The Summer Games
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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. Recently thirteen upper year design students, six from Adelaide University (Adelaide, South Australia, Australia), five from Deakin University (Geelong, Victoria, Australia), and two from Victoria University, (Wellington, New Zealand) were commissioned over a ten-week period of the 2000-2001 Australian summer to construct a new series of games. This paper discusses the process behind constructing these games. This paper discusses six topical areas:

– what is a game;
– specific goals of the summer games;
– the structure of a game;
– the game-making process;
– key findings from the production unit; and
– future directions.

Keywords: Reflection-in-action, design making, game container, collections, meta-cases, data repository.

What is a game?
From Bower (Bower, 1974) we see games are useful for enhancing specific skills in a structured yet playful environment. Cheng (Cheng, 1999) alludes to games containing narratives that become less dependent on logic. And Caillios (Caillios, 1961) sees games as removing the mysterious. Again Bower describes games as “...a contest in which there are agreed upon rules and goals. It is a contrived social system with prescribed space and time boundaries” (Bower, 1974). In a designerly sense, playing a game can be an exploration of paths of choices and actions from all those available to the players. In our case, a game is a structured basis for learning about construction, the process of researching information, building/environment interaction or other relevant topic through a series of activities using digital media that are analogous to playing a game. A group of games with different learning objectives may use a single architectural work as their focus.

Why Games?
Games attempt to address, through their emphasis on problem solving skills, what Schon describes as Universities’ commitment to a particular epistemology that “…fosters selective inattention to practical competence and professional artistry” (Schon, 1983 p-vii). Games attempt to ameliorate, for the student, the mismatch between professional knowledge and the complexity of value judgements required of...
practice. Games do this by exemplifying the unique events of practice situations. Through numerous case studies, drawn from real-world contexts, games help students gain the generic problem-solving skills highly valued in the profession (Wyeld, 2001). Digital media, and in particular CAD, in delivery of, and construction of, the games enhances traditional pen and paper design language. They are as much ‘the stuff of inquiry’ as a design studio teacher’s ruminating and sketching.

Play follows contingent agreements embedded in the rules of a game. Games have clear political implications, “acknowledging excess and complication as facts of architectural practice…. Play negotiates stability and instability and demands participation” (AR, 1996, p8-95). Designing is game like. Early learner design students are empowered to explore spatial concepts through game-play in a CAD environment which they may not have had the skill, hence confidence, to do so in a traditional paper based design studio (Woodbury et al, 2001A).

Not all the games created over the summer were based on real-world cases. Some form making games are abstract, isolated design issues intended to stretch students’ imagination (Bury et al, 1999). These isolated parts of larger design tasks reveal important architectural ideas. In particular abstract form-making games assist learning through self-directed, structured play (Woodbury et al, 2001B).

Specific goals of the summer games
Reflection-in-action and design making were two primary goals for the summer games. Computing offered a new way to engage these goals:

- Reflection-in-action is fostered through development and application of criteria for judging performance in the game—these criteria are an explicit part of a game’s content. The hope is that self-judgment and use of that judgement moves beginning students to a new understanding.
- The summer games’ emphasis on design making attempts to address the paradoxical relationship of designing in a computing medium and the relationship to its physical counterpart. This is achieved through a recurring theme of construction image sequencing followed by physical referencing (Radford, 1999B). These games can be fun to play. Their play strategy aims to de-emphasise the instrument. Putting the tool in the background means that the attainment of a higher level of digital mastery happens through the process of doing things meaningful in themselves. A key enabling feature of these games is how, through active learning, IT and making skills are acquired as an outcome of low-risk explorative play. The introduction of web-based games delivery/submission both supported existing on-line curriculum delivery at Adelaide and initiated it at Deakin. In the case of Deakin the role of staff developing the games during the summer extended within the domain to that of being an ‘adopter’ as well as ‘change agent’ for the integration of games into the curriculum across the curriculum areas Architecture and Construction Management respectively (see Figure 1). (Davies and Csete 1998).

