (game players) and the seniors (game designers).

The design gaming and game designing activi-

Figure 7. Game pieces and example results of the Richard Meier Game

Figure 8. An example result of the Richard Meier Game

ties illustrated above have not be seriously evaluated. The evidence described was based on personal observations and informal discussions. Recent discussions by Data et al (2001), Radford (2001) and Woodbury et al (2001) have demonstrated associations between games, design and pedagogy. I hope to learn from their experiences so that some form of incremental evaluation can be conducted in the near future. Furthermore, a thorough evaluation of this "designing as game playing" approach will be conducted at a later time.

Acknowledgements

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[1] *All figures in this section are produced by Chu, Y.-C. (the game designer) unless otherwise noted.*

[2] *All figures in this section are produced by Li, C.-Y. (the game designer) unless otherwise noted.*