Playing Property – designing serious games to enhance the learning experience for undergraduate property students in Australia

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BAppSc (PropEc) MAppSc (PropDev)

Submitted in fulfilment of the requirements for the degree of

Doctor of Philosophy

Faculty of Arts and Business
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2015
Keywords

- Constructivism
- Constructive alignment
- Serious games
- Property education
- Higher education
- Intended learning outcomes
Abstract

Whether Australian universities are in the midst of an education revolution or an early stage of transformation, the needs of the new student cohort are not going to be met by the current teaching model alone. This presents the opportunity to refine program offerings and look to innovative means to constructively align intended learning outcomes, functional learning activities, and formative assessment to support the changing student cohorts.

Learning in university property programs may be enhanced through games. Games are, by their nature, fun problem-solving vehicles enabling students to gain skills and build knowledge. Similarly, gameplay presents the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life. The problem lies with the lack of alignment between what is learnt through gameplay and the intended learning outcomes of university property programs.

Utilising a design science research method as the methodological framework, this research extends to the design of a serious games suite and associated learning activities, tailored to enhance the learning experience for undergraduate property students in Australian universities. The games suite comprises four games: two designed specifically for educating property students; and two existing proprietary games repurposed as property learning activities.

The implementation process supports the assertion that the serious games suite may enhance the learning experience for property students by providing a motivating activity that may develop their knowledge of property theory and function. Additionally, the individual games present opportunities for students to develop sought-after skills and attributes, such as communication through playing the board game Possession v Poverty and creative/critical problem-solving through playing the simulation game Investorville.

While subsequent, postdoctoral, evaluation and empirical testing will provide a more detailed investigation into what undergraduate students learn from playing games, emergent themes from this research to consider in future studies relate to the type of student who may benefit from the pedagogical approach and how passive teaching methods may be activated though incorporating games.
## Design science activity summary

<table>
<thead>
<tr>
<th>Activity</th>
<th>As applied in the design of the serious games suite</th>
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<tr>
<td>Problem identification and [research] motivation</td>
<td>The needs of a new student cohort are not expected to be met by the current university teaching methods alone (1.1) and there is an implied directive to find the right pedagogical tools to engage students and develop them as deeper learners (2.1). Serious games present as one solution for universities aiming to support learning processes in a more playful way (2.6.3). As a problem-based learning activity, serious games enhance learning, and proponents underscore the role of playing games in supporting collaboration, problem-solving, communication and critical thinking (2.6.3). Similarly, gameplay is said to present the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life (2.6.3). These attributes associated with playing serious games align well with the learning outcomes for property students in Australian universities (2.6.2). As such, this research endeavours to contribute to extant research by demonstrating how serious games may be designed to enhance the learning experience for undergraduate property students in Australian universities, as depicted in Figure 1.1. The design of such an innovative artefact is dependent upon an understanding of the specific problem domain which presents the first problem (3.3). While Chapter 1 (1.1) and the literature review, Chapter 2, seek to define the problem and the domain, the published research does not sufficiently define what skills, attributes and knowledge are sought after by property graduates, let alone how well their playing of serious games contributes to satisfaction of the intended learning outcomes (2.7).</td>
</tr>
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| Define the objectives for a solution | Primary objective:  
- To enhance the learning processes of property students in a more playful way.  
Secondary objective:  
- To enable property students to analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations.  
Tertiary objectives:  
1. To enable property students to describe and explain objective theories of property custodianship and the practical skills they require for a career in property  
2. To enable property students to communicate effectively as professionals with clients and colleagues in addressing real-life property situations  
3. To enable property students to operate effectively and ethically as team members in real-life property situations  
4. To enable property students to reflect on their role as property students and initiate transformative practices to guide their actions in an unknown future. |

| Design and development | Two purpose-built serious games, Playing Property and Possession v Poverty.  
Game | Platform/venue | Purpose |
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<tbody>
<tr>
<td>Playing Property</td>
<td>Theatre and computer</td>
<td>Designed by author for educating property students</td>
</tr>
<tr>
<td>Possession v Poverty</td>
<td>Board game</td>
<td>Designed for educating property students</td>
</tr>
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| Demonstration | The purpose-built serious games along with the repurposed SimCity and Investorville games implemented as learning activities.  
Game | Platform/venue | Purpose |
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<tbody>
<tr>
<td>SimCity</td>
<td>Mobile device/computer</td>
<td>Proprietary game repurposed by author as property learning activity</td>
</tr>
<tr>
<td>Investorville</td>
<td>Computer lab</td>
<td>Proprietary game repurposed by author as property learning activity</td>
</tr>
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</table>

| Evaluation | The primary evaluation method incorporates a questionnaire and scoring rubric and a reflective journal (7.2). The triangulation of results considers three primary connections between the evaluation tools, published research, a larger sample and across the sample being examined (7.2). |

| Communication | The structured thesis provides the primary communication mechanism being explicitly structured to align with design science guidelines and activities (3.6). |

Source: Peffers et al. 2008, p. 54; Author.
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List of abbreviations

API          Australian Property Institute
AQFC         Australian Qualification Framework Council
DSRM         design science research method
FCIC         Financial Crisis Inquiry Commission
GDP          gross domestic product
GPA          grade point average
IS           information systems
MOOC         massively open online courses
OBOW         open book and open web
PCA          Property Council of Australia
PED321       Property Development and Project Management Processes
PMI          Project Management Institute
REIQ         Real Estate Institute of Queensland
PRRES        Pacific Rim Real Estate Society
RICS         Royal Institution of Quantity Surveyors
SES          socioeconomic status
USC          University of the Sunshine Coast
Statement of original authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature:

Date:
Related publications and artefacts

- Boyd, S 2013b, *Possession v Poverty*, board based property game, University of the Sunshine Coast, April.
Acknowledgements

In no particular order, I thank:

• The students and participants who took part in this research
• Those academic staff involved with my studies, in particular, my supervisor Professor Mike Hefferan, co-supervisors Doctor Jacqueline Blake and Doctor Shah Jahan Miah, and mentor Doctor Terry Boyd
• Professional editor, Robyn Kent, for providing copyediting and proofreading services, according to the guidelines laid out in the university-endorsed Guidelines for editing research theses.
• Last but not least, thank you to my family for their support.
Chapter 1  Introduction

This chapter provides the context and reasoning for undertaking this research. In particular this chapter addresses the background, problem and research question, and then extends to describe how the problem is approached in this research project and thesis.

This research endeavours to demonstrate how to design serious games to enhance the learning experience for undergraduate property students in Australian universities (2.7). Fundamental to this endeavour is the principle that knowledge and understanding of the problem and its solution are acquired in the process of designing and building an artefact. As such, this research comprises the design and development of a serious games suite for use in Australian higher education. The project utilises principles and activities of design science, which is a novel but accepted approach in the property discipline. Design science is soundly based on traditional experimental and design approaches to education and is an established method in Information Technology (3.3). The design science research method is supported by explanatory theories in education research (3.2).

1.1  Background

The background, or problem domain, for this research relates to the changes occurring in Australian higher education, and the associated impact on the students’ learning of (real) property. The background commences with a critique of the current and emerging higher education environment (1.1.1), then extends to property education (1.1.2) and introduces serious games (1.1.3) as preliminary justification for the research project.

1.1.1  Higher education environment

With a hypothesis reading ‘that the dominant university model in Australia … will prove unviable in all but a few cases over the next 10–15 years’, Ernst and Young (2012) set the
scene for an industry-led investigation into the Australian university model. While the findings of their report are not empirically supported in an academic sense, the research includes interviews with leaders from public and private universities, policy makers, and sector representative groups. They present drivers of change into five key trends:

1. democratisation of knowledge and access
2. contestability of markets and funding
3. digital technologies
4. global mobility
5. integration with industry.

Similarly, quasi-industry investigations into emergent learning technologies (Johnson, Adams & Cummins, 2012; Johnson et al. 2011, 2013, 2014), acknowledge the evolution of the higher education sector and explore trends in education activities. Johnson et al. (2013) present the highest ranked trends of the New Media Consortium advisory board members, informing their adoption of higher educational technology for the period 2013–2018. The trends, listed in the order in which the advisory board ranked them, are:

1. Openness – … open content, open data, and open resources, along with notions of transparency and easy access to data and information
2. Massively open online courses … being widely explored as alternatives and supplements to traditional university courses
3. The workforce demands skills from college graduates that are more often acquired from informal learning experiences than in universities
4. There is an increasing interest in using new sources of data for [personalising] the learning experience and for performance measurement
5. The role of educators continues to change due to the vast resources that are accessible to students via the [internet]
6. Education paradigms … shifting to include online learning, hybrid learning, and collaborative models.

(Johnson et al. 2013)

Whether accurate in their conclusions or not, Ernst and Young (2012) and Johnson et al. (2013) broadly capture the discussions on the role of universities and higher education in the future. When considered with the findings of the reviews into Australian higher education (Bradley 2008), and quality of learning at university (Biggs & Tang 2009), the trends impacting the current university teaching model may be broadly grouped as:
1. transparency and availability of knowledge (Ernst & Young 2012; Johnson et al. 2013)
2. structure and financing (Ernst & Young 2012; Johnson et al. 2013; Bradley 2008; Biggs & Tang 2009)
3. the new student cohort (Johnson et al. 2013; Bradley 2008; Biggs & Tang 2009).

Ernst and Young (2012) speak of the democratisation of and ready access to knowledge as drivers of what they term a global ‘education revolution’. This revolution, considered to be of a scale never before seen, is said to create both new opportunities and new sources of competition (Ernst & Young 2012).

The most referenced opportunity or source of competition, relating to university education, is from massively open online courses (MOOCs). MOOCs have been hailed as vehicles for an educational revolution that has the potential to override borders, race, gender, class and income (Emanuel et al. 2013), as students work at their own pace, relying on their own style of learning and assessing each other’s progress. The potential for diversity and disparity is a clearly cited benefit of the MOOC model (Johnson et al. 2013; North et al. 2014; Ernst & Young 2012; McAndrew & Scanlon 2013). Even though the opportunity exists for MOOCs to educate the diverse masses, Emanuel et al. (2013) share how MOOCs may be falling short on expectations: MOOCs are being taken by the educated few, reinforcing the advantages of the ‘haves’ rather than educating the ‘have-nots’. The educational disparity is particularly stark in countries of low socioeconomic status (SES), where four out of five MOOC students come from the wealthiest and most well-educated six per cent of the population (Emanuel et al. 2013).

Organically, the growth of the higher education sector has driven a movement from teaching the elite to teaching the masses. With a greater number of students comes a greater diversity of students including those who are ‘[the] first in [the] family’ to attend university. This growth in diversification is sustained by national, state and institute agendas promoting social equity, such as the Australian Government’s Higher Education Participation and Partnerships Program (Department of Education, Employment and Workplace Relations 2011).

Even with a subsequent change of leadership within the Australian Government, the plan to expand opportunities for more people to attend university remains, with the Minister for Education (at the time of writing) expressing his intention to ‘extend access, particularly for disadvantaged and regional students’ (Pyne 2014). Low SES and first-in-
family students without financial resources, or inherent informed family support, face additional challenges in higher education. The challenges are shared by the educators and students alike as additional resources, such as tutoring time and supplementary research aids, may be necessary to compensate for those resources which are readily available to the rest of the cohort. Conversely, it is not specifically issues associated with the lack of resources which academically separate low SES and first-in-family students from the broader cohort. In a multi-cohort study by Rothman (2003) it was found that lower SES students had lower achievement scores and that they were less likely to complete their degrees, although they maintained a positive perspective regarding their schools and they were also likely to allocate more time to homework. Time, or lack of it, may be a significant contributor as Vickers, Lamb and Hinkley (2003) found that only young people within the highest SES quartile were ‘protected’ from dropping out at university and that undertaking more than 20 hours of part-time work a week influenced a student’s likelihood of non-completion.

While there are many more questions and relationships to investigate with regard to increasing student diversity and bridging the equity ‘gap’, there are some simplified observations to be made. The requirements for on-campus resources and off-campus services are likely to increase at rates above the student admission rates if current teaching practices are continued and the current standard of higher education is retained. As such, even with the introduction of MOOCs, the search for socially equitable education models remains (Ernst & Young 2012). The search presents an opportunity for property educators to look again at how and what students learn, how they may be encouraged to assume more sustainable, deeper approaches to learning (2.1), and how to get ‘most students to use the level of cognitive processes needed to achieve the intended outcomes that more academic students use spontaneously’ (Biggs & Tang 2009, p. 11). The opportunity for enhancement extends across university, business and (real) property education.

1.1.2 Real property

The economic performance of a region or nation is dependent on the quality of property decision-making, and the respective education and learning approaches adopted by the decision-maker. This relationship between property decision-making and economic performance is demonstrated in the wake of the recent financial crisis, where misunderstandings of property markets accompanied by poor lending practices were
attributed to the international economic downturn. Specifically, the Financial Crisis Inquiry Commission [FCIC] identified:

the collapse of the housing bubble – fuelled by low interest rates, easy and available credit, scant regulation, and toxic mortgages – [as] the spark that ignited a string of events, which led to a full-blown crisis in the fall of 2008.

(FCIC 2011, p. 16)

In addition to the macroeconomic influences, property is one of the most popular vehicles for wealth creation, or loss, for an individual investor or owner (2.4).

The nature of property and the changing higher education environment (1.1.1) present an opportunity for university and program leaders to refine their education offerings (2.5) and look to innovative means to enhance the learning experience. One way to achieve this may be through the design and implementation of serious game–based learning activities.

1.1.3 Serious games

Serious games, the focus of this research project, are games that aim to support learning processes in a more playful way (2.6.3). By their nature, serious games are problem-solving vehicles aligned to the social constructivist theory of learning (Vos, van der Meijden & Denessen 2011) (2.6.3). Constructivism (2.2) underlines the idea that knowledge is not transmitted to the student, but rather is constructed through activity, such as participating in problem-based learning workshops or playing serious games, or even interacting socially (Vos, van der Meijden & Denessen 2011; Biggs & Tang 2009).

Games, and play, have an established relationship with problem-based learning, a functional learning activity well suited to property education. Play and the related term ‘fun’ are expressions that are not common in property education publications; however, they should not be considered as superficial or flippant but rather as central to the applied learning approaches. Gameplay is said to present the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life (2.6.3). These attributes associated with playing serious games align well with the outcomes from learning property in Australian universities (2.6.2). Conversely, published research does not clearly define how well the playing of serious games contributes to satisfaction of the intended learning outcomes (2.7).
1.2 The problem

Whether Australian universities are in the midst of an education revolution or an early stage of transformation, the needs of the new student cohort are not expected to be met by the current teaching methods alone (1.1) and there is an implied directive to find the right pedagogical tools to engage students and develop them as deeper learners (2.1).

Serious games present as one solution for universities aiming to support learning processes in a more playful way (2.6.3). As a problem-based learning activity, serious games enhance learning, and proponents underscore the role of playing games in supporting collaboration, problem-solving, communication and critical thinking (2.6.3). Similarly, gameplay is said to present the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life (2.6.3). These attributes associated with playing serious games align well with the learning outcomes for property students in Australian universities (2.6.2).

As such, this research endeavours to contribute to extant research by demonstrating how serious games may be designed to enhance the learning experience for undergraduate property students in Australian universities, as depicted in Figure 1.1. The design of such an innovative artefact is dependent upon an understanding of the specific problem domain, which presents the first problem (3.3). While this chapter (1.1) and the literature review, Chapter 2, seek to define the problem and the domain, published research does not sufficiently define what skills, attributes and knowledge are sought after by property graduates, let alone how well their playing of serious games contributes to satisfaction of the intended learning outcomes (2.7).

1.3 The research question

The question guiding this research, ‘How to design serious games to enhance the learning experience for undergraduate property students, in Australian universities’, is novel in the sense that it draws from a range of disciplines. The education discipline is mature, with a body of empirical research supporting the philosophical approaches. On the other hand, learning through serious games is an emergent field of research and property education may be regarded as a practical, or problem-based, rather than a philosophically deep research field. The imbalance in extant research from the various disciplines creates a series of gaps requiring elaboration and extension.
Figure 1.1. Research question and its relationship to extant research.

As illustrated in Figure 1.1, further research is required to elaborate and extend existing research prior to commencing the design and development stage (3.4). The first dependent research task relates to the constructive alignment approach to learning and teaching, and requires the stating of intended learning outcomes for a property program (2.3) (2.6.2). In this research, this step is approached initially through a review of published research as detailed in Chapter 2, as well as publication and presentation to academic peers in property education.

The related publication, *Learning outcomes and opportunities in property education through constructive alignment* (Boyd S 2015a), presents five intended learning outcomes (2.6) for application to Australian property programs. Additionally, the refereed paper demonstrates the application of an outcomes-based learning and teaching framework to reflect on opportunities to enhance learning in property education.

The second key task involves an elaboration on the existing research base. To achieve this, a more detailed investigation into Australian university property programs is undertaken to identify knowledge, skills and attributes suitable for building a framework for assessing the effectiveness, or otherwise, of learning activities such as serious games in property programs across Australian universities (Chapter 4).

The third key task involves the development of a better understanding of the tasks, activities, skills and operations associated with playing property games that, on the face
of it, can contribute to an enhanced student learning experience (Chapter 5). The problem identification and motivation for the research emerge in the literature review and are refined through the investigation into current Australian property education and the evaluation of what property students may learn from playing games (chapters 4 and 5). The three initial research tasks provide a foundation to the question ‘How to design serious games to enhance the learning experience for undergraduate property students, in Australian universities’.

The research question is approached through the design and development of a serious games suite utilising the design science methodology of Peffers et al. (2008) (3.3). The methodology relates to traditional experimental and design approaches to education and is an established research method commonly applied in the Information Technology discipline (3.3). The same design science research method is applied in the development of a mobile application, a research venture related to this project. The research method and the associated refereed publication, ‘REFeasibility: designing a mobile application for initiating feasibility analysis’ (Boyd S 2015b), were presented at the Pacific Rim Real Estate Society conference.

This research presents a solution, in the form of an artefact, and a procedure, to answer the research question and enhance the learning experience of property students in Australian universities. The artefact comprises a suite of four serious games and associated learning activities. The procedure is inherent in the design and development journey of the games suite as detailed in this thesis.

### 1.4 Methodology

This research relates to the design and development of a domain-situated serious games suite to enhance the learning experience for students studying property in Australian higher education. Fundamental to this endeavour is the principle that knowledge and understanding of the problem and its solution are acquired in the process of designing and building the artefact. As such, the author carried out the research in the context of an authentic, real-life setting, adopting qualitative approaches to frame the design of the artefact, or games suite.

The project utilises principles (Hevner et al. 2004) and processes (Peffers et al. 2008) of design science, which is a novel approach in the property discipline, although it is soundly based on traditional experimental and design approaches to education and is an
established method in Information Technology (3.3). The ultimate result of the research is to create a ‘purposeful … artefact created to address an important organisational problem …, described effectively, enabling its implementation and application in an appropriate domain’ (Hevner et al. 2004, p. 80).

In the application of design science, complementary research methods and approaches have been adopted. The investigation of property education in Chapter 3 and the evaluation of property games in Chapter 4 are primarily qualitative in nature and include case studies and extrapolation of findings from a range of media, from publications to website posts, where other sources are exhausted. Chapter 7, which includes the prototype evaluation, draws upon numerous methods and survey tools in an aim to produce more balanced outcomes.

1.5 Research contribution

The structure and contribution provides a foreword to the thesis with explicit reference to the research contributions.

Besides introducing the research, the background presented in this chapter identifies that, in higher education in the future, the needs of a new student cohort are not expected to be met by the current teaching methods alone (1.1). As such, there is an implied directive to find supplementary pedagogical tools to engage students and better support their learning.

The literature review in Chapter 2 continues the search for effective pedagogical tools, focusing on how students learn and how their approaches to learning are considered in higher education teaching philosophies. The learning and teaching theories, in particular constructivism (2.2), are then discussed in the context of university property education and the respective outcomes sought after by, and from, graduates. Such outcomes are phrased as program level intended learning outcomes, in accordance with the education approach known as constructive alignment (2.3). Constructive alignment refers to the systematic alignment of teaching/learning activities, and the assessment tasks to the learning outcomes, according to the learning activities. The five intended learning outcomes of the property program, and their development, are discussed in section 2.6 and presented as:
1. Describe and explain objective theories of property custodianship and the practical skills you require for a career in property.

2. Analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations.

3. Communicate effectively as a professional with clients and colleagues in addressing real-life property situations.

4. Operate effectively and ethically as a team member in real-life property situations.

5. Reflect on your role as a property student and initiate transformative practices to guide your actions in an unknown future.

The intended learning outcomes are subsequently applied as a framework for the literature review. This is achieved through applying constructive alignment to the body of the review to provide a conceptual framework for reflecting on property education and the role for serious games. The reflection uncovers a series of shortcomings, and opportunities to better align learning and teaching activities with assessment to enhance the learning experience for property students. Specifically, from the published studies it is found that the second learning outcome may be better achieved through structured, problem-based learning activities relating to the playing of serious games.

Conversely, the review of published research fails to sufficiently uncover the knowledge, skills and attributes sought after for, and by, graduates of undergraduate property programs in Australian universities. The review could not define what an undergraduate property student may learn from playing domain-situated games, either. As such, further research is deemed necessary prior to designing serious game–based activities for property education.

Chapter 3 addresses the research methods applied to fill the research gaps and answer the research question, ‘How to design serious games to enhance the learning experience for undergraduate property students, in Australian universities’. Initially, the chapter is structured to discuss traditional approaches to property research and the associated philosophical underpinnings. As gaps in methodology are identified, design science is presented as a paradigm and approach suited to the design of a serious games suite for the property discipline (3.3). The application of design science activities and principles to this project is subsequently addressed along with considerations of how the thesis is structured to accommodate the design of the artefact, or serious games suite.
The design science research methodology (3.4) applied in this research is led by goals and objectives. Through re-positioning the research question, a project level goal may present as: To design serious games to enhance the learning experience for undergraduate property students, in Australian universities. With respect to the artefact, or serious games suite, the product scope and associated objectives related to the program level intended learning outcomes are defined in 2.6.1 and the definition of a serious game can be found in section 2.6.3. The definition refers to serious games as supporting learning processes in a more playful way. In the context of property education, the role of serious games in problem-based learning has been identified as an opportunity, with the second learning outcome providing the primary focus. As such the primary, secondary, and tertiary objectives for the serious games suite may be re-presented in Table 1.1.

Table 1.1
Design Objectives

<table>
<thead>
<tr>
<th>Priority</th>
<th>Objective(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>To enhance the learning processes of property students in a more playful way</td>
</tr>
<tr>
<td>Secondary</td>
<td>To enable property students to analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations</td>
</tr>
<tr>
<td>Tertiary</td>
<td>To enable property students to describe and explain objective theories of property custodianship and the practical skills they require for a career in property</td>
</tr>
<tr>
<td></td>
<td>To enable property students to communicate effectively as a professional with clients and colleagues in addressing real-life property situations</td>
</tr>
<tr>
<td></td>
<td>To enable property students to operate effectively and ethically as team members in real-life property situations</td>
</tr>
<tr>
<td></td>
<td>To enable property students to reflect on their role as a property student and initiate transformative practices to guide their actions in an unknown future</td>
</tr>
</tbody>
</table>

Chapter 4 elaborates on the findings of the literature review and presents a deeper look into property education in Australian universities. The knowledge, skills and attributes sought after for, and by, graduates of undergraduate property programs in Australian universities are specifically identified. As part of the investigation, a clearer perspective of what universities seek to teach is uncovered, shortcomings in traditional teaching practices and assessment are identified and, implicitly, the research problem is refined.

The findings of the investigation into property education, in particular the identified gaps between required attributes and skills, and the traditional teaching and assessment practices, present opportunities for the design of the serious games suite. With respect to knowledge, an understanding of both property practice and the property market are sought after. Graduate skills may be broadly covered under the categories of communication, numeracy and interpersonal. A successful graduate of a property
program may be said to possess the attributes of a creative/critical problem solver and a team worker, and demonstrate social and environmental awareness (4.2).

Additionally, the investigation into property education uncovers two prominent shortcomings associated with traditional teaching practices: the deficiencies in the teaching of current market activity; and the misalignment of the teaching system and the student who does not know how to, or does not wish to, adopt deeper learning practices. These shortcomings present a case for the deeper consideration of what property students may learn from other learning and teaching activities and assessments, including those associated with the playing of serious games.

In Chapter 5, existing property games are evaluated, to build upon the findings of published research and inform the artefact design. As such, the research associated with the chapter extends to serious games research to identify what an undergraduate property student may learn from playing domain-situated games. As the evaluation formed part of an initial design searching stage, the scope of the evaluation does not comprise empirical testing. Rather, the evaluation draws from a broad and diverse range of published research, as well as the findings of the author as the property games are played. Specifically, the evaluation draws from observations made during situated gameplay and lessons learnt from the game development process. A purposely created scoring rubric (2.6.4; Appendix 5.1), in the form of a matrix, is used as a means of assessing how closely the gameplay aligns with the knowledge, skills and attributes sought after by stakeholders in property education.

Having identified the attributes which playing property games may contribute to students’ learning, Chapter 6 leads to the development of the artefact, or serious games suite. Chapter 6 demonstrates the design journey, utilising design science as a methodological paradigm to uncover how the findings from published research, an investigation into undergraduate property programs in Australian universities, and the evaluation of existing property games may be applied in the design of a suite of serious games.

Playing Property and Possession v Poverty are games specifically designed and procured to enhance the learning experience for undergraduate property students. Playing Property is a property investment game which utilises audience response technology to enable students to buy, sell and hold virtual property. Possession v Poverty is a board game developed from Monopoly’s predecessor, The Landlord’s Game.
Chapter 7, ‘Demonstration and evaluation’, discusses the implementation of the serious games suite, including the activities developed to leverage the learning potential from two property games that are repurposed, or redesigned, for educating property students. The final suite of four games comprises Possession v Poverty and Playing Property as designed in Chapter 6, along with Investorville and SimCity as evaluated in Chapter 5 and repurposed, as shown in Table 1.2.

Table 1.2
Serious Games Suite

<table>
<thead>
<tr>
<th>Game</th>
<th>Platform/venue</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>SimCity</td>
<td>Mobile device/computer</td>
<td>Proprietary game repurposed by author as property learning activity</td>
</tr>
<tr>
<td>Playing Property</td>
<td>Theatre and computer</td>
<td>Designed by author for educating property students</td>
</tr>
<tr>
<td>Possession v Poverty</td>
<td>Board game</td>
<td>Designed by author for educating property students utilising The Landlord’s Game as a foundation</td>
</tr>
<tr>
<td>Investorville</td>
<td>Computer lab</td>
<td>Proprietary game repurposed by author as property learning activity</td>
</tr>
</tbody>
</table>

The serious games are incorporated into a third-year property course, which is a compulsory subject delivered in a face-to-face manner with a traditional lecture and tutorial format. In this research, ‘courses’ refers to the individual subjects that combine to form a degree program. Chapter 7 includes the evaluation of the games suite and analysis of the findings. Numerous approaches to prototype testing are employed, reconciled through triangulation, and appropriately discussed in the findings. After analysis and reflection the question, ‘How serious games based activities can be integrated into the students’ higher education learning experience’, is addressed. The serious games suite and associated learning activities are finalised in the chapter.

As a significant finding, the suite may be classified as serious games, and meets part of the primary objective, ‘To enhance the learning processes of property students in a more playful way’ (3.5.2). According to the participants, three of the serious game-based activities, relating to Possession v Poverty, Playing Property and Investorville, conclusively meet the Oxford University Press (2014) definition of a game, being activities ‘that one engages in for amusement’. The learning activity related to SimCity, for the majority of the participants, may also be regarded as a game, or fun problem-solving activity. In future applications due consideration must, however, be given to the delivery of the SimCity learning activity to ensure that fun prevails over frustration.
Following discussions and conclusions in Chapter 8, the serious games suite is presented in a manner ready for external empirical testing and the thesis completes as a vehicle for the communication of the research. In addition to the thesis, a series of refereed publications was shared with academic peers through the Pacific Rim Real Estate Society as shown in Table 1.3

Table 1.3

<table>
<thead>
<tr>
<th>Paper</th>
<th>Audience / peers / setting</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Functional learning for property students’ (Boyd S 2012b)</td>
<td>Pacific Rim Real Estate Society Conference, Adelaide</td>
<td>January 2012</td>
</tr>
<tr>
<td>‘What property students may learn from playing games’ (Boyd S 2013c)</td>
<td>Pacific Rim Real Estate Society Conference, Melbourne</td>
<td>January 2013</td>
</tr>
<tr>
<td>‘Learning outcomes and opportunities in property education through Constructive Alignment’ (Boyd S 2015a)</td>
<td>Pacific Rim Real Estate Society Conference, Kuala Lumpur</td>
<td>January 2015</td>
</tr>
</tbody>
</table>

In addition to this research and related publications, further evaluation and empirical testing will provide a more detailed investigation into what undergraduate students learn from playing games. Emergent themes from this research to consider in future research relate to the type of student who may benefit from the pedagogical approach and how passive teaching methods, such as lecturing, may be activated through incorporating games.

1.6 Considerations and limitations

This research relates to the design of a serious games suite to inform the practice of educating property students in Australian universities. A defining and controversial aspect in qualitative research of this nature relates to the active role of the researcher and their potential to influence the results of the study. With the main aim of qualitative research being to discover the perceptions and experiences of the participants so that the researcher can then extract themes (Levy 2006), the researcher becomes embedded in their study. As such, the interpretive nature of the qualitative research approach is affected by the researcher’s interpretations, leading to potential misrepresentations of data, however unintentional (Brown 1992).

In this research it is important to identify perceived or actual researcher bias. The author has a quantifiable interest in the Australian Property Institute [API], as referenced
through the body of the thesis. The author is a Fellow and chair of the API’s Queensland University and Academia Liaison Committee as well as an elected councillor of the Queensland division of the API. Further, the author is the coordinator of a property program accredited by the API.

With the intention of mitigating the influence of bias and misrepresentation, a soundly based research approach, design science (3.3), is incorporated. The paradigm sets principles and processes to add rigour and guide the presentation of the research in a reliable manner. Complementary methodologies have also been introduced at various stages, including the investigations and evaluations. Additionally, the prototype testing incorporates questionnaires, rubric scoring and reflective journals, supported by triangulation with findings from published research and independent third-party surveys. Similarly, the findings of other researchers have been considered in the testing process and triangulation of findings reflected upon.

While the prototype testing sufficiently informs the design activity and demonstrates the highly interdependent outcomes of a complex social and cognitive intervention, the small survey population limits the explanatory significance of the author’s observations. Subsequently, empirical testing of the serious games suite and associated learning activities is recommended as a stand-alone postdoctoral research project for the future.

In considering the role for serious game–based activities in enhancing the learning experience for undergraduate property students, this chapter has introduced the problem of applying serious game–based activities, and the lack of mapping, or alignment, between what is learnt through playing property games and the intended learning outcomes of property programs in Australian universities. The chapter introduces the research approach, which is tasked to design serious game–based activities to enhance the learning experience for undergraduate property students, in Australian universities.

Given the nature of property education and the potential for learning enhancement through playing serious games, new cross-disciplinary research is considered as a significant addition to the emerging body of knowledge. The research is focused on enhancing the learning experience of undergraduate property students in Australia. Notwithstanding the research focus, the method and approach may be applied to other geographical jurisdictions, outside Australia, or even to disciplines other than property. In applying the method and approach to other domains the problem would need to be re-defined and new objectives identified.
Chapter 2  Literature review

This chapter presents a review of previously published research, bringing together previous academic and practical research findings as a foundation for the research. Specifically, the literature review addresses what has been done previously, and what insights may be gained for the emerging research problem.

The review commences with a focus on how students learn and how their approaches to learning are considered in higher education teaching philosophies. The learning and teaching theories, in particular constructivism, are then discussed in the context of university property education and the respective outcomes sought after by, and from, graduates. Such outcomes are phrased as program level intended learning outcomes, in accordance with the education approach known as constructive alignment. Constructive alignment is then applied to the body of the review to provide a conceptual framework for reflecting on property education and the role for serious games.

The final sections of the chapter, and conclusion of the literature review (2.7), identify the themes and gaps in the current published research and present justification, or support, for the research presented in subsequent chapters.

2.1  How students learn

The study of learning has been the subject of research by psychologists, with theories of human knowledge construction shared and contested. While acknowledging the relationship between the cognitive theories of phenomenography and constructivism and the focus on student learning, Biggs (1993) criticises much of the earlier research as he considered the approach of the psychologists to be too centred on uncovering a single grand theory. Rather, Biggs (1993) and Biggs and Tang (2009) believe learning to be context situated and student centric, attributing the advancement of the ‘student learning’
field of study to Marton and Saljo (1976a, 1976b) and their studies of surface and deep approaches to learning.

According to Marton and Saljo (1976a), there are two distinguishable levels of processing in learning: a surface level and a deep level. In surface level processing the student directs their attention towards learning the knowledge verbatim and, as a result, the student is more or less encouraged to employ a rote-learning strategy. Deep level processing sees the student look beyond the text itself towards the material and what is signified (Biggs & Tang 2009). Through testing deep and surface learning, Marton and Saljo (1976b) found that deep processing was more conducive to longer-term knowledge retention. Further, deep approaches to learning are linked to deep learning outcomes (Biggs, Kember & Leung 2001).

Students, by their very nature, are said to be more inclined to adopt surface or deep learning strategies in higher education (Biggs 1999; Biggs & Tang 2009; Marton & Saljo 1976b). According to Biggs (1999), students who adopt deep approaches to learning virtually teach themselves. The deeper learners are said to be autonomous and compatible with the current and emerging form of higher education (Biggs & Tang 2009).

While a particular student may be more inclined to adopt one learning strategy over another, through experimentation Marton and Saljo (1976b) discovered that students will adapt their use of surface or deep strategies depending on the perceived expectation of the teacher or assessor. Specifically, they note:

> While many students are apparently capable of using ‘deep’ or ‘surface’ strategies, it may be that the current demands of the examination system at school level are interpreted by them as requiring mainly the recall of factual information to the detriment of a deeper level of understanding. (Marton & Saljo 1976b, p. 125)

In sharing the findings of Marton and Saljo, Biggs and Tang (2009) contrast two teaching methods – passive lectures and active problem-based learning – against the cogitative activities for two students: a stereotypical academic ‘Susan’ and non-academic ‘Robert’. Susan, by their definition, is academically committed, taking interest in her studies and virtually teaching herself. Conversely, Robert is said to be at university primarily to obtain the qualification, wanting only to put in sufficient effort to pass.

By moving away from passive lecture–based activities to active learning, such as problem-based learning, Biggs and Tang (2009) argue that the non-academics employ a
higher level cognitive activity, making Robert learn like Susan. Correspondingly, they define good teaching as narrowing the gap between the Susans and Roberts of this world:

*Good teaching is getting most students to use the level of cognitive processes needed to achieve the intended outcomes that more academic students use spontaneously.* (Biggs & Tang 2009, p. 11)

### 2.2 Teaching theories

Phenomenography and constructivism are theories of teaching that are well suited to this research and the Biggs and Tang (2009) definition of good teaching (2.1). Phenomenography has its origin in clinical psychology, being used by Sonnemann in 1954, and subsequently resurrected by Marton, following his studies with Saljo (Biggs & Tang 2009). In the context of student learning, phenomenography refers to the idea that the learner’s perspective determines what is learned, which is not necessarily what the teacher intends should be learned.

Constructivism, as adopted in this research, underlines the idea that knowledge is not transmitted to the student, but rather is constructed through activity or social interaction (Vos, van der Meijden & Denessen 2011; Biggs & Tang 2009). Rather, as constructivists warn, knowledge that is ‘transmitted may not be the knowledge that is constructed by the learner’ (Jonassen 1991, p. 12). The advancement of constructivism may be attributed to Piaget more broadly and is practised in Australian higher education pedagogy through the interpretations of outcomes-based learning and teaching (Dearing 1997; Biggs & Tang 2009).

The constructivist’s view of learning is not without criticism, especially in disciplines where the goal of teaching, or instruction, is considered to relate to the mapping of an external reality onto the learners, as shared in branches of cognitive psychology and instructional systems technology (Jonassen 1991). Objectivists, or opponents to the constructivists’ view, may argue that, from the pragmatic perspective ‘any [non-objectivist] or [non-realist] position is inoperable, that constructivism is antecedent to academic chaos’ (Jonassen 1991, p. 12).

In acknowledging the objectivist perspective, there is an implied necessity for constructivist teaching and learning practitioners to plan learning activities and make clear the intended outcomes. Biggs and Tang (2009) discuss the first stage of education as ‘conceptual change’, where teachers and learners share an understanding of the intended
learning outcomes and where they are supposed to be going. In their view, outcomes-based teaching requires a shared understanding, while teaching in the form of ‘covering a topic’ does not.

2.3 Constructive alignment

The first stage of outcomes-based learning and teaching, and the related approach of constructive alignment, requires the stating of intended learning outcomes for the particular course or program. The learning outcomes are generally defined in statements which describe what and how well students are able to do something, as opposed to prescribing topics or material to cover (Biggs & Tang 2009). Constructive alignment takes the process further with a systematic alignment of teaching or learning activities, and the assessment tasks to the learning outcomes, according to the learning activities (Biggs & Tang 2009).

This research and the remaining part of the literature review are structured with constructive alignment as a model and framework for reflecting on property education and the opportunity to enhance learning though playing serious games. Biggs and Tang (2009) speak of constructive alignment utilised in this manner as ‘provid[ing] a conceptual framework for reflecting on questions that need to be answered at critical stages of teaching in general’ (p. 249).

2.4 Nature of real property

The economic performance of a region or nation is dependent on the quality of property decision-making. This relationship is demonstrated in the wake of the global financial crisis with the FCIC identifying:

*the collapse of the housing bubble - fuelled by low interest rates, easy and available credit, scant regulation, and toxic mortgages - that was the spark that ignited a string of events, which led to a full-blown crisis in the fall of 2008.* (FCIC 2011, p. 16)

Given the nature and diversity of real property, the quantification of property’s role in the economy, or society, is difficult. Even with a series of resources and models the adopted approaches remain contestable. Nevertheless, as a consideration Higgins (2005) estimated the Australian property investment ‘universe’ to be approximately AU$332 billion, with a core property market (office, retail and industrial) of AU$154 billion, as at December 2003. The economic activity model utilised in his assessment relates the four-
Playing Property

year weighted average gross domestic product (GDP) of AU$738 billion to a 45 per cent multiplier. Utilising the 2012–2013 GDP of AU$1,525 billion (Australian Bureau of Statistics 2013, 1345.0) and the same multiplier, the Australian property investment universe may be estimated at AU$686 billion. Nomura Research Institute (cited in Urban Land Institute & Price Waterhouse Coopers 2013) provides a similar estimate of the investment market size, noting the estimated size of institutional-grade real estate in Australia at US$655 billion.