The structure of a game
Games comprise a collection of resources including CAD models, digital images, QTVR panoramas, links to trade and regulatory literature and a construction primer, text, and other media, delivered on line. A

Figure 1. Construction Management submission (Deakin).
game container holds web pages setting out and linking to: aims, tasks, resources, assessment criteria, and extension exercises (see Figure 2). Each page is a carefully crafted document:

- Aims often comprise a realistic ‘scene’ setting narrative, (such as the student may be implicated in the outcome of a discussion between an architect and a client about a construction process (McNair, 1954)).
- Tasks set out what is the minimum expectation of engagement.
- Self and mastery assessment criteria are both explicit from the outset (Biggs, 1999).
- Extension exercises suggest further directions of investigation which challenge those students who quickly master the game.
- Resources may include sophisticated digital resources and links to on-line references including student submissions (see Figure 3).

A central theme in many of the games was “how do buildings get built?”

The game-making process

Over the ten-week period forty-six (Adelaide 22, Deakin 14, and Wellington 10) games were produced. Each game was directed by a client, typically the teacher who would use the game in a course, and created by a small team of students. Chronologically the main features of the game process were the following:

- agreements with vested parties, such as architects and others, sought in both a formal and informal manner;
- collections of pertinent resource data: digital, working drawings, aerial photographs, maps, documents etc;
- selection of suitable games constructors, and the formation of teams and team leaders;
- collective motivational site visits (and further data collection);
- games client meetings –brief drafting;
- CAD model construction, digital photographing, scanning, referencing, copyright proofing, etc;
- third party testing within the production unit;
- refinement ready for delivery; and
• classroom delivery and learning evaluation supported by journalling.

Typically the scope for any game was restricted to what was achievable in one week. The weekly cycle included Monday morning briefings with a games client followed by reviews on Wednesday mornings, and Thursday afternoons with Fridays reserved for final polishing. Clients typically came with hesitant expectations and were much encouraged by the enthusiasm of the student games-constructors. The student games-constructors gave invaluable insights to the final game form that showed constant self-reflection throughout the game making process. The game container, successfully established earlier, posed as a working template for all games.

Key findings from the production unit

Findings can be grouped into three categories: before, during and after production.

Prior to production commencing:
• various methodologies for addressing the goals and needs of game production were discussed and mapped-out;
• the need for a meta-case collection of games and a method for storage and easy retrieval of case resources was identified;
• across the three universities involved, five case studies were chosen;
• a repository with associated metadata entry template was trialed and though valuable as a storage device it did not deliver the useability sought. The repository is subject to ongoing research;
• a games container model was established;
• all copyright agreements were in place; and
• substantial data related to specific cases had been collected.

Early in production it became clear that:
• selected students vary in their ability, personality, and application. While students had been chosen for a combination of their computing aptitude, general construction knowledge and research backgrounds, they were forthright in promoting their specific talents in adding a professional level of detail beyond expectations;
• each game reflected authors’ peculiar strengths and insights;
• successful games did not always follow a carefully drafted work plan. Student game-constructors often invested heavily in risk-taking with rewards outweighing failures. Overly-structured games can be less interesting than ones which follow a more intuitive path;
• a weekly cycle of encouraged self-direction by games directors followed by positive criticism leaves time to polish the games. This leads also to a deep mutual respect followed by equal dedication from both parties. In this workplace environment students felt they could extend themselves, spawning desirable yet unpredictable outcomes; and
• deep exploration of the tools of games construction is crucial and is directed by the games coordinator.

On completion of the summer games production clients were invited to include their games in their teaching schedules. At this time, with the clarity of teaching expectations, clients found their ‘games’ needed to fit more closely traditional teaching material. Some minor and ongoing refinements include:
• in the uptake of digital construction systems into construction subjects 3D digitising of a construction ‘system’ needs to be supplemented by its physical counterpart. Students should be encouraged to contribute their digital interpretations directly to the resource base for the game/case; and
• real-time constraints of loading and executing large/complex models on slow delivery machines can be problematic. Optimisation of digital resources allows for wider use across differential platform performance.
Future directions
The summer games build on a history of the use of games as design learning tools at the participating universities (Radford, 1997A). What makes these games different is the level to which each reflects the student-games-constructors' interpretation of their own learning strategies. The games are an exemplar of, and promote, reflection-in-action. Student users will contribute directly to furthering this digital making. As collections of games they support a case study of a particular built environment. Evaluation of their learning effectiveness in the classroom is ongoing (Woodbury, 2001B). A data repository that can organise and allow for multiple cross-referencing of digital resources for consistent delivery of games and cases is a future goal of this research team.

References