The Property Council of Australia [PCA] estimate supports a smaller value with AU$340 billion presented as the value of investment grade assets under management (PCA 2013). The variance between the estimate from the adjusted economic activity model and the PCA figure may relate to the proportion of assets under management, implying AU$346 billion or around one-half of the investment grade assets are not managed, conceivably as a business or going concern. The PCA is an advocacy body and substantiation of its position may be contestable in peer review; nevertheless it presents a perspective of the industry, contributing the following as facts:

$[AU]6 trillion the market value of all land and buildings in Australia.
$[AU]34 billion in property specific taxes paid by the property industry to state and federal governments in 2013 – by far the nation’s single largest tax payer.
11.6 million Australians collectively own the nation’s most valuable commercial property assets.
1.3 million jobs – 12.8% of the total workforce.
$[AU]340 billion the value of investment grade assets under management.
$[AU]204 billion forecast total construction spending in F2013.
$[AU]148 billion property and construction industry contributes directly to economic activity... $[AU]219 billion in additional contribution to GDP via flow-on demand.
11.5% of Australia’s GDP.

(PCA 2013)

Regardless of the approaches applied in quantifying the property market, the underlying theme which emerges is that the property industry is a significant contributor to the economy in a macroeconomic sense. Similarly, property investment is a dominant vehicle for wealth creation or loss for the investor or owner. From a macroeconomic sense there are objective ‘truths’ (2.2) regarding real property and its impact on and from the economy, as evaluated by Higgins (2005) and the PCA (2013). With the development
of further econometric modelling and associated quantitative research, the search for these objective positions of property may improve, although there are fundamental barriers to the uncovering of a single objective truth (2.2). Specifically, property value, utility and worth are not defined through set matrices or benchmarks. Rather, as T Boyd (2005a) contends, ‘[real] property takes its worth from its utility and the impact of humans’ (Boyd T 2005a, p. 2).

2.5 Property education

Property education may be regarded as sharing philosophical assumptions of objectivism and constructivism (2.2) with other disciplines, such as cognitive psychology and instructional (learning) systems technology (Jonassen 1991). In Australia, the connection of the property pedagogy to objectivism may be attributed to the origins of teaching property in higher education. As Hefferan and Ross (2010) and Hefferan (2013) discuss, the tertiary practice-based education of property professionals is a relatively new practice in Australian universities. Initially focussed on valuation education, property studies largely transferred from technically based education to tertiary institutions (Hefferan & Ross 2010) and, in the process, subsequently extended to cover the broader property education areas (Newell & Acheampong 2002).

Another influence on educational practice and philosophies in Australian university property programs is that of the accrediting institutes, being the API and Royal Institution of Chartered Surveyors [RICS], which nominate minimum standards for either the program or related outcomes. Even with the influence of accreditation, property programs offer additional subjects, or courses, that provide what Armitage refers to as a ‘richer’ experience for students and contribute to variety in the character of degrees offered across Australia (Armitage 2011, cited in Parker 2012). Of the 43 property program offerings identified through searching ‘property’ and ‘real estate’ in the Hobsons Course Finder and the respective centralised tertiary application hosting entities for each of the Australian states and territories, 27 are endorsed for Certified Practising Valuer accreditation with the API and 17 are accredited by the RICS.

To determine whether an Australian university property program is considered a property degree, and duly accredited, the API prescribes a list of knowledge fields that the majority of courses within the program shall cover (API 2013a). By prescribing knowledge fields, the API may be regarded as encouraging the objective transmission of
knowledge (2.2). Conversely, the API sets broad ‘benchmarks’ relating to the employability standard of graduates, the qualifications and performance of academic staff, and the standard of teaching and learning (API 2013a). According to Biggs and Tang (2009) such benchmarks may be better achieved through constructivist learning and teaching (2.2).

The RICS approach to recognising an academic program focuses on benchmarks relating to the ability of the institution to maintain an acceptable level of performance across nominated categories (Susilawati & Armitage 2011). The RICS benchmarks for academic institutional accreditation define the following categories:

1. academic standard of entering students as measured by their tertiary entry score or equivalent
2. the teaching quality of the program
3. the research output performance of the academic staff teaching on the accredited degree
4. the employability of the graduates.

(Susilawati & Armitage 2011)

Despite the accrediting institutes making reference to the benchmarking of teaching and programs, the onus remains with the university program leaders to provide support for the assertions through materials from surveys and other references and reference tools. As such, neither the RICS nor the API defines learning outcomes as referred to in constructive alignment (Biggs & Tang 2009) or outcomes-based learning and teaching (Dearing 1997).

In the absence of a consensus view of intended learning outcomes, the application of constructive alignment, which relates to alignment with learning outcomes, is complicated (2.3). While the specific question of whether the professional organisations should define learning outcomes had not been addressed in published literature before the related proceeding by the author (Boyd S 2015a), the role of and desire for further institutional involvement has been addressed. When profiling university offerings, Susilawati and Armitage (2011) found there is variety across the universities in Queensland with respect to non-specialised knowledge fields. This finding is contested by Parker (2012), who blames the demanding and prescriptive nature of the API accreditation process for squeezing out specialist property units to accommodate ‘generic socialisation units’ (p. 4).
Irrespective of the knowledge fields, undergraduate property programs offered at Australian universities are marketed as pathways to careers in the property industry (Bond University 2013; CQUniversity 2013; Curtin University 2013; Deakin University 2013; RMIT University 2013; University of New South Wales [UNSW] 2013; Queensland University of Technology [QUT] 2013; The University of Queensland [UQ] 2013; University of South Australia 2013; University of Technology Sydney [UTS] 2013; University of Western Sydney [UWS] 2013). Deakin University relates its program to the profession through promoting that:

The course aims to produce graduates prepared for a career in property development, property valuation, management and a wide array of property-related professions. (Deakin University 2013)

As preparation for careers, the overviews for property programs in Australia focus on the terms ‘real life’ and ‘real world’, especially when expressed in terms of the student experiences, assessment and engagement with industry (Deakin University 2013; QUT 2013; UTS 2013; UWS 2013). Deakin University acknowledges this perspective and embeds the concept of industry currency and active learning (2.1) through stating that ‘students in this course undertake “real life” education with the focus placed on current issues and relevant topics in the property industry’ (Deakin University 2013).

In support of Susilawati and Armitage’s (2011) position on program diversification there is an inherent flavour emanating from the individual university structure; in particular, the direction of the faculty or school leaders. The degree programs provided under a business-related school or faculty incorporate a link to business knowledge or skills; for example, CQUniversity discusses its programs as:

provid[ing] you with knowledge in the fundamental basics of business, as well as specific knowledge in the area of property, giving you the skills to work within a variety of organisations and positions. (CQUniversity 2013)

Where a property program is offered in a non-business faculty or school the themes focus towards societal paradigms. This is evident in the UNSW property offering, provided through the Faculty of the Built Environment, which specifies a focus on people and process management (UNSW 2013). Similarly, the Bond University program promises to equip graduates ‘with a comprehensive knowledge of sustainable development’ (Bond University 2013), leveraging the benefits of the host faculty of Society and Design.
2.5.1 Property education performance

There are varied opinions across academia and the published research as to the effectiveness or otherwise of property education. In an Australian context, property lecturers and researchers have supported the notion that student satisfaction is quite high (Hefferan & Ross 2010; Newell, Susilawati & Yam 2010). Conversely, the API identified a perceived gap in the national education offerings and initiated a supplementary training program, ‘Future property professionals’, which aims ‘to bridge the ever increasing gap between academic rigour and professional competency’ (API 2011c).

Newell, Susilawati and Yam (2010), through analysing student feedback questionnaires from seven Australian universities, conclude that recent initiatives notably improved course content and structure, and course delivery and assessment, and have resulted in an enhanced learning experience for property students. On the contrary, in the author’s research findings, students rate the quality of property teaching and overall satisfaction below their peers in the related disciplines (accounting, building, business, economics, law, and planning) for the ten years leading to 2009. Only planning students recorded a lower average student satisfaction result over the extended 16-year period (commencing 1994), although the level of satisfaction improved at a rate faster than for property to show higher results in all studies over shorter time periods.

The Newell, Susilawati and Yam (2010) study does not purport to be conclusive or provide a definitive perspective on the quality of the property programs across Australia. As addressed in published research, the quality of a property program is viewed differently by the various stakeholders, whether they are students, alumni (graduates), academics (faculty) or employers (Baxter 2007; Tu et al. 2009). The perspectives of property education performance are likely to further diversify if the stakeholder group is expanded to include accrediting bodies (Hefferan & Ross 2010) and the public (Boyd T 2005b; Project Management Institute [PMI] 2008, 2013).

A further contested perspective relates to whether or not the satisfaction of any nominated stakeholder is a measure of good teaching. Warren (2013) addresses his view in respect of a perceived overreliance on student satisfaction surveys in higher education performance measurement, quoting Professor Beard’s transcript recorded with the British Broadcasting Corporation (2012). Beard asserts that, at times, there is a disconnection between the satisfaction recorded by a student and the quality of education provided, and development of the student, in saying:
dissatisfaction and discomfort have their own, important, role to play in a good university education. We’re aiming to push our students to think differently, to move out of their intellectual comfort zone, to read and discuss texts that are almost too hard for them to manage. It is, and it’s meant to be, destabilizing. (BBC 2012)

While further debate on these matters ensues in property and broader education research, the Biggs and Tang (2009) perspective of good teaching (2.1), as ‘getting most students to use the level of cognitive processes needed to achieve the intended outcomes that more academic students use spontaneously’ (p. 11), presents a foundation for advancing property education.

The advancement of property education is by no means a novel consideration in published research. With research supporting 40 years of property teaching at Australian universities, there is a rich history and even a culture supporting the way property is taught today. The literary journey is evident in the Pacific Rim Real Estate Society’s [PRRES] journal (Pacific Rim Property Research Journal) and conference proceedings, which feature a permanent property education stream (PRRES annual conference). Similarly, the Emerald Group’s published journals, including Property Management, consistently feature articles on property education. Within these publications, the body of current published research regarding property pedagogy, including T Boyd (2010), Hefferan and Ross (2010), Blake and Susilawati (2009), and Page (2008), addresses the changing teaching landscape. Similarly, change, and the skills base required by future property professionals, has been the focus of a national survey undertaken by the API (2010) that sought to better inform and prepare accredited program leaders.

The role of research in advancing property education is evident in property research (Newell, Susilawati & Yam 2010; Hefferan & Ross 2010; Boyd T 2010) and is even considered to be undervalued or underrepresented (Boydell 2007). Conversely, property education research may be regarded as practical, or problem-based, rather than philosophically deep. Rather, connections with theories from natural and social sciences, as evidenced in the broader studies of education and other disciplines such as information communication technology (Hevner et al. 2004), are not made in the design or evaluation of learning activities. Baxter (2007) addresses the disconnection of property education research from the body of knowledge on tertiary education and learning from other disciplines through his assertion:

Curiously most of the literature on property education seems to lie within a vacuum, without the critical cross-referencing to the mainstream tertiary
education norms or pedagogy that might otherwise be expected. (Baxter 2007, pp. 447–448)

The absence of both references to theories from natural or social sciences and clear connections with mainstream education ‘norms’ have not necessarily precluded the advancement of the property discipline. For example, Baxter (2007) demonstrates the application of what Biggs and Tang (2009) term ‘transformative reflection’ in his research, reporting on the ‘reengineering’ of a valuation degree. The merits of transformative reflection and teaching are well established in the broader educational literature, including Boud (1985), and are used to ‘set the stage’ for effective teaching (Biggs & Tang 2009). Rather, the absence of referred theories may limit the adoption of property research in other disciplines.

In acknowledging Baxter’s (2007) view, the remainder of this literature review is structured with consideration of the chosen teaching theory of constructivism (2.2) and approach to constructive alignment (2.3) within the discipline of property education (2.3).

2.6 Learning outcomes

As discussed in 2.1, the first stage of outcomes-based learning and teaching and the related approach of constructive alignment, is to define the intended learning outcomes for the particular course or program. The learning outcomes are generally defined in a statement which describes what and how well students are able to do something, as opposed to prescribing topics or material to cover (Biggs & Tang 2009).

Published research relating to assessed competencies has been critiqued in this thesis, with an aim of uncovering learning outcomes which may be used to enhance the learning experience for property students. With respect to property education in Australia, Poon and Brownlow (2014) acknowledge that there is no lack of research discussing the need for reform of property education. On the other hand, they identify a gap in the previous research into the knowledge, skills and attributes required for property professionals. In justifying the need for their research into competency expectations, Poon and Brownlow (2014) make the observation that:

Previous studies have expressed concerns on the need for property education reform, but there is yet to be any research identifying the qualities (e.g. knowledge, skills and attributes) required for property professionals. (Poon & Brownlow 2014, p. 258)
2.6.1 Learning competencies

In assessing competencies, Poon, Hoxley and Fuchs (2011) and Poon and Brownlow (2014) distinguish between knowledge, skills and attributes. In a similar study, Tu et al. (2009) group knowledge, skills and attributes in broader terms as ‘skills and competencies’. The variation in interpretations is not specific to the discipline of property education but rather is regarded by some as a systemic issue in Australian higher education (Barrie 2006). According to Barrie, university communities have struggled to identify the combination of skills, attributes and knowledge to include in statements of graduate outcomes. While Barrie attributes the issue to factors including a misinterpretation of what constitutes generic graduate attributes, he cites Bowden et al. (2000) in defining his view of graduate attributes, as:

*the qualities, skills and understandings a university community agrees its students should develop during their time with the institution. These attributes include but go beyond the disciplinary expertise or technical knowledge that has traditionally formed the core of most university courses. They are qualities that also prepare graduates as agents of social good in an unknown future.*

(Bowden et al. 2000, cited in Barrie 2006, p. 217)

For literary purposes, competencies, in this review, have been considered in two categories: ‘skills and attributes’ and ‘knowledge’.

2.6.1.1 Skills and attributes of graduates

Tu et al. (2009) sought to test the empirical findings of Weinstein and Worzala (2008) via an online survey based on the authors’ prior empirical findings, to uncover the best ways to educate future property professionals. While the study focused on Northern American graduates of real estate schools, the findings, with respect to desired critical skills, would appear to be universal. Tu et al. (2009) tested 11 set skills and competencies against the preferences of stakeholders including faculty, students, graduates and board members. On average, they found the top three student skills, as rated on a five-point Likert scale, comprised critical thinking, comprehensive knowledge of business, and quantitative/financial analysis skills. The comparison of skills and competencies by stakeholders, as found by Tu et al. (2009), is re-presented in Table 2.1.
Table 2.1  
*Skills and Competencies by Stakeholders*

<table>
<thead>
<tr>
<th>Student skill</th>
<th>Faculty/ admin</th>
<th>Students</th>
<th>Alumni</th>
<th>Board members</th>
<th>Average</th>
<th>Weighted average</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>111</td>
<td>474</td>
<td>346</td>
<td>39</td>
<td>4</td>
<td>970</td>
</tr>
<tr>
<td>Comprehensive knowledge of business</td>
<td>4.75</td>
<td>4.79</td>
<td>4.64</td>
<td>4.53</td>
<td>4.68</td>
<td>4.72</td>
</tr>
<tr>
<td>Critical thinking</td>
<td>4.84</td>
<td>4.74</td>
<td>4.77</td>
<td>4.78</td>
<td>4.78</td>
<td>4.76</td>
</tr>
<tr>
<td>Understanding the current market trends</td>
<td>4.54</td>
<td>4.73</td>
<td>4.55</td>
<td>4.28</td>
<td>4.53</td>
<td>4.63</td>
</tr>
<tr>
<td>Writing skills</td>
<td>4.58</td>
<td>4.73</td>
<td>4.55</td>
<td>4.28</td>
<td>4.53</td>
<td>4.63</td>
</tr>
<tr>
<td>Oral communications skills</td>
<td>4.72</td>
<td>4.21</td>
<td>4.44</td>
<td>4.22</td>
<td>4.36</td>
<td>4.33</td>
</tr>
<tr>
<td>Quantitative/financial analysis skills</td>
<td>4.58</td>
<td>4.69</td>
<td>4.77</td>
<td>4.59</td>
<td>4.66</td>
<td>4.60</td>
</tr>
<tr>
<td>Negotiation skills</td>
<td>4.11</td>
<td>4.43</td>
<td>4.18</td>
<td>4.19</td>
<td>4.23</td>
<td>4.29</td>
</tr>
<tr>
<td>Leadership and management skills</td>
<td>4.17</td>
<td>4.43</td>
<td>4.19</td>
<td>4.38</td>
<td>4.29</td>
<td>4.31</td>
</tr>
<tr>
<td>Proficiency in tools used in the industry</td>
<td>3.96</td>
<td>4.31</td>
<td>4.14</td>
<td>4.13</td>
<td>4.14</td>
<td>4.20</td>
</tr>
<tr>
<td>Ability to work in teams</td>
<td>4.31</td>
<td>4.45</td>
<td>4.45</td>
<td>4.53</td>
<td>4.44</td>
<td>4.44</td>
</tr>
<tr>
<td>Ability to work individually</td>
<td>4.36</td>
<td>4.50</td>
<td>4.47</td>
<td>4.44</td>
<td>4.44</td>
<td>4.47</td>
</tr>
<tr>
<td>Average</td>
<td>4.45</td>
<td>4.53</td>
<td>4.47</td>
<td>4.43</td>
<td>4.47</td>
<td>4.50</td>
</tr>
</tbody>
</table>

*Note:* Likert scale 1–5, with 5 being extremely important (Tu et al. 2009, p. 113)

Interestingly, students considered the objectivist attribute (2.2), ‘comprehensive knowledge about the property industry’, as most significant, whereas the other three groups placed more emphasis on the constructivist (2.2) attributes and skills relating to critical thinking and the ability to analyse and communicate. The comparatively lower weighting of knowledge by alumni and board members may be attributable to the type of knowledge implied by the responders. Or, possibly, the future employers consider the type of knowledge delivered by the faculty does not align with that required to be a successful industry professional, a view shared by Leinhardt, McCarthy Young and Merriman (1995) and the API (2011). Apart from those examples, the study by Tu et al. (2009) reflected a relative consensus among the stakeholders.

Poon, Hoxley and Fuchs (2011), utilising previous studies, conducted a broad survey investigating 31 knowledge areas, 20 skills and 21 attributes. The questionnaire was directed towards RICS accredited course providers. The respondents were categorised into two groups, graduates and employers. Employers were asked what they feel graduates require, while the graduates were asked what they feel they acquired during
their studies (Poon, Hoxley & Fuchs 2011). Employers considered communication to be paramount, with the highest rated skill being ‘effective oral communication’ and six of the top 10 rated skills relating to various forms of communication, writing and listening. Other skills ranked highly by employers included ‘numeracy’, ‘ability to define and solve problems’, and ‘information technology’ (Poon, Hoxley & Fuchs 2011). In broad terms, the graduates agreed they had acquired the primary skills, although ‘numeracy’ reflected a relatively lower score, representing a gap between the expectations of employers and the reflections of the graduates. Similarly, the graduates were less inclined to agree that they had acquired appropriate skills in ‘negotiation and industry based software tools’ (Poon, Hoxley & Fuchs 2011).

There are variations between the skills sought from property graduates in the findings of Poon, Hoxley and Fuchs (2011) and the findings of Tu et al. (2009). Potentially, the variation in the desired skill set relates to the cultures of the employees and differences in learning and teaching practices between the United States of America and Europe. Nevertheless, high-rating skill sets from both regions and studies include communication in oral and written forms.

Employers, in the study by Poon, Hoxley and Fuchs (2011), rate ‘ability and willingness to update professional knowledge’, ‘professional attitude’, ‘interpersonal skills’, ‘ability to effectively work as part of a team’, and ‘enthusiasm’ as the top five attributes sought. Board members in the Tu et al. (2009) study support the desire for graduates to work effectively in teams. Had the studies been conducted in comparable ways with identical terms and categorisation, it is likely that further overlap in desired attributes may be witnessed.

In a subsequent research project, Poon and Brownlow (2014) sought to identify the competencies expected of property professionals in Australia. The study was, in part, an extension of Poon, Hoxley and Fuchs’s (2011) research from the United Kingdom as it utilised the same list of knowledge areas (31), skills (20) and attributes (21). In the later Australian study Poon and Brownlow utilised a quantitative survey tool administered through the API, specifically addressing the API’s membership.

With respect to skills, there are emergent themes across the studies by Tu et al. (2009), Poon, Hoxley and Fuchs (2011) and Poon and Brownlow (2014). Communication skills are popular, in both oral and written forms. In a study from the United Kingdom (Poon, Hoxley & Fuchs 2011), employers rated oral communication as most significant,
while in the Australian study (Poon & Brownlow 2014) API members rated written communication and report writing as dominant. As illustrated in Table 2.2, oral and written skills were considered to be within the top three skills in the United States study, which included a broader diversity of stakeholder groups (Tu et al. 2009). The findings by Tu et al. (2009) diverged from the others, in that quantitative/financial analysis skills were considered the most sought after.

Table 2.2

Skills by Study

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quantitative/financial analysis skills</td>
<td>Effective oral communication</td>
<td>Effective written communication</td>
</tr>
<tr>
<td>2</td>
<td>Oral communication skills</td>
<td>Report writing</td>
<td>Report writing</td>
</tr>
<tr>
<td>3</td>
<td>Writing skills</td>
<td>Effective written communication</td>
<td>Effective oral communication</td>
</tr>
<tr>
<td>4</td>
<td>Negotiation skills</td>
<td>Numeracy</td>
<td>Decision-making</td>
</tr>
<tr>
<td>5</td>
<td>Leadership and management skills</td>
<td>Effective verbal presentation</td>
<td>Effective listening</td>
</tr>
</tbody>
</table>

The ability of and desire for a graduate or student to work effectively as part of a team and on their own are attributes shared across the three studies, as depicted in Table 2.3. In the United Kingdom and Australian studies referred to here, members of the respective institutions shared a desire for university graduates to have a professional attitude. While contestable in the nature of categorisation, the API members identified ‘practical experience’ as the most sought-after attribute (Poon & Brownlow 2014). The most striking variation from the studies relates to the attribute of critical thinking, which is rated as the most important in the United States study (Tu et al. 2009). While not specifically identified in the other studies, the somewhat related attribute of creativity was rated as least important in the responses from the Australian study (Poon & Brownlow 2014). Poon and Brownlow (2014) consider this response to echo previous research and they attribute the low weighting to:

*property professionals are usually members of professional organisations such as the API or RICS, and their work is largely bound by legislations and therefore they have less flexibility to be creative.* (Poon & Brownlow 2014, p. 277)
Table 2.3
Attributes by Study

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Critical thinking</td>
<td>Ability and willingness to update professional knowledge</td>
<td>Practical experience</td>
</tr>
<tr>
<td>2</td>
<td>Ability to work individually</td>
<td>Professional attitude</td>
<td>Professional attitude</td>
</tr>
<tr>
<td>3</td>
<td>Ability to work in teams</td>
<td>Interpersonal skills</td>
<td>Ability and willingness to update professional knowledge</td>
</tr>
<tr>
<td>4</td>
<td>Leadership and management skills</td>
<td>Ability to effectively work as part of a team</td>
<td>Ability to work independently</td>
</tr>
<tr>
<td>5</td>
<td>—</td>
<td>Enthusiasm</td>
<td>Willingness and ability to accept responsibility</td>
</tr>
</tbody>
</table>

Another focus of the studies by Tu et al. (2009), Poon, Hoxley & Fuchs (2011) and Poon and Brownlow (2014) is knowledge; specifically, the knowledge fields or topics of study, as opposed to the theoretical perspectives of knowledge type (2.1).

2.6.1.2 Knowledge fields and function

Oxford University Press (2011) refers to knowledge in both theoretical and practical understandings of the subject. Biggs and Tang (2009) and Leinhardt, McCarthy Young and Merriman (1995) make similar distinctions, citing university, or declarative, knowledge and professional, or functioning, knowledge as:

*Professional knowledge is functioning, specific and pragmatic. It deals with executing, applying and making priorities. University knowledge is declarative, abstract, and conceptual. It deals with labelling, differentiating, elaborating and justifying.* (Leinhardt, McCarthy Young & Merriman 1995, cited in Biggs & Tang 2009)

Leinhardt, McCarthy Young and Merriman share a particularly critical view of university educators in the field of applied professions, such as property, teaching declarative, non-functioning knowledge, stating:

*As university educators and researchers, we have tended to ignore or devalue the uncodified knowledge of practice. Our testing procedures bear witness to our values as the probe analytic, principled knowledge.* (Leinhardt, McCarthy Young and Merriman 1995)

A similar theme may be drawn from the research of Poon and Brownlow (2014) and the practices of the API. As discussed in section 2.6.1.1, Poon and Brownlow’s (2014) survey responders considered ‘practical experience’ to be the most sought-after of graduate attributes. This view underlines the constructivist direction of this research project with the idea that knowledge is not transmitted to the student, but rather constructed through activity or social interaction (Vos, van der Meijden & Denessen 2011;
Biggs & Tang 2009). According to the API, its accredited property education programs are not sufficiently integrating professional knowledge (2.5.1.1).

In reporting the most desirable fields of property knowledge sought after by the university community in the United States, Tu et al. (2009) present a ‘comprehensive knowledge of the business’ and an ‘understanding of the current market trends’. From a United Kingdom perspective, Poon, Hoxley and Fuchs (2011) found employers valued most significantly graduates with knowledge in valuation, property law, landlord and tenant law, professional practice and ethics, and client care.

In Australia, the API (2011), while critical of the declarative nature of the knowledge taught at universities, presents a prescriptive list of knowledge fields that the majority of accredited courses within a degree may cover, as presented in Table 2.3. As such, a close correlation may be expected with the findings of Poon and Brownlow (2014), whose survey respondents comprised members of the same institute. The alignment between the API’s knowledge fields (API 2013) and the survey responses (Poon & Brownlow 2014) it is evident although there are knowledge subcategories not explicitly contained in the category title. According to Poon and Brownlow (2014), knowledge fields sought by members but not prescribed by the API extend to understanding the roles of other professionals and stakeholders, market awareness and the specific practice of rural valuation. Similarly, the findings from the United Kingdom survey (Poon, Hoxley & Fuchs 2011) explicitly present the opportunity for property programs to assist students with their development of knowledge in client care, and conflict avoidance and resolution, or the related fields of ethics.
Table 2.4
Knowledge by Study and Institution

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Valuation</td>
<td>Valuation</td>
<td>Building construction</td>
</tr>
<tr>
<td>2</td>
<td>Property law</td>
<td>Professional standards</td>
<td>Finance and accounting</td>
</tr>
<tr>
<td>3</td>
<td>Landlord and tenant law</td>
<td>Specialist knowledge in the field of practice</td>
<td>Commercial law</td>
</tr>
<tr>
<td>4</td>
<td>Professional practice and ethics</td>
<td>Construction knowledge/techniques</td>
<td>Property valuation fundamentals</td>
</tr>
<tr>
<td>5</td>
<td>Client care</td>
<td>Understanding the wider built environment and the roles of other built environment professionals</td>
<td>Property investment</td>
</tr>
<tr>
<td>6</td>
<td>Property development</td>
<td>Factors affecting property market, including international, national and local factors</td>
<td>Property economics</td>
</tr>
<tr>
<td>7</td>
<td>Construction technology</td>
<td>Being able to understand and analyse of stakeholders’ needs</td>
<td>Property law</td>
</tr>
<tr>
<td>8</td>
<td>Property economics</td>
<td>Market awareness/knowledge</td>
<td>Property management</td>
</tr>
<tr>
<td>9</td>
<td>Planning</td>
<td>Rural valuation</td>
<td>Property market analysis</td>
</tr>
<tr>
<td>10</td>
<td>Conflict avoidance and resolution</td>
<td>Market analysis</td>
<td>Land use, planning and development</td>
</tr>
</tbody>
</table>

Note: API knowledge fields are not presented in ranked order (API 2013, p. 4).

2.6.2 Intended learning outcomes for property students

The published research, as reviewed in preceding sections from 2.4, assists with framing the nature of knowledge and broad knowledge fields sought after in a graduate of a university property program. Additionally, the review of the research presents the skills and attributes a graduate of the property program may gain to better prepare them for a career in property. On the other hand, there are clear limitations, acknowledged in the respective research papers. A significant limitation relates to the nature of the samples informing the findings of Tu et al. (2009), Poon, Hoxley and Fuchs (2011), and Poon and Brownlow (2014). While the Poon and Brownlow (2014) study does not have the geographic influence bias acknowledged in the other studies, the study does express that there is a skew towards valuers’ opinions (Poon & Brownlow 2014). Property valuers may be experts in their set domain; however, they are not education specialists and their duties do not extend to the setting of learning outcomes for property courses or programs.

Rather, intended learning outcomes for property programs are framed by program leaders, sometimes in consultation with learning and teaching experts. The establishment of program level learning outcomes through the analysis and application of constructive alignment is evident in the related research by the author in S Boyd (2015a). S Boyd (2015a) applies constructive alignment as a framework to review published research.
findings and investigate Australian undergraduate property programs. In the absence of further related research into learning outcomes for property students, it is proposed, in this research, that the goal of an Australian property program may be served if its graduates can achieve the following outcomes:

1. **Describe and explain** objective theories of property custodianship and the practical skills you require for a career in property.
2. **Analyse the functioning** of investment and development property and apply practical skills to make the best decisions in real-life property situations.
3. **Communicate effectively** as a professional with clients and colleagues in addressing real-life property situations.
4. **Operate** effectively and ethically as a team member in real-life property situations.
5. **Reflect** on your role as a property student and initiate transformative practices to guide your actions in an unknown future.

These program level learning outcomes are sufficient to guide the next stage of constructive alignment, which is the consideration and application of teaching and learning activities (2.3). The prescribed outlines are not, however, sufficiently detailed to inform the more comprehensive process of designing learning activities. Rather, supplementary research, as detailed in Chapter 3, ‘Methodology’, and demonstrated in Chapter 4, ‘Investigation: property education in Australia’, is applied to provide a clearer view of the knowledge, skills and attributes required of a property graduate.

### 2.6.3 Teaching or learning activities

As the primary activity of tertiary institutions, the effectiveness of teaching and learning activities dominate published research into higher education. Similarly, quasi-industry investigations into the sustainability of the university model, such as Ernst and Young (2012), and emergent learning technologies (Johnson, Adams & Cummins, 2012; Johnson et al. 2011, 2013, 2014), provide assessments of tertiary teaching and learning activities. Biggs and Tang (2009) and T Boyd (2005b) acknowledge the dominance of lectures and tutorials in higher education and property, yet they present alternative approaches. Specifically, Biggs and Tang (2009) speak of developing teaching/learning activities in the context of the learning outcomes and nature of the knowledge, skills and attributes sought. In a similar manner, the remainder of this section considers teaching and learning activities in the context of the five intended learning outcomes (2.6.2).
2.6.3.1 Learning outcome 1: Describe and explain ...

The first intended learning outcome relates to describing and explaining objective theories of property custodianship and the practical skills required for a career in property. The knowledge prescribed in the learning outcome implies a focus on the learning of objective ‘truths’, or objectivism (Jonassen 1991) and the teaching of declarative knowledge. Biggs and Tang (2009) are particularly critical of the lecture and tutorial method as a generic university duty, noting that while lectures and tutorials have their uses, the activities have limitations and can present passive learning environments encouraging students to adopt surface learning approaches (2.1). Nevertheless, the traditional lecture may suit receptive learning so long as it is interactive, with supportive learning activities and an emphasis placed on what the student does (Biggs & Tang 2009). Similarly, advances in educational technology have presented numerous tools and activities to enhance declarative knowledge development.

As discussed in Chapter 1 (1.1.1) a common trend in reviews of higher education relates to the transparency and availability of knowledge. Ernst and Young (2012) speak of the democratisation of and ready access to knowledge as drivers of a global education revolution. Constructivists, who do not consider availability and transmission of knowledge to equate to the knowledge constructed by the learner (Jonassen 1991), may not share Ernst and Young’s (2012) assertion. Nonetheless, from an objective perspective, students with ready access to objective truths would be better placed to describe and explain objective theories of property custodianship and the practical skills required for a career in property (2.6.2).

Massively open online courses (MOOCs) are both opportunities and sources of competition for university education. While learning at scale and at distance is not a new phenomenon, a MOOC is an educational delivery approach that is generally available ‘openly’, meaning without charge for access (Johnson et al. 2013). Emanuel et al. (2013), in similar terms to Ernst and Young (2012) and the advocates’ perspective in Johnson et al. (2013), share the literary perspective on MOOCs as:

Massive[ly] open online courses (MOOCs) have been hailed as an educational revolution that has the potential to override borders, race, gender, class and income. (Emanuel et al. 2013, p. 342)

With tens of thousands of students participating in a single course, working at their own pace, relying on their own style of learning, and assessing each other’s progress,
MOOCs are said to have the potential to change the landscape of online learning (McAndrew & Scanlon 2013; Johnson et al. 2013).

North, Richardson and North (2014) present MOOCs as the logical outcome of the ongoing evolution of distance learning. In discussing their international survey, North, Richardson and North say the adoption of MOOCs is on the rise. In 2013 only 13 per cent of schools offered MOOCs; however, 43 per cent planned to offer MOOCs by 2016 (North, Richardson & North 2014). In differentiating a MOOC from other, more traditional, forms of education, North, Richardson and North (2014) speak of:

- motivation, through the opportunity to study at an elite university
- enormous enrolment, for instance Stanford’s course on artificial intelligence attracting 150,000 students
- retention and the ease of dropping out due to having no invested capital. MOOCs commonly have a low completion rate of 10–20 per cent
- diversity and disparity, associated with inherently wider representation of participants
- interaction and feedback, or lack thereof associated with MOOCs. In particular the reliance on peer reviews and privacy issues
- plagiarism and cheating, as widely associated with online education offerings
- success rate, with thousands enrolling but only 10–20 per cent completing. Further, completion is not assurance of learning.

The potential for diversity and disparity is a cited benefit of the MOOC model (Johnson et al. 2013; North, Richardson and North 2014; Ernst & Young 2012; McAndrew & Scanlon 2013). While the opportunity exists for MOOCs to educate the diverse masses, Emanuel et al. (2013) share how they may be falling short of expectations.

Through analysing survey responses from participants utilising the online education service Coursera, Emanuel et al. (2013) conclude that, far from realising the high ideals of their advocates, MOOCs are being taken by the educated few. MOOCs seem to be reinforcing the advantages of the ‘haves’ rather than educating the ‘have-nots’, with 83 per cent of the surveyed students already having post-secondary degrees (Emanuel et al. 2013). Emanuel et al. consider the educational disparity to be particularly stark in Brazil, Russia, India, China and South Africa, all of which are acknowledged as prime candidates for MOOC education. In those countries, almost 80 per cent of MOOC
students are said to come from the wealthiest and most well-educated 6 per cent of the population (Emanuel et al. 2013).

Regardless of the argument for social equity, MOOCs may be regarded as an early stage example of a search for new educational models (Ernst & Young 2012). Similarly MOOCs, as with interactive lectures, may encourage receptive learning and lead a learner to the development of declarative knowledge and an understanding of the skills they will require for a career in property (2.6.2).

2.6.3.2 Learning outcome 2: Analyse the functioning ...

According to Biggs and Tang (2009), the concept of lecturing or delivering information is contrary to the theory of constructivism (2.2). The concept of constructive alignment (2.3) supports the focus on learning, rather than teaching, and places little emphasis on what the student does. Rather, Biggs and Tang (2009) suggest functional knowledge teaching activities suited to intended themes in learning outcomes (2.6) as depicted in Appendix 2.1. For learning outcomes framed around the verb ‘apply’, such as the second intended learning outcome adopted here, ‘apply practical skills to make the best decisions in real-life property situations’, Biggs and Tang proposed case-based learning, group work and workplace learning. Similarly Biggs and Tang promote problem-based learning as a reflection on the way people learn in real life, where the learner seeks the knowledge of disciplines, facts and procedures that are needed to solve the ensuing problems.

Problem-based learning

In the context of property education, T Boyd (2005b) and Susilawati and Yam (2013) propose integrated problem-based workshops and other industry linked training opportunities as teaching delivery modes to provide a more effective learning environment for property students. In their published research, Susilawati and Yam (2013) investigate the potential for case-based learning through analysis of feedback from stakeholders in an international case competition. They conclude there is sufficient feedback to assert that the case competition: ‘helped students to develop critical thinking skills, and the ability to solve problems in a changing environment within a group dynamic’ (Susilawati & Yam 2013, p. 7).

In addition, Susilawati and Yam (2013) make the explicit connection to Biggs and Tang’s (2009) concepts of active learning and the potential to engage students in adopting a deeper approach to their learning.
Case-based and problem-based learning approaches, as applied in property education, are not without limitations. Susilawati and Yam (2013) acknowledge problem-based learning is labour intensive and their description of the analysed case study demonstrates the considerable financial cost and the cost of resourcing required to enable relatively few students to receive the perceived pedagogical advantages. The authors note that only three universities had participated in all four case competitions and that participation was always subject to funding and the availability of a coach or mentor. As a further limitation the nature of the event, being a competition or opportunity for trans-university rivalry, may add emotive stimulation but also bias with respect to the team selection. In such a competition it is conceivable that contestant selection may be based on prior academic performance and, in a similar manner to MOOCs, benefit the ‘haves’ over the ‘have-nots’ (2.6.3).

Outside of property education, another innovative problem-based learning approach has been empirically tested with positive results relating to student-centred learning and problem-solving. Games, the focus of this research project, are by their nature problem-solving vehicles, aligned to the social constructivist theory of learning (Vos, van der Meijden & Denessen 2011). While the body of published research is focused on learning and societal change, researchers in the pure sciences have applied games to problems of the real world.

Khatib et al. (2011) demonstrate the link between games and targeted problem-solving through harnessing the problem-solving ability of online gamers to decipher the structure of an enzyme of an AIDS-like virus that they say thwarted scientists for a decade. By incorporating a fun-for-purpose game, called Foldit, Khatib et al. (2011) demonstrate how problems in science, in particular protein folding, may be solved through gameplay.

Games, and play, have an established relationship with problem-based learning. Through meaningful play, Vygotsky (1978, cited in Young et al. 2012) proposes that one might ‘develop abstract imaginative thinking and realise goals that they could not yet achieve in real life’.

Serious games

By definition, games are to be regarded as ‘activit[ies] that one engages in for amusement’ (Oxford University Press 2014). In extending the definition, with reference to published
research, the critical defining theme relates to games being amusing, fun, or inciting play. According to Rieber (1996) play, as it relates to game design, is complex and difficult to define, yet relatively easy to observe. The benefits associated with play in education are evident in the context of emotive learning and engagement. On the other hand, Rieber concedes that not all forms of play are considered positive or beneficial and the published history of play in education resembles the debate between objectivism and constructivism (2.2). In discussing interactive multimedia learning environments, he asserts:

*There appear to be many advantages to seriously considering play as a dominant goal for these types of learning environments, despite the caution that all forms of play should not be considered positive or beneficial. Play also holds promise as a benchmark for evaluating interactive learning environments - those that evoke it deserve special recognition and consideration.* (Rieber 1996, p. 55)

More broadly in Rieber’s findings, play and games in learning may require justification through a constructivist perspective on learning and teaching (2.2). Still, a game by definition must be engaging, or fun, and need not satisfy learning goals or objectives (Oxford University Press 2014).

While acknowledging the necessity for fun, or engagement for amusement, games may enable students to gain skills and build knowledge through participatory learning (Crawford 1984; Knechel 1989; Albrecht 1995; Tanner & Lindquist 1998; Gee 2003, 2011; Clayton 2003; Shanklin & Ehlen 2007; Gaber 2007; Klopfer, Osterweil & Salen 2009; Egenfeldt-Nielsen 2009; Ferdig 2009; Mayo 2009; Isbister et al. 2010; O’Halloran & Deale 2010; Nilsson & Jakobsson 2011; Johnson et al. 2011, 2013, 2014; Johnson, Adams & Cummins 2012, Wu et al. 2012; Connolly et al. 2012; Yang 2012; Wouters et al. 2013). As such games, or more specifically games designed to enhance learning, or ‘serious games’, may be an educational tool to add engagement to traditional teaching practices and MOOCs, or even present as separate stand-alone learning and teaching activities.

The origin of the term ‘serious game’ is contested in literature, with credit attributed to Clarke Abt for the work in his 1970 publication by that name (Abt 1987) and to the later Serious Games Initiative of 2002 when the term became widespread (Susi, Johannesson, & Backlund 2007). Authors acknowledge the seemingly oxymoronic lexicon grouping (Abt 1987) as ‘serious games’ appears to be a contradiction between its parts, with the terms ‘serious’ and ‘game’, seemingly being mutually exclusive (Poplin 2011). The conflict is addressed further in consideration of embedding educational
content (Klopfer, Osterweil & Salen 2009). However, for the purpose of this research, Poplin’s definition of a serious game provides a sound orientation for advancing the project, as ‘serious games aim to support learning processes in a new, more playful way’ (Poplin 2011, p. 195).

Poplin’s (2011) reference to ‘new’ relates to the intervention of a serious game within an established learning process or program. Her definition is not set to imply that games are a new intervention in learning. Rather, games and education have a relationship predating historic records and spanning cultures and species. Gameplay, manifested as play with rules, is evident in the evolutionary journey as children pretend to be parents, or whale calves mimic the breaching dance of their mothers. In discussing schools and games, Crawford (1984) sets an advocatory position for games in education in:

Games are thus the most ancient and time-honoured vehicle for education ... We don't see mother lions lecturing cubs at the chalkboard; we don't see senior lions writing their memoirs for posterity. In light of this, the question, ‘Can games have educational value?’ becomes absurd. It is not games but schools that are the newfangled notion, the untested fad, the violator of tradition. (Crawford 1984, p. 18)

Advocates of serious games see games and play as more than process learning tools. Young et al. (2012) cite Vygotsky (1978): ‘highlighting play as the means … to develop abstract imaginative thinking and realise goals that they could not yet achieve in real life’. Similarly, in the broader property discipline, Monopoly, or rather its earlier variant The Landlord’s Game, was created to incite behavioural change in children (5.3.1). Lizzie Magie, the creator of The Landlord’s Game, expressed her intention through the game’s development as:

Let the children once see clearly the gross injustice of our present land system and when they grow up, if they are allowed to develop naturally, the evil will soon be remedied. (Magie, quoted in The Single Tax Review 1902, p. 56)

Serious games in higher education

In the context of higher education, emerging studies of consumer games have identified the aspects of games that make them engaging learning tools. Johnson, Adams and Cummins (2012) justify the inclusion of game-based learning in their Horizon Report, noting:

Early studies of consumer games helped to identify the aspects of games that make them especially engaging and appealing to players of various ages and of both genders: the feeling of working toward a goal; the possibility of
attaining spectacular successes; the ability to problem solve, collaborate with others, and socialize; an interesting story line; and other characteristics. (Johnson, Adams & Cummins 2012, p. 18)

Although authors propose that students do learn from playing computer games (2.6.3), as this is an emergent research field the body of academic research and empirical evidence of learning has, until recently, been regarded as not sufficiently ‘deep’ (Gee 2011; Iacovides et al. 2012). Moreover, in a more recent meta-analysis Young et al. (2012) call for the conduct of longitudinal studies, noting that there were no studies or projects that examined the long-term effects of game-based learning. Connolly et al. (2012) also encourage further research; however, they promote qualitative approaches to develop a better understanding of how the gameplay may match desired learning outcomes.

Wouters et al. (2013) concede that, prior to their research into the cognitive and motivational effects of serious games, there was little evidence for the assertion that serious games influence learning by changing cognitive processes and affecting motivation. They considered the increase in empirical studies on serious games from 2007 to 2012 to justify their meta-analysis. Through their research they confirm the findings of earlier reviews that, in general, serious games are more effective than conventional instruction methods.

The evolving perspective of games in higher education is evident in the phrasing of the New Media Consortium’s Horizon Report, a collaborative report on emerging technologies which are considered to have an impact on higher education. When first introduced, as one of two technologies expected to gain widespread usage within two to three years, game-based learning was described as an active field of research in higher education where ‘proponents of game-based learning in higher education point to its role in supporting collaboration, problem-solving, and communication’ (Johnson et al. 2011, p. 20). The 2014 publication addresses the trend, presenting a subsequent, more advocacy view with the assertion:

Educational gameplay [in higher education] has proven to foster engagement in critical thinking, creative problem-solving, and teamwork - skills that lead to solutions for complex social and environmental dilemmas. (Johnson et al. 2014, p. 42)

In review of the published research it is evident that the argument has moved beyond the question of whether games are or are not effective learning tools. The discussion is more precisely focused on what the student learns when playing a game. In support of the student-centred learning focus, Egenfeldt-Nielsen (2009) and Wu et al. (2012) criticise
the majority of published studies, noting they are not based on learning theory or aligned to learning content. Specifically, Egenfeldt-Nielsen (2009) speaks of a next generation of educational games needing to be tailored more closely to actual learning content. Similar conclusions, incorporating the act of gaming and skill development, are supported by Gee (2011), Klopfer, Osterweil and Salen (2009), Ferdig (2009), Johnson et al. (2011), and Connolly et al. (2012). Precisely, Connolly et al. (2012) reflect upon games and learning outcomes through encouraging further qualitative studies to extend our understanding of the nature of engagement in games, and:

To encourage the use of games in learning beyond simulations and puzzles, it is essential to develop a better understanding of the tasks, activities, skills and operations that different kinds of game can offer and examine how these might match desired learning outcomes. As with other educational interventions, it will also be important to consider the detail of how games are integrated into the student's learning experience. (Connolly et al. 2012, p. 672)

Besides investigations into the computer-based simulation game SimCity and related game variants that look into the relationship between town planning education and a simulated city development, there is no discipline-centric support for the inclusion of serious games in teaching property. With the exception of pilots, or initial investigatory studies, no researchers within Australian universities have addressed the parallels, or alignment between what an individual student may learn from playing a game and the intended learning outcomes of the property program. The initial or pilot studies by the author, S Boyd (2013c), and Bryant et al. (2014) have only raised the discussion, acknowledging the potential for learning enhancement and uncovering potential for linkages between gameplay experiences and the desired learning outcomes in a property program.

The Bryant et al. (2014) study relates to the play of a Monopoly variant board game within tutorials associated with a first-year undergraduate property valuation course. The pilot was designed to engage students in the discipline of property and extend to include deeper evaluation questions such as: ‘how did game playing assist in developing an understanding of core threshold concepts in property education’ (p. 4), and ‘how did game playing assist in creating a cohesive property cohort’ (p. 4). Due to the small cohort, and the timing of response collection, the findings of the deeper evaluation questions were not available. The pilot concludes with the benefit of playing Monopoly City being acknowledged as the formation of explicit linkages between play-based understanding of
how the property market functions and the new theoretical concepts associated with the subject (Bryant et al. 2014).

In expanding the empirical base this research seeks a broader review of the published research, focusing on the attributes of serious games and gameplay through enhancing learning, supporting collaboration and communication, problem-solving and functional knowledge construction.

Learning through gameplay

Klopfer, Osterweil and Salen (2009), Johnson, Adams and Cummins (2012) and Johnson et al. (2011, 2013) identify two separate pathways by which gaming may contribute to learning.

The first pathway is said to relate to the content taught, or knowledge learnt, in a specific game. The second pathway relates to the acquisition of skills and competencies inherent in the playing of an appropriate game. Both pathways may overlap in some games such as SimCity, which provides content specifically related to the town planning discipline while encouraging problem-solving (Klopfer, Osterweil & Salen 2009).

The first pathway of learning through gameplay relates primarily to the first two intended learning outcomes. More specifically, the applied and functioning nature of gameplay aligns with the second learning outcome, ‘Analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations’ as seen earlier in this section and in the discussion regarding games and functional knowledge.

With respect to the second pathway identified by Klopfer, Osterweil and Salen (2009), Johnson, Adams and Cummins (2012) and Johnson et al. (2011, 2013), published research is rather less conclusive as there are limited studies supporting the skills and attributes gained through gameplay. Acknowledging the limited empirical knowledge base, there have been well-intentioned advances since Gee’s (2003) early work through his publication, What video games have to teach us about learning and literacy. Through describing the impact of gameplay on cognitive development, Gee (2003, 2011) identifies 36 principles of learning literacy inherent in good video games, as contained in Appendix 2.2. In a higher education context Johnson et al. (2011) provide a more succinct categorisation of the proponent’s view of games as supporting collaboration,
communication, and problem-solving. There is a clear alignment between the proponent’s view, as shared by Johnson et al. (2011) and the third and fourth learning outcomes which relate to communication and operation, as illustrated in Table 2.5. Similarly, Johnson, Adams and Cummins (2012) identified critical thinking as a skill or attribute that is related to gameplay and sought after in higher education. Critical thinking has close ties to the concepts of reflection and transformative practices (Biggs & Tang 2009), as sought after in the final intended learning outcome.

Table 2.5

<table>
<thead>
<tr>
<th>Intended learning outcome</th>
<th>Horizon Report, gameplay fosters</th>
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</thead>
<tbody>
<tr>
<td>1. Describe and explain objective theories of property custodianship and the practical skills you require for a career in property</td>
<td>—</td>
</tr>
<tr>
<td>3. Communicate effectively as a professional with clients and colleagues in addressing real-life property situations</td>
<td>Communication (Johnson et al. 2011; Johnson, Adams &amp; Cummins 2012)</td>
</tr>
<tr>
<td>5. Reflect on your role as a property student and initiate transformative practices to guide your actions in an unknown future</td>
<td>Critical thinking (Johnson, Adams &amp; Cummins 2012; Johnson et al. 2013, 2014)</td>
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A further discussion of findings from published research on serious games, as they relate to the intended learning outcomes identified in section 2.6.2, is included in the remainder of this literature review, Chapter 2.

Games and functional knowledge

With the property industry expecting, and higher education institutions promising, work-ready property graduates (2.1), the case for Australian university programs to incorporate more professional or functioning teaching activities, assessment and grading is supported (Boyd S 2012b). Functioning knowledge deals with executing, applying and making priorities (Leinhardt, McCarthy Young & Merriman 1995, cited in Biggs & Tang 2009), which are foundation attributes of games (Gee 2003, 2011; Johnson et al. 2011; Klopfer, Osterweil & Salen 2009).

Gaming that is related authentically to course content can help a student gain a fresh perspective on the material and can potentially engage them in the content in more
complex and nuanced ways, according to Johnson et al. (2011, 2013, 2014) and Johnson, Adams and Cummins (2012). Support for this view is evident in a published study by McGrath et al. (2010), where a serious game is designed and deployed to enable physics students to encounter phenomena that are considered outside human experience. The goal of the McGrath et al. (2010) study was to ‘provide a learning environment which presents “special relativity” in a less abstract way’ (p. 8). The resultant simulation game was said to provide a visual model of ‘traveling’ through time and accompanied the mathematical models of special relativity. McGrath et al. (2010) found that students who played Real Time Relativity and completed the experiment performed better on the special relativity question in a subsequent test.

In discussing how playing video games may contribute to learning outcomes in STEM (Science, Technology, Engineering and Math) disciplines, Mayo (2009) presents a connection between accomplishment and functional knowledge construction. Mayo (2009) cites rapid feedback, the relationship between reward and self-confidence and self-efficacy, and the translation to greater persistence, as contributing to a higher level of accomplishment. Accomplishment is not necessarily a measure of functional knowledge construction; however, engagement and self-efficacy are readily associated with deeper learning and the functional knowledge teaching activities presented by Biggs and Tang (2009).

2.6.3.3 Learning outcome 3: Communicate effectively ...

In section 2.6.1, oral and written skills are considered prominent skills for a property graduate. The development of such practical skills may be considered in the context of how property programs are offered, specifically the mode of delivery and approaches to assessment. In total there are 43 property program offerings identified through searching ‘property’ and ‘real estate’ in the Hobsons Course Finder and the respective centralised tertiary application hosting entities for each of the Australian states and territories. Of the 20 undergraduate programs offered in 2013 to 2014, the majority (fifteen, or 75 per cent) are offered on campus only, with CQUniversity providing the only solely online, or external, program (CQUniversity 2013). Curtin University (2013) offers the flexibility of on-campus or blended learning while Deakin University (2013) offers its degree through either internal or external modes.

For the majority of property programs which offer face-to-face learning and assessment, the opportunity for a student to enhance their oral communication may be
provided through in-class group activities and even assessments such as class presentations and problem-based learning activities as recommended by Susilawati and Yam (2013). For programs delivered solely through distance education there is a range of tools to encourage communication, especially those incorporated in MOOCs to enable peer-guided learning (2.6.3). Nevertheless, the simulation of oral communication may be difficult and is not empirically addressed in higher education research.

Rather, the focus of communication in higher education has been on the potential of social media and other communication tools (Johnson et al. 2014). Johnson et al. identify the integration of online, hybrid and collaborative learning systems as an emerging driver of change in higher education, stating their use ‘facilitate[s] group problem-solving and build[s] communication skills, while advancing students’ knowledge of the subject matter’ (Johnson et al. 2014, p. 10).

Written skills, and specifically proficiency in report writing, may be best suited to traditional forms of assessment (2.6.4). Alternatively, verbal and written communication skills are another avenue for consideration in the design of serious games. In studies relating to Monopoly-based learning activities, Albrecht (1995) and Clayton (2003) found accounting students to be exposed to intensive verbal and written practices in gameplay.

2.6.3.4 Learning outcome 4: Operate ... as a team ...

Group work and problem-based learning activities provide the opportunity to simulate professional practice, and help students to develop critical thinking skills and the ability to solve problems in a changing environment within a group dynamic. Such activities are resource and time intensive, and some case and group work may be impractical to apply in an online environment.

Tanner and Lindquist (1998) propose combining Monopoly with the use of cooperative learning to develop team-building skills. When set as a team and tournament learning activity for first-year accounting students, they found that, while time intensive, playing Monopoly provided participants with the added benefit of team-building skills, including a positive mutual concern and heightened perception of achievement. As an extension of the cooperative learning activity, Tanner and Lindquist report that lower achieving students are more likely to attend class and more likely to complete homework assignments on time due to their involvement within a team.
With respect to digital games, massively multiplayer (online) games, or MMOs, are said to support collaborative problem-solving (Isbister et al. 2010; Gee 2003, 2011; Johnson et al. 2011; Johnson, Adams & Cummins 2012; Klopfer, Osterweil & Salen 2009). The playing of MMOs may require, and may encourage the development of, skills relating to teamwork, leadership, and discovery (Johnson, Adams & Cummins 2012). Specifically, Isbister et al. (2010) speak of MMOs as:

*provid[ing] structured experiences in which players take on specialized roles and work together to solve problems, leveraging one another’s strengths.*

(Isbister et al. 2010, p. 2043)

Some online games, namely Minecraft and World of Warcraft, have been integrated into specific course curriculums to bring many players together to work on activities that require collaborative problem-solving (Johnson, Adams & Cummins 2012). On the other hand, online games are complex systems and may not align well with specific course content or intended learning outcomes. As Johnson, Adams and Cummins discuss, the link between MMOs and education is said to exist in the highest levels of interaction in which gameplay requires teamwork, leadership, and discovery.

In such a manner, the respective merits of playing generic online games need to be considered in light of the lost opportunities. According to Young et al. (2012) there are opportunities, as well as opportunity costs, when playing games for education. They consider deep understanding to take time and reflection practices which may be more efficiently allocated to curriculum coverage (Young et al. 2012). In lieu of online games specifically aligned to additional learning outcomes, traditional group-based learning activities such as case-based learning, group work and workplace learning (Biggs & Tang 2009) may have greater relevance in higher education. More specifically, as addressed in a related peer-reviewed proceeding, it is the property programs offered in online modes that would appear to be potential beneficiaries from incorporating existing MMOs into the curriculum (Boyd S 2013c).

2.6.3.5 Learning outcome 5: Reflect on your role ...

According to Mezirow (1990), reflection is generally used as a synonym for higher-order mental processes. As an activity, reflection relates to the self-exploration of experiences in order to form new understandings and appreciation (Biggs & Tang 2009). In that way, reflection is the validating of what is known and, if applied in an appropriate manner, can lead to transformative learning (Mezirow 1990).
While oriented towards the constructivist theories of knowledge creation (2.2), reflective practice is not just an activity situated in higher education. Rather, the practice of reflecting and then taking transformative action is situated in many contexts including professional practice. Biggs and Tang (2009) attribute the coining of the term ‘reflective practitioner’ to Donald Schön and his 1983 book, *The reflective practitioner: how professionals think in action*. In describing the reflective practitioner they point out that effective professionals, who may include those in property, need to reflect when faced with new problems that they have not been specifically trained to cope with.

While the published research into serious games relates to behavioural transformation and knowledge construction (2.6.3), there are few direct connections between the playing of serious games and the activity ‘transformative reflection’. On the other hand, Nilsson and Jakobsson (2011) and Johnson et al. (2014) propose that gamers are encouraged to adopt adaptive critical reasoning skills and critical thinking. Nilsson and Jakobsson (2011) specifically discuss that ‘when students are allowed to manipulate variables in a simulation computer game, they develop critical reasoning skills that may be used to solve problems’ (p. 36).

Serious games may provide the appropriate environment or setting for transformative reflection to occur. There is, however, insufficient empirical evidence to assert that playing serious games would initiate transformative practices to guide a person’s actions in an unknown future, as sought in the final learning outcome. As such, the most appropriate way to leverage gameplay’s potential for transformative reflection may be through the more recognised assessment medium, the reflective journal (2.6.4).

### 2.6.4 Assessment

Besides constructive alignment another dominant, and related, term in higher education practice and research is ‘assessment for learning’ or ‘assessment as learning’. While Brown (2004) discusses the concept in detail, it is evident that assessment items have a role in education beyond just measuring performance. Students utilise formative feedback to learn from and adapt their respective learning approaches (Biggs & Tang 2009) and depth of cognitive processing (2.1). Some assessment tasks, such as multiple-choice tests and end-of-year exams, are not followed with in-depth student feedback, but rather are only prescribed a grade. In such a case, the summative-only feedback provides little scope for students to learn and they may be reluctant to pursue formative feedback when the course is finished.
2.6.4.1 Learning outcome 1: Describe and explain ...

As addressed in the previous section, the first prescribed learning outcome relates to property students developing declarative, or university knowledge (2.6.1). Declarative knowledge is typically assessed by writing answers to set questions or by multiple-choice testing (Biggs & Tang 2009). Summative assessments such as the multiple-choice test are said to provide little scope for assessment for learning (Brown 2004; Biggs & Tang 2009). On the other hand, the shared assessment of written tasks with rubrics may enhance the learning of declarative knowledge.

Rubrics are utilised in education to articulate expectations for an assessment (Andrade 2000; Stiggins 2001; Arter & Chappuis 2007; all cited in Reddy & Andrade 2010), as well as to provide more reliable benchmarks for comparison (Biggs & Tang 2009). Across disciplines there are various forms of rubrics, including those designed specifically for serious games assessment. Annetta et al. (2011) describe the rationale, development and measurement of a serious games rubric, noting the reliability, or fair agreement amongst assessors.

2.6.4.2 Learning outcome 2: Analyse the functioning...

As seen in section 2.6.3, gaming that is related authentically to course content can help a student gain a fresh perspective on the material and potentially engages them in the content in more complex and nuanced ways (Johnson et al. 2011, 2013; Johnson, Adams & Cummins 2012). In discussing engagement in games, Mayo (2009) cites rapid feedback and the relationship between reward and self-confidence and self-efficacy, and the translation to greater persistence, as contributing to a higher level of accomplishment. Accomplishment is not necessarily a measure of functional knowledge construction; however, engagement and self-efficacy are readily associated with deeper learning and the functional knowledge teaching activities presented by Biggs and Tang (2009).

Winning and losing is another way that emotion may be intrinsically harnessed in games and gameplay (Gee 2003). With games, learners can take risks, and share the respective despair or euphoria, in a space where real-world consequences are lowered (Gee 2003). Gee (2003) supports other ways to situate emotive learning in games such as through role play, as a player may adopt avatars or characters with cultural backgrounds opposed to their own and assume multiple perspectives. As shared by Professor Beard
and Warren (2013), such destabilisation may have a role in good university education practice (2.5.1.1).

More formally, assessment for attributing summative grades in serious games has been adopted by Adams (1998). Adams pioneered the embedding of the city building simulation, SimCity 2000, in an introductory urban geography class. In his study, university students were tasked with three experiments instructing the creation and management of their virtual cities, and subsequent reporting of their responses to set questions through an assessable essay. As one of the ‘experiments’, Adams had his class:

create a green city. Put in large and small parks in appropriate spots. Plant trees. If you have heavy industry, you might want to build a railroad through your industrial area and terminate it with depots at either end to reduce pollution from trucks. Expand the Industries window and levy a heavy tax on industries that you suspect would create pollution. (Adams 1998, p. 48)

The assessable essay requested by Adams doubled as a questionnaire with students required to write a critique of two to three pages, answering:

Did you enjoy using SimCity 2000?;

What did you enjoy or not enjoy about it (be specific)?;

Describe the results of Experiments A, B, and C;

What do you think SimCity teaches people about urban processes (this may be something correct or incorrect in your view, in either case, explain)?;

After doing the experiments, identify two or three ideologies which you feel are ‘between the lines’ of the SimCity software;

Which of the following words best describes SimCity 2000: puzzle, game, model, toy, other (explain)?;

Rate your prior experience with SimCity 2000 or SimCity: none, one or two encounters, an occasional user, fairly experienced, an ‘expert’ SimCity mayor. (Adams 1998, p. 48)

The assessment did not appear as a barrier in the Adams (1998) study, as his students reportedly voted the SimCity project the most popular in the course offering. Through analysis of the essays, Adams found the most effective learning to be associated with the game-based activity was not the learning of facts, in an objective sense as discussed in section 2.2, but rather the development of certain attitudes through interaction with the software. The attitudes uncovered by the students in playing SimCity include:

(a) power: the feeling that urban patterns and processes can and often should be changed;
(b) interrelatedness: awareness of the complex ways that any modification of the urban fabric can affect urban processes and patterns throughout a city;

(c) respect for urban decision-makers and planners

(d) familiarity with the bird’s eye perspective of geographers and planners;

(e) appreciation for the collection and allocation of municipal revenues;

and

(f) humility toward the task of regulating and maintaining a system as complex as a city.

(Adams 1998, p. 54)

In a similar manner, O’Halloran and Deale (2010) sought to improve the student learning process by creating a game as a learning tool to supplement lectures and traditional classroom methods. In their study, they repurposed the Monopoly board game for integration in a university hospitality and tourism course. While the serious game–based learning activity was acknowledged as a pilot study, a student’s success or lack of success in the game was to contribute 15 per cent towards their final class grade. Unlike the Adams (1998) study, O’Halloran and Deale (2010) conducted two separate assessment approaches: one facilitated by the instructor, and the other by the individual student. The instructor, while maintaining strategy meetings, kept a record of student performance. The instructor’s assessment, by way of a scoring rubric, was said to relate to team participation and peer evaluation. To evaluate the game itself, students were provided with their own rubric focusing on research, decisions and justification. The students’ rubric was not assessed, but rather completion was incentivised through the offer of a prize.

As a part of their analysis, O’Halloran and Deale (2010) considered the influence of the gameplay on the students’ examination grades. In comparing student exam grades, semester to semester, they found the class, subject to the game intervention, achieved grade improvements of 5 to 7 per cent. They acknowledge limitations in their analysis and call for further empirical exploration of games in learning to test their findings.

2.6.4.3 Learning outcome 3: Communicate effectively ...

For property programs offered in face-to-face or blended learning modes, the opportunity for a student to enhance their oral communication may be provided through class group activities and assessments (2.6.3). Assessment of communication in traditional oral and written forms is appropriately set in an authentic or simulated environment. Such settings
may be presented in a classroom or theatre with students role-playing or acting in the respective professional situation. In discussing assessment and grading of functioning knowledge, Biggs and Tang (2009) speak of the appropriateness of student presentations and related benefits associated with peer input.

For distance education programs, higher education research does not empirically address the simulation of oral communication, but rather the potential of social media and other communication tools (2.6.3). Similarly, MMOs and virtual worlds are commended for their collaborative problem-solving (2.6.3) potential but not the assessment of more traditional oral skills.

2.6.4.4 Learning outcome 4: Operate ... as a team ...

As demonstrated by Tanner and Lindquist (1998), playing serious games as cooperative learning activities may leverage the existing learning outcomes and develop team building skills (2.6.3). When asked to rate their view of the statement, ‘I felt more social support from my teammates than I normally do from classmates in a traditional (non-team) classroom exercise’ (Tanner & Lindquist 1998, p. 147), 83 per cent of the respondents in their exercise either agreed or strongly agreed.

In grading and assessment, Tanner and Lindquist (1998) adopted a similar approach to O’Halloran and Deale (2010) with the evaluation questionnaire not being assessed. Rather, in Tanner and Lindquist’s experiments the questionnaire was issued after the completion of a suite of assessment items. The assessment items contributed a total of 15 per cent towards the students’ final grades and principally comprised the submission of a group project pack; however, a portion of the grade was attributed to peer assessment and a bonus for gameplay performance. The gameplay performance bonus was 10 additional points, equivalent to 13 per cent of the assessment, allocated to the team with the highest net income. To ascertain the impact of the bonus system on student motivation, Tanner and Lindquist presented the statement, ‘The bonus points for the best achievement served to motivate my performance’ (Tanner & Lindquist 1998, p. 146), with a modest majority of the students (63 per cent) either agreeing or strongly agreeing.

2.6.4.5 Learning outcome 5: Reflect on your role ...

Critical incidents in learning activities and serious games (2.6.3) may provide the appropriate environment or setting for transformative reflection to occur. The most appropriate way to leverage the potential for transformative reflection may be through the
more recognised assessment medium, the reflective journal (Biggs & Tang 2009). In
justifying the use of reflective journals, Biggs and Tang (2009) connect the process of
reflection as guiding professional functioning, and the journal’s usefulness in assessing
intended learning outcomes.

For the intended learning outcome, ‘Reflect on your role as a property student and
initiate transformative practices to guide your actions in an unknown future’, a journal
may be considered a deliverable, or evidence of the student’s reflections. On the other
hand, if the journal is truly reflective and transformative, not just an expression of what
had happened, then there may be reflections of a personal nature. As Biggs and Tang
(2009) discuss, the assessment of such personal reflections needs to be delicate. They take
the argument further by saying reflective journals should not be marked, or graded, as a
task, but taken as sources of evidence for the fulfilment of intended learning outcomes.

The approach by Adams (1998), in assessing his students’ reflections on playing
SimCity, conflicts with the view from Biggs and Tang (2009). In the Adams study the
task was named as an essay, or critique, rather than a reflective journal. Nevertheless, the
assessment task he prescribed related to his research findings and encouraged students to
adopt reflective practices and discuss ideologies. For example, a student’s reflection, as
shared below, went beyond describing events that happened and presented the first stages
of transformative reflection, covering the three stages of Boud’s (1985) critical reflections:
‘describe objectively what happened’, ‘interpret the events’, and ‘evaluate the
effectiveness and usefulness of the experience’:

*SimCity does teach some rather disturbing lessons which are obviously
misleading. If I make a mistake in my city, I can simply bulldoze it, or reload
the city from my last save point. If a plane crashes into an apartment building,
who cares? I’ll just shut the game off. [R]eal mayors cannot simply reload
their cities if they screw up.* (Adams 1998, p. 52)

Another of Adams’s students presented a simple comment relating to the final, ‘Plan
how this information will be useful to you’, stage of Boud’s reflective describe, interpret,
evaluate, plan [DIEP] framework noting, ‘I hate politicians but I will look at them from a
different light now… It is not an easy job to maintain an entire city’ (Adams 1998, p. 51).

While there may be ethical considerations worth noting in the Adams (1998)
approach, the quality of reflections supports the notion that serious games and reflective
journals may be constructively aligned to the final intended learning outcome, ‘Reflect on
your role as a property student and initiate transformative practices to guide your actions in an unknown future’.

2.7 Conclusion

There are distinguishable levels of processing in learning, with two being a deep level and a surface level. In surface level processing, the student directs their attention towards learning the knowledge verbatim. Deep level processing sees the student look beyond the text itself towards the material and what is signified, and in turn retain the knowledge for longer and achieve other sought-after learning outcomes (Biggs, Kember & Leung 2001).

As asserted by Biggs and Tang (2009) active learning, through problem-based learning activities, compels non-academic students to employ higher-level cognitive activity, making them learn more like their academic counterparts. In turn, this less passive approach is said to lead to enhanced learning and good teaching.

The active approach to learning and teaching is not without criticism; in particular, the supportive theory of constructivism underlines the idea that knowledge is not transmitted to the student, but rather is constructed through activity or social interaction. From a purely objectivist perspective, the lack of objective direction or control in the activity or social interaction leads to academic chaos, and as such there is a necessity for planning and measuring outcomes. This argument is evident in property education as various stakeholders seek knowledge, skills and attributes from graduates which necessitate objective and constructive approaches to learning.

As demonstrated in the structure of this literature review, constructive alignment is a form of outcomes-based learning and teaching where learning activities and assessments are systematically aligned to intended learning outcomes. Through constructive alignment, the findings from previous property education and research have been applied to form higher level, generic, program-based learning outcomes as:

1. Describe and explain objective theories of property custodianship and the practical skills you require for a career in property.
2. Analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations.
3. Communicate effectively as a professional with clients and colleagues in addressing real-life property situations.
4. Operate effectively and ethically as a team member in real-life property situations.

5. Reflect on your role as a property student and initiate transformative practices to guide your actions in an unknown future.

The published findings of research into traditional and emerging learning and teaching activities and assessments were then considered in the context of the intended learning outcomes. With respect to the first outcome, which has a declarative knowledge foundation, traditional university teaching methods such as lectures and tutorials, and MOOCs, present as relatively effective means of ‘delivery’, as long as they retain a level of engagement and focus on student-centred learning.

It is the second learning outcome, relating to functioning knowledge, that is identified as a gap in traditional teaching approaches to property education. Specifically, property students have few facilitated opportunities to apply their knowledge besides resource- and time-intensive case competitions. Serious games, on the other hand, present as a problem-based learning opportunity for students studying property at university to gain skills and build knowledge through active, participatory learning.

Serious games aim to support learning processes in a more playful way. As such, they must be fun and incite play and should satisfy learning goals or outcomes. The benefits associated with play in education are clear in the context of emotive learning and engagement. On the other hand, not all forms of play are considered positive or beneficial and the published history of play in education resembles the debate between objectivism and constructivism. Correspondingly, published research does not clearly define what students learn through playing games, let alone how well their playing of a serious game contributes to satisfying intended learning goals or outcomes.

Nevertheless, serious games enhance learning, and proponents support the role of playing games in supporting collaboration, problem-solving, communication and critical thinking. Similarly, gameplay is said to present the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life. These attributes associated with playing serious games align well with the remaining learning outcomes prescribed for property students in Australian universities.

In conclusion, the review of published research provides support for the assertion that serious games enhance learning. The question guiding this research, ‘How to design
serious games to enhance the learning experience for undergraduate property students, in Australian universities”, is novel in the sense that it draws from a range of disciplines. The education discipline is mature with a body of empirical research supporting the philosophical approaches. On the other hand, learning through serious games is an emergent field of research, and property education may be regarded as a practical, or problem-based, rather than a philosophically deep, research field. Due to the imbalance in extant research from the various disciplines, there are a series of gaps requiring elaboration and extension, as illustrated in Figure 1.1, prior to commencing the design and development stage.

In the absence of related studies, a more detailed investigation into Australian property programs is deemed necessary to identify knowledge, skills and attributes suitable to build a framework for assessing the effectiveness, or otherwise, of learning activities such as serious games, in property programs across Australian universities (Chapter 4).

Similarly, as a dependent research task there is a residual need to develop a better understanding of the tasks, activities, skills and operations associated with playing property games that contribute to an enhanced student learning experience (Chapter 5). As such the problem, identification, and motivation emerge in the literature review and are refined through the investigation into Australian property education and the evaluation of what property students may learn from playing games (chapters 4 and 5).

As a progression from the research in chapters 4 and 5, this project will extend to the design of serious games to enhance the learning experience of property students.
Chapter 3 Methodology

This chapter presents how the research is conducted and addresses the design of the artefact, research contributions, and associated methodology and methods adopted. Specifically, the chapter seeks to provide clarity regarding the approach, and to present verifiable contributions in the areas of the design artefact, design foundations, and design methodologies (Hevner et al. 2004).

Initially the chapter is structured to discuss traditional approaches to property research and the associated philosophical underpinnings. As gaps in methodology are identified, design science is presented as a paradigm and approach suited to the design of a serious games suite for the property discipline. The application of design science activities and principles to this project is subsequently addressed, along with considerations of how the thesis is structured to accommodate the design of the artefact. Methodological limitations and ethical considerations are addressed as the chapter concludes.

3.1 Traditional property research

Traditionally, academic research in the field of property has been dominated by quantitative research (Levy & Henry 2003; Levy 2006). In examining articles from property journals published during the period 1990 to 2001, Levy and Henry (2003) witness a bias towards a positivist theoretical perspective. With respect to methodology, the Levy and Henry (2003) study presents the traditional preference for econometric modelling and statistical analysis in respect of property research, particularly from the United States of America.

The positivist way of looking at the world, which is dominant through property research, may be attributed to an underpinning perspective of knowledge known as...
objectivism (2.2). According to this view, independent objects have truth and meaning residing in them and, through adopting appropriate research, that objective truth and meaning may be uncovered (Crotty 1998). As such, quantitative analysis may be seen as an appropriate avenue for research, suited to testing the respective theories and quantifying relevance from an objectivist standpoint.

Conversely, the traditional approach to property research has difficulty accounting for deeper, more complex interactions, such as those influenced by humanity. Ibrahim (2006) relates the systemic preference for teaching objective truths, to the lack of coverage of behavioural aspects in real estate, and property, studies. Levy and Henry (2003) and Levy (2006) further acknowledge the confines of traditional conceptions of science in restricting the study of human behaviour (Levy 2006).

In acknowledging problems with an overreliance on the objectivist perspective, Kummerow (2000), Levy and Henry (2003) and Levy (2006) call for a broader range of approaches to property and real estate research. Citing Graaskamp’s contribution to the field of property research, Kummerow (2000) advocates the use of diverse methods to enrich the marketplace of ideas and complement the traditional, objectivism-influenced methods.

Alternative epistemological viewpoints considered in this research include constructionism and post-positivism. Levy (2006) describes constructionists as typically rejecting the objectivists’ view of human knowledge, contending that there is no objective truth waiting to be discovered. Truth, or meaning, is said to come into existence through interaction with the realities of the world (Crotty 1998; Levy 2006). Crotty (1998) and Levy (2006) summarise the constructivist view as assuming that meaning is constructed rather than discovered.

Through the search for ‘usable knowledge’ in social sciences, Fischer (1998) criticises the overapplication of conventional neo-positivist epistemology. Fischer (1998) speaks of the overreliance on ‘hard sciences’, focusing rigidly on objectivity and truth, as contributing to the failure to build a body of predictive generalisations. As such, there is no ready reference for effective policy solutions to pressing social and economic problems (Fischer 1998). An alternate, post-positivist approach seeks to situate the empirical inquiry in a broader interpretive framework, acknowledging bias and influence, to uncover a form of truth, or accurate description. Fischer considers assessment in post-positivist research ‘to go beyond an appraisal of empirical data to an examination of the
practical judgments that shape both the [empirical] instrument and the object’ (Fischer 1998, p. 132). Post-positivism, in Fischer’s (1998) perspective, strives to offer a better empirical explanation of social scientific process.

Levy (2006) suggests that when the goal of research is to develop a conceptual model for the purpose of building theory, an interpretive approach utilising a qualitative methodology may be more appropriate, noting:

In situations where a review of the extant literature does not reveal significant attempts at constructing a theoretical model of a phenomenon, the researcher may wish to take an alternative research approach to the more traditional quantitative techniques in order to uncover concepts and construct a conceptual model and build theory within a specific context. (Levy 2006, pp. 370–371)

A defining and controversial aspect of qualitative research relates to the active role of the researcher and their potential to influence the results of the study. With the main aim of qualitative research being to discover the perceptions and experiences of the participants, so that the researcher can then extract themes (Levy 2006), the researcher becomes embedded in their study. As such, the interpretive nature of the qualitative research approach is affected by the researcher’s interpretations, leading to potential misrepresentations of data, however unintentional (Brown 1992).

This research relates to the design and development of a property domain–situated serious games suite to enhance the learning experience for students studying property in Australian higher education. Fundamental to this endeavour is the principle that knowledge and understanding of the problem and its solution are acquired in the process of designing and building the artefact. As such, the author carries out the research in the context of an authentic, real-life setting, adopting qualitative approaches to frame the design of the artefact, or games suite.

3.2 Design-based research

Brown (1992) introduced design experiments, a precursor to design-based research, as a new methodological approach for carrying out research and design in the context of a real-life setting (Barab et al. 2005). According to Brown (1992), the situated nature of educational research lends itself to practical application. In the context of applying research in a classroom, she expresses the shortcomings of testing independent variables in a classroom environment as:
Classroom life is synergistic: Aspects of it that are often treated independently, such as teacher training, curriculum selection, testing, and so forth actually form part of a systemic whole. Just as it is impossible to change one aspect of the system without creating perturbation in others, so too it is difficult to study any one aspect independently from the whole operating system. Thus, we are responsible for simultaneous changes in the system, concerning the role of students and teachers, the type of curriculum, the place of technology, and so forth. (Brown 1992, pp. 142–143)

In application, design-based research examines the impact of the design, or intervention, on the learning process. Lessons learned are cycled back into the next iteration of the design innovation. Barab et al. (2005) advocate the use of design experiments, asserting that the development of theory in practice leads to interventions that are trustworthy, credible, transferable, and ecologically valid.

The concept of design-based research has, in a broad sense, led to the development of the information technology–centric research paradigm, design science, along with others.

### 3.3 Design science

The design science approach, or paradigm, as attributed to Simon (1996) has its roots in engineering and the sciences of the artificial (Hevner et al. 2004). Simon (1996) speaks of design as the process associated with devising courses of action aimed at changing existing situations into preferred ones. As such, he considers design to be the core of all professional training: ‘it is the principal mark that distinguishes professions from the sciences’ (Simon 1996, p. 111).

While acknowledging the importance of design science as a foundation in information systems research, Hevner et al. (2004) extend the paradigm to address human and organisational behavioural science. They consider design science to be a problem-solving paradigm, seeking to extend the boundaries of human and organisational capabilities by creating new and innovative artefacts, or objects. Behavioural science originates from natural science research methods and seeks to develop and justify theories that explain or predict organisational and human phenomena. Hevner et al. (2004) argue for the inclusion of both behavioural and design sciences in the information systems research cycle, through proposing that technology and behaviour are not dichotomous in an information system, but rather that they are inseparable.

In the approach taken by Hevner et al. (2004), information systems research is conducted in two complementary phases: the behavioural science phase, addressing
research through the development and justification of theories that explain, or predict, phenomena related to an identified business need; and the design science phase, which addresses the building and evaluation of artefacts designed to meet the identified business need (Hevner et al. 2004).

Sadler-Smith (2014) considers the pivotal role of building and evaluation in design science, commenting that it is not enough to simply develop propositions:

[A] vital requirement of the design science approach is to arrive at an empirical understanding of the relationships between the contexts, inputs, mechanisms and outputs. It is this type of knowledge that enables designs to be revised and refined iteratively through field testings. (Sadler-Smith 2014, p. 12)

Hevner et al. (2004) suggest that design science research must address the creation of an innovative and purposeful development for a specific problem domain. The authors recommend seven guidelines to help researchers conduct design science research effectively in the field of information systems [IS], as presented in Table 3.1.

<table>
<thead>
<tr>
<th>Guideline</th>
<th>Description</th>
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<tbody>
<tr>
<td>1. Design as an artefact</td>
<td>Design science research must produce a viable artefact in the form of a construct, a model, a method, or an instantiation.</td>
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<tr>
<td>2. Problem relevance</td>
<td>The objective of design science research is to develop technology-based solutions to important and relevant business problems.</td>
</tr>
<tr>
<td>3. Design evaluation</td>
<td>The utility, quality, and efficacy of a design artefact must be rigorously demonstrated via well-executed evaluation methods.</td>
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<tr>
<td>4. Research contributions</td>
<td>Effective design science research must provide clear and verifiable contributions in the areas of the design artefact, design foundations, and/or design methodologies.</td>
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<tr>
<td>5. Research rigor</td>
<td>Design science research relies upon the application of rigorous methods in both the construction and evaluation of the design artefact.</td>
</tr>
<tr>
<td>6. Design as a search process</td>
<td>The search for an effective artefact requires utilizing available means to reach desired ends while satisfying laws in the problem environment.</td>
</tr>
<tr>
<td>7. Communication of research</td>
<td>Design science research must be presented effectively both to technology-oriented as well as management-oriented audiences.</td>
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Source: Hevner et al. (2004, p. 83).

While the design science research guidelines prescribed by Hevner et al. (2004) may share relevance with, or similarities to some artefact-delivering action research projects, it is important to define where the paradigms diverge and why action research may be less applicable to this project. Papas, O’Keefe and Seltikas (2012) investigate the arguments for and against the approaches, concluding that there are conformances between action research and design science, but suggesting that they are ‘complementary or alternative’ ways to design artefacts is too simple.
Papas, O'Keefe and Seltikas (2012) identify the role of the artefact as a defining design science, stating its importance in both action research and design science: ‘but in [action research] the artefact is normally the by-product of the research intervention, not the goal of that intervention’ (Papas, O'Keefe & Seltikas 2012, p. 156). As in design science, this particular project centres on designing the serious game–based activities. As such, a participant may benefit from the research but the utility of the artefact, or games suite, is paramount.

As a further distinction between action research methodology and the design science paradigm, Iivari and Venable (2009) consider the role of the instructing party, or client, as distinguishing design science research. Design science assumes neither any specific client nor joint collaboration between researchers and the clients (Iivari & Venable 2009). Specifically, this research project does not have a prescribed client or research collaborators. There is a set problem and there are potential beneficiaries; however, they would not meet the definitions of clients or research collaborators.

With respect to evaluation, Peffers et al. (2008) and Hevner et al. (2004) acknowledge the necessity of setting evaluation as a specific activity or guideline in the design science approach. Unambiguously, Hevner et al. (2004) consider the utility, quality, and efficacy of a design artefact as requiring rigorous demonstration via well-executed evaluation methods. Evaluation is crucial in both action research and design science; however, in design science research the activity is generally carried out towards the end of the design horizon, rather than as integrated steps during the application of the method, as occurs in action research (Papas et al. 2012). While Iivari and Venable (2009) support the perspective of Hevner et al. (2004) regarding the importance of evaluation in design science, the authors make an appropriate delimitation with regard to the expectation of robustness:

\[\text{Design science research by definition attempts to construct new and innovative artefacts or solution technologies. As a consequence, it operates at the edge of the existing technology. Such cutting edge technology is not usually robust.} \] (Iivari & Venable 2009, p. 10)

Similarly, in this research project well-executed evaluation methods are utilised as an explicit evaluation, or prototype testing, stage. The evaluation approach is scoped to inform the design activity. Empirical testing of the artefact, in this case the serious games suite and associated learning activities, is presented as a stand-alone postdoctoral research project.
Design science, while less mature as a paradigm, or research approach, is gaining popularity in disciplines outside of information systems (Papas et al. 2012; Sadler-Smith 2014). Sadler-Smith (2014) attributes the enthusiastic uptake of the design science approach as: ‘a reaction against the “scientization” of management research and as a return to its more practice-oriented and prescriptive roots’ (Sadler-Smith 2014, pp. 8–9). In reviewing the uptake of the design science approach across disciplines, he cites examples from education, entrepreneurship, high-reliability organisation, organisational development and strategic management. Sadler-Smith (2014) concludes that ‘[d]esign science has the potential to place [human resource development] research at the leading edge of the theory and practice of learning in organizations’ (Sadler-Smith 2014, p. 14).

In applying design science to other disciplines, such as property education, it is necessary to consider that the paradigm and associated artefact are not exempt from explanatory theories. On the contrary, as Hevner et al. (2004) propose, design science relies on existing theories that are ‘applied, tested, modified, and extended through the experience, creativity, intuition, and problem solving capabilities of the researcher’ (p. 75). Theories and approaches assigned to this project include constructivism (2.2), as a basis for learning and teaching theory, and constructive alignment (2.3), as the systematic approach to the alignment of teaching/learning activities, and the assessment tasks to the learning outcomes, according to the learning activities.

### 3.4 Design science research methodology

Design science principles and practice rules have emerged, particularly from researchers in the fields of information technology and engineering (Peffers et al. 2008). Nevertheless, Peffers et al. consider the principles and practice rules to be only two out of the three characteristics of a methodology, with the ‘missing part [being] a procedure that provides a generally accepted process for carrying [design science research] out’ (Peffers et al. 2008, p. 50). Through the review of so-called ‘influential’ prior research, Peffers et al. (2008) designed a methodology tasked to serve as a commonly accepted framework for carrying out research based on design science principles. The resulting process, or framework, as described, comprises six activities leading from problem identification, definition of solutions, design and development, demonstration, to evaluation, and communication, as summarised in Table 3.2 and Figure 3.1. In particular, Figure 3.1 presents the process and numerous entry points associated with the design science research methodology of Peffers et al. (2008).
The prescriptive method applied to the design science paradigm, as presented by Peffers et al. (2008), is not without criticism in published research. The explicit ‘activities’ may present a robust framework for what may be inherently fluid or dynamic artefacts, on one hand, while not considering the integration of evaluation and design on the other hand. Sein et al. (2011) are particularly critical of the sequencing proposed by Peffers et al. (2008), stating:

*The method articulated by Peffers et al. (2008) does not recognize that artefacts emerge in interaction with organizational elements. This view is manifested in the separating and sequencing of key steps such as ‘design and development’ and ‘evaluation,’ where a suitable demonstration context is selected after building the artefact.* (Sein et al. 2011, p. 38)

As an alternative approach, Sein et al. (2011) present a new design research method, action design research. Contrary to the perspectives of Iivari and Venable (2009) and Papas et al. (2012), the action design research method presents as a hybrid between the action research method and the design science paradigm.

Regardless of the reproaches of Sein et al. (2011), the Peffers et al. (2008) approach provides a sound overarching methodological framework, well suited to the design of serious game–based activities to enhance the learning experience for undergraduate property students. On the other hand, due consideration is given to the perspective of Sein et al. (2011); in particular, due acknowledgement is given to the organisational context in which the games suite will exist. In practice, the design and development of the games suite takes place with the author and games designer embedded in the targeted domain environment. Additionally, the findings from related engagement activities are considered in the thesis and design process.


Table 3.2  
Design Science Research Methodology Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Ref. chapter</th>
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<tr>
<td>1. Problem identification and [research] motivation</td>
<td>Define the specific research problem and justify the value of a solution. Resources required for this activity include knowledge of the state of the problem and the importance of its solution.</td>
<td>1,2</td>
</tr>
<tr>
<td>2. Define the objectives for a solution</td>
<td>Infer the objectives of a solution from the problem definition and knowledge of what is possible and feasible. Resources required for this include knowledge of the state of problems and current solutions, if any, and their efficacy.</td>
<td>3</td>
</tr>
<tr>
<td>3. Design and development</td>
<td>Create the artefact. This activity includes determining the artefact’s desired functionality and its architecture and then creating the actual artefact. Resources required for moving from objectives to design and development include knowledge of theory that can be brought to bear in a solution.</td>
<td>6</td>
</tr>
<tr>
<td>4. Demonstration</td>
<td>Demonstrate the use of the artefact to solve one or more instances of the problem. This could involve its use in experimentation, simulation, case study, proof, or other appropriate activity. Resources required for the demonstration include effective knowledge of how to use the artefact to solve the problem.</td>
<td>7</td>
</tr>
<tr>
<td>5. Evaluation</td>
<td>Observe and measure how well the artefact supports a solution to the problem. This activity involves comparing the objectives of a solution to actual observed results from use of the artefact in the demonstration. It requires knowledge of relevant metrics and analysis techniques. At the end of this activity the researchers can decide whether to iterate back to activity 3 to try to improve the effectiveness of the artefact or to continue on to communication and leave further improvement to subsequent projects. The nature of the research venue may dictate whether such iteration is feasible or not.</td>
<td>7</td>
</tr>
<tr>
<td>6. Communication</td>
<td>Communicate the problem and its importance, the artefact, its utility and novelty, the rigor of its design, and its effectiveness to researchers and other relevant audiences such as practicing professionals, when appropriate. In scholarly research publications, researchers might use the structure of this process to structure the paper, just as the nominal structure of an empirical research process is a common structure for empirical research papers. Communication requires knowledge of the disciplinary culture.</td>
<td>1–8</td>
</tr>
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Source: Peffers et al. (2008) and Author.
Figure 3.1. Design science research methodology process model.
3.5 Design science for the research problem

This research endeavours to demonstrate how to design serious games to enhance the learning experience for undergraduate property students, in Australian universities (2.7). Fundamental to this endeavour is the principle that knowledge and understanding of the problem and its solution are acquired in the process of designing and building an artefact. As such, this research proposes the design and development of a domain-situated serious games suite for use in Australian higher education. The approach appears well suited to utilise principles and activities of design science, which is a novel approach in the property discipline, although soundly based on traditional experimental and design approaches to education, and an established method in Information Technology (3.3).

The application of Peffers et al.’s (2008) six-activity framework – leading from problem identification, definition of solutions, design and development, to demonstration, evaluation, and communication – to this project is outlined later in the work.

3.5.1 Problem identification and motivation

The problem and associated justification for enhancing the learning experience for property students is defined in Chapter 1 and the published research reviewed in Chapter 2. This establishes that the needs of a new student cohort are not expected to be met by the current teaching methods alone (1.1) and there is an implied directive to find pedagogical tools to engage students and develop them as deeper learners (2.1).

Serious games present as one solution for universities aiming to support learning processes in a more playful way (2.6.3). As a problem-based learning activity, serious games enhance learning, and proponents underscore the role of playing games in supporting collaboration, problem-solving, communication and critical thinking (2.6.3). Similarly, gameplay is said to present the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life (2.6.3). These attributes associated with playing serious games align well with the learning outcomes for property students in Australian universities (2.6.2).

As such, this research endeavours to contribute to extant research by demonstrating how serious games may be designed to enhance the learning experience for undergraduate property students, in Australian universities. The design of an innovative artefact is dependent upon an understanding of the specific problem domain, which
presents the first problem (3.3). While the previous chapters sought to define the problem and the domain, published research does not sufficiently define what skills, attributes and knowledge are sought after by, and from, property graduates, let alone how well their playing of serious games contributes to satisfaction of the intended learning outcomes (2.7).

Further research is necessary to elaborate on the extant research, with a more detailed investigation into Australian property programs undertaken to identify knowledge, skills and attributes suitable to build a framework for assessing the effectiveness, or otherwise, of learning activities such as serious games in property programs across Australian universities (Chapter 4). Similarly, as the second expressed gap in the reviewed research, there is a residual need to develop a better understanding of the tasks, activities, skills and operations associated with playing property games that contribute to an enhanced student learning experience (Chapter 5). As such, the problem identification and motivation emerge in the literature review and are refined through an investigation into Australian property education and the evaluation of what property students may learn from playing games (chapters 4 and 5).

3.5.2 Define the objectives for a solution

The broader research goals and objectives for this design science research project emerge as gaps in the literature and refined research questions from chapters 1 and 2. Through re-positioning the research question, a project level goal may present as, ‘To design serious games to enhance the learning experience for undergraduate property students, in Australian universities’.

With respect to the artefact, or serious games suite, the product scope and associated objectives relate to the program level intended learning outcomes defined in 2.6.1 and the definition of what constitutes a serious game (2.6.3). The definition refers to serious games as supporting learning processes in a more playful way. As such, the primary objective for the serious games is related to supporting learning in a more playful way. In the context of property education, the role of serious games in problem-based learning has been identified as the salient opportunity with the second learning outcome, ‘Analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations’, relating to the secondary objective. The primary, secondary, and tertiary objectives for the serious games suite are presented as:
Primary objective:

- To enhance the learning processes of property students in a more playful way.

Secondary objective:

- To enable property students to analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations.

Tertiary objectives:

1. To enable property students to describe and explain objective theories of property custodianship and the practical skills they require for a career in property
2. To enable property students to communicate effectively as professionals with clients and colleagues in addressing real-life property situations
3. To enable property students to operate effectively and ethically as team members in real-life property situations
4. To enable property students to reflect on their role as property students and initiate transformative practices to guide their actions in an unknown future.

Further research, aligned to the objectives, is undertaken to identify opportunities to enhance the learning experience for property students and identify what property students learn from playing games (Chapter 4). As part of the deeper investigation into property education and evaluation of discipline situated gameplay, a scoring rubric is designed in Chapter 5. The rubric forms the primary benchmark for designing and developing the serious games suite.

3.5.3 Design and development

With a refined research problem and goal, and a clearer perspective of the attributes that playing property games may contribute to students’ learning, the artefact or serious games suite is designed. Specifically, three games are selected for the suite based on their potential to enhance learning through aiding the development of prescribed skills, attributes and knowledge. The games forming the suite, SimCity, Investorville and Monopoly, are not without barriers to adoption and, with respect to Monopoly, there are
fundamental inaccuracies in how the game represents the property market. As such, without clear representation, playing the game may be considered to conflict with the objective theories presented in the first tertiary objective.

With respect to SimCity and Investorville, the games are repurposed as learning activities with more traditional assessment techniques incorporated to leverage the learning potential and encourage reflection (Tertiary objective 3) on model and play inaccuracies. In the case of Monopoly the gameplay, as opposed to the game itself, is regarded as the richer contributor to the attainment of skills and attributes. As such, the game is rebuilt utilising its precursor, The Landlord’s Game, as the foundation with due regard given to the representations of objective theories (Tertiary objective 1).

The suite of three games is expected to contribute to the attainment of the skills, attributes and knowledge as identified in the property rubric. Notably, the suite is not presented as a stand-alone learning method but rather as one that integrates and supports traditional teaching practices. From the literature review and investigation it can be seen that aspects of traditional teaching need to be considered. Two of the most prominent shortcomings of traditional teaching practices in property education are: the perceived deficiencies in the teaching of current market activity (2.6.1; Chapter 4); and the misalignment of the teaching system and the student who does not know how to, or does not wish to, adopt deeper learning practices (2.1).

The play and motivational attachment to gameplay is broadly expected to help the surface learner adopt deeper learning practices. As such, the playing of fun games with authentic and reflective assessment should overcome one of the two most prominent shortcomings in the teaching of property through traditional university practices. With respect to teaching current market practices, no other learning tools or games have been identified. As such, this research extends to the creation of a fourth game in the suite. The primary objective of the final game, titled Playing Property, relates to the sharing of current market information, or building the students’ knowledge of property markets.

3.5.4 Demonstration

The demonstration, or prototype testing, is undertaken in a ‘real-life’ university setting. The experiment, comprising predominantly property students, utilises a range of testing techniques with questionnaires, rubric scoring, and formative reflection through journals
whereby the participants assess the artefact’s potential to solve one or more instances of the problem.

Students enrolled in the property development course, PED321 Property Development and Project Management Processes, in 2013 at the University of the Sunshine Coast [USC], were tasked with participating in four serious game–based activities throughout the 13-week teaching semester. The game and activities demonstrated are summarised in Table 3.3.

Table 3.3
Serious Game Activities Demonstrated

<table>
<thead>
<tr>
<th>Game</th>
<th>Purpose</th>
<th>Platform/venue</th>
<th>Week</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>SimCity</td>
<td>Proprietary game repurposed by author as property learning activity</td>
<td>Mobile device/computer</td>
<td>1–2</td>
<td>Home tutorial activity</td>
</tr>
<tr>
<td>Playing Property</td>
<td>Designed by author for educating property students</td>
<td>Theatre and computer</td>
<td>7</td>
<td>Lecture</td>
</tr>
<tr>
<td>Possession v Poverty</td>
<td>Designed by author for educating property students utilising The Landlord’s Game as a foundation</td>
<td>Board game</td>
<td>9</td>
<td>Lecture</td>
</tr>
<tr>
<td>Investorville</td>
<td>Proprietary game repurposed by author as property learning activity</td>
<td>Computer lab</td>
<td>10</td>
<td>Structured tutorial</td>
</tr>
</tbody>
</table>

3.5.5 Evaluation

The findings from the demonstration are considered in assessing how well playing the serious games suite, or artefact, may support a solution to the problem. The activity involves comparing the objectives of a solution to actual observed results from use of the artefact in the demonstration. As an iterative part of the evaluation, the games suite and associated learning activities are refined to improve the effectiveness of the artefact.

The primary evaluation method incorporates a questionnaire and scoring rubric, which are provided at the conclusion of the respective learning activities, and a reflective journal, which is handed in towards the end of the course. The questionnaire, which is discussed further in Chapter 7 and contained in Appendix 3.1, is structured on the evaluation tool applied by Adams (1998) (2.6.4) when assessing the learning potential of incorporating SimCity in an introductory university class.

3.5.5.1 Questionnaire

A uniform questionnaire was adopted to assess the participants’ perception of learning from the activities. The questions specifically reflected the study conducted by Adams (1998), who asked his students:
Did you enjoy using SimCity 2000?

What did you enjoy or not enjoy about it (be specific)?

Describe the results of Experiments A, B, and C;

What do you think SimCity teaches people about urban processes (this may be something correct or incorrect in your view, in either case, explain));

After doing the experiments, identify two or three ideologies which you feel are ‘between the lines’ of the SimCity software;

Which of the following words best describes SimCity 2000: puzzle, game, model, toy, other (explain)?;

Rate your prior experience with SimCity 2000 or SimCity: none, one or two encounters, an occasional user, fairly experienced, an ‘expert’ SimCity mayor.

(Adams 1998, p. 48)

In a similar fashion, the questions asked in the subject evaluation were rather general and framed to encourage a level of reflection rather than to test the specifics of the game. The questions asked of the participants, in the form of a handout given in the first tutorial, were:

1. Have you played SimCity or Micropolis before? If so how frequently, which versions and on which platforms?
2. Did you enjoy using SimCity/Micropolis? What do you enjoy or not enjoy about it (be specific)?
3. Describe the results of your Task?
4. What do you think undergraduate property students learn from playing SimCity/Micropolis (this may be something correct or incorrect in your view, in either case, explain)?
5. After completing the Task, identify two or three ideologies which you feel are inferred or, ‘between the lines’ of the SimCity software?
6. Rate your prior experience with SimCity 2000 or SimCity: none, one or two encounters, an occasional user, fairly experienced, an ‘expert’ SimCity mayor. If you have played before, which versions and on which platforms?

In addition, there was space allocated for ‘formative comments’ at the end of the questionnaire as a capture for closing thoughts and reflections.

The same primary questions were incorporated in the subsequent game-based activities, with the exception of Question 6 which appeared to have been appropriately addressed in the latter part of Question 1.
3.5.5.2 Rubric

The questionnaire handout included the games assessment rubric from Chapter 5 (5.1.1) (Appendix 5.1). The rubric was specifically created to assess the learning potential of property games for undergraduate property students. No amendments or tunings were undertaken; rather, the scoring rubric, as utilised in the author’s review of the initial games suite and evaluation of Monopoly, was incorporated verbatim as detailed in Appendix 5.1.

3.5.5.3 Reflective journal

The final evaluation tool applied was a reflective journal. The journal was structured to draw from critical reflections throughout the course and to enable the property students to reflect and initiate transformative practices to guide their actions in an unknown future (3.5.2). While there is no set format, the Boud (1985) DIEP reflection strategy was promoted to encourage deeper reflection, and potentially uncover additional learnings and perspectives. The reflective journal was further addressed in the prescribed course outline, as depicted in Table 3.4.

Table 3.4

Reflective Journal Assessment – Description

<table>
<thead>
<tr>
<th>Goal:</th>
<th>To think about and understand your learning experiences.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product:</td>
<td>Reflective Journal.</td>
</tr>
<tr>
<td>Format:</td>
<td>This is an Individual Assessment. During the various learning activities and assessments you are required to maintain a Reflective Journal, or learning log, to encourage deeper reflection and understanding of your learning experiences. You are encouraged to use the D.I.E.P four step approach as adapted from Boud (1985) as a strategy to describe, interpret, evaluate and plan from these respective learning activities. The Reflective journal may incorporate colloquial language and diagrams and illustrations are welcome. See USC Portal (Blackboard) for more information.</td>
</tr>
<tr>
<td>Criteria:</td>
<td>1. Communicate an understanding of the project management knowledge areas and their applicability to the property development process. 2. Analyse and suggest how social, environmental, economic and political issues of project management relate to sustainable personal, financial and community assets. 3. Demonstrate high standards of ethical behaviour, independence of thought and professionalism in the assessment of, and dealings with, property assets, their owners and the community 4. Capacity to construct knowledge through the synthesis of theory and practice. 5. Independently uncover salient themes, and questions for further investigation, through the review of experienced successes and failures.</td>
</tr>
</tbody>
</table>

Source: USC (2013a, p. 6).

In Chapter 7, which includes the prototype evaluation, numerous methods and survey tools are adopted through triangulation, in an aim to produce more balanced outcomes.
The triangulation considers three primary connections between the survey tools, published research, a larger sample and across the sample. The relationship between the primary and alternative evaluation tools and the triangulation connections are discussed in Chapter 7 (Figure 7.3).

3.5.6 Communication

The structured thesis provides the primary communication mechanism through ‘impacting or exchanging of information by speaking, writing, or using some other medium’ (Oxford University Press 2014). In traditional fashion, the thesis is intended to be followed by a series of publications in academic journals and conferences. The forms of communication associated with the thesis and publications are inherently closed as they depict the design and research journey as they complete. While there remains scope for peer feedback to inform further research, the communication does not inform the journey in the same way the literature and research findings do.

In practice, the research and design associated with this thesis are founded on previously published studies and the research as disclosed; however, as discussed by Sein et al. (2011) due consideration is given to interaction with organisational elements. As such, engagement activities have, to some extent, contributed to the refinement of the research question and scope. The formal engagement activities associated with this research, during the term of the doctoral studies, are identified in Table 3.5.
### Table 3.5

**Formal Research Engagement Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Audience/peers/setting</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Game release (early variant of Playing Property) and collation of feedback</td>
<td>Property students, in property class, and university related engagement activities including a range of school students and parents/care-givers, university, Sippy Downs</td>
<td>July 2011 – present</td>
</tr>
<tr>
<td>ABC Coast FM radio interview</td>
<td>General radio listeners, Sunshine Coast and Gympie</td>
<td>August 2011</td>
</tr>
<tr>
<td>Australasian Three Minute Thesis competition finals presentation</td>
<td>University staff and peers including the school students, Sippy Downs and Perth</td>
<td>September 2011</td>
</tr>
<tr>
<td>Expo presentation of Playing Property, extending to the achievement of a university innovation award</td>
<td>University staff and peers including the Deputy Vice Chancellor, University of the Sunshine Coast, Sippy Downs</td>
<td>September 2013</td>
</tr>
<tr>
<td>Confirmation written submission and presentation</td>
<td>University staff and peers including academic examiners, Brisbane and Sippy Downs</td>
<td>November 2011</td>
</tr>
<tr>
<td>Apple CreateWorld conference presentation</td>
<td>Game designers and developers, South Brisbane</td>
<td>December 2012</td>
</tr>
<tr>
<td>Refereed written conference paper, ‘What property students may learn from playing games’ submission and presentation (Boyd S 2013c)</td>
<td>Pacific Rim Real Estate Society Conference, Adelaide</td>
<td>January 2013</td>
</tr>
<tr>
<td>Game release (Possession v Poverty) and feedback collation (Boyd S 2013b)</td>
<td>Property students, in class, university, Sippy Downs</td>
<td>July 2013 – present</td>
</tr>
<tr>
<td>Progress presentation</td>
<td>Property industry, Sippy Downs</td>
<td>November 2013</td>
</tr>
</tbody>
</table>

A central theme or personal reflection from the formal engagement activities relates to the need for authenticity or presentation of the game as a property game. From the first colloquium, in early 2011, all the way through to the industry progress presentation, property professionals, academics and students have expressed the desire for serious games to have domain authenticity, implying that the game that does not present with a property or real estate theme may not be accepted as a learning tool in property education. Utilising the Boud (1985) DIEP reflection strategy, the authenticity reflection exercise presented for consideration in the research is as depicted in Table 3.6.
### Table 3.6

**Reflection on Formal Research Engagement Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Reflective comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Describe objectively what happened ‘D’</td>
<td>From peer feedback at the initial PhD colloquium the theme of the research was considered as novel, if not too novel and difficult to adapt to a traditional doctorate project. Besides contrary perspectives from feedback at the Apple CreateWorld conference it has been difficult to assure property industry persons that the games need alignment to skills and attributes development, not just knowledge building.</td>
</tr>
<tr>
<td>Interpret the events ‘I’</td>
<td>Serious games are an intervention to recognised traditional teaching practices. As such the connection to ‘knowledge’ is essential for students and industry persons, so that they don’t perceive the activity as wasting their time. The early variant of the Playing Property game was generally well received from inception by students and academic peers as it presented a clear tangible link to knowledge, or the learning of historical property market movements. Similarly, Monopoly was not as readily accepted by property peers as a learning game as it may teach the ‘wrong knowledge’.</td>
</tr>
<tr>
<td>Evaluate the effectiveness and usefulness of the experience ‘E’</td>
<td>The experience was frustrating at times as the literature inferred the importance of serious games in developing skills and attributes, whilst in practice domain-situated knowledge appeared as the dominant consideration for industry professionals and students. Without satisfying the players’ perspective that they are learning ‘property knowledge’ they were reluctant to engage. The arising issue appears to relate to the understanding the player brings into the game. As the player of these serious games is likely to be a property student, not an academic researching pedagogical techniques, the games require setting as such. Therefore, it is unlikely that property students would embrace a ‘shooter’ or ‘beer trading’ game without clear connection, in their understanding, to the program material.</td>
</tr>
<tr>
<td>Plan how this information will be useful to you ‘P’</td>
<td>Simply, the serious games need appropriate introduction and ‘setting’ as a learning activity where the players are made aware of the contribution to their learning. Even so, they are unlikely to accept the presenter’s perspective of how the games contribute to their development of skills and attributes. The serious games adopted in this research need to present as property games with as many connections to industry practice as possible.</td>
</tr>
</tbody>
</table>

Source: Author and Boud (1985).

The reflection supports the findings of the published research where it was identified that opponents to the constructivist approach to learning and teaching may need to witness tangible connections to objective truths, or theories of property custodianship, before embracing the intervention (2.7).

### 3.6 Designing the thesis for the artefact

The Australian Qualification Framework Council [AQFC] (2013) defines the purpose of the Doctoral Degree as being ‘to qualify individuals who apply a substantial body of knowledge to research, investigate and develop new knowledge, in one or more fields of investigation, scholarship or professional practice’ (AQFC 2013, p. 63). The structure of the thesis and deliverables for the award of a Doctoral Degree are not specified, although
reference is made to the application of a ‘substantial body of knowledge’ to research, and
the volume of learning is defined in the duration of three to four years (AQFC 2013).

The Doctor of Philosophy, as detailed in USC academic policy, shares a similar
purpose to AQFC (2013) and is awarded solely on the basis of a thesis produced under
supervision that makes an original, significant and extensive contribution to knowledge in
the relevant field of study (USC 2013b). Conversely, a higher degree research project
utilising design science requires two distinct deliverables: a design artefact, and a thesis
(Hevner et al. 2004; Papas et al. 2012). With respect to the thesis, design guidelines
developed by Hevner et al. (2004) may form an explicit methodological framework and
structure guide for a written thesis publication in the disciplines of information systems or
information technology. The application of the guiding principles to a comparable project
incorporating the disciplines of both property and education is novel and without clear
precedent. Rather, the suggested format for the body of a conventional thesis, in the field
of property, includes chapters as defined in Table 3.7 (USC 2013b; Deakin University
2014).

Table 3.7

Conventional Thesis Structure

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>An introductory chapter</td>
</tr>
<tr>
<td>2. Literature review</td>
<td>A review of the literature in the field, possibly accompanied by an outline of the objectives of the research project</td>
</tr>
<tr>
<td>3. Methodology and methods</td>
<td>A chapter discussing the methods used in the research</td>
</tr>
<tr>
<td>4. Research data analysis and findings</td>
<td>A series of substantive chapters presenting the research findings, possibly a general discussion drawing the findings together and leading into the conclusion</td>
</tr>
<tr>
<td>5. Discussion and conclusion</td>
<td>A conclusion that summarises the contribution to knowledge, and may also reflect on future research questions that follow from the project</td>
</tr>
</tbody>
</table>

Source: USC (2013b) and Deakin University (2014).

The first chapter in a conventional thesis introduces the research problem and sets the
context for the research. Topics typically included in the chapter are the background to
the research and the research problem. The research background outlines the broad field
of study and then focuses on the specific research area. The research problem generally
states the research question, or questions, to be addressed and the specific research aim to
be investigated. Ultimately, the outcome should be action orientated and capable of
implementation.
Following the introduction is a review of previously published research, which brings together previous academic and practical findings as a foundation for the research. Specifically, the literature review in a conventional thesis addresses what has been done previously, and what insights can be gained for the selected research problem. Typically, the final sections of the literature review will identify the gaps in the current published research, present models for analysis, and lead into clear justification or support for the research presented in subsequent chapters.

The methodology chapter in a conventional thesis presents how the research is conducted (Deakin University 2014). In a traditional ‘hypothesis and testing’ research project the methodology chapter is said to provide sufficient detail to enable subsequent researchers to replicate the studies. For less prescriptive and more creative research studies it may not be possible or necessary to replicate the studies; however, the methodology chapter should clearly present how the research is conducted. The methods adopted will determine the structure of the later chapters and refer back to the research question and aims.

Research data analysis and findings follow the methodology and present the results of the data analysis in a conventional thesis. The results are related back to the research question and aims. Generally, this chapter does not draw upon the published research findings but rather the actual researcher’s findings.

The final chapter, ‘Discussions and conclusions’, brings together all previous chapters of the conventional thesis. Included in the discussions and conclusions are summaries of the previous chapters, conclusions and discussions relating back to the research questions and findings, recommendations for practice and further research, and appropriate acknowledgement of the research limitations.

Many design orientated theses present in a broadly traditional format with some structural modification. Sampled design theses, including Willis (2011), Terton (2013) and Blake (2012), apply a broadly conventional thesis frame in their design-related Doctor of Philosophy theses. The chapter structure and relativity to a conventional thesis are presented in Table 3.8.
Table 3.8

Sample of Design Theses and Chapter Structure

<table>
<thead>
<tr>
<th>Conv. chapter</th>
<th>Willis 2011</th>
<th>Terton 2013</th>
<th>Blake 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>1. Introduction</td>
<td>1. Introduction</td>
<td>1. Introduction</td>
</tr>
<tr>
<td>2. Literature review</td>
<td>2. Literature review (PI) 3. Literature review (PII) 4. Literature review (PIII)</td>
<td>2. Offline and online computer gaming [Literature review]</td>
<td>2. Literature review</td>
</tr>
</tbody>
</table>

*Source: USC (2013b) and Deakin University (2014).*

The design theses commence with standardised inclusions, such as title, statement of authenticity and an introductory chapter. The second chapter presents a review of published research, referred to as a literature review (Willis 2011; Blake 2012), or the topic-specific content as in Terton (2013). Willis (2011) presents the literature review over three chapters. In each thesis, the next chapter relates to methods or methodology (Willis 2011; Terton 2013; Blake 2012). Terton (2013) extends the methodology chapter to include discussions on the associated project. Willis (2011) dedicates an additional adjoining chapter to methodology, identifying the chapters as ‘Research methods’ parts I and II. The subsequent chapter in each thesis relates to the development, making or design of the artefact (Willis 2011; Terton 2013; Blake 2012). Willis (2011) presents a description of the artefact, Emotishare, as the next chapter. Results, observations from trial and usability analysis form the next chapters (Willis 2011; Terton 2013; Blake 2012). Findings, discussions and conclusions complete the respective theses.

### 3.6.1 Structure of this thesis

The application of the guiding principles to a comparable project incorporating the disciplines of both property and education is without clear precedent. After consideration
of the sample theses, a conventional thesis structure, and design science guidelines, the author has chosen an eight-chapter thesis structure for this research thesis. The broad alignment of chapters with the conventional thesis framework and design guidelines proposed by Hevner et al. (2004) is depicted in Table 3.9.

Table 3.9
Adopted Thesis Structure and Alignment with Design Science Guidelines

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Content alignment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Design science guideline</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>7. Communication of research</td>
</tr>
<tr>
<td>2. Literature review</td>
<td>2. Problem relevance</td>
</tr>
<tr>
<td></td>
<td>4. Research contributions</td>
</tr>
<tr>
<td>4. Investigation: property</td>
<td>2. Problem relevance</td>
</tr>
<tr>
<td>education in Australia</td>
<td>3. Design evaluation</td>
</tr>
<tr>
<td></td>
<td>6. Design as a search process</td>
</tr>
<tr>
<td></td>
<td>6. Design as a search process</td>
</tr>
<tr>
<td>6. Design and development</td>
<td>4. Research contributions</td>
</tr>
<tr>
<td></td>
<td>5. Research rigor</td>
</tr>
<tr>
<td>7. Demonstration and evaluation</td>
<td>4. Research contributions</td>
</tr>
<tr>
<td></td>
<td>5. Research rigor</td>
</tr>
<tr>
<td></td>
<td>6. Design as a search process</td>
</tr>
<tr>
<td>8. Conclusion</td>
<td>7. Communication of Research</td>
</tr>
</tbody>
</table>

Source: Author, USC (2013) and Hevner et al. (2004).

In this thesis, chapters 1 and 2, the introduction and literature review, present as in a conventional thesis, addressing research contributions to date and the relevance of the problem. With respect to the problem relevance, and the associated literature review, it is important to note that, while the chapter reads in progression, it had not evolved as such. Rather, the literature review and development of the research problem have been progressively refined during the project. While the inherent lack of clarity regarding the problem relevance during early, initiation, stages may lead to scope creep and ultimately project failure (PMI 2013) in the traditional research project, design science accommodates a level of change, so long as the initial problem is identified (Papas et al. 2012). The refinement of the scope and problem has been necessary as the empirical research base for games and learning has expanded considerably during the research horizon.
This chapter addresses the design of the artefact and associated methodology and methods adopted. Specifically, this chapter seeks to provide clarity regarding the approach in the areas of the designed artefact, design foundations, and design methodologies (Hevner et al. 2004). As a minor deviation from the structure proposed by Hevner et al. (2004), not all the verifiable contributions in the areas of the artefact’s design, design foundations, and design methodologies are presented in Chapter 3. Rather, some of the verifiable contributions emerge following the investigation and evaluation in chapters 4 and 5, respectively. Initially, the chapter relates to the traditional approaches to property research and the associated philosophical underpinnings. As the suitability of traditional research approaches to the research question is contested, design science is presented as an approach worthy of application in the discipline of property.

Chapter 4 elaborates upon the findings of the literature review and presents a deeper look into property education in Australian universities. As part of the investigation a clearer perspective of what universities seek to teach is uncovered, shortcomings in traditional teaching practices and assessment are identified and, implicitly, the research problem is refined.

In Chapter 5, existing property games are evaluated, to build upon the published research findings and inform the artefact’s design. As this is an initial design searching stage, the scope of the evaluation does not extend to empirical testing. Rather, the evaluation draws from a broad and diverse range of published research, as well as the findings of the author as the property games are played. Specifically, the evaluation draws on observations from situated gameplay and lessons learnt from the game development process. The evaluation utilises a purposely created rubric as a means of assessing how closely the gameplay aligns with the knowledge, skills and attributes sought after by stakeholders in property education.

Chapter 6 demonstrates the design journey, utilising design science as a methodological paradigm, to uncover how the findings from published research, an investigation into undergraduate property programs in Australian universities, and the evaluation of existing property games may be applied in the design of a suite of serious game–based activities. Through the design process, verifiable contributions in the areas of the designed artefact are made, although due reference is made to the foundational game where espoused.
Chapter 7, ‘Demonstration and evaluation’, discusses the implementation of the serious games suite, including the activities developed to leverage the learning potential from games that are repurposed, or redesigned, for educating property students. Included in the chapter is the evaluation of the games suite and analysis of the findings. Numerous prototype testing approaches are adopted, reconciled through triangulation, and appropriately considered in the findings.

Following discussions and conclusions, in Chapter 8 the serious games suite is presented in a manner ready for external empirical testing and the thesis completes as a vehicle for the communication of the research. The contribution of this research is first considered with reference to the research question, intended learning outcomes and product objectives. Subsequently, the salient findings are discussed in both practical and research applications with future research opportunities identified. Subsequent, postdoctoral, evaluation and empirical testing will provide a more detailed investigation into what undergraduate students learn from playing games.

### 3.7 Limitations of methodology

This research relates to the design of a serious games suite intervention to inform the practice of educating property students in Australian universities. A defining and controversial aspect in qualitative research of this nature relates to the active role of the researcher and their potential to influence the results of the study. With the main aim of qualitative research being to discover the perceptions and experiences of the participants, so that the researcher can then extract themes (Levy 2006), the researcher becomes embedded in their study. As such, the interpretive nature of the qualitative research approach is affected by the researcher’s interpretations, leading to potential misrepresentations of data, however unintentional (Brown 1992).

With the intention of mitigating the influence of bias and misrepresentation, a soundly based research approach, design science, is incorporated. The paradigm sets principles and processes to add rigour and guide the presentation of the research in a reliable and repeatable manner. Complementary methodologies have also been introduced at various stages, including the investigations and evaluations. Additionally, the prototype testing incorporates questionnaires, rubric scoring, and reflective journals supported by triangulation with findings from published research and independent third-party surveys.
The findings of other researchers have similarly been considered in the testing process, with triangulation of findings reflected upon.

3.8 **Ethical considerations**

The research investigates how serious game–based activities may be created and implemented to enhance the learning experience for undergraduate property students in Australia. Principally, the research involves acquiring and analysing feedback from serious game–based activities undertaken in the third-year property course, PED321 Property Development and Project Management Processes [PED321]. The course is required as part of the Property Economics and Development program at the USC.

The PED321 course principally focuses on property development, bringing together a range of knowledge and skills applicable to the processes (USC 2013a). PED321 is not a capstone course, nevertheless it does have prerequisite courses from which material is reapplied. The course is offered on campus with one two-hour lecture and a single one-hour applied theory workshop each week. The outline, given as Appendix 3.2, makes specific reference to the requirement for playing games as learning activities. In particular, under the heading ‘Assumed prior knowledge and skills’, it reads ‘[a] willingness to participate in practice-based learning activities including group work and playing serious games’ (USC 2013a, p. 3).

A total of 16 students enrolled in the course PED321 for semester 2, 2013. The students broadly represent the demographic of Australian property programs, with males (three-quarters of the class) dominating the gender mix and a generally even spread of mature age students and recent school leavers. Regardless of the gender spread, the small survey population limits the explanatory significance of the author’s observations.

All of the students were invited to take part in the project due to their enrolment in PED321. In agreeing to take part in the research, the students were asked to make available their feedback by way of reflective exercises, including questionnaire responses, rubric scoring and journal entries.

The primary risks identified and shared in the ethics approval (Boyd S & USC 2013a) and information sheet (Boyd S 2013a), as given in Appendix 3.3, relate to the researcher being the course coordinator. The information sheet, as approved by the university’s Research Ethics Committee and provided to the potential research participants, reads,
‘you may feel obliged to participate in the research with a fear of being identified and or concern that the research responses are in some way linked to grading’ (Boyd S 2013a, p. 1). To negate or minimise the associated risk the data collected was made non-identifiable prior to publication. Further, students and participants were advised that their choice to participate would not affect their grades. As a mitigation strategy, an additional course moderator was utilised to review the grades provided for Assessment task 3, the individual reflective journal.

The students and participants were advised that while they may not receive any direct benefits for participating, their information may help the researcher improve the learning experience for subsequent students.

The serious game–based activities were implemented during the 13-week semester, commencing July 2013 and ending in October 2013. The participants were advised that there would be four to five sessions in which their feedback would be sought by way of completing questionnaires and rubrics, in addition to the assessed journal. The anticipated duration for feedback was around one hour per session, equating to an overall duration of four to five hours.

Participation in the research was clearly depicted as voluntary, and the participants informed that they may discontinue at any time, prior to submission of Assessment task 3, the individual reflective journal, without penalty. The students’ consent was prescribed through a ‘Consent to participate in research’ form with consent being for the use of their results in the project as well as future related research projects.

With respect to confidentiality, the responses were coded and stored in a re-identifiable manner and then made non-identifiable prior to publication. Non-identifiable results are included in the thesis and may be presented at external or internal conferences or meetings, or by publication.

3.9 Conclusion

The preceding sections identify how the research is conducted and address the design of an artefact and the associated methodology and methods adopted. Specifically, the chapter discusses the primary research approach, design science, and how complementary research methods have been incorporated to inform and evaluate the design process.
By using design science, the research presents a rigorous framework for the evolving design of a serious games suite. As suggested in the literature review in Chapter 2, there are dependent research queries which need to be addressed prior to the research advancing to the design and development of the games suite. The next chapter, Chapter 4, will investigate property education in Australia to define what knowledge, skills and attributes are sought-after for, and by, graduates of undergraduate property programs in Australian universities. Following the investigation, Chapter 5 will incorporate an evaluation of existing, proprietary property games to uncover what undergraduate property students learn from playing domain-situated games.
Chapter 4  Investigation: property education in Australia

Property programs offered in Australian universities share knowledge fields and the expectation that they will create graduates who are readily employable (2.7). Besides employability and knowledge coverage, the leaders of property programs in transformative universities have relative freedom to set learning objectives and shape their offerings for specialisations. Program leaders may even creatively restructure the entire offering and move away from passive teaching techniques to a more engaging and outcome-aligned education environment.

Nevertheless, students rate the quality of existing property teaching and overall satisfaction lower than related disciplines (2.5.1). The perspectives of employers and other stakeholders vary and there are no local studies addressing whether or not the educational institutions are currently meeting the needs of the Australian property industry. Multiple stakeholder research projects have been undertaken overseas; nevertheless, a deeper investigation is necessary to define the knowledge, skills and attributes suitable to inform the design of serious games (2.7). The studies do, on the other hand, identify some common desired skills and attributes, and present a sound base to form program level intended learning outcomes (2.6.2).

In this chapter, further research is undertaken to elaborate on and extend the findings from Chapter 2 through identifying the knowledge, skills and attributes suitable to build a framework for assessing the effectiveness, or otherwise, of learning activities in property programs across Australian universities. In particular, the outcome of the research includes a concise list of knowledge, skills and attributes sought after in graduates of Australian property programs.
As a further consideration, the published research reveals a residual need to investigate further the nature, or type, of knowledge taught (2.6.1). As knowledge aligns to the learning activities and assessments, the investigation may extend to analysing the assessment tools and learning delivery techniques adopted in the property programs at Australian universities.

The research in this chapter is focused on an investigation into property education in Australia, specifically drawing on the findings from an analysis of course and program outlines for API accredited, or endorsed, undergraduate programs across Australian universities. In this investigation, ‘courses’ refers to the individual subjects that combine to form a degree program. From the course outlines and other program information there are four main fields investigated, namely:

1. The reported program and course level intended learning outcomes are compared with the program level intended learning outcomes identified in Chapter 2 (2.6.2).
2. The graduate skills, attributes and knowledge contained in the sampled courses and programs are compared with those found in the published research (2.6.1), in particular the studies by Tu et al. (2009), Poon, Hoxley and Fuchs (2011) and Poon and Brownlow (2014).
3. The teaching delivery methods are noted to demonstrate the diversity or otherwise of learning and teaching activities and how they are constructively aligned (2.6.3) with assessment and learning outcomes.
4. The assessment items and respective grade weightings are reviewed, with consideration given to alignment with intended learning outcomes and learning activities and findings of published research (2.6.4), in particular Biggs and Tang (2009).

4.1 Undergraduate program sample

For this research, the API endorsed undergraduate programs have been chosen as the API is the pre-eminent professional membership association in Australia, representing more than 8,600 property professionals while maintaining the industry practice standards (API 2014a). In addition to publishing material on property education, the API has a broad governance structure with national and state-based committees and boards representing property education and academia liaison (API 2014b). Internationally, there are larger property and real estate institutes, including the RICS as sampled in the research by Poon, Hoxley and Fuchs (2011). The RICS has a smaller representation in Australia, when
compared to the API; however, the majority, 11 out of the 12 (RICS 2014), of the RICS accredited institutions offer API accredited undergraduate programs.

During the period of the study, from 2011 to 2014, there were around 27 API endorsed university programs including double degree offerings. Approximately half, 14 to 16 dependent upon name variants, of the programs are undergraduate offerings provided within 12 universities across Queensland (5), New South Wales (2), Victoria (3), South Australia (1) and Western Australia (1), as detailed in Table 4.1.

Table 4.1  
API Accredited Undergraduate Degrees

<table>
<thead>
<tr>
<th>State</th>
<th>University</th>
<th>Program/qualification award</th>
<th>Duration</th>
</tr>
</thead>
</table>
| QLD   | Bond University             | Bachelor of Property and Sustainable Development  
Bachelor of Property (2015)                                                          | 2 years full-time [FT]    |
| QLD   | USC                        | Bachelor of Property Economics and Development                                               | 3 years FT                |
| QLD   | QUT                        | Bachelor of Urban Development (Property Economics)  
Bachelor of Property Economics (2015)                                                      | 4 years FT                |
| QLD   | CQUniversity               | Bachelor of Property (External Delivery)                                                     | 3 years FT                |
| QLD   | UQ                         | Bachelor of Business Management (Real Estate and Development)                                 | 3 years FT                |
| NSW   | UTS, Sydney                 | Bachelor of Property Economics  
Bachelor of Business and Commerce - Property                                                   | 2 years FT plus  
2 years PT  
3 years FT |
| NSW   | UWS                        | Bachelor of Business and Commerce - Property                                                  | 3 years FT                |
| VIC   | University of Melbourne     | Bachelor of Environments with the Master of Property                                          | 5 years FT                |
| VIC   | RMIT University             | Bachelor of Applied Science (Property)  
Bachelor of Applied Science (Valuation)  
Bachelor of Applied Science (Property and Valuation) (Honours) (2015)                  | 4 years FT  
4 years FT |
| VIC   | Deakin University           | Bachelor of Property and Real Estate  
Bachelor of Property and Real Estate & Bachelor of Law/Commerce (Combined Degree)            | 3 years FT or 2  
years FT  
4 years FT or 3  
years FT |
| SA    | University of South Australia | Bachelor of Business (Property) (Internal & External Delivery)                             | 3 years FT                |
| WA    | Curtin University           | Bachelor of Commerce - Property  
Bachelor of Commerce (Property and Major)                                                    | 3 years FT  
3 years FT |


The majority of the sampled universities feature course and program information which is readily available for public perusal through the respective universities’ websites or online student handbooks. Detailed course and program information was not made available for four of the programs, while a further five programs had only partial course outlines available. To aid this study, full course outlines were sourced and provided for
two of the listed programs, extending the sample to twelve accredited undergraduate programs.

Due to a diversity of subject material, the scope of the investigation into courses within the programs was limited to the API knowledge fields of building construction, finance and accounting, commercial law, property valuation fundamentals, property investment, property economics, property law, property management, property market analysis, and land use, planning and development (API 2013a). In total, there were 131 courses identified as relating directly to the API’s knowledge fields in the sampled property programs.

4.1.1 Intended learning outcomes

The learning outcomes or desired skills and competencies from university programs are prescribed in a range of manners. Some programs note program-specific learning outcomes and attributes; however, the majority of the learning outcomes and attributes are assigned to the individual courses, or subjects.

While there is a variance in reporting styles, it is clear that the reviewed courses and programs follow an outcomes-based teaching format with some demonstration of alignment with lectures and assessment (2.3). Of the nine programs reporting such detail, seven featured courses structured with specified (intended) learning outcomes. A further university did not utilise the term ‘learning outcome’, although there were prescribed aims and objectives that reflected such.

The only identified program level learning outcomes were general in nature, prescribing the outcome as relating to the accrual of a sound foundation of knowledge. The course level outcomes are generally more specific, with each presenting between three and 13 set learning outcomes. The outcomes generally referred to content-specific material; however, dominant recurring themes were:

- Develop an understanding of […]
- Develop skills, competencies and knowledge to […]
- Analyse and criticise […]
- Apply the principles of […]
- Describe the issues […].

To a lesser extent, intended learning outcomes emerged relating to communication, problem-solving, working in teams and appreciating the roles of prescribed professions.
With the exception of a few specific outcomes, the prescribed outcomes, aims and objectives detailed in the courses of the reviewed programs are broadly covered in the program level outcomes defined in Chapter 2 (2.6.2). More specifically, the vast majority of the reviewed courses prescribed outcomes related to the first two intended learning outcomes adopted in this research, these being:

1. Describe and explain objective theories of property custodianship and the practical skills you require for a career in property.
2. Analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations.

4.1.2 Skills and attributes and knowledge

As with the learning outcomes, desired skills and competencies from university programs are prescribed in a range of manners. A few programs note, or imply through discursive prose, program-specific attributes; however, the majority of the attributes are assigned to the individual courses, or subjects.

Under the Tertiary Education Quality and Standards Agency, universities are generally permitted to self-accredit their courses of study (Department of Industry, Innovation, Science, Research and Tertiary Education [DIISRTE] 2011). The Higher Education Standards Framework does, however, prescribe requirements for consideration of external standards and engagement in the setting of key graduate attributes and course content, specifically in addressing the necessity for a robust internal approval process. The standards read:

> the course of study, which ... take account of external standards and requirements, e.g. published discipline standards, professional accreditation, input from relevant external stakeholders, and comparable standards at other higher education providers; and, provide for appropriate development of key graduate attributes. (DIISRTE 2011, s 1.2)

As discussed in Chapter 2 (2.6.1) the API prescribes fields of knowledge for property programs (API 2013). The API has also expressed concern regarding the nature, or type, of knowledge taught (2.5.1). With respect to sought-after skills and attributes, the API has prescribed benchmarks addressing, amongst others, the development of professional industry skills and the quality of final year learning outcomes (API 2013). The benchmarks do not specifically note what constitutes professional industry skills or quality learning outcomes, although due reference is made throughout to student
satisfaction and the requirement for industry engagement including an active advisory board.

The accreditation processes associated with operating a university in Australia and the practices required to maintain industry program accreditation provide for active stakeholder engagement in the setting of required skills, attributes and knowledge. As such, it may be hypothesised that a thorough investigation of existing program and course material from API accredited universities would give a clear indication of the skills, attributes and knowledge sought after by industry and students. With the investigation utilising published research as a base, the emergent skills, attributes and knowledge should relate to all primary stakeholders including the students, graduates, academics, accrediting institute and industry.

In assessing competencies, Poon, Hoxley and Fuchs (2011) and Poon and Brownlow (2014) distinguish between knowledge, skills and attributes. Tu et al. (2009) group knowledge, skills and attributes in broader term as ‘skills and competencies’. For the purpose of the investigation, competencies have been considered in two broad categories, ‘skills and attributes’ and ‘knowledge’. Knowledge is given further consideration with respect to the nature of the knowledge sought or acquired, this being professional or functioning knowledge as defined by Biggs and Tang (2009) and Leinhardt, McCarthy Young and Merriman (1995) (2.6.1).

In establishing the initial framework for the investigation, student skills and attributes and knowledge fields have principally been derived from Tu et al. (2009) and Poon, Hoxley and Fuchs (2011), as replicated in Poon and Brownlow (2014) (2.6.1), with four additions which featured prominently in the reviewed course outlines. Table 4.2 demonstrates that communication skills, either oral or written, are considered in each program and that in each of the courses reviewed, knowledge of the subject area, or comprehensive knowledge of business, was considered paramount. Further, critical thinking and creative and innovative problem-solving are dominant skills and competencies sought from the API accredited programs.

Less noted, in the sampled programs, are other skills and competencies including: understanding current market trends, leadership and management skills, negotiation skills, ability to work individually, and digital technology literacy. As a consideration and limitation, for the later, more generic skills, it is likely that these may be implied. For example, ability to work individually or as a team is addressed in core university courses,
such as compulsory entry level business courses. Core university courses without a clear link to the prescribed API knowledge field subjects were excluded from the sample.

Table 4.2

**Skills and Attributes by University Program**

<table>
<thead>
<tr>
<th>Student skill or competency/program</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive knowledge of business</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
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<tr>
<td>Critical thinking</td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Understanding the current market trends</td>
<td></td>
<td></td>
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<td></td>
<td>9</td>
</tr>
<tr>
<td>Oral communications skills</td>
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<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Quantitative/financial analysis skills</td>
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<td></td>
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<td>7</td>
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<tr>
<td>Negotiation skills</td>
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<td>3</td>
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<tr>
<td>Leadership and management skills</td>
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<td>2</td>
</tr>
<tr>
<td>Proficiency in tools used in the industry</td>
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<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Ability to work in teams</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
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<tr>
<td>Ability to work individually</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Creative and innovative problem-solving</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Social and ethical behaviour</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Digital technology literacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Environmental awareness</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

*Note: The letter attributed to each program has intentionally been altered table by table to de-identify the programs (Author)*

The omission of ‘understanding current market trends’ is notable, especially when considered against the findings of Tu et al. (2009). In examining the elements of successful real estate graduates in the United States of America, Tu et al. (2009) found ‘having industry experience’ to be the highest ranked qualification faculty may hold. Comparatively, ‘understanding of the current market conditions and recent trends’ was considered a prominent student skill by faculty, students, alumni and board members. In contrast, the API accredited programs focus on research methodologies, presumably incorporating subject material such as market analysis. The intent of the accredited courses appears to be aimed towards enabling students to source and read market trends rather than specifically understanding the current status of the markets.

In Australia, workshops and conferences addressing current market trends are addressed to some extent by industry bodies such as the PCA and the Urban Development Institute, and larger agencies, including CB Richard Ellis, Jones Lang LaSalle, Savills, and Colliers International Consultancy and Valuation [Colliers]. The API and a selection of valuation practices do contribute to state-of-the-market conferences, although it is increasingly rare to see universities or academics actively contributing to current market research. T Boyd (2014) sees a role for the academic in market analysis, while at the
same time conceding that industry practitioners do not use university prepared market analysis or forecasting materials.

4.1.3 Teaching delivery method

Faculty staff and program coordinators are not solely responsible for the teaching delivery method as the universities may coordinate lecture and tutorial sessions while also restricting off-campus activities due to workplace health and safety, and insurance issues. For example, the USC has a central facilities management and security group which, in conjunction with a timetabling committee, allocates rooms and timeframes for each faculty and school.

Of the eleven programs in this study which provide face-to-face education, the lecture and tutorial format was dominant in terms of number of occurrences (Table 4.3). More specifically, every course except for one had prescribed lectures. Only eight per cent of the courses incorporate site visits or field trips, while one program featured a moot court as a learning and teaching activity. The lectures and tutorials generally comprise durations of one to three hours per week. Durations for the field trips, site visits and the moot court may be more extensive, with the learning activity spanning an interval greater than individual lectures or tutorials.

Table 4.3

Teaching Delivery Method by University Program

<table>
<thead>
<tr>
<th>Teaching delivery/Program</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of courses reviewed</td>
<td>12</td>
<td>8</td>
<td>12</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Lectures</td>
<td>12</td>
<td>-</td>
<td>12</td>
<td>11</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Tutorials/workshops/laboratory</td>
<td>7</td>
<td>-</td>
<td>12</td>
<td>8</td>
<td>4</td>
<td>12</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>7</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Field trips/site visit</td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>3</td>
<td>-</td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Online learning</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Supplementary online learning</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: The letter attributed to each program has intentionally been altered table by table to de-identify the programs (Author)

The concept of a lecture and tutorial is rather unique, being associated with university education rather than professional practice or professional development. While property professionals attend professional development events where information is delivered in a manner similar to a university lecture, the commitment need only account for 20 hours a year (API 2011a). The other (some 1,900) hours in the working year of the property professional are dominated by time spent at the desk in front of a computer and phone,
driving, conducting inspections, negotiating and debating with clients and stakeholders, attending small company meetings, and meeting clients and peers informally over coffee or another beverage.

As conferred in Chapter 2 (2.6.3), Biggs and Tang (2009) are particularly critical of the lecture and tutorial method as a generic university duty, noting that while lectures and tutorials have their uses, there is a limit to what can be achieved and the format can provide a passive learning environment conducive to surface learning. Further, the concept of lecturing or delivering information is contrary to the constructivist theory of teaching (2.2) and concept of constructive alignment. Constructive alignment has a focus on learning, rather than teaching, and places emphasis on what the student does (2.3).

T Boyd (2005b) proposes the use of integrated problem-based workshops and other industry linked training opportunities as teaching delivery modes to provide a more effective learning environment for property students. It is possible that such workshops may already be incorporated into courses with professional guest speakers, although not enough information is contained with the available course outlines to investigate further.

The course outlines alone may not be adequate to judge teaching delivery methods, as more innovative lecturers may regard the lecture theatres and tutorial rooms as places where a range of learning activities may take place. In such instances it may be advantageous for the respective course coordinators to explicitly depict the activities in the course outlines and inform faculty so that appropriate notations may be made on program and marketing information.

4.1.4 Assessment tasks

The concept of constructive alignment, the theme of Teaching for quality learning (Biggs & Tang 2009), refers to the systematic alignment of the teaching/learning activities, and the assessment items to the prescribed intended learning outcomes (2.3). The results of the process and respective links between learning outcomes and assessment tasks are evident in most of the reviewed courses, as demonstrated in those from the University of Queensland [UQ] program, Bachelor of Business Management (UQ 2011).

While the mapping of objectives and assessment items is evident, there appears to be an overreliance on what Biggs and Tang (2009) define as declarative assessment tasks. Table 4.4 depicts the assessment item weighting by property program with the average
for all the sampled courses illustrated. The clearly dominant assessment item is exams, accounting for approximately 50 per cent of the total assessment points. For many of the reviewed courses no assessment items, other than the exam itself, are hurdle tasks, making it theoretically possible for a student to obtain a pass through mastering exam answers only.

Table 4.4
Assessment Task Weighting by University Program

<table>
<thead>
<tr>
<th>Assessment weighting / Program (%)</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam</td>
<td>59</td>
<td>48</td>
<td>48</td>
<td>52</td>
<td>52</td>
<td>45</td>
<td>53</td>
<td>42</td>
<td>47</td>
<td>49.5</td>
</tr>
<tr>
<td>Report</td>
<td>3</td>
<td>25</td>
<td>15</td>
<td>-</td>
<td>-</td>
<td>33</td>
<td>19</td>
<td>33</td>
<td>19</td>
<td>16.3</td>
</tr>
<tr>
<td>Essay/literature review</td>
<td>4</td>
<td>13</td>
<td>16</td>
<td>3</td>
<td>3</td>
<td>10</td>
<td>7</td>
<td>-</td>
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<td>6.2</td>
</tr>
<tr>
<td>Quiz/class test</td>
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<td>3</td>
<td>3</td>
<td>9</td>
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<td>6</td>
<td>3</td>
<td>3</td>
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<td>3.9</td>
</tr>
<tr>
<td>Oral presentation</td>
<td>5</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>7</td>
<td>6</td>
<td>-</td>
<td>2.4</td>
</tr>
<tr>
<td>Tutorials</td>
<td>8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Journal/field diary</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>2</td>
<td>2.2</td>
</tr>
<tr>
<td>Undefined assignment</td>
<td>18</td>
<td>5</td>
<td>9</td>
<td>36</td>
<td>36</td>
<td>-</td>
<td>4</td>
<td>2</td>
<td>29</td>
<td>15.4</td>
</tr>
<tr>
<td>Financial analysis</td>
<td>-</td>
<td>1</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.8</td>
</tr>
<tr>
<td>Portfolio</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
</tr>
<tr>
<td>Case study</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>0.3</td>
</tr>
<tr>
<td>Measurement</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
</tr>
<tr>
<td>Poster</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.2</td>
</tr>
</tbody>
</table>

*Note: The letter attributed to each program has intentionally been altered table by table to de-identify the programs (Author)*

The dominance of exams, of which the majority are closed-book in nature and positioned at the end of semester, is of concern from a pedagogical perspective for two primary reasons: the lost opportunity for formative feedback and constructive reflection, and the lack of authenticity and alignment with industry practice.

Besides constructive alignment, another dominant term in higher education learning is ‘assessment for learning’ or ‘assessment as learning’. While Brown (2004) discusses the concept in detail, it is evident that assessment items have a role in education beyond just measuring performance. Students utilise formative feedback to learn from and adapt their respective approaches. Some assessment tasks, such as multiple-choice tests and end-of-year exams, are not followed with in-depth student feedback but rather are only prescribed a grade. In such a case, the summative-only feedback provides little scope for students to learn and they are often reluctant to pursue formative feedback when the course is finished.
The exam itself does not represent industry practice but rather aligns to declarative, or university knowledge (2.6.1). This approach to assessment may be sufficient for the first of the adopted intended learning outcomes, ‘Describe and explain objective theories of property custodianship and the practical skills you require for a career in property’ (2.6.2), as it has its origin in declarative knowledge. On the other hand, the examination does not align with the other prescribed learning outcomes (2.6.4) and presents in an inauthentic manner. In practice, property professionals are seldom without ready access to their files or the internet, through a personal computer, laptop, or even phone/mobile devices, and they would be discouraged by the registration or accrediting institutions from providing advice within a compressed timeframe or under pressure whereby they do not have adequate access to resources or expert advice, such as occurs in a closed book exam.

Open book and open web [OBOX] exams may have more pedagogical relevance, though formative feedback should be incorporated if the assessment is to contribute to learning. While Brown (2004) is not generally supportive of peer assessment, the merits of student self and peer evaluations are evident in professional property practices and quality assurance. In education, MOOCs (2.6.3) are dependent upon quality peer reviews in coursework and assessment.

A review of the assessment items in Table 4.4 against the functional assessment items derived from Biggs and Tang (2009) (refer Appendix 4.1), indicates that eight out of the 12 categories may be regarded as functional assessment tasks: report, oral presentation, journal/field diary, financial analysis, portfolio, case study, measurement, and poster. The functional assessment tasks only account for one-quarter or, more accurately, 27 per cent (excluding undefined assignments) of the total assessment weighting for the API accredited property programs investigated, with the other three-quarters being focused on declarative or university knowledge. Two of the API accredited programs sampled had no clear reference to any functional assessments.

Where all, or the majority, of the assessment is declarative there may be support for the API assertion that there is a gap between academic assessment items and professional practice (API 2011c).

### 4.2 Investigation findings

Perceptions of the quality of property education are influenced by considerations about who the stakeholders are, and the respective cultures of their professions. This is evident
in the comparison of findings from published studies (2.6.1). The student cohort may be regarded as a primary stakeholder group, or ‘clients’; nevertheless, it is important to note that alumni, academic staff, employers, and even accrediting bodies and community or the general public have interests that may be positively or negatively affected by the quality of property education provided. In particular, the published research as presented in Chapter 2 did sufficiently account for the view of academic staff that they may be regarded as the stakeholder conduit or experts in assessing intended learning outcomes, learning and teaching activities, and assessment.

One way of assessing the performance of a property program is to measure the graduates’ acquisition of prescribed skills, attributes and knowledge. In undertaking a program assessment, the baseline, for comparison purposes, would be difficult to ascertain and the overall apportioning of ratings would be equally subjective. Nevertheless, in investigating property education in Australia a suite of desired skills and attributes and knowledge have emerged, and may be presented as set in Table 4.5.

Table 4.5
Knowledge, Skills and Attributes of Graduates

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
<th>Source and reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>of property practice</td>
<td>Tu et al. (2009), API accredited program or course outlines</td>
</tr>
<tr>
<td></td>
<td>of property market</td>
<td>Tu et al. (2009)</td>
</tr>
<tr>
<td>Skills</td>
<td>Communication</td>
<td>Tu et al. (2009), Poon, Hoxley &amp; Fuchs (2011), API accredited program or course outlines</td>
</tr>
<tr>
<td></td>
<td>Numeracy</td>
<td>Tu et al. (2009), Poon, Hoxley &amp; Fuchs (2011), API accredited program or course outlines</td>
</tr>
<tr>
<td></td>
<td>Interpersonal</td>
<td>Tu et al. (2009), Poon, Hoxley &amp; Fuchs (2011), API accredited program or course outlines</td>
</tr>
<tr>
<td>Attributes</td>
<td>Creative/critical problem-solving</td>
<td>Poon et al. (2011), API accredited program or course outlines</td>
</tr>
<tr>
<td></td>
<td>Team work</td>
<td>Tu et al. (2009), API accredited program or course outlines</td>
</tr>
<tr>
<td></td>
<td>Social and environmental awareness</td>
<td>API accredited program or course outlines</td>
</tr>
</tbody>
</table>

The investigation also reveals a dominant lecture and tutorial method for teaching property in Australian universities. The lecture and tutorial format has a role in education and may adapt relatively well to the building of declarative knowledge. The traditional approach to education has clear shortcomings, though, and if not facilitated appropriately, classes may become less engaging, passive and conducive to only surface learning. For a property student, a lecture and tutorial only format may be a barrier to accumulating the functioning knowledge and the prescribed skills and attributes identified in Table 4.5. Further, the concept of lecturing or delivering information is contrary to the learning and
teaching theory of constructivism (2.2) and the related approach of constructive alignment (2.3).

In the absence of innovative and engaging teaching practices in property education, supplementary learning activities and assessment take on a greater role in delivering the desired skills and attributes. The investigation demonstrates that the property courses include some assessments which may be regarded as functional. Conversely, nearly three-quarters of the assessment weighting for all sampled programs is attributed to declarative or university knowledge. While the accumulation of declarative knowledge has relevance in a property program, it relates to only one of the five intended learning outcomes (2.6.2) and does not sufficiently address the construction of functioning knowledge or development of the prescribed skills and attributes.

As discussed in Chapter 1, it is clear that there is an emergent structural change in Australian universities. To accommodate the new, and potentially more diverse, cohort and maintain or improve teaching quality, changes in teaching practice and respective programs and substantive reviews will be necessary. Effective reviews will incorporate mainstream pedagogical practices, such as constructive alignment, and innovative learning activities and assessment pieces. A closer alignment of the property discipline pedagogy with mainstream pedagogy, through practice and research, may be a productive way to improve the quality of teaching in higher education.

Regardless of the subject material, the principle of deeper learning should be applied to encourage students to use higher cognitive functions and to discourage rote learning. A move away from the dominant, yet potentially passive, lecture to problem-based learning workshops may be the first stage. Such a move, supported by curriculums and assessment that focus on functional knowledge, may counter the argument that there is a gap between academic rigour and professional competency, and better prepare property students for practice.

Another emerging consideration stems from the lack of specific focus on the teaching of current market trends in the reviewed courses. If academics were to allocate further time to professional or market research, as opposed to academic research, then there may be more opportunities for community and professional engagement. If professionally orientated, research-active academics were to share their knowledge with the students then they may be better equipped for practice.
Technology and new innovative learning strategies in mainstream university pedagogy continue to emerge and it is foreseeable that there are, or will be, more effective learning tools than those addressed in this chapter. For example, as addressed in Chapter 2, the *Horizon Report* identifies emerging technologies including game-based learning (Johnson et al. 2011, 2013, 2014; Johnson, Adams & Cummins 2012).

### 4.3 Conclusion

The research associated with this investigation elaborates on property education practice in Australian universities, primarily through extending the findings of previously published research. The investigation presents a deeper look into property education in Australian universities, to specifically identify what knowledge, skills and attributes are sought after for, and by, graduates of undergraduate property programs. With respect to knowledge, an understanding of both property practice and the property market is sought after. Graduate skills may be broadly covered through the categories of communication, numeracy and interpersonal skills. A successful graduate of a property program may be said to possess the attributes of a creative/critical problem solver and a team worker, and demonstrate social and environmental awareness.

This investigation identifies two of the most prominent shortcomings of traditional teaching practices in property education: the deficiencies in the teaching of current market activity; and the misalignment of the teaching system and the student who does not know how to, or does not wish to, adopt deeper learning practices. Additionally, the shortcomings present a case for the deeper consideration of what property students may learn from other learning and teaching activities and assessments, including those associated with the playing of serious games.
Chapter 5  Evaluation: property games

Serious games present as a problem-based learning opportunity for students studying property at university to gain skills and build knowledge through active, participatory learning (2.7). Playing the right property game, if it is played appropriately, may complement traditional teaching practice and support collaboration, problem-solving, communication and critical thinking. Similarly, gameplay presents the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life. During constructive play, a student will enhance their functional knowledge development while being emotionally supported to encourage further learning through building self-confidence and self-efficacy.

Conversely, not all forms of play are considered positive or beneficial and the published history of play in education resembles the debate between objectivism and constructivism. Correspondingly, the published research does not clearly define what students learn through playing games, let alone how well their playing of a serious game contributes to satisfying intended learning goals or outcomes.

This chapter will investigate the opportunities for enhancing learning through playing domain-situated property games, and develop a better understanding of the tasks, activities, skills and operations associated with playing property games that contribute to an enhanced student learning experience. This chapter follows on from the review of published research into game enhanced learning as it may apply to property studies, and extends to an initial analysis, or review, of existing property games, and observations from situated gameplay. The initial review utilises a rubric to assess the alignment of gameplay with the skills and attributes sought after by stakeholders in property education, as derived from Chapter 4.
The second stage of the research presents a deeper analysis of three existing property games, Monopoly, SimCity and Investorville, and endeavours to surface opportunities for enhancing learning through playing these domain-situated property games.

5.1 Review of property games

This review investigates game playing as an emerging learning activity which has limited empirical presence in property pedagogy research. As such, the research aims to further the findings in game-based learning and property education through experiment, reflection and assessment. The practical method seeks to identify links between, and opportunities for, game-based learning and the discipline of property. As this review is only the initial stage of the evaluation, further experiments are to be undertaken, subsequently, to thoroughly test the effectiveness or otherwise of playing the selected games as part of learning property in higher education.

For this initial review the author, a program leader of an API accredited university property program with ten years’ experience in valuation and funds management, plays the games as part of the initial analysis. The analysis of the property games principally comprises observations and assessment from situated gameplay. Observations and personal reflections are captured through voice recording and the assessment is undertaken utilising a scoring rubric.

In selecting a sample for analysis, the internet and application stores were investigated to identify popular mobile and fixed platform games with a domain situated in the fields of property and real estate. The basket of games, and salient details, are contained in Table 5.1.
Table 5.1
Initial Property Game Evaluation Sample

<table>
<thead>
<tr>
<th>Game</th>
<th>Price AUS</th>
<th>Released/updated</th>
<th>Platform</th>
<th>Developer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Be Rich – HD</td>
<td>Free</td>
<td>26-Oct-11</td>
<td>iPad</td>
<td>Big Fish Games</td>
</tr>
<tr>
<td>Millionaire Tycoon</td>
<td>$0.99</td>
<td>30-Jan-12</td>
<td>iPad, iPhone and iPod touch</td>
<td>Savy Soda</td>
</tr>
<tr>
<td>Monopoly Hotels</td>
<td>Free</td>
<td>9-May-12</td>
<td>iPad, iPhone and iPod touch</td>
<td>Hasbro/Electronic Arts</td>
</tr>
<tr>
<td>Sim City Deluxe for iPad</td>
<td>$7.49</td>
<td>10-May-11</td>
<td>iPad</td>
<td>Electronic Arts</td>
</tr>
<tr>
<td>Build-a-lot 2 Free</td>
<td>Free</td>
<td>1-Oct-10</td>
<td>iPad, iPhone and iPod touch</td>
<td>HipSoft/Glu</td>
</tr>
<tr>
<td>Investorville</td>
<td>Free</td>
<td>1-Aug-11</td>
<td>PC</td>
<td>Commonwealth Bank of Australia</td>
</tr>
<tr>
<td>Monopoly Streets</td>
<td>$29.99</td>
<td>14-Jun-11</td>
<td>Xbox, Play Station 3, Wii</td>
<td>Hasbro/Electronic Arts</td>
</tr>
</tbody>
</table>

5.1.1 Assessment rubric

Rubrics are utilised in education to articulate expectations for an assessment as well as to provide a more reliable benchmark for comparison (2.6.4). Annetta et al. (2011) describe the rationale, development and psychometrics of a serious games rubric, noting the reliability or fair agreement amongst assessors. The serious games rubric as developed and tested by Annetta, Lamb and Stone is generic in nature, not tailored to higher education or the discipline of property.

The rubric applied in this research is intentionally aligned to property and games, being designed to assess the alignment of gameplay with the skills and attributes sought after by stakeholders in property education. As derived through the investigatory research presented in Chapter 4, the sought-after knowledge, skills and attributes of graduates may be broadly categorised as depicted in Table 5.2. As a further addition, ‘motivation’ is included in the desired knowledge, skills and attributes, due the prominent discussion around fun and play in the published research, and the primary objective from Chapter 3, which is to support the learning processes of property students in a fun, more playful way (3.5.2).
Table 5.2
Knowledge, Skills and Attributes Sought After in Graduates

<table>
<thead>
<tr>
<th>Graduate</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Knowledge of property practice</td>
</tr>
<tr>
<td></td>
<td>Knowledge of property market</td>
</tr>
<tr>
<td>Skills</td>
<td>Communication</td>
</tr>
<tr>
<td></td>
<td>Numeracy</td>
</tr>
<tr>
<td></td>
<td>Interpersonal</td>
</tr>
<tr>
<td>Attributes</td>
<td>Creative/critical problem-solving</td>
</tr>
<tr>
<td></td>
<td>Team work</td>
</tr>
<tr>
<td></td>
<td>Social and environmental awareness</td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
</tr>
</tbody>
</table>

In the absence of published research support or comparable investigatory findings, industry and expert knowledge has been applied to populate the body of the property games rubric, as depicted in Table 5.3. As such the assessment areas, which form the framework for the rubric, are supported by published research and the previous findings of this research project; on the other hand, the wordings associated with the gradations of quality are novel and without an empirically defendable level of support. For the purpose of this research the precise ‘tuning’, or the gradation of quality, is not considered necessary as each game will be assessed on the same matrix, in a ‘like with like’ manner. As such, the rubric should work adequately to surface opportunities for enhancing learning through playing domain-situated property games; however, it would be inaccurate to rely on the summative comparison between rating categories.
### Table 5.3
**Property Games Assessment Rubric**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>3 (Excellent)</th>
<th>2</th>
<th>1</th>
<th>0 (Poor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>The model underlying the game validly represents property practice</td>
<td>The model underlying the game represents several elements of property practice</td>
<td>The model underlying the game rarely represents property practice</td>
<td>The model underlying the game does not represent property practice</td>
</tr>
<tr>
<td>Knowledge of property practice</td>
<td>Simulates real property markets</td>
<td>Simulates property markets</td>
<td>Attempts to simulate a market</td>
<td>Does not simulate a market</td>
</tr>
<tr>
<td>Communication</td>
<td>Necessitates articulation through numerous communication channels</td>
<td>Encourages articulation through communication channels</td>
<td>Provides scope for articulation through communication channels</td>
<td>No communication channels are provided</td>
</tr>
<tr>
<td>Numeracy</td>
<td>Requires feasibility and investment analysis</td>
<td>Requires mathematical problem-solving</td>
<td>Does not require mathematical problem-solving</td>
<td></td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Necessitates reflection and sharing of emotions and strategies</td>
<td>Encourages reflection and/or sharing of emotions and/or strategies</td>
<td>Provides scope for reflection and/or sharing</td>
<td>No reflection or sharing options</td>
</tr>
<tr>
<td>Attributes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative/critical problem-solving</td>
<td>Large number of original ideas and strategies are required</td>
<td>Several original ideas and strategies are required</td>
<td>Original ideas and strategies are rarely required</td>
<td>No original ideas or strategies are required</td>
</tr>
<tr>
<td>Teamwork</td>
<td>Necessitates effective teamwork between small and large cohorts</td>
<td>Encourages effective teamwork and cooperation</td>
<td>Provides scope for cooperative multiple playing</td>
<td>No multiplayer option</td>
</tr>
<tr>
<td>Social and environmental awareness</td>
<td>Requires critical reflection on authentic social and ecological environments</td>
<td>Encourages critical reflection on social and ecological environments</td>
<td>Provides scope for critical reflection on social and/or ecological environments</td>
<td>Does not present social or ecological environments</td>
</tr>
<tr>
<td>Motivation</td>
<td>Fully immersive, sustaining continued and repeated playing</td>
<td>Engaging, encouraging continued and repeated playing</td>
<td>Relatively engaging and/or engaging for set periods</td>
<td>Lacking engagement</td>
</tr>
</tbody>
</table>

#### 5.1.2 Review findings

The sampled games were played on 4 July 2012 with each play time of broadly 30 minutes’ duration. With the exception of Investorville and Monopoly Streets, the games were played on an Apple iPad device. The sound recordings captured free-flowing reflections which were later transcribed and are considered in the findings. The property
The games scoring rubric was completed immediately after each game was played, with the results depicted in the assessment findings in Tables 5.4 to 5.6.

5.1.2.1 Knowledge

With the exception of Monopoly Hotels and Millionaire Tycoon, the games present a general understanding of functioning property practice. Buying and selling practices are adequately modelled by most games; Monopoly Streets takes the practice a step further with players’ avatars freely trading cash, ‘properties’ and other assets. Playing Be Rich and Build-a-lot 2 exposes players to the simplified practices of developing land and refurbishing properties in an aim to raise funds and expand their real estate companies.

Table 5.4

<table>
<thead>
<tr>
<th>Game assessment</th>
<th>Be Rich – HD</th>
<th>Millionaire Tycoon</th>
<th>Monopoly Hotels</th>
<th>Sim City Deluxe</th>
<th>Build-a-lot 2 Free</th>
<th>Investor-ville</th>
<th>Monopoly Streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of property practice</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Knowledge of property market</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Knowledge</td>
<td>3/6</td>
<td>2/6</td>
<td>1/6</td>
<td>4/6</td>
<td>3/6</td>
<td>4/6</td>
<td>3/6</td>
</tr>
</tbody>
</table>

*Note. Summary from the rubric based assessment. Utilises a scale from 0 (poor) to 3 (excellent) (Author).*

Ultimately, all the sampled games are designed for the amusement of a broad spectrum of users, not specifically for educating property students, and as such they do not reflect the more complex, nuanced operations of the property profession. For example, owning complementary properties – not those that adjoin, but rather those which can offset the financial weaknesses of the portfolio – is not adequately rewarded. A further limitation of the games is the focus on financial gain and encouragement of a risk-seeking strategy to ultimately ‘win’ or succeed.

From a town planning perspective, SimCity presents a rich learning environment with players assuming a mayoral or even god-approximating role in the development of a city. The gameplay requires a careful balance of services, land uses and governmental policy to develop a functional city with satisfied ‘Sims’ or residents. It is, however, pertinent to note that, as identified by Adams (1998), SimCity is not a scientifically accurate simulation model and, therefore, the knowledge gained through play should not be
assumed to be a true reflection of geographic education but rather as a tool supported by other teaching approaches.

Only Investorville, an online simulation tool developed for the Commonwealth Bank of Australia, claims to be educational and ‘break down common misconceptions and show the practicalities of property investment’ (Commonwealth Bank of Australia 2011). By incorporating Google Earth satellite photography and ‘market insights’ from RP Data, a residential market researcher, the game presents as a ‘sandbox’ for aspiring residential property investors.

For the author, playing Investorville appeared to lead to personal knowledge development specifically set in the discipline of property, though the quality and authenticity of the knowledge gained appears questionable or even misleading at certain stages, setting the scene for a level of critical reflection (2.6.4). With prescribed growth rates, some ‘simulated conditions’, and options such as renovations which drive excessively high financial gains, it would not be prudent to play without an acute understanding of the game’s limitations and inherent bias of the game provider.

5.1.2.2 Skills

Playing the sampled games to enhance communication, numeracy and interpersonal skills would not be a worthy dedication of time for property students. Traditional learning exercises would appear to be more effective with set exercises in participatory tutorials and reflective journals providing a more solid base for developing the respective skills.

Table 5.5
Skills: Summative Assessment Findings

<table>
<thead>
<tr>
<th>Game assessment</th>
<th>Be Rich - HD</th>
<th>Millionaire Tycoon</th>
<th>Monopoly Hotels</th>
<th>Sim City Deluxe</th>
<th>Build-a-lot 2 Free</th>
<th>Investorville Mono</th>
<th>Monopoly Streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Numeracy</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. Summary from the rubric based assessment. Utilises a scale from 0 (poor) to 3 (excellent) (Author).
Nevertheless, there are commendable sub-activities in the SimCity, Investorville and Monopoly Streets games that may encourage skill development. The games present numerous problems to be solved, which are met with immediate or prompt feedback (2.6.3). For example, Investorville provides a level of formative feedback on the player’s investment performance at the game’s conclusion, while also providing immediate summative responses by way of financial position statements, each time the player undertakes a financially reflective activity.

SimCity does not necessitate self-reflection, although in playing the game one may be compelled to consider the appropriateness of one’s choices. With powers to create devastation and misery for the Sims, it may not be easy to detach from emotional responsibility as the creator and nurturer.

As the only sampled game with remote multiplayer capability, Monopoly Streets creates channels for communication beyond just a link to a discussion group. The channels may become more useful in competitive gameplay.

5.1.2.3 Attributes

Developing a city from scratch, as is encouraged in SimCity, presents the opportunity to apply imaginative thinking to realise goals that could not be readily achieved in real life (2.6.3). The simulation environment is broad with few ‘scaffolds’ or supports to dictate or control gameplay. Players of SimCity have the freedom to create individualised cities and precincts and apply their personal strategies through the planning, development, management and redevelopment phases. As such, the created digital artefact is unique and represents the series of choices made by the player. The success or otherwise of their city and choices are measured in real time with financial as well as social and environmental benchmarks.
Table 5.6
Attributes: Summative Assessment Findings

<table>
<thead>
<tr>
<th>Game assessment</th>
<th>Be Rich – HD</th>
<th>Millionaire Tycoon</th>
<th>Monopoly Hotels</th>
<th>Sim City Deluxe</th>
<th>Build-a-lot 2 Free</th>
<th>Investor-ville</th>
<th>Monopoly Streets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative/ critical problem-solving</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Team work</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Social and environmental awareness</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Motivation</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Attributes</td>
<td>4/12</td>
<td>4/12</td>
<td>2/12</td>
<td>7/12</td>
<td>4/12</td>
<td>3/12</td>
<td>4/12</td>
</tr>
</tbody>
</table>

*Note.* Summary from the rubric based assessment. Utilises a scale from 0 (poor) to 3 (excellent) (Author).

The games in the analysed sample are inherently problem-solving vehicles which encourage creative problem-solving. For the rest of the sample, the structure and ‘scaffolding’ of the modelled gameplay are more restrictive and supportive than in SimCity, presenting fewer opportunities for creative exploration (2.6.3).

The collaborative opportunities associated with MMO games are overlooked in the sampled games. While Monopoly Streets allows multiplayer online gaming, the benefits of collaborative problem-solving, as identified by Isbister et al. (2010), Gee (2003, 2011), Johnson et al. (2011), Johnson, Adams and Cummins (2012), and Klopfer, Osterweil and Salen (2009) and supported by Johnson et al. (2014) (2.6.3), are not evidenced with any of the games.

Millionaire Tycoon, while relatively shallow in its educational offering, as measured by the knowledge and skills rating in the rubric, is motivating to the point of addiction. With its simple gameplay set in a digital board game framework, Millionaire Tycoon can sustain hours of play. Additionally, the engaged playing of Millionaire Tycoon incorporates a level of chance through ‘rolling’ dice, and simple strategy and problem-solving. Millionaire Tycoon also features nested games and simple avatars, and allows players to spite others through utilising bombs, traps and financially biased auctions.
5.1.3 Summary

The sampled games provide a range of promising results in the knowledge categories and motivation rating. Similarly, SimCity may encourage creative and critical problem-solving and the development of social and environmental awareness. Conversely the sampled games do not address all the learning outcomes desired from a property program (2.6.2), nor all the knowledge, skills and attributes (4.2) sought after by property graduates. As such, no game, or games suite, would be likely to provide a stand-alone pedagogical method for effective property education. Rather the games, as part of a constructively aligned learning and teaching program, may ensure the elemental development of knowledge, skills and attributes in a subtle and engaging manner.

In acknowledging the limitations of this study, learning activities based on playing SimCity and Investorville may enhance the learning experience for students studying early planning and property investment courses respectively. While the Monopoly variants rated below SimCity and Investorville, it is pertinent to note that the board game variant of Monopoly was not played. In particular, the original version of the board game, played in a group setting, face-to-face, may have the potential to score more highly in skills and attributes. With consideration given to the findings in the literature, the board game version of Monopoly may conceivably outperform the variants reviewed in respect of communication, teamwork, and motivation (2.6.3). Similarly, the skill set relating to social and environmental awareness may be tested in competitive gameplay.

5.2 Evaluation

In addition to the preliminary findings, the review of the existing property games presents a position to look deeper and evaluate Monopoly, SimCity and Investorville. In the absence of peer-reviewed published research, alternative literary sources and methods have been utilised. The evaluation of Monopoly, SimCity and Investorville incorporates the evaluation techniques illustrated in Table 5.7.
Table 5.7

Evaluation Techniques

<table>
<thead>
<tr>
<th>Game</th>
<th>Evaluation method</th>
<th>Information sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monopoly</td>
<td>Review of non-academic literature</td>
<td>Popular books/novels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Player reviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Advocacy journal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Patent documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Court cases</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Game materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Producer materials</td>
</tr>
<tr>
<td>SimCity</td>
<td>Review of previous research</td>
<td>Journals</td>
</tr>
<tr>
<td></td>
<td>Review of non-academic literature</td>
<td>Player reviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Designer transcripts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Producer materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Game materials</td>
</tr>
<tr>
<td>Investorville</td>
<td>Review of non-academic literature</td>
<td>Client presentations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Player reviews</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Producer materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Game materials</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Newspaper articles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Industry statistics</td>
</tr>
<tr>
<td></td>
<td>Case study</td>
<td>Reflective journal</td>
</tr>
</tbody>
</table>

5.3 Evaluation: Monopoly

Monopoly, on the face of it, may not appear to fit Poplin’s (2011) description of a serious game as one that is ‘aim(ing) to support learning processes in a new, more playful way’ (Poplin 2011, p. 195) (2.6.3). However, many games do not just appear; they evolve and are adapted. Sometimes one may even grow into a game that, when played, has the opposite affect to that intended by the creator. It may be presumptuous to assume that Monopoly fed on society’s negativity. On the other hand, it is equally difficult to conceive how a Quaker and Georgist could bring to life ‘a game that modelled capitalism at its most ruthless’ (Axelrod 2002, p. 16) – a game where everyone loses, except one – to flourish in the isolation of the Great Depression. Nevertheless, Monopoly did ‘flourish’, and while it exists in various forms the detailed review is primarily based on the traditional board game and its precursor, The Landlord’s Game. The salient details regarding the Monopoly board game are presented in Table 5.8.
Table 5.8

Monopoly Board Game Salient Details

<table>
<thead>
<tr>
<th>Format</th>
<th>Dice driven board game ‘board game apparatus and is intended primarily to provide a game of barter, thus involving trading and bargaining.’ (Darrow 1935) The Fast-Dealing Property Trading Game</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designer</td>
<td>Elizabeth Magie (1904 – The Landlord’s Game, as precursor to Monopoly) Charles Darrow</td>
</tr>
<tr>
<td>Publisher</td>
<td>Hasbro, Parker Brothers, Waddingtons</td>
</tr>
<tr>
<td>Players</td>
<td>2–6/12</td>
</tr>
<tr>
<td>Variants</td>
<td>Numerous including early location adaptations, electronically assisted banking, and inflation adjusted. The game has also witnessed subtle rule changes since the initial patent. The game has been extended to most computer game formats with electronic handheld versions marketed from 1997. In conjunction with Electronic Arts, Monopoly variants were developed for iPhone and alternate mobile and console platforms.</td>
</tr>
<tr>
<td>Popularity</td>
<td>More than 275 million games have been sold worldwide and it is available in 111 countries, in 43 languages (Hasbro 2013).</td>
</tr>
</tbody>
</table>

5.3.1 Monopoly game development

Monopoly, or rather the early variants of The Landlord’s Game as the precursor to Monopoly, was conceived as a sober-sided model of economic reality (Axelrod 2002). The initial, rudimentary versions of The Landlord’s Game were played in college campuses by a small group of individuals, many of whom were related by blood or marriage (Axelrod 2002; Anti-Monopoly v. Hasbro (1997)). Elizabeth ‘Lizzie’ Magie, the inventor and original patent holder of The Landlord’s Game, aspired for more from the board game, believing that through play, children may be taught the true laws of economics and, ultimately, influence policy change.

As a supporter of the economic philosophy of Georgism, Magie saw injustice in the land ownership and taxation system of the time (Kennedy 2004; Single Tax Review 1902). The Georgist economic philosophy and ideology she followed held that people own what they create, but that things found in nature, most importantly land, belong equally to all (Heavey 2003). Private ownership and associated holding of property portfolios for wealth creation were, at the core, opposed to the Georgist philosophy held by the Single Taxers and Magie.

To illustrate and remedy the deficiencies in the land system, Magie developed and patented The Landlord’s Game board as illustrated in Figure 5.1. The Landlord’s Game is a game of chance with ‘the object[ive] of the game to obtain as much wealth or money as possible’ (Magie 1904) ‘through trading buying and selling lots, collecting rent and
borrowing money’ (Single Tax Review 1902). In an earlier Single Taxer publication, Magie discussed The Landlord’s Game and Georgism’s intent to:

Let the children once see clearly the gross injustice of our present land system and when they grow up, if they are allowed to develop naturally, the evil will soon be remedied. (Magie, quoted in The Single Tax Review 1902, p. 56) (2.6.3)

In 1910 The Landlord’s Game was played in Arden, Delaware, being principally adopted by the Georgism Single Taxers (Kennedy 2004). University of Pennsylvania Wharton School Professor Scott Nearing was a socialist economist who, according to Kennedy (2004), also saw evil embedded in capitalism. Through Nearing and, conceivably with the best wishes of Magie, The Landlord’s Game migrated to other colleges and campuses (Kennedy 2004; Axelrod 2002; Anti-Monopoly v. Hasbro (1997)). With a more diverse cohort of players, not all would see Magie's modelling of an unjust land system but rather some would be ‘revelling in the simulation of moneymaking and ruthless business tactics’ (Kennedy 2004, p. 11).
The Landlord’s Game was susceptible to uncontrolled distribution, copying and modification. According to Kennedy (2004), Magie sold copies of her game but did not enforce the patent, resulting in the development of a game version known as ‘Monopoly’. In Monopoly, grouped properties were assigned higher rents if owned by the one player (Kennedy 2004). Properties could then be improved to yield even greater income. With the increasing popularity of the folk game Monopoly, Magie Phillips, since married, sought a second patent.
To rein in some of the game variants and to express the educational underpinnings of The Landlord’s Game, Phillips secured a second patent 20 years after the first. A salient change to the game rules included the ability to leverage grouped holdings to make ‘improvements’ to the land (Phillips 1924). While the new game incorporated changes made by her and others, Phillips tailored the rules so that the abuses of landowning were underscored (Kennedy 2004). Philips also sought to re-establish the intent of the game which was to educate players in the favour of the Single Taxers’ ideology through setting the object as:

*The object of the game is not only to afford amusement to players, but to illustrate to them how under the present or prevailing system of land tenure, the landlord has an advantage over other enterprises and also how the single tax would discourage land speculation.* (Phillips 1924, p. 1)

Seeking not wealth but education of the public, Phillips presented her game to George Parker, Parker Brothers’ founder (Casey 2010; Kennedy 2004). Her proposal was declined. Parker Brothers did eventually purchase The Landlord’s Game and the game of Finance to settle patent conflicts with its ever-popular variant board game, Monopoly (Kennedy 2004).

The Monopoly board game apparatus, as depicted in Figure 5.2, was developed and then patented by Charles Darrow in 1935 (Darrow 1935), just prior to assignment to Parker Brothers (Kennedy 2004; Casey 2010) in the depth of the Great Depression (Office of the Historian, Bureau of Public Affairs, United States Department of State 2013). Casey (2010) discusses Parker Brothers’ initial refusal of the game in 1933, citing fifty-two fundamental errors including: the game’s duration being too long, gameplay being too complicated and the lack of a specific goal for completion (Brady 1974, cited in Casey 2010). Parker Brothers’ change of perspective was influenced by either Darrow’s new, appealing design (Obanes 2006, cited in Casey 2010) or the wife of the Parker Brothers president Robert Barton (Kennedy 2004). Regardless, Casey (2010) and Kennedy (2004) illustrate the near-immediate success Darrow experienced, handmaking the games and securing sales agreements through the nation’s most difficult economic times.
Monopoly, the game of free-flowing capital and financial risk, in the depths of an economic depression, became a bestseller of unprecedented magnitude (Kennedy 2004; Casey 2010; Axelrod 2002). While it presents a capitalist environment rich with opportunity, in the end all but one player would be bankrupt (Axelrod 2002). Axelrod (2002) likens this to Aristotle’s explanation of the appeal of great dramas in which incredibly painful and horrific things happen while the audience experiences fascination and pleasure at the spectacle. Aristotle explained that tragedy gives fear shape and
meaning, so that the audience comes through cleansed, purged, and generally feeling better (Axelrod 2002).

The endurance of Monopoly’s board game domination is acknowledged by advocates and critics (Kennedy 2004; Casey 2010; Axelrod 2002; Curry 2009). The latter underscores the game’s deficiencies including:

- zero-sum game with gain only coming from another’s loss (BoardGameGeek cofounder Derk Solko, cited in Curry 2009)
- having almost no strategy, besides to buy or not, for most of its ‘interminable three to four hour average playing time’ (Curry 2009), mostly spent waiting for others to roll the dice (Curry 2009).

In a review of Klaus Teuber’s trading game, Settlers of Catan, Curry (2009) cites BoardGameGeek cofounder Derk Solko: ‘if I could wave a magic wand and replace all the copies of Monopoly out there with Settlers, I truly think the world would be a better place’.

5.3.2 Monopoly learnings from gameplay

The Monopoly board game has a clear association with education, as Magie’s original game, The Landlord’s Game, was purposed for educating in the ways of land ownership (Single Tax Review 1902). The initial rudimentary versions of The Landlord’s Game were played in colleges and educational institutions (Axelrod 2002; Kennedy 2004; Anti-Monopoly v. Hasbro (1997)), with many of the rules adapted in higher education institutes (Kennedy 2004).

Besides the game’s origin, and the intent of the designer, the empirical evidence for learning through playing Monopoly is not deep. Of the business related programs in higher education only the accounting discipline has an established pedagogical and research attachment to the game. The accounting research stems from the conceptual work of Knechel in 1989, who promoted the use of Monopoly to teach undergraduate students the financial accounting journal entry process (Shanklin & Ehlen 2007; Clayton 2003; Albrecht 1995). Knechel (1989) presented instructions for a learning activity which involved recording accounting activity when playing the Monopoly board game.

When approaching the question of whether Monopoly is an effective learning tool for property students, there are encouraging responses in the published research and studies
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(refer Chapter 2; 2.6.3; 2.6.2). Unfortunately, the empirical evidence is shallow and the scope of the studies is not broad enough to encompass the desired learnings set for property students. As such, the net is cast wider, beyond academically supported research, to capture the untested findings of Monopoly advocates. Axelrod (2002), with the publication, *Everything I know about business I learnt from Monopoly*, advocates for the board game as a model or learning tool for studying business. In particular, Axelrod (2002) identifies 29 lessons from playing Monopoly which may be adapted to achieve greater success in business. The lessons, and brief supporting statements, are contained in Appendix 5.2.

Axelrod’s (2002) 29 lessons align somewhat to the knowledge, skills, and attributes assigned to the property games assessment rubric developed earlier in this chapter. The rubric, developed after a review of published research, comprises nine subcategories for which a learning activity or game may be assessed against the desired skills and attributes of property graduates. In assuming Axelrod’s (2002) lessons are justifiably obtainable through playing Monopoly, they may contribute to property students gaining the knowledge, skills, and attributes from the rubric as detailed in Table 5.9.

Table 5.9

*Monopoly Lessons Alignment with Rubric*

<table>
<thead>
<tr>
<th>Competency</th>
<th>Rubric assessment field</th>
<th>Axelrod lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Knowledge of property practice</td>
<td>1, 2, 3, 4, 5, 14, 21</td>
</tr>
<tr>
<td></td>
<td>Knowledge of property market</td>
<td>7, 14, 21, 22, 23, 24</td>
</tr>
<tr>
<td>Skills</td>
<td>Communication</td>
<td>13, 20</td>
</tr>
<tr>
<td></td>
<td>Numeracy</td>
<td>3, 4, 6, 7, 10, 12, 13</td>
</tr>
<tr>
<td></td>
<td>Interpersonal</td>
<td>12, 15, 16, 25, 29</td>
</tr>
<tr>
<td>Attributes</td>
<td>Creative/critical problem-solving</td>
<td>21, 26, 27, 28</td>
</tr>
<tr>
<td></td>
<td>Team work</td>
<td>13, 20</td>
</tr>
<tr>
<td></td>
<td>Social and environmental awareness</td>
<td>2, 5, 6, 8, 17, 18, 19, 23, 29</td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
<td></td>
</tr>
</tbody>
</table>

*Source: Author; Axelrod (2002).*

5.3.2.1 Knowledge fields and function

Around half of Axelrod’s (2002) lessons relate to knowledge construction in the fields of property practice and property markets. In particular, in Lesson 3, ‘A roll of the dice – the role of luck’, Axelrod proposes that playing Monopoly contributes to an understanding that, ‘in all ventures, take steps to reduce randomness, counter chance with knowledge; and create luck with self-confidence built on understanding’ (Axelrod 2002, p. 39). Similarly, property education students are taught the relationship between risk and return
in early property studies then, later, in property investment and development courses, they are expected to develop strategies to understand risk and reduce the impact or likelihood of negative impacts.

Axelrod’s (2002) lessons 22 through 25 relate to types of properties, particularly the relationships between probability, risk, return and volatility. These measures of returns and risk are all crucial elements of value and worth, forming authentic considerations in the ownership and development of property and real estate. Worth, value and cost are concepts taught in early property studies which may be evidenced well through facilitated Monopoly gameplay or subsequent critical reflection. According to the API and Property Institute of New Zealand, market value and worth are defined as:

*Market Value is the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm’s-length transaction after proper marketing wherein the parties had each acted knowledgably, prudently, and without compulsion.*

*... worth (or investment value) [is] the value of a property to a particular investor, or class of investors, for identified investment objectives.* (API and Property Institute of New Zealand 2012, p. 70)

Adopting these standards, each Monopoly property has three defined values or worths as follows:

- the price of the property, as noted on the card
- the value as prescribed by the willing buyer–willing seller model. This value would not necessarily reflect price. As Axelrod notes, ‘you have to pony up to buy, rent, and sell’ (Axelrod 2002, p. 23); winning in Monopoly requires a level of aggression in property purchasing, implying, in a general sense, that the value of a property is greater than the prescribed price. More specifically, due to the ‘Go to jail’ square and other directional influences, there are properties which have a greater probability of being landed upon. These properties are likely to have a greater value to knowledgeable buyers and sellers
- the worth, as the value of a property to a particular player for identified investment objectives.

5.3.2.2 Skills

With the board game variant of Monopoly and traditional set of rules, including the elective Income Tax square, numeracy skills are regularly tested and rewarded. As in property investment studies, ‘[t]here is no surer way to get yourself in trouble in business
than by remaining blissfully unaware of just what your assets and liabilities are every single day' (Axelrod 2002, p. 82).

The lessons 13 and 20, ‘Let’s talk’ and ‘Cornering corporate karma’, address the rich skill set required in successful play of Monopoly. Both lessons relate to the player-to-player trade and the associated multidimensional relationships that trading or not trading can bring forth. In the gameplay, Axelrod identifies the seeming conflict in views between the real object of the game, to make other players lose, and the notion that success requires cooperation. According to Axelrod ‘Monopoly models capitalism. Winning calls for a combination of ruthless competition and willing cooperation’ (Axelrod 2002, p. 140).

Contrary to initial perception, perhaps the most prominent skills identified in the lessons are those relating to relationships between players and reflections on one’s actions. Axelrod proclaims that, ‘Monopoly creates a more intense and dramatic situation than real life’ (Axelrod 2002, p. 109), providing a sandpit or secure test environment for interpersonal experimentation. With the real object of the board game being to make others lose and drive them out of the game, the environment is set for ruthless play. Ruthless play does not imply unethical play, rather:

*Ethical play, in Monopoly as in business, does not mean diluting the will to win. It means defining victory ethically and, within that definition, devoting your efforts to winning, to playing fairly but ruthlessly.* (Axelrod 2002, p. 135)

5.3.2.3 Attributes

The very nature of Monopoly and the capacity for only one winner per game at the cost of all others provides little scope for longer term team cooperation (Axelrod 2002) or relationship building. On the other hand, where other players are cooperating and trading properties for monopolies, they are generally acting for mutual gain with the only ‘loser’ being the inactive player or players. In this way, successful play of Monopoly necessitates player-to-player trade or even strategic alliances. Such alliances and friendships may dissolve with ruthless practices as the game progresses.

Axelrod’s (2002) extensive list of lessons is not empirically supported in published research and therefore the individual lessons are considered on face value only. On face value, the lessons present as a reference for consideration in this research.
5.4 Evaluation: SimCity

SimCity, or rather ‘Micropolis’ as the simulation was initially titled, was not conceived as a serious game but rather has been repurposed, or repositioned, for educational use. The simulation, with the exception of scenarios adopted in later versions, is open-ended, tending away from a win-or-lose scenario.

With the later establishment of SimCityEDU, an ‘online community of educators’, SimCity fits Poplin’s (2011) description of a serious game as one ‘aim(ing) to support learning processes in a new, more playful way’ (Poplin 2011, p. 195) (2.6.3). SimCityEDU, based on the SimCity game, is not specifically aligned to property or town planning education but rather is presented as a digital platform and learning tool to drive student interest in STEM (Science, Technology, Engineering and Mathematics) subjects (Electronic Arts 2014). Nevertheless, past and current versions of the SimCity simulation have been emphasised as being ripe with learning potential (Adams 1998; Gaber 2007; Egenfeldt-Nielsen 2009; Nilsson & Jakobsson 2011; Lin & Lin 2014). The salient details regarding the SimCity simulation are presented in Table 5.10.

Table 5.10
SimCity Simulation Game

| Format       | Computer game
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Designer</td>
<td>Will Wright</td>
</tr>
<tr>
<td>Publisher</td>
<td>Broderbund, Maxis, Nintendo, Electronic Arts, Superior Software/Acornsoft and Infogrames Entertainment SA (first European release)</td>
</tr>
<tr>
<td>Players</td>
<td>Single player and multiplayer</td>
</tr>
<tr>
<td>Variants</td>
<td>SimCity was originally released 3 October 1989 for home computers. Later converted for several other computer platforms and video game consoles. Current versions of the simulation are available on portable and mobile devices</td>
</tr>
<tr>
<td>Popularity</td>
<td>SimCity has sold more than 17 million copies around the world (Electronic Arts 2013, cited in Lin &amp; Lin 2014)</td>
</tr>
</tbody>
</table>

5.4.1 SimCity game development

In 1985, Will Wright created the city-building simulator Micropolis, later titled SimCity, for fun and entertainment (Starr 1994). During the development process and years spent refining the game, Wright developed an interest in system dynamics, traditional urban planning and, more specifically, ‘enabling the creativity of the player’ (Pearce 2002).
Micropolis, as illustrated in Figure 5.3, was influenced by Wright’s enjoyment of creating virtual landscapes in a ‘terrain editor’. According to Starr (1994), it was while working on a video game for bombing islands that Wright conceived SimCity. ‘Wright told me recently that while designing a terrain editor to create the landscape, he discovered that he had more fun building the islands than bombing them’ (Starr 1994).

Wright’s interest in simulated landscapes and development lead him to urban planning research findings, in particular the adapted models of Jay Wright Forrestor, the founder of system dynamics, a study of simulated interactions between objects in a dynamic system (Forrestor 1969, 1971, cited in Starr 1994). Drawing upon his progressive investigations, Wright fashioned the models of land use, traffic, power systems, and other aspects of urban development that underlie SimCity.

Starr (1994), transcribing an interview with Wright, refers to the basic conceptual framework of SimCity as ‘capitalistic land value ecology’ and presents the designer’s argument that it fits the development of American cities in the twentieth century, in particular a city built on an industrial base. The base SimCity model:
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consists of a series of ‘concentric rings.’ At the core is a so-called ‘basic/nonbasic’ or ‘export/import’ model, borrowed from the traditional urban development literature, that describes the evolving relationship of the industrial, commercial, and residential sectors. SimCity assumes that while 70 percent of industrial production is exported outside of a city, 70 percent of commercial production is consumed internally. Thus in the early stages of a city's development, while its internal market is small, the industrial sector must predominate. As the city and its internal market grow, commerce begins to expand, ultimately overtaking industry as the main source of employment. (Starr 1994)

According to Wright, SimCity uses a ‘bid rent’ model to determine land valuations. Specifically, properties carry different values depending on use; for example, land closest to the urban centre is valued most for commercial and residential purposes and least for industry. Starr (1994), citing Wright, notes that:

_The actual numbers used in SimCity for land values, city investments, and other items bear no relation to the real world. However, the overall valuation of SimCity and thus its tax base will depend on how the player distributes and locates different zones and allocates resources among roads, schools, and other public services._ (Wright, cited in Starr 1994)

The twentieth century industrialist city-building simulator was accompanied by a sequel, SimCity 2000, in 1993 (Electronic Arts 2014). According to Electronic Arts (2014), the sequel featured different land elevations, underground layers, new facilities, a variety of power plants, neighbouring cities, more elaborate budget, finance controls, and disaster scenarios.

Following the acquisition of Maxis studios by Electronic Arts in 1997, SimCity 3000 was released (Electronic Arts 2014). This third instalment in the SimCity series expanded upon city management and business deals while featuring new advisers and petitioners, news tickers, real-world landmarks and a live music store (Electronic Arts 2014).

Electronic Arts (2014) discuss the fourth-generation game, SimCity 4 released in 2003, as featuring a new 3D graphics engine, day and night cycles and three play modes: God mode, Mayor mode and My Sim mode. Later in the year, Maxis released Rush Hour: SimCity 4, an expansion pack with enhanced transportation and architecture options (Electronic Arts 2014).

With less focus on city planning and more focus on citizens and societal values, SimCity Societies was released in 2007 (Electronic Arts 2014). It featured a higher level of customisation, from buildings to game rules and citizen behaviour (Electronic Arts 2014).
SimCity Creator, developed for Wii and Nintendo DS, was subsequently released in 2008 (Electronic Arts 2014). Electronic Arts (2014) consider the game to feature more advanced zones, sophisticated transportation, customisable buildings based on several themes, and the option to take overhead, three-dimensional tours of the city by helicopter or airplane.

As a further progression into mobile devices, SimCity Deluxe for iPad and Android was released in 2011 (Electronic Arts 2014). Electronic Arts (2014) market the mobile simulation as an opportunity to build and manage your dream city with seven scenarios, from staging ‘World Games’ to managing a scorching heat wave, and seven starter cities, inspired by world famous locations.

The 2013 version of SimCity, similarly titled SimCity, utilises a GlassBox engine said to give each Sim, or agent, purpose (Electronic Arts 2014). ‘Sims go to work, purchase items, consume goods and live in a home (unless they’re homeless)’ (Electronic Arts 2014). With GlassBox, SimCity is said to deliver a deeper level of simulation of real city behaviour, with cars exhibiting authentic traffic patterns, water travelling down pipes, and fire spreading in realistic radiuses (Electronic Arts 2014).

5.4.2 SimCity learnings from gameplay

The learning potential of SimCity has been explored in a number of classroom settings. With respect to planning, Gaber (2007) presents SimCity as successful in reaching learning objectives specific to the discipline. In summarising prior research results, and building upon Gaber’s (2007) learning outcomes, Nilsson and Jakobsson (2011) discuss cognitive objectives associated with the gameplay, these being ‘holistic understanding’, ‘strategic knowledge’ and ‘adaptive critical reasoning’.

Holistic knowledge implies an ability to see a situation embedded in a larger context, and that the whole consists of many interconnected parts (Gaber 2007, Nilsson & Jakobsson 2011). Through such insight, students develop strategic knowledge and an understanding that their decisions may not only have a direct impact on the immediate situation, but also consequential impacts on other, indirectly linked situations (Nilsson & Jakobsson 2011).
When students are allowed to manipulate variables in a simulation computer game, they develop critical reasoning skills that may be used to solve problems and, as such, adapt critical reasoning (Nilsson & Jakobsson 2011).

Adams (1998) and Gaber (2007) point out limitations when using SimCity in educational contexts. The game is not a close approximation to reality (Adams 1988; Gaber 2007), with a bias towards economic development. Another bias expressed by Gaber (2007) is the overstated role of the planner.

In taking the analysis further, Lin and Lin (2014) conducted a study involving in-depth interviews with 50 students with an undergraduate degree (or higher) to explore the correlation between game attributes, learning effects and personal values. In order to determine the correlation between attributes, learning and values, Lin and Lin (2014) adopted a means-end chains [MECs] theory as the framework, coupled with laddering and content analysis to derive a total of 12 game attributes, 13 consequences and nine values from the key phrases mentioned by 50 respondents. Through categorising the learning effects, Lin and Lin (2014) found playing SimCity to:

- increase the planning experience
- cultivate organizational thinking
- strengthen leadership decision-making
- improve control ability.

5.4.2.1 Knowledge fields and function

SimCity is not a close approximation to reality (Adams 1998; Gaber 2007). While it may provide content specially related to the town planning discipline (Klopfer, Osterweil & Salen 2009), Wright acknowledges that the purpose and direction for SimCity is not accuracy or prediction but communication (Wright, cited in Starr 1994). When further questioned, Wright said, ‘unless it's entertaining, the educational value is irrelevant’ (Wright in Starr 1994). A similar view is shared of serious games more widely, and the role of play emerged in the review of previous research (2.6.3).

As SimCity has evolved, it has incorporated increasing levels of complexity. In the original SimCity, the fiscal options were limited and people were moving around generically (Gaber 2007). The 2013 version of SimCity utilises a GlassBox engine said to give each Sim, or agent, purpose (Electronic Arts 2014). ‘Sims go to work, purchase items, consume goods and live in a home (unless they’re homeless)’ (Electronic Arts
With GlassBox, SimCity is said to deliver a deeper level of simulation of real city behaviour with cars exhibiting authentic traffic patterns, water travelling down pipes, and fire spreading in realistic radiiuses (Electronic Arts 2014).

Whilst the improvements may address some of the town planning limitations identified by Gaber (2007), including an arguably closer representation of reality and a community of less generic Sims, there are numerous residual shortcomings in the representation of property practice and markets.

Treyz (2013), the balance designer for the 2012 SimCity, discusses the models, and the design team’s approach and interpretation of density and wealth. According to Treyz (2013), buildings will go up in density when they collect ‘happiness’. Happiness is accrued when Sims are able to successfully complete their life cycle (Treyz 2013). There are two levels of land value, medium and high, with medium- and high-wealth residential and commercial buildings moving into areas of medium- and high-wealth land value respectively (Treyz 2013). Treyz (2013) informs industry as having its own wealth level, not related to land value. Instead, industry lowers both medium- and high-wealth land values nearby for residential and commercial uses (Treyz 2013).

Medium- and high-wealth buildings take up more space than low-wealth buildings, and house fewer Sims (Treyz 2013). In Treyz’s (2013) words, ‘high wealth Sims are also more needy’, they complain earlier and more often about things like the lack of education, power, and water, as well as local crimes and health issues. They do, however, provide more tax revenue per square metre than low-wealth buildings (Treyz 2013). Appendix 5.3 details what makes each different type and wealth level of building gain and lose happiness. While the happiness rating chart is stylised, and does not reflect the true dynamics of property markets and practices, the approximations have advanced from Wright’s early industrialist city-building simulator.

Regardless of the advancement Adams (1998) found, the most important learning associated with SimCity was not the learning of facts, but rather the development of certain attitudes through interaction with the game. Nilsson and Jakobsson (2011) support Adams (1998), in discussing that, regardless of the model’s accuracy, knowledge of a holistic and strategic nature may be gained through playing SimCity.

Specifically a holistic knowledge, implying an ability to see a situation embedded in a larger context, and that the whole consists of many interconnected parts, may be
developed (Gaber 2007; Nilsson & Jakobsson 2011). Through such insight, students may develop strategic knowledge and an understanding that their decisions may not only have a direct impact on the immediate situation, but also consequential impacts on other, indirectly linked situations (Nilsson & Jakobsson 2011).

5.4.2.2 Skills

Wright considers SimCity to be directed at enhancing communication (Wright in Starr 1994). By ‘communication’, Wright may have been referring to the communication of knowledge as the communication benefits of the earlier SimCity variants appear restricted.

Whilst not acknowledged in published research, the 2012 SimCity is played online with multiple players, and communication tools including social media and discussion forums. During gameplay the decisions, whether developmental or operational, may not only impact the subject city, but may also impact the region and neighbouring players’ cities (Electronic Arts 2014). This element of gameplay presents the opportunity for the player to assume the role of a good neighbour and send fire and police resources to other cities in need (Electronic Arts 2014). Alternatively, as Electronic Arts (2014) propose, a player may adopt an adversarial approach and create pollution and watch as the Sims in the neighbouring cities become sick.

The open-ended nature of SimCity provides a somewhat unique environment which may encourage reflection or sharing of emotions or strategies. While the game does not necessitate reflection, through the use of class assignments and reflective journals students may reflect on their value systems as they relate to planning their simulated cities (Gaber 2007).

5.4.2.3 Attributes

Gaber (2007) considers adaptive critical thinking as a learning outcome of playing SimCity. With respect to critical decision-making, Gaber suggests that ‘when working in SimCity, student[s] need to identify problems, analyse the available visual and quantitative data provided by the simulation, and develop immediate and long-term solutions to solve them’ (Gaber 2007, p. 115). Similarly, Lin and Lin (2014) found the cultivation of imagination and creativity as SimCity’s chief learning effect, referring to the opportunity learners have to create an ideal city from their vision, which is not practicable in real life.
Through the use of class assignments, Gaber (2007) invites students to discuss the values, variables, and desired outcomes that make up good planning. The reflective process, and associated learning outcome, may be presented as an assessment to encourage critiques from geographical perspectives to social, political, philosophical, scientific, and economic implications of the simulated environment (Adams 1998).

Apart from the 2012 version, SimCity play is directed towards a single-user interface. The more recent version incorporates multiple players, and presents the opportunity for players to work together to create a synergetic region of complementary neighbouring cities (Electronic Arts 2014). Through social media and targeted forums there is capacity for the enhancement of team work.

Lin and Lin (2014) found playing SimCity to cultivate organisational thinking, strengthen leadership decision-making, and improve control ability. Through role playing as the mayor, learners are said to engage in numerous decision-making exercises which could cultivate organisational thinking. Lin and Lin (2014) suggest that learners, through implementing policies that would facilitate city development, may strengthen leadership decision-making and improve control ability in different tasks to arrive at a sense of achievement, self-fulfilment, fun, enjoyment of life, and self-respect.

Perhaps the most controversial discussion in the published research regarding SimCity relates to the social and environmental properties and learnings. Adams (1998), Gaber (2007), and Nilsson and Jakobsson (2011) agree that SimCity unrealistically bestows too much power on the student planner, or player. Additionally, the basic nature of the underlying model presents rich aesthetics but lacks the dynamic human interactions (Gaber 2007; Nilsson & Jakobsson 2011). Without the deep social connections and with an excessive appointment of power, students trivialise major decisions (Gaber 2007; Nilsson & Jakobsson 2011).

Adams (1998), Gaber (2007), and Nilsson and Jakobsson (2011) acknowledge the potential for structuring learning activities or assessments around the game to enhance the ability of students to reflect upon social and environmental matters. Nilsson and Jakobsson (2011) assert that the use of SimCity in a specific assignment contributed to creating a situation where the students had to struggle to overcome complex obstacles in order to build a sustainable city.
In the majority of cases students are reported to be engaged and motivated in the SimCity-based learning activities (Adams 1998; Gaber 2007; Nilsson & Jakobsson 2011). Interestingly, Adams (1998) found planning students to be less likely to enjoy SimCity ‘without reservations’, while Gaber (2007) found the inverse relationship, with planning students providing the most support for the game-based activity.

5.5 Evaluation: Investorville

Investorville perhaps does not fit the traditional games, or serious games, offering. On one hand, its objectives extend to learning; however, there are commercial drivers which cannot be overlooked, and which may create a conflict, outdoing the educational merits. On the other hand, if the game ‘support(s) learning processes in a new, more playful way’ (Poplin 2011, p. 195) (2.6.3), then it may have merit as a serious game, regardless of the other motives and influences of the financier. The salient details regarding the Investorville simulation are presented in Table 5.11.

Table 5.11
Investorville Simulation

<table>
<thead>
<tr>
<th>Format</th>
<th>Online property simulation ‘Main aim is to increase your overall net worth over a 15 year period’ (Whelan 2012, p. 13)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designer</td>
<td>Commonwealth Bank and BMF</td>
</tr>
<tr>
<td>Players</td>
<td>Single person only</td>
</tr>
<tr>
<td>Popularity</td>
<td>20,000 registered players during the first year</td>
</tr>
</tbody>
</table>

5.5.1 Investorville game development

Investorville was initiated by the marketing department of the Commonwealth Bank of Australia as a customer engagement application (Whelan, cited in McDonald 2012) and subsequently launched in August 2011 (Whelan 2012; McDonald 2012). As a marketing tool the game was initially heralded as a success, receiving industry acknowledgement through awards, and revenue through referrals to loan funding (Whelan 2012). Whelan suggests that, during the first year, 20 per cent of the 20,000 registered players applied for a loan, with 613 loans funded.

While not created principally for educational purposes, the project’s objectives were equally spread between market and brand awareness, and learning and education. Whelan speaks of Investorville’s ability to de-mystify the complex world of property investment
through presenting an innovative web-based technology which mimics reality. Specifically, Whelan identifies the objectives of the online game as including:

To create a fun environment that is engaging and educates our customers on everything they need to know about property investment before they hit the market for real. (Whelan 2012)

Investorville’s ability to educate has not (yet) been tested in published research. The only available information relates to the developer’s and client’s media releases and associated coverage from financial series and information technology industry journals. Interestingly, there is an emergence of secondary data and feedback available through social media, in particular blogs associated with the respective releases in a property investor forum and video gamer’s blog. In the absence of empirical evidence the social media discussions have been considered to identify themes.

5.5.2 Investorville learnings from gameplay

The Kotaku blog and Somersoft Property Investment Forum (2011) were studied as they were the only readily available blogs with a flow of comments. Other blogs viewed were limited to one or two postings without reply threads or flowing conversations. In total, the blog and forum contained 34 comments ranging from a three-word posting to detailed discussions of ideology and taxation. Broadly, the discussions were framed around three main themes: the approach to offer a game for property investment learning, authenticity and conspiracy, and game playability.

In the Somersoft Property Investment Forum, opinions were mixed regarding the approach adopted by the Commonwealth Bank. Wobblycarly (2011) did not support the approach while Player (2011) and House_Keeper (2011) consider the game as being far from responsible to blatantly dangerous in the false interpretation of risk it may present. Converely, Kaos (2011) and House_Keeper (2011) found the game fun to play, with House_Keeper (2011) expressing the potential of the game to be a great learning tool for kids and ‘newbies’.

Opinions on the approach were also mixed in the gamers’ blog, Kotaku, with Jordaarmm (2011), Serrels (2011), Bish (2011), Mchaza (2011), Reoh (2011) and Tiewaz (2011) supporting the Commonwealth Bank’s approach, with a shared position that games can assist property education. Aidan (2011), while acknowledging the educational approach, expressed cynicism, noting that everything is being made as a game due to a misconception that that is the only thing younger people understand.
Across both forums there were expressions of concern regarding the authenticity of Investorville (Milbo 2011; Penmonicus 2011; Joshua 2011; Wobblycarly 2011; Santaslayer 2011; Player 2011; HouseKeeper 2011; Cartoon 2011). Some expressed further concern, identifying ‘conspiracies’ related to the bank’s approach (Milbo 2011; Ed 2011; Bill 2011; Player 2011). Ed (2011) concisely expressed a perspective on conspiracy as:

*Sounds like a great way for Commbank to learn your financial profile and risk appetite, and then use this in a carefully played marketing exercise when they contact you in the real world.* (Ed, 1 August 2011, blog following Serrels 2011).

With respect to playability, a perceived lack of fun was considered to be a barrier to play (Mchaza 2011; Luke 2011; Trefer 2011). The lack of fun may relate to the subject matter, as expressed by Tiewaz (2011): ‘I hope this does well, if only because it will highlight the educational benefits of taking otherwise dry subject[s] and making them fun’ (Tiewaz, 1 August 2011, blog following Serrels 2011; Ed, 1 August 2011, blog in Serrels 2011). Interestingly, of those who admitted to playing the game, there was a consensus that the game was fun (Bill 2011; Kaos 2011; HouseKeeper 2011), with no reports to the contrary.

The findings of the forums and blogs provide themes worthy of consideration, although the sample is subject to considerable bias and the level of investigation superficial at times. It may be concluded that there is insufficient evidence currently available to assess whether or not playing Investorville will enhance the learning experience for undergraduate property students. Therefore, the game review cannot be based on empirical evidence but rather on information as sourced in published reviews and the owner’s related publications such as those of Whelan (2012) and McDonald (2012). For this reason the review has extended to a supplementary gameplay exercise, or case study, being an extension of the research presented by S Boyd (2013c).

### 5.5.3 Investorville case study of gameplay

Besides testing and incorporation in a tutorial for PED311 Property Development and Feasibility Analysis, Semester 1 2013, Investorville had not been played often by the author. While the gameplay is of relatively short duration, there have been no compelling reasons for the author to play and the requirement for Adobe Flash Player and internet access restricts mobile access. As such, the author may be regarded as a relatively inexperienced Investorville player, although an active property owner and experienced
investment analyst. It is also prudent to note that the author does have a home loan account with the Commonwealth Bank of Australia, the copyright holder and owner of Investorville.

After choosing the ‘All in the family’ profile, which most closely mimics the author’s real-life situation, the game commenced at 3:07 pm, 16 July 2013, at a computer room in the Noosa campus of the USC. The venue comprises a series of desktop PCs with reliable internet access.

The game was played with the game window and Word windows open, and the findings directly typed into the Word document and later formatted and amended.

With an initial $460,190 medium yield search budget there were limited opportunities to acquire a portfolio. Having limited resources, the chosen investment strategy aligned with that of owner occupation; the suburb of Wynnum, in Brisbane’s bayside, was chosen as it had demonstrated strong capital growth, was within close proximity to the CBD and was supported by infrastructure and the amenity associated with bayside living.

A house close to the water was selected and an offer of $445,000 made against the market value of $466,162. The offer price and respective ‘market value’ appear reasonable, given the Real Estate Institute of Queensland [REIQ] median of AU$450,000 in the March quarter of 2012 (REIQ 2012). The offer was accepted and the three-bedroom, one-bathroom house with an $89,000 deposit, $22,250 stamp duty and a loan of $356,000 was secured. The loan comprised a 7.0 per cent variable rate and term of 30 years, interest free for the first five years.

The property was then managed with rent set at $1,801 per month, 6.3 per cent above the market rent of $1,694. The available funds were below the price of any renovation options. Given the property had no repairs identified and funds restricted other opportunities, the ‘take next turn’ option was taken and the date moved forward from July 2013.

During the 18-month period leading into January 2015, the simulation presented a 3.0 per cent pay rise, interest rates changed and the six-month rental agreement expired. Tax provided a refund of $7,402, the fixed loan term expired and properties in Wynnum had dropped 7.0 per cent due to the state government closing the railway station in Wynnum.
While the majority of the assumptions may appear reasonable, the tax refund presents as unusually large and the chance of the state government closing Wynnum station or any of the nearby stations was considered remote. With a combined annual return of $76,000, for the ‘All in the family’ scenario, the tax refund represents almost ten per cent of the salary. According to Planning Service Queensland Rail (2011) the three Wynnum stations accounted for 1,831 passengers in the third quarter of 2011. The political impact associated with rail closures may be devastating in a traditionally marginal seat, held by the Liberal National Party since Labor were subject to a 13 per cent swing in the 2010 House of Representatives election (Australian Electoral Commission 2012). Nevertheless, a 7.0 per cent reduction in capital value may be appropriate for a station closure.

Due to financial changes the new ‘search budget’ has increased to $245,889, presenting an opportunity to look into purchasing an apartment in the lower priced suburbs of the greater Brisbane region. A brief search of Ipswich apartments revealed a centrally located Brisbane Street apartment with an asking price of $201,297 and expected growth of 9.0 per cent. An offer of $190,000 for the one-bedroom apartment was successful and a loan of $152,000 chosen with a cash contribution of $47,500 to cover the deposit and stamp duty of $9,500. According to the Office of State Revenue (2013) ‘stamp duty’, or transfer duty, applicable for the property would be AU$1,050 plus AU$3.50 for each AU$100 more than AU$75,000, equating to AU$5,075. The official transfer duty obligation is significantly lower than the amount charged in the simulation, although if the costs associated with due diligence are considered then the ‘stamp duty’ provides a reasonable provision for total acquisition costs. The new loan is secured with a five-year fixed rate of 6.0 per cent, interest only, with a term of 30 years. Rent for the Ipswich property is set at $943 per month, relative to the ‘market’ at $890 per month.

During the same period, the rental for Wynnum was raised to $1,902 per month against the simulated market rental of $1,804 per month. The REIQ (2012) median weekly rental for a three-bedroom house in the Brisbane City local government area was AU$400 per week, or AU$1,733 per month. Given the duration and location, the simulated rental appears appropriate.

After choosing to take the next turn, 18 months passed, with simulated events comprising: interest rates changing; termites infesting one of the properties; and a rent agreement expired. From a tax perspective, two refunds were granted at $1,035 and
$22,334, totalling $23,334. With regard to property, new floors were required for the Ipswich property, decreasing the value of the property by 6.0 per cent.

Again the tax return appears exceptional, even after taking into account the prospect of claiming the termite eradication and a modest pay rise of 3.0 per cent. On the face of it, a 6.0 per cent decrease in value associated with flooring appears high. It may be conceivable that a property owner could spend $11,400 on new floors, although they would anticipate an increase in capital value and market rental.

The search budget is too low and the property investment strategy for this period relates to managing the existing assets. No properties are considered for sale due to the capital gains assumed accountable in the simulation and the cost associated with re-entering the investment market.

Wynnum’s rental was adjusted to $2,074 against a ‘market rental’ of $1,978 per month. The rental for Ipswich rose to $1,020, relative to the market level of $971 per month.

For Ipswich a repair option was chosen relating to the worn timbers. At a cost of $17,000, alternate options would be sought; however, none were presented. Upon completing the works there was a ‘renovate’ option available to install new floorboards throughout for $28,719. For a single-bedroom apartment the price appeared unreasonable and unnecessary given the previous repair work.

Renovation options for Wynnum related to replacing the bathroom ($23,408), building a pool ($23,408), and repainting the interior ($31,525). Only the bathroom replacement was actioned; the pool, while reasonably priced, may present excessive running costs and complicated maintenance arrangements for a rental property. The cost of repainting the interior appeared excessive for a three-bedroom rental property and repainting was therefore not considered further. Service Central (2013) consider the cost to repaint a single standard room to be AU$650 to AU$850 which, even after allowing for inflation and larger common areas, falls well short of the simulated cost.

The next turn was again chosen, bringing the date to January 2018. It was a profitable duration with an inheritance of $50,000, 7.0 per cent pay rise and tax refund of $19,494. Besides rental agreements expiring and interest rate changes no other property events occurred during the past 18 months.
Given the fortuitous financial prosperity the search budget matured to $369,854, presenting an opportunity to look to purchase a Noosa property. Unfortunately, Noosa properties were generally out of reach and an apartment was bid for in Coolum, a suburb in relatively close proximity to Noosa. The single-bedroom apartment, close to the ocean, was listed for $379,028 with an offer of $360,000 accepted. Payment was covered with the aid of a $271,087 loan with a variable rate of 7.0 per cent, term of 30 years and interest-only period of five years.

The portfolio was managed to account for changes in market rent with Coolum set at $1,596 per month, approximately 6.3 per cent above the market rent. The Wynnum rental was also lifted to $2,290 with the market rental $2,142 per month. Ipswich was left unchanged due to negligible market movements. In addition to setting rents, new floorboards were installed in the Coolum property for the relatively high sum of $26,558. While considered high, the option appeared favourable against the cost to repaint the interior at $21,097.

The ‘next turn’ option was selected and 18 months passed. Besides rental agreements expiring and interest rates changing, the only events leading into July 2019 related to tax returns. Two tax refunds totalling $35,837 assisted the financial base.

Besides the tax refunds, the financial position was relatively unchanged. Rental levels were retained and options for repairs checked. No repairs were considered necessary and the next turn option taken.

The 18 months leading into January 2021 was relatively eventful with simulated events comprising interest rate changes, expiry of rental agreements, rising damp issues, and one of the properties’ rentals being well above the market rate. From a tax perspective $20,232 was refunded. A fixed loan term expired. Perhaps most interestingly, a casino was built at Coolum, decreasing the value of all properties in the seaside suburb.

The cost associated with rising damp at $2,000 appears reasonable. Assuming inflation and repair costs grew at three per cent, the upper band of the Reserve Bank of Australia target range (Reserve Bank of Australia 2013), then the AU$2,000 in January 2021 would reflect a present value (July 2013) of around AU$1,600. The present value may be an appropriate allowance for minor repair works.
The prospect of a casino development in southern Coolum has been shared in the media, with Elks (2012) presenting the ambitions of a resort owner to register the trademark Coolum Casino and ultimately create the Sunshine Coast’s first ‘high rollers’ casino’. According to the simulation, all property values declined with the development of the casino which presents a position contrary to those of Wenz (2007) and Wiley and Walker (2011). Through a hedonic pricing model, Wenz found casinos had a net positive affect on housing prices across the United States with increases of some two per cent to six per cent. Wiley and Walker support Wenz’s proposition, with findings suggesting casinos have a complementary effect on nearby businesses, as measured by commercial property prices. Such findings may bring into question the validity of the simulation’s position, although southern Coolum may not follow the trends demonstrated in the United States.

Coolum became vacant and the rental was reduced to $1,482 per month, a premium of 8.9 per cent above market. All other properties were kept as they were with no repairs or improvements.

Shortly after selecting the next turn option, the calendar stopped ‘due to vacancy’. Coolum required a further rental reduction and monthly rental was brought to within 4.5 per cent of market, at $1,423. The next turn was then initiated.

During the 18 months leading into July 2022, interest rates changed, salary increased, a bonus was received and tax refunds were collected. A portion of the 15.0 per cent pay rise, $2,297, and the full bonus of $21,500 were directed to the investment fund. Tax refunds totalling $41,202 were received and presumably added to the investment fund.

The search budget had increased to $407,494 which prompted a quick look into other investment opportunities. With Noosa still too expensive, the investment strategy was adapted to conserve the additional funds in preparation for ensuing ‘rougher times’. Minor portfolio adjustments included resetting the rent for Ipswich at $1,041 per month, some $42 or 4.2 per cent above the market level. No repairs or renovations were available so the improvements were left as they were and the next turn taken.

As time moved forward to January 2024 interest rates changed again, a rental agreement expired and tax refunds were received.Additionally, two property-related events were simulated: gutters rusted in one of the properties and severe rain caused water damage in the other.
The automatic debiting of the cost associated with the rainwater damage, $3,000, and the 5.0 per cent decrease in the value of the property, were presumably larger than the tax refund of $19,718. As such, the search budget had dropped, reinforcing the proposed strategy to hold and not buy or sell.

Instead, the option to repair plastering and repaint Coolum for $29,994 was chosen. While the repair appeared expensive, no further details were made available and there were sufficient funds available. The rental for Coolum was lifted to $1,447 per month, being $89 above market, not due to market changes, but rather to account for the injection of funds for the repair. At $89 the rental premium reflects 3.0 per cent of the cost associated with the repair works. The proportion of rental relative to capital is rather low; however, it may be difficult to claim such a rise if the works provide little or no improvement to the base liability of the residence.

The next turn was chosen, bringing the date forward 10 months to November 2024. During the shortened term, interest rates changed, a rental agreement expired, one of the properties was considered to be well above market, perhaps related to market fall, tax refunds were received and repairs relating to a kitchen decreased the value of the respective property. The tax refund remained consistently high with $26,428 received. Adversely, the kitchen at Coolum was considered to be in need of repair, decreasing the value of the property by 7.0 per cent.

On the face of it, the decrease in property value for the kitchen repairs appears unrealistic. The reduction in value appears to reflect the full cost of a kitchen refurbishment. Seldom do cost and value align as such. Additionally, if such damage was experienced during the 10-month rental period then there would most likely be recourse by way of bond recovery or an insurance claim.

Nevertheless, Coolum became unoccupied, necessitating a rental decrease to $1,342 per month, 6.8 per cent above market. Additionally, plumbing fittings and tiling repairs were initiated for a cost of $14,788. No other repairs were deemed necessary.

The rental level for Wynnum was retained while Ipswich was lifted to $1,111 per month, some $66 or 6.3 per cent above the indicated market level.

No selling or purchasing decisions were made and a cautious approach was adopted to retain the $316,566 available funds.
After selecting next turn, the simulator moved forward eight months to July 2025. The events of the period related to a rental term expiring, interest rates changing and a tax refund of $29,146 being received. There were no reports of property or suburb events. On the other hand, something had happened, unknown to the author. The search budget had evaporated to nil.

With rents within broader market parameters and no repairs available, the next turn was chosen.

During the 18 months leading into January 2027, the usual simulation and tax events happened including interest rate changes, rental agreements expiring and a healthy tax return of $23,390 being successfully claimed. In addition, the local council redirected the bus route, removing a nearby bus stop on Brisbane Street which reduced the value of the Ipswich property by 2.0 per cent. Over the same period a flight path was changed, increasing the value of Ipswich by 1.0 per cent. With respect to Coolum there was a crime spike, decreasing the value of all properties by 7.0 per cent.

The value movements for Ipswich may be within justifiable parameters; however, the impact of the Coolum crime spike appears exaggerated. In August 2013 the same suburb was subject to a horrific machete murder and suicide event in which three residents lost their lives (Donaghey & Hall 2013). Median residential sale prices appeared to not reflect any change, presenting growth from August 2013 to December 2013 of 1.8 per cent (RP Data 2013f). However, the Sunshine Coast median did increase at a far higher rate of 15.2 per cent over the corresponding period (PR Data 2013f). In each respect there were other more significant drivers of value at play, including the emergence of the Kawana hospital precinct in the southern Sunshine Coast, and the advancement of the airport master plan, which may impact the Coolum beach suburb. Both have the potential to impact sales activity and market pricing, generally to the betterment of the southern Sunshine Coast and the detriment of the Coolum region.

In spite of the generally detrimental market activity, the search budget had increased to $437,461. And, given the volatility, a conservative investment strategy was continued with no buy or sell options taken. Rather, the portfolio was again managed to increase the rentals at Ipswich and Coolum to $2,601 and $1,232 reflecting respective premiums above market of 6.3 per cent and 6.0 per cent.

No repairs or renovations were chosen leaving $409,099 in funds available.
The next turn brought the simulation to a conclusion. The results of the simulation presented a profit of $776,488 and annual growth of 7.0 per cent. The simulation commenced with starting finances of $125,000 and ended with a final net worth of $1,466,407. Cash invested totalled $564,918 and tax was $110,692. In the game summary the feedback read:

*Overall, your performance was good.*

*Your net worth [increase] during this simulation was 7%. A property investor would typically aim to reach a figure around 8% (although this varies depending on market conditions) and other Investorville players averaged 9% over the same period, so well done.*

*To maximise your performance next time, you might consider buying more properties, purchasing properties with higher rental yields (higher rent and lower purchase price) or look to add to the value of your properties with renovations.*

*You can try again and see how much further you can go. Or, why not learn more about investing in property for real? (Investorville 2011)*

The simulation history presents a rather consistent trend in net worth growth with only minor drops in any one period. The ‘history chart’ presenting net worth change of the 15-year simulation period is illustrated in Figure 5.4.
The review of feedback was concluded at 4:12 pm, taking the ‘real time’ duration of gameplay to one hour and five minutes. As an initial reflection upon the gameplay the conservative strategy was retained and, in general terms, the choices appeared to be well reasoned and supported. On the other hand, the overall results were somewhat disappointing with annual increases in net worth 2.0 per cent below the Investorville player average. This may, in part, be attributable to the conservative approach and may reflect a risk-and-return relationship inherent in property investment and development.

The feedback does, however, present concerns, specifically where encouragement is given to ‘buying more properties, purchasing properties with higher rental yields (higher rent and lower purchase price) or look to add to the value of your properties with renovations’ (Investorville 2011). In adopting the more aggressive ‘spending’ strategy, the chance to obtain higher returns is increased but so too is the likelihood of financial loss. In any case, a more aggressive investment approach should be regarded as such, not implied as the means to ‘maximise performance’.

The last paragraph of the Investorville feedback provides another level of concern. If the players are encouraged to try over and over again, adopting the more aggressive
approach successfully, and ‘succeeding’, then they may gain a further level of confidence in risk-seeking strategy and follow the game prompts to invest in property for real.

5.6 Findings of the gameplay evaluations

The evaluation has uncovered the learning potential associated with property students playing Monopoly, SimCity and Investorville. As proposed, playing Monopoly, SimCity and Investorville in a meaningful way would appear to complement traditional teaching practice and support collaboration, problem-solving, communication and critical thinking. Similarly, as proposed in the review of published research, gameplay presents the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life (2.6.3). Further, as asserted, the constructive play of the suite of games may enhance the students’ development of functional knowledge while emotionally supporting further learning through building self-confidence and self-efficacy.

Conversely, there is no assurance of learning the knowledge, skills or attributes set in property programs. Even if the chosen games have the potential to be played in such a constructive manner it is unlikely all students will play in that same way, and therefore the educational gains may differ from student to student. As a further limitation, even with advances in graphics, data processing, and augmented reality there are no assurances that the underlying assumptions and models forming the games’ operation are accurate and, as such, the knowledge gained may be perceived as erroneous, or may even be erroneous.

While the barriers to the adoption of games in property education, as previously identified, remain, the emergent opportunities associated with the learning are seemingly endless. Interestingly, many of the potential learning opportunities, or lessons, from gameplay may be subtle and, when surfaced, provide for another reflection. For example, it is easy to be critical of the gameplay techniques required to be successful in playing Monopoly with one player benefitting at the expense of the others. On the face of it, this may present an artificial environment with vexed players. A deeper consideration or reflection on the gameplay techniques of self and others may actually lead to a better understanding and appreciation of ethics, as Axelrod (2002) expresses:

An ethical game creates good feelings, win or lose. Lose to an ethical player, and you get up from the game board feeling you’ve fought the good fight. Lose to a jerk, and feel robbed and cheated. Which were you? (Axelrod 2002, p. 133)
In summary of the evaluation, each of the sampled games presents opportunities to enhance the learning of property at university. They may even be considered to complement each other as the attributes lacking in the playing of some games may be inherent in the playing of another. With respect to the skills and attributes associated with communication, both Investorville and SimCity present limited opportunities, while successful play of Monopoly necessitates the adoption of tactics to persuade in negotiations and collude where there is mutual gain at another’s expense. From a knowledge perspective Investorville, and to some extent SimCity, may broadly represent market practice while, in contrast, Monopoly presents a ruthless and extreme capitalist environment where risk-seeking behaviour may be the only way to thrive, let alone survive.

5.7 Conclusion

The opportunities for enhancing learning through playing domain-situated property games are identified as an extension to the extant research reviewed in Chapter 2 (2.7). Due to the shallow pool of research, the evaluation necessitated the inclusion of non-traditional information sources. While this approach has been rigorous and transparent, the findings present opportunities to enhance learning rather than providing empirical support for the learning gained from playing serious games.

Following the initial review and deeper evaluation, three games were provisionally selected for the serious games suite, based on the potential to enhance learning through aiding the development of prescribed skills, attributes and knowledge. The three games, Monopoly, SimCity and Investorville, have the potential to enhance the learning experience for property students through aiding in the development of skills, attributes and knowledge as illustrated in Table 5.12.
Table 5.12

*Learning Enhancement Opportunities*

<table>
<thead>
<tr>
<th>Category</th>
<th>Monopoly</th>
<th>SimCity</th>
<th>Investorville</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>…of property practice</td>
<td>…of property market</td>
<td></td>
</tr>
<tr>
<td>Skills</td>
<td>Communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numeracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interpersonal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attributes</td>
<td>Creative/critical problem-solving</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Team work</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social and environmental awareness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Shaded areas represent opportunity to enhance learning

The games proposed for forming the suite are not without barriers to adoption and with respect to Monopoly there are fundamental inaccuracies in how the game represents the property market. With respect to SimCity and Investorville, the games will require repurposing as learning activities with more traditional assessment techniques incorporated to leverage the learning potential and encourage reflection on inaccuracies in the model and in play. In the case of Monopoly the gameplay, as opposed to the game itself, is regarded as the richer contributor to the attainment of skills and attributes. As such, the game will be rebuilt utilising its precursor, The Landlord’s Game, as the foundation.

As a further consideration, another serious game will be designed to address the shortcomings in the knowledge, skills and attributes identified in Table 5.12. In particular the new game, titled Playing Property, as addressed in the next chapter, will be tasked with enhancing the learning capacity of property students through developing knowledge in the property market, and encouraging communication and teamwork.
Chapter 6  Design and development

The preceding chapters have contributed to the refinement of the research problem, and have identified the attributes which playing property games may contribute to a student’s learning. This chapter leads to the development of the artefact, or suite of serious games, through the application of design science, specifically the first three activities in the design science methodology (3.4) of Peffers et al. (2008).

In accordance with the first two activities prescribed by Peffers et al. (2008), this chapter commences by revisiting the problem and objectives from Chapter 3 (3.5). With consideration of the findings from the investigation into property education (Chapter 4) and evaluation of property games (Chapter 5), the problem and objectives are addressed through the design and development of the serious games suite, as the third design science activity.

The development of the two purpose-built serious games in the suite is described in this chapter, with the other two, repurposed, games discussed in the subsequent chapter, Chapter 7. The subsequent chapter also demonstrates the application of the fourth and fifth activities proposed by Peffers et al. (2008), being demonstration and evaluation. The resultant suite of four serious games is presented in Figure 6.1.
6.1 Problem re-identification

The initial problem is defined and the associated justification for enhancing the learning experience for property students emerged in Chapter 3 (3.5.1). Specifically, the needs of a new student cohort are not expected to be met by the current teaching methods alone (1.2) and there is an implied directive to find the right pedagogical tools to engage students and develop them as deeper learners (2.1).

Serious games present as one solution for universities aiming to support learning processes in a more playful way (2.6.3). As a problem-based learning activity, serious games enhance learning, and proponents underscore the role of playing games in supporting collaboration, problem-solving, communication and critical thinking (2.6.3). Similarly, gameplay is said to present the means for a student to develop abstract imaginative thinking and realise goals not yet achievable in real life (2.6.3). These attributes associated with playing serious games align well with the learning outcomes for property students in Australian universities (2.6.2).

The serious games are not presented as a stand-alone learning method, but rather one which integrates with and supports traditional teaching practices. Through an investigation into traditional teaching practices, in Chapter 4, two of the most prominent shortcomings of property education were identified: the deficiencies in the teaching of current market activity, and the misalignment of the teaching system with the non-academic student (4.3). The shortcomings present a case for the deeper consideration of what property students may learn from other learning and teaching activities and assessments, including those associated with the playing of serious games (4.3).
In the evaluation of property games, in Chapter 5, opportunities for enhancing learning through playing games are identified as an extension to the extant research reviewed in Chapter 2 (2.7). Three games are selected for the serious games suite based on the potential to enhance learning through aiding the development of prescribed skills, attributes and knowledge. The games proposed for forming the suite are not without barriers to adoption, and with respect to Monopoly there are fundamental inaccuracies in how the game represents the property market.

As a further consideration, the three games in the suite do not address all of the shortcomings in the knowledge, skills and attributes identified in Table 5.12. In particular, a new game will need to be designed with the task of enhancing the learning capacity of property students through developing knowledge in the property market, and encouraging communication and teamwork.

### 6.2 Aligning the objectives

The fun and motivational attachment to gameplay are expected to help the surface learner adopt deeper learning practices (2.7). As such, the playing of fun games with authentic and reflective assessment should overcome one of the two most prominent shortcomings in the teaching of property through traditional university practices. With respect to teaching current market practices, no other learning tools or games have been identified. This research extends to the creation of a fourth game in the suite. The novel addition of the final game, titled Playing Property, relates to the sharing of current market information, and building knowledge of property markets.

The product scope and associated objectives for the games suite relate to the program level intended learning outcomes defined in 2.6.1 and the definition of what constitutes a serious game (2.6.3). The definition refers to serious games as supporting learning processes in a more playful way. In the context of property education, the role of serious games in problem-based learning has been identified as an opportunity, with the second learning outcome ‘Analyse the functioning of investment and development property and apply practical skills to make the best decisions in real-life property situations’, providing the primary focus (3.5.2).
6.2.1 **Primary objective: ... learning ... in a ... more playful way**

Serious games aim to support learning processes in a more playful way (2.6.3). More particularly a game, by definition, must be engaging, or fun, and need not satisfy learning goals or objectives (Oxford University Press 2014). As such, the design of this serious games suite took into account experiencing fun and the incitement of play for participants.

Play, as it relates to game design, is complex and difficult to define, yet relatively easy to observe (2.6.3). Similarly, the introduction of play or addition of fun to a learning activity does not come with a precedent or practice. Rather, previous attempts to re-badge an activity as a game have had negative repercussions with the edutainment era, in part, coming to an end due to the ‘edutainment games’ presenting only a game façade and lacking fun in gameplay (Klopfer, Osterweil & Salen 2009).

To mitigate the risk associated with introducing fun, the serious games in this research are designed from foundation games or activities with proven ability to motivate or engage participants in play. With respect to the games which are repurposed, SimCity and Investorville, the extant research and or reviews have revealed that the majority of players have had fun in their gameplay or enjoyed the experience (2.6.4.1; 5.5.2). For Possession v Poverty, the principles and gameplay of the bestselling game Monopoly (5.3.1) have principally been retained. The final serious game, Playing Property, does not have a game foundation but rather is developed utilising an engaging audience response system.

The audience response system driving the play of Playing Property is regarded as an engaging tool (Cain et al. 2009; Medina et al. 2008) to encourage students to communicate and participate. To support engagement and further set the activity as a game, points are tallied and winners often provided with a reward. Similarly, a game atmosphere is set with participants encouraged to collaborate and use spite or malice in a playful way to ensure success over their classmates.

6.2.2 **Secondary objective: enable [analysis] and apply...**

As addressed in Chapter 2, serious game play has a direct relationship with problem-based learning and functional knowledge construction. In particular, serious games may enable students to gain skills and build knowledge through participatory learning (2.6.3). According to Mayo (2009), rapid feedback and the translation to greater persistence
contribute to a higher level of accomplishment. Accomplishment is not necessarily a measure of functional knowledge construction; however, engagement and self-efficacy are readily associated with deeper learning and the functional knowledge teaching activities presented by Biggs and Tang (2009).

In other disciplines serious games have been designed, developed and tested with respect to their ability to encourage students to analyse and learn complex matters and see how problems function. For example, McGrath et al. (2010) created the game Real Time Relativity to ‘provide a learning environment which presents “special relativity” in a less abstract way’ (McGrath et al. 2010, p. 8) (2.6.3). In their analysis they found students who played Real Time Relativity and completed the experiment performed better on the related questions in a subsequent test.

Each of the property games in the games suite was selected and designed to provide students with a simulated environment, or sandpit, for them to test theories and learn through their successes and failures. Of the proprietary games, SimCity is the most recognised simulation as it simulates a city with virtual residents who adapt behaviours based on the actions of the god-mimicking player. Similarly, Investorville mimics residential property investment and management (5.5.1). Even the oldest game, The Landlord’s Game, was designed to simulate property investment, with the focus on the ‘injustice’ associated with capitalist property ownership (5.3.1).

As with the proprietary games, the new serious game, Playing Property, aims to simulate property investment on the Sunshine Coast, Queensland, Australia (6.3.1). The serious game provides players with the opportunity to buy or sell commercial and residential properties and witness the successes or failures of their investment choices, all without committing to a financial outlay.

With the property games suite, the challenge is not whether the games enable analysis but rather whether the representation of the simulation, and feedback provided by such, lead the student to the appropriate learning. That said, games need not be an exact approximation of reality to be relevant learning activities as addressed in Chapter 5 (5.4.2). There remains, however, a potential for conflict between what playing a game presents, and the objective theory sought after in the first learning outcome (2.6.2) and the related first tertiary objective (3.5.2).
The conflict between gameplay representation and objective reality may offer an opportunity for a student to apply reflective learning as in the study by Adams (1998) (2.6.4.). Alternatively, the conflict may lead to confusion, or even the learning of inaccurate or superfluous lessons as demonstrated in some aspects of Monopoly gameplay and deliberated on in Chapter 5.

The challenge and associated conflict are provided for in the game design and demonstrated in two ways. Principally, the new games are created to represent objectives theories and the functioning of property as closely as practicable without losing the fun associated with gameplay (6.3.1). This is demonstrated in the explicit and sectorial approach to the design of Playing Property and Possession v Poverty (6.3). To account for the remaining conflict between the gameplay representation and objective realities, students are encouraged to use reflective practices to assess the appropriate answers. The reflective practice is facilitated through the use of a reflective journal as an assessment item in a similar manner to the approach by Adams (1998) (2.6.4).

6.2.3 Tertiary objectives

With respect to declarative knowledge and objective truths – the first tertiary objective (3.5.2) – Axelrod (2002) (5.3.2) affirms the value of playing Monopoly. Around half of his proposed lessons relate to declarative and functioning knowledge formation in the broader field of property practice and property markets (5.3.2). More specifically, the learnings from playing Monopoly identify the potential of enhancing a student’s ability to describe and explain the theories of price, worth, value and opportunity cost (5.3.2). The concepts and theories relating to price, worth, value and opportunity cost are the foundation of property valuation and investment analysis and feature prominently in the related practice standards (5.3.2) and the knowledge fields prescribed by the API (2.6.1). As such, Possession v Poverty is designed to retain the Monopoly gameplay while changes are made to the game board and apparatus to better represent objective realities.

Possession v Poverty and Playing Property are designed to encourage verbal communication which forms part of the second tertiary objective (3.5.2); however, only Possession v Poverty necessitates effective verbal communication and negotiation. As with Monopoly, players of Possession v Poverty are to cooperate and trade properties to form monopolies (5.3.2). They act for mutual gain with the only ‘loser’ being the inactive player or players. In this way, successful play of Possession v Poverty necessitates player-
to-player trade or even strategic alliances. Such alliances and friendships may dissolve with ruthless practices as the games progress.

Both Possession v Poverty and Playing Property seek to present an intense and dramatic scene for interpersonal experimentation, as sought in the third tertiary objective (3.5.2). The real object of both games is to either win or make others lose and drive them out of the game. In this way the environment is set for ruthless play. As discussed by Axelrod (2002) (5.3.2), ruthless play does not imply unethical play, but rather it means ‘defining victory ethically and, within that definition, devoting your efforts to winning, to playing fairly but ruthlessly’ (Axelrod 2002, p. 135). In Playing Property, ruthlessness in gameplay is encouraged through player-to-player communication where students are free to assist or mislead their peers. For those misled, it is made difficult to ascertain whether or not the advice giver made a similar error in their selection as the results presented on screen are maintained in a generally anonymous manner.

The ruthless gameplay inherent in Possession v Poverty and Playing Property has the added value of providing an environment or setting for transformative reflection to occur, as expressed in the fourth tertiary objective (3.5.2). On the other hand, enabling transformative reflection takes more than scene setting (2.6.3.5). To have participants apply transformative practices, the serious games require further setting as learning activities aligned to a piece of reflective assessment, such as the reflective journal (7.3.3).

6.3 Design and development

From Chapter 5, three games were selected for the suite based on their potential to enhance learning through aiding the development of prescribed skills, attributes and knowledge. The games forming the suite are not without barriers to adoption, and with respect to Monopoly there are fundamental inaccuracies in how the game represents the property market.

The games SimCity and Investorville were repurposed as learning activities, as addressed in Chapter 7, with more traditional assessment techniques incorporated to leverage the learning potential and encourage reflection on inaccuracies in the model and in play. In the case of Monopoly the gameplay, as opposed to the game itself, is regarded as the richer contributor to the attainment of skills and attributes. As such, the game was rebuilt utilising its precursor, The Landlord’s Game, as the foundation and design science as the method (3.5).
The suite of serious games was expected to contribute to the attainment of the skills, attributes and knowledge as identified in the property rubric from Chapter 5 (5.1.1) (Appendix 5.1), and the intended learning outcomes specified in Chapter 2 (2.6.2). Correspondingly, the serious games were designed as problem-based learning activities with set objectives (3.5.2).

The development of the two purpose-built serious games, Playing Property and Possession v Poverty, is addressed in this chapter with the repurposed games discussed in the subsequent chapter, Chapter 7.

6.3.1 Playing Property

6.3.1.1 Desired functionality

The PED Property Investment Game, an early variant of the Playing Property game, was designed and developed by the author in 2011, towards the commencement of this research project. While the early design process did not necessarily follow the guidelines of Hevner et al. (2004) and the activities of Peffers et al. (2008), the game was created with the purpose of helping students and the general public to understand property markets. More specifically, the purpose was shared as the initial step in developing a revolutionary game:

\[\textit{which could teach or simulate how housing market cycles act which was as much fun as catapulting Angry birds at pigs. Then, in just over 1 year we could have 400 million homeowners, financiers and policy makers better equipped to avoid the next [global financial crisis].} \text{(Boyd S 2011)}\]

With consideration given to the intent and nature of the artefact, Playing Property met Poplin’s (2011) definition of a serious game. Furthermore, the early variants of the game were played and tested in classroom settings with lessons learned cycled back into the next iteration of the design innovation (Barab et al. 2005).

From the onset it was acknowledged that the game would need to accurately reflect the movements of the respective property markets and, as such, a rigorous process was developed to collect and apply the market information (6.3.2). As the initial reference point, the background workings from a Master’s dissertation by S Boyd (2010) were employed. Subsequently, market information was sourced from numerous providers and individual sales were analysed to support the adopted figures and establish the baseline. In practice the duration of the game would be extended by one slide each year. In this
manner the original reference point may be retained while new material is introduced and the financial baseline extended.

Architecture

With data collected, consideration was then given to the play of the game and the respective delivery tool or model. Audience response devices were trialled and TurningPoint 2008 (LUL Technology 2014) software adopted as it presented as an engaging tool (Cain et al. 2009; Medina et al. 2008) to encourage students to communicate and participate. With TurningPoint, players are able to make selections by utilising a response card or ‘clicker’, with a running total keeping track of how their investments are performing. Points are allocated to the player who reads the markets best, with a point gained if their property’s return goes up and a point lost if their return was negative.

Establishing the baseline

Having established the serious game’s functionality and architecture, the markets, durations and intervals were then considered to frame the game. Annual rests were adopted as an appropriate interval because a year provided players with an opportunity to evaluate their investment selections against the most commonly referenced full-year returns. In assessing the duration and commencement date the year 2000 presented a reasonable start as Goods and Services Tax had been introduced in Australia and many players may associate the year with the transition to the new millennium. Having a commencement in 2000 and annual rests, the players would need to initiate between eleven and 13 investment decisions, which appeared manageable.

The first version of the PED Property Investment Game incorporated the baseline performance indicators as presented in the Master’s dissertation (Boyd S 2010). As such, the submarkets comprised residential land, residential built (being houses and units), and the commercial classes of office, retail and industrial. Through reviewing players’ feedback, given verbally and collected as ‘Post-it note’ suggestions, the submarkets were later refined to more familiar terminology comprising four investment choices: homes, sheds, shops and offices.

For the residential markets, or homes as they were later classed, there was a significant quantum of information to derive the price and return trend information. In particular, the house price trend for the set 13-year horizon was determined through a
comparison of published median data from the REIQ (2012), Queensland Treasury and Trade (2013) and RP Data (2013e). In addition, actual single unit dwelling sales information from RP Data (2013a) were analysed to support the median results presented. The analysis and adopted residential house price index are depicted in Table 6.1.

With respect to the commercial markets, a broader selection of material was sourced with a comparable approach adopted. Raw sales information from RP Data (2013b, 2013d, 2013c) was analysed to provide an indication of median price changes for the asset classes: office, industrial (sheds) and retail (shops). Similarly, secondary material including median trends in prices, yields and rents was considered in determining the respective price indices (Day 2012; CB Richard Ellis 2011; Boyd S 2012a; Dowling 2012; Colliers 2012), as illustrated in appendices 6.1 and 6.2.

The price indices for the respective asset classes present a baseline representation for the trends in values, or capital variations, but not total return. In owning real estate and property there are two distinctive forms of return: the capital gain or loss as defined in the price indices, and the income return or loss. In determining the income return or loss for residential, or homes, the median gross rents from the Queensland market monitor (REIQ 2012) were considered, with a deduction for rates and insurances applied after consideration the Sunshine Coast Council Rating category statement (Sunshine Coast Council 2012). With commercial yields reported on a net basis no deductions for rates, insurances or other outgoings were adopted for sheds, offices and shops. The adopted yields and income returns were determined with respect to the market reports and presentations (Day 2012; CB Richard Ellis 2011; Boyd S 2012a; Dowling 2012).

Through a summation of the price indices and respective income returns and losses, the total returns for the market subsectors resulted. The workings associated with the total return determinations, and reflected year-on-year figures, for each of the asset classes are presented in Appendix 6.3. While the property sectors broadly track together, homes was the highest achiever over the full horizon with only two periods where the total return was negative. On the other hand industrial, or sheds, suffered an initial first-year fall, recovered strongly then, with the exception of one year, fell for successive periods from 2007 to 2013.
6.3.1.2 Constructing the game

With the baseline, or body of knowledge about the local property market, established the next design stage related to the establishment of the means for play and learning and the application of the respective delivery tool or model.

Audience response system

Audience response devices and systems provide a sound foundation for an in-class serious game. Essentially, Playing Property presents as a PowerPoint (Microsoft Corporation 2014) presentation and may be seamlessly integrated into a lecture or tutorial or even played as a stand-alone activity in the technology enabled environment. But, unlike the less engaging lecture or tutorial, the traditional TurningPoint 2008 (LUL Technology 2014) software and audience response ‘clickers’ invite the audience, or class, to participate in the activity, with their choices changing the course of the exercise. Through the interaction and appropriate facilitation there is the potential to make the learning activity engaging (Cain et al. 2009; Medina et al. 2008) or even fun. As a further consideration, TurningPoint presented a clear benefit over more complex and rigid game systems, as it could be easily updated with new slides added and amended in a similar manner to restructuring lecture slides.

The introduction of the TurningPoint software was not without issues. Some of the limitations were met early, and others only discovered in the lead-up to a class activity. An ongoing issue in the software relates to TurningPoint being an add-on, or non-native addition, to PowerPoint which leads to functionality issues when PowerPoint is opened before TurningPoint. Discovered earlier was a capacity restriction relating to the allocation of points, where there is no capacity to allocate fractional points. For example, from 2000 to 2001 offices presented a year-on-year return of 27 per cent, while sheds declined 12 per cent. As such, it would have been preferable to allocate 0.27 points to players who select offices and take away 0.12 for those who choose sheds. This option was not available in TurningPoint and therefore the game worked in a simpler one-point gain or one-point loss system which, in practice, caps and collars the returns. The effect of the cap and collar is evident in the period from 2002 to 2003 where the selection of homes or offices would each equate to a single positive point allocation; however, more authentically, homes boomed with a 60 per cent gain while offices performed comparatively modestly with a 13 per cent gain.
The hardware associated with TurningPoint, the audience response cards or ‘clickers’, present other ongoing issues. The devices were expensive and, initially, were relatively popular across the university creating booking issues with the university’s information technology services. As the devices aged, the wear and tear caused functional issues and the battery charge would, on occasion, run out midway through the gameplay, effectively eliminating the player from making any further selections. As such, it is important to facilitate the play of Playing Property in a fun, somewhat ‘carefree’ manner, and make no promises that the system will work flawlessly.

Method of play and instructions

Acknowledging the purpose of the game and the capacity of the audience response system, the game is structured in a manner whereby the players play to win through making the best investment selections each year. The Playing Property game instructions express the intent of the game as:

*Buy, hold and sell Sunshine Coast property to get rich. The player who reads the markets bests wins. If your property’s return goes up gain a point. If it goes down lose a point.* (Boyd, S & USC 2013b, s. 2)

To buy, hold and sell, players are given the chance to select from the set property asset classes. Selecting the same class year-on-year implies holding and the option of not selecting means no points are gained or lost, with the player pulling out from the property market for that term. The choice for no selection creates a sound option, in the years following the financial crisis, as players may choose to abstain and retain the gains from previous years.

In the earlier variant of the game, titled the PED Property Investment Game (Boyd, S & USC 2012), there were six potential investment choices each year: residential land, residential built, retail, office, industrial, or make no selection. As the game was rolled out, feedback was received, verbally and through ‘Post-it’ note reflections, implying that there were too many selection options and too much material to process. This was also evident in the introduction process where the facilitator was called upon to explain what was included in the selection categories. While reducing options and formative material also reduces exposure to declarative principles, as they relate to the first tertiary objective, there was a risk of losing the fun in the play as expressed in the primary objective (6.3.1). As such, the later versions of Playing Property exclude residential land and reword the options into the simpler, more recognisable categories of homes, offices, shops and sheds.
In accordance with the baseline, the Playing Property game commences in 2000 and ends in 2013. The earlier variants were shorter as the baseline information related to market reports and settled sale transactions leading into the year of game play. In some cases, the final period required a later revision as the number of sales and quality of information necessitated an update of the baseline.

To encourage more play (6.2.1), fun, and interaction, and ultimately to seek to enhance the players’ communication skills (3.5.2), the game was intentionally designed to encourage discussion and team play. The instructions for Playing Property address the interactions through noting, ‘work as a team, chat and discuss but make your own decision’ (Boyd, S & USC 2013b, s. 2). In supporting the instructions the facilitator would suggest that the players talk, share information from their own experiences (e.g. ‘Mum and Dad sold their shed at Kunda Park around this time and made a tidy profit’), and even collaborate or collude. On the other hand, the instructions would extend further with the facilitator reminding the players that only one person could win and, as such, they may wish to bluff or pretend to make a choice opposed to their true selection. TurningPoint and the response cards made it possible to deceive others as the selection results were grouped and individual scores were displayed at selected intervals only, not at each year. Further, the individual player was not easily identifiable as the hidden code on the back of the response card was displayed instead of the player’s name.

Following the introduction, Playing Property players are presented with the first of ten to 13 slides, each representing an annual period, with the first slide covering the period from 2000 to 2001. The first slide presents a brief news capture from the period, and the selection categories. The earlier game variant, PED Property Investment Game, included period extracts from three newspapers, as sourced utilising the media searching engine Factiva (Dow Jones & Company 2013), with search parameters relating to ‘property’, ‘sunshine adj coast’, ‘market’, ‘retail’, ‘office’, ‘industrial’, ‘real estate’, and others, over the period from 1 January 2000. The intention in providing the news clips was not to lead the player to a set choice but rather to present a position for consideration, reflection and discussion (3.5.2). An example of the information shared over the first period is an extract referring to the comments of an industry analyst, which reads:

*Make no mistake, we have a bubble.*

*Northern Times, 16 November 2001,*
Demand for housing is exceeding supply. PROPERTY analyst Michael Matusik says Australia is experiencing a housing bubble, not a housing boom...

(Northern Times 2001, cited in Boyd S & USC 2013b, s. 3)

On the face of it, the comments by Matusik appear to support the view that the housing market is going to be subject to a rapid fall as the property ‘bubble’ pops. Should a student adopt Matusik’s perspective they may be inclined to move away from investing in homes for the next few years. Conversely, such a move would disadvantage them as homes returned 12 per cent during that period and reflected the greatest total return year-on-year for the next three periods. While the full article is not referenced, the approach presents a relatively authentic representation of the conflicting views of property analysts within the news media. The sourced articles are not set to mislead, rather the relatively few articles that were on topic were chosen with due consideration given to presenting a balance of perspectives, not to guide or misguide the player.

Upon reflection on games played from 2011 through to late 2012, and after considering the verbal and ‘Post-it note’ feedback, it became apparent that there was too much structure in place. By providing an abundance of structure, or scaffolding, the activity was at risk of becoming formatively instructional, being more objective and less conducive to knowledge construction (2.2). Having a compressed time, around 60 to 100 seconds, in which to make a selection, the players did not have enough time to ‘digest’ the information from the article extracts and discuss their thoughts with neighbouring players. To reduce the time pressures and encourage more cross-player engagement, the quantum of articles was reduced in exchange for facilitated discussion. The media content in the Playing Property game was reduced to one or two article extracts.

The second and subsequent market selection slides share a common format, as illustrated in Figure 6.2. To the left of the screen, the players could see the results from the previous year, providing them with rapid feedback on their investment choices (2.6.4). As depicted in Appendix 6.3 and Figure 6.2, each of the property classes performed well in the period 2002 to 2003, with homes being the highest achieving and sheds, shops and offices following. On the right-hand side of the screen, the selected media article provides a basis for facilitated discussion as the players make their selection. After the set time of 60 to 100 seconds the ‘voting’ is closed and the grouped preferences displayed. As illustrated in the bottom right corner, the most popular selection chosen by the cohort at the time was homes, followed by offices and shops, with no one committing to sheds.
To break the potentially repetitive game sequence, additional slides were included to assess fastest responders, present interim scores, and provide an opportunity to increase or reduce the wager on the outcome of the final year’s performance. The fastest responder slide, incorporated earlier in the game, presents an opportunity for an interim award to be given as well as a moment for the facilitator to discuss the detriments associated with making quick, less informed, investment decisions. In practice, the fastest responder, as displayed in rank order identified by the unique ‘clicker’ reference code, is rewarded and cautioned. Discussion and reflection continue with consideration given to whether it is a good thing, or not, to act quickly or impulsively when buying and selling property.

Towards the end of the game, interim scores for the top participants are presented for reference. Shortly after the presentation of interim scores, players are given the opportunity to wager a proportion of their accumulated points on the results of the final year. In practice, the approach is similar to leveraging, as addressed in the API’s knowledge fields (2.6.1), through using another’s funds to increase return, and risk, or
even gambling, with the questions and options presented as ‘What % of your points would you like to wager on the last question?’.

At the conclusion of the game, final scores are shared and awards often given. The selection of awards relates to the participant cohort. When the exercise is undertaken as a stand-alone activity, such as at university open days and other marketing events whereby a younger cohort plays, the rewards relate to university merchandise such as iPod pouches and Frisbees. As part of a lecture or tutorial the reward, if given, will usually be a single chocolate bar for the winner. While the reward is not utilised as a ‘catch’ to encourage participation, it does assist with setting the ‘play’ atmosphere.

As the game completes, the baseline information forming the method for allocating the points is shared, as depicted in the screen shot at Figure 6.3, and within Appendix 6.4. It is intended that the chart puts the gameplay into perspective and demonstrates to the participants the level the asset classes moved. Assuming the participants have just recently ‘experienced’ the market, ideally they now have a greater appreciation for, and association with, how property markets trend. They may be more inclined to take the opportunity to reflect in a deeper manner as described in Boud (1985), and ultimately plan how the experience and information will be useful to them into the future (2.6.4).
6.3.2 Possession v Poverty

6.3.2.1 Desired functionality

As addressed in Chapter 5, the emergent opportunities associated with learning through playing Monopoly are seemingly endless. While the previous chapter addressed alignment with categories in the matrix there are other potential learning opportunities, or lessons from playing Monopoly, which are subtle and, when surfaced, provide for further reflection and even transformative reflection (2.6.4). For example, it is easy to be critical of the gameplay techniques required to be successful in playing Monopoly, with one player benefitting at the expense of the others. On the face of it, this may present an artificial environment with vexed players. A deeper consideration or reflection on the gameplay techniques of self and others may actually lead to a better understanding and appreciation of ethics as Axelrod (2002) expresses:

*An ethical game creates good feelings, win or lose. Lose to an ethical player, and you get up from the game board feeling you’ve fought the good fight. Lose to a jerk, and feel robbed and cheated. Which were you?* (Axelrod 2002, p. 133)
Nevertheless, to play Monopoly successfully necessitates the adoption of tactics to persuade in negotiations and collude where there is mutual gain at another’s expense, as sought in the later tertiary objectives (3.5.2). Monopoly presents a ruthless and extreme capitalist environment where risk-seeking behaviour may be the only way to thrive, let alone survive (5.3.1).

To take advantage of this authentic ruthlessness the variant, Possession v Poverty, brings the ethical considerations to the forefront. Rather than pushing down or lessening the ruthless play, the new variant brings the matter of conflict and ruthless play into the instructions, effectively leaving the implied objective of the game untouched, but less hidden. The defined objective and mission of the game are addressed in establishing the gameplay.

As per the critical reflection in Chapter 3, for the game to be adopted as a serious game any new variant needed to present as a true property game and more accurately reflect property practice and objective theories (6.2.3). Therefore, the changes to the game more authentically reflect and mimic a property market and property practice. As such, the game board and devices were reset based on the original, The Landlord’s Game from 1904. The design and development of the game board and playing apparatuses are discussed in establishing the game board.

Objective in gameplay

Originally, The Landlord’s Game was described as a game of chance with ‘the [objective] in the game to obtain as much wealth or money as possible’ (Magie 1904), ‘through trading buying and selling lots, collecting rent and borrowing money’ (Single Tax Review 1902). The later variant, Monopoly, had a more ruthless objective: ‘the object of the game is to become the wealthiest player through buying, renting and selling property (Hasbro 2007, p. 2) (5.3.1).

In play, the underlying objective of Monopoly is perhaps more accurately defined by Axelrod: ‘the real object of Monopoly is not so much to win as it is to make others lose, to drive them out of the game’ (Axelrod 2002, p. 99). This perspective is shared by critics who underscore the game’s deficiencies, calling it a zero-sum game with gain only coming from another’s loss (BoardGameGeek cofounder Derk Solko, cited in Curry 2009). Where the perspectives shared by Curry and Axelrod diverge is in the
consideration of ethics. Axelrod shares the connection between the gameplay and business through:

_**Ethical play, in Monopoly as in business, does not mean diluting the will to win. It means defining victory ethically and, within that definition, devoting your efforts to winning, to playing fairly but ruthlessly.**_ (Axelrod 2002, p. 135)

He also refers to fair and ethical play as requiring the making of a covenant ‘to do whatever damage is necessary’ (Axelrod 2002, p. 137).

In designing Possession v Poverty, Axelrod’s (2002) view of the game was duly considered and the repercussions of not having a clear covenant were evidenced in the gameplay. In playing Monopoly, it is foreseeable that if the objective is not clear some players may form enduring alliances with friends and or family, which cannot result in an equitable conclusion to the game, as there is no scope for multiple winners. Therefore, in Possession v Poverty the objective of the game is delivered not only in the instructions but also through a narrative.

The adopted narrative for Possession v Poverty, as shared before delivering instructions is:

_Verses_

**Kim and Clive**

Kim and Clive were regarded as quintessential friends in preschool despite Kim’s tendency to kick the boys with her steel toed boots.

Clive was unperturbed by Kim’s anxiety filled tantrums and their acquaintance endured schooling as they shared the presumption that the world owed them, as well as an ‘unhealthy artistic’ appreciation for watching accidents on home video shows.

After school Clive became the bold front of a barter betting franchise whilst Kim seemingly disappeared.

One lonely night some years later, Clive made contact with Kim using his brand new MeoIP enabled smart phone. A freak accident, which would later see the demise of VoIP, then occurred and Clive and Kim were united again through a kind of permanent out of body internet experience later labelled as ‘inorganic soul osmosis’.

As supernatural beings living in the cloud Kim and Clive created a website to share short video clips of stacks and fails. With the website growing in popularity Clive and Kim uncovered effective ways to influence the choices of viewers and ultimately manipulate the weak and accepting. Clive and Kim could play people as people play avatars, manipulating the behaviours of the living. However the manipulated had to forgo free will by choosing Kim or Clive as their demigod, or deity. Fun ensued... well at least for Clive, Kim and internet voyeurs.

To play select a totem then perform as an avatar for either Kim or Clive, the 2 deities.
[note: from this time forth you are an avatar and no longer assume personal control or maintain alliances or friendships until a deity realises its vision and releases you from the ‘game’.]

Clive
Dominator of financial markets
Mission: become ruthlessly rich, eliminate my competition and dominate the activities of the financial markets.
Strategies:
1. Purchase, trade and develop property to increase my wealth;
2. Influence others and leverage my short term alliances for personal gain;
3. Possess all the riches; and
4. Eliminate competition and dominate the financial markets.

Kim
Supreme leader and dictator
Mission: financially defeat my opponents, ruining their capitalist system and ultimately instating my dictatorship.
Strategies:
1. Purchase, trade and develop property to increase my wealth;
2. Influence others and leverage my short term alliances for personal gain;
3. Possess all the riches; and then
4. Ruin capitalism and instate dictatorship.

In later playing of Possession v Poverty the narrative was reduced, with the instructions presenting two, seemingly opposed, missions for deities Clive and Kim:

Clive
Dominator of financial markets
Mission: become ruthlessly rich, eliminate my competition and dominate the activities of the financial markets.

Kim
Supreme leader and dictator
Mission: financially defeat my opponents, ruining their capitalist system and ultimately instating my dictatorship.

(Boyd, S & USC 2013b, s. 57)
6.3.2.2 Architecture

Foundation

The Landlord’s Game board (Figure 5.1) is square in shape and comprises 22 properties supplemented with taxation, franchises and railway and other landing areas bringing the total spaces to 40. The price of the properties increases in increments of $10 as play progresses in a clockwise direction from the starting point, ‘Labor upon mother earth produces wages’. The property rentals are uniformly set at one-tenth of the ‘for sale’ price, reflecting a yield of 10 per cent. The pricing of the properties and calculations of the yield do not appear to reflect any actual properties, past or present.

The properties

The properties in Possession v Poverty have been re-established with reference to the property market on the Sunshine Coast, to present the local market more authentically and avoid the conflict with objective theories (6.2.2). The Sunshine Coast region is considered a logical case study as the market provides a range of property types and information regarding property prices and the broader economy is readily available and recognisable by the playing cohort.

While the Sunshine Coast region, like other regions in Australia, is dominated by residential properties investment, property is spread across other categories as well including retail, office, industrial and tourism. In particular, of the commercial transactions from 2006 to 2010, the most active market was retail, followed by industrial, then office and hospitality (Boyd S 2010). In more recent years, office activity has picked up with the emergence of the commercial precincts at Maroochydore and Kawana. The property classes adopted in the Possession v Poverty game, which broadly reflect the Sunshine Coast property investment market, are presented in Table 6.1.

Table 6.1

<table>
<thead>
<tr>
<th>Investment property class</th>
<th>No.</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>15</td>
<td>58%</td>
</tr>
<tr>
<td>Retail</td>
<td>4</td>
<td>15%</td>
</tr>
<tr>
<td>Office</td>
<td>3</td>
<td>12%</td>
</tr>
<tr>
<td>Industrial</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td>Tourism</td>
<td>2</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 6.1

*Investment Property Classes*
As discussed in the teaching of the knowledge field Property Economics (2.6.2), spatially office, industrial, and tourism property classes cluster together in regions or nodes while the dominant retail product, the neighbourhood shopping centre, is located within residential areas and central business areas. As such, the retail properties in Possession v Poverty occupy the ‘railroad’ spaces of The Landlord’s Game. The other investment classes are broadly grouped, with residential areas spanning three sides of the board. The residential proprieties and adopted suburb placenames generally progress from south to north around the board.

In considering names for the properties, prominent regional place names have been assumed with the residential properties represented by suburb names. Industrial names have been selected after considering the two larger industrial precincts, in Caloundra and Kunda Park. The retail, or shopping centre, properties assume shorter versions of the recognised regional centre names from the PCA Shopping Centre Directory (PCA 2012), with Sunshine Plaza becoming ‘Plaza’ and so on. The office properties are named after streets in the central business areas with, for example, ‘Maroochy’ in place of Maroochy Boulevard. The two most prominent tourism and hospitality precincts in the greater Sunshine Coast area are around Hastings Street in Noosa Heads, and Mooloolaba Esplanade at Mooloolaba. ‘Hastings’ and ‘Mooloolaba’ have been included as the two tourism properties in Possession v Poverty.

Investment analysis

Investment analysis, in particular the consideration of the risk and return relationship associated with buying, selling and holding properties, is a principle consideration, or objective theory, in property education (6.2.3) as it is in the Possession v Poverty serious game. As such, the properties need to, as closely as is practicable, represent a true property market. The considered application of investment analysis will add a dimension not addressed adequately in the game variants of Monopoly and The Landlord’s Game. In addition to setting prices, improvement costs and returns and the investment nature of the property classes require further consideration. For example, with industrial properties the concept of gaining a land rent is acceptable practice for storage and fabrication purposes. However, with residential investment properties the owner is unlikely to accrue any rental until improvements are constructed and appropriate approvals are gained.
**Land price**

For each of the residential properties, or suburbs, land price benchmarks have been sourced from the REIQ (2013) and RP Data Suburb Statistics reports (RP Data 2013f). The chosen land prices broadly reflect the median for the respective suburbs with a range from $180,000 in Nambour up to $350,000 in Noosa.

The industrial properties adopt a notional 2,000 square metre block with a price benchmark considered from the sales and market information analysed previously in S Boyd (2010). With rates of $200 and $250 per square metre adopted, the land prices for Caloundra and Kunda Park reflect $400,000 and $500,000 respectively.

Shopping centres and retail properties require a different approach to pricing. Despite the fact that a 2,000 square metre site may accommodate a retail property, the land size needed to accommodate a neighbourhood shopping centre and associated car parking is substantially larger. Additionally, the price of the land does not relate to the subject as such, rather it reflects the proposed centre’s ability to trade and, in turn, accrue rental from occupants. In the interests of gameplay, and in support of the fun directive of the primary objective (3.5.2), a notional $500,000 land price is adopted for each centre on the basis that retail land is generally more expensive than industrial land.

Similarly, office land parcels cover a substantial size range, depending on the scale of the improvements proposed. Nevertheless, the pricing does change between regions, often relating to the developable intensity of use. According to the *South East Queensland regional plan* (Infrastructure and Planning 2009), Maroochydore is the principle activity centre for the Sunshine Coast with potential to accommodate a higher order of office space when compared with the Kawana and central Caloundra regions. As such, the relative pricing of office land in Possession v Poverty ranges from $500,000 in Bulcock to $600,000 for Maroochy.

The tourism precincts of Noosa Heads and Mooloolaba command the highest land values in the Sunshine Coast region. While the prices range substantially depending on land size and proximity to the waterfront, land around Hastings Street on average commands a value twice that of retail and office land. As such, pricing for the two regions represents the most expensive land in the Possession v Poverty game. The land price ranges are depicted in Table 6.2 and in more detail in Appendix 6.5.
Table 6.2
Land Prices

<table>
<thead>
<tr>
<th>Investment property class</th>
<th>No.</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>15</td>
<td>$200,000</td>
<td>$350,000</td>
</tr>
<tr>
<td>Retail</td>
<td>4</td>
<td>$500,000</td>
<td>$500,000</td>
</tr>
<tr>
<td>Office</td>
<td>3</td>
<td>$500,000</td>
<td>$600,000</td>
</tr>
<tr>
<td>Industrial</td>
<td>2</td>
<td>$400,000</td>
<td>$500,000</td>
</tr>
<tr>
<td>Tourism</td>
<td>2</td>
<td>$900,000</td>
<td>$1,000,000</td>
</tr>
</tbody>
</table>

Property improvements

Improvements have been structured in an authentic manner; that is, in such a way as to commence with a lower intensity of development and build to a higher level. Taking the residential properties in Possession v Poverty as an example, houses may be built right away with no need to hold a set, or monopoly. But if the player’s intent is to build to a higher density then the full suite must be held. This, in an exaggerated sense, reflects the practice where, if the potential developer owns the neighbourhood, then they remove the risk of other property owners objecting and in turn they have the liberty to develop further. In the interest of fun, and the first objective (3.5.2), this perspective is taken further with the monopoly holder allowed to develop a contentious and socially unacceptable development.

The choice of developable improvements initially reflects those that may be built on land of that nature. Choices then transition to less socially accepted developments. To identify the least socially acceptable developments, a search of media articles was undertaken. In Maroochydore there were long-running disputes regarding building heights, with the Sunshine Coast Daily (2010) reporting on the regional council’s contentious height review. In the Noosa area, residents and ratepayers voiced concerns over a contentious proposal to introduce a casino (Campbell 2011). Nearby in Marcoola, there was a so-called disastrous proposal for the development of a desalination plant (Atkinson 2009). As expressed in Sustainable Sunshine Coast Blogger (2011), regardless of the location residents were broadly opposed to coal seam gas. Due to environmental impacts, further canal developments such as those in Pelican Waters (Pelican Waters Community 2011) were also opposed. These leads were all considered in choosing specific, socially unacceptable developments for the respective regions.

The pricing of the respective improvements was considered in conjunction with authentic building costs. The house and unit pricing increases progressively with the pricing of the suburbs ranging from $100,000 in Beerwah up to $200,000 in Noosa. With
respect to commercial properties, the Rider Levett Bucknall (2013) Construction Cost Indicator mobile application was utilised in determining the price per 100 square metres for various property types.

**Return on improvements**

Initial investment returns adopted in Possession v Poverty broadly represent the normalised property returns as previously analysed and applied in the Playing Property game (6.3.1). In the interests of gameplay, and the primary objective (3.5.2), the returns on investment are exaggerated as the intensity of development increases. This inflation is reflected in Mooloolaba as the return on a single improvement is $180,000 on an investment of $1,200,000, or 15 per cent. With a second improvement, the return on the same property increases to $680,000 on $1,500,000, or 45 per cent. While the returns reflect some consideration of true market practice there are sufficient deviations to encourage the player to consider the investment returns prior to purchase, and again before undertaking development, demonstrating the ‘apply intent’ inherent in the secondary objective (3.5.2).

Axelrod (2002) discusses the smartest and dumbest properties to own in Monopoly. In his considerations he speaks of a three-dimensional model of investment for the purpose of building wealth relating to:

1. the range of available opportunities (22 streets)
2. available money resources
3. time spent assessing the range of available opportunities and its relationship with available money resources.

As discussed in the Monopoly learnings (5.3.2), the consideration of investment returns, including probability, is a dynamic result of the gameplay associated with Monopoly. With each roll of the dice the investment position of the player changes and the relationship between investment worth and market value varies. For example, in Possession v Poverty, Hastings improved with a casino provides the greatest return on investment, at 155 per cent (Appendix 6.4). Conversely, the total cost of the land, which adjoins Mooloolaba, plus the cost associated with creating the appropriate improvements, is $3.4 million. The chance of other players landing on the site is low given the use of a dice and the position of the jail. As such, a prudent player would not only need to balance investment returns but also consider their personal financial position in determining the worth of a set property at any given time.
Mortgaging

The processes and investment impact of leveraging and mortgaging properties are complex in practice. In a general sense, taking a loan over a property provides the owner with immediate access to funds in exchange for a mortgage. The mortgage provides the bank with an interest in the property and the right to change the owner an interest fee.

In Possession v Poverty a simpler approach is adopted where the player may elect to mortgage their property for 50 per cent of its value. In exchange for the payment they forgo any rental return, effectively producing a balanced leverage situation with interest payments equal to rental income. Should the player then wish to discharge the mortgage, they are required to pay a fee set at around 10 per cent above the loan they were given. The details of the mortgage and other property information are depicted on title cards and in Appendix 6.4. The Kawana and Caloundra titles are illustrated in Figure 6.4.
Even with a simple approach to leveraging, players have the opportunity to leverage, or ‘go for broke’. At earlier stages of the game, mortgaging properties may come across as ‘foolish fiscal aggression’ (Axelrod 2002, p. 61). However, as the game draws to a close, a player who is behind may decide it makes sense to mortgage everything in sight and build where possible. This approach may be regarded as ‘going for broke’, but that usually means just that: the player will go broke (Axelrod 2002).

Property comparison

As with real property, the properties in Possession v Poverty are not uniform in their offerings. Due to the nature of the investment class, the returns in one class may be higher or lower than in others. As such, prudent decision-making requires the application of investment analysis skills to make the best decisions (3.5.2). The investment details for each of the properties in the serious game are presented in Appendix 6.4.

Other properties and investments

In addition to purchasing real property, two other investment opportunities are accommodated in Possession v Poverty: light rail and airport offerings, by way of public–private partnerships (Infrastructure Australia 2013). Both light rail and airport
infrastructure projects are considered for future development or expansion on the Sunshine Coast (Sunshine Coast Council 2014).

Such investment offerings appear where government authorities partner with private providers to develop infrastructure. The entities seek to raise funds through investment offerings, with private persons or investment funds purchasing shares in exchange for an expected return. The return on each public–private partnership offering in Possession v Poverty has been estimated at 20 per cent, being a return of $50,000 on a purchase price of $250,000. Due to both offerings being transport related, ownership of both is considered a monopoly, providing for a greater return of 30 per cent or $75,000.

Relative to the improved properties, the returns from the other investments are low. Nevertheless, they are worthy considerations for purchase as a passive investment with modest returns. The returns commence from acquisition and there are no further requirements for capital expenditure. The light rail and airport may similarly complement a property-rich portfolio, as their return profile complements the other volatile, high capital investments. The grouping of property and other investments so as to optimise risk and return relationships is a complex objective theory known as portfolio management, which is generally taught in the knowledge field of property management (2.6.1.2), or broader business. Axelrod (2002) discusses the passive investment asset class in his 24th lesson, ‘cash cows and old sows’.

Non-property landing areas

Possession v Poverty assumes similar non-property landing areas to The Landlord’s Game. The corner squares comprise salary, the jail, parkland and the directive: ‘Arrested – go to jail’. Similarly, Possession v Poverty features taxation squares, relating to income and capital gains taxes. In lieu of other legacy and taxation landing points, risk is introduced through new places named ‘systemic risk’ and ‘unique risk’.

Corner squares

The salary square is the game’s starting point. As in The Landlord’s Game, play proceeds in a clockwise direction, with each cycle, or passing of ‘salary’, providing a set payment. In setting the level of payment in Possession v Poverty, the 2012 Hays Salary Guide is considered. For employees in the related property fields across the Sunshine Coast, salaries range from AU$40,000 to AU$250,000 (Hays Specialist Recruitment 2013).
After assuming additional revenue from shares at around AU$50,000, an annual salary of $300,000 is adopted for each circuit of the board.

As with personal investment decisions, salary and the security of a regular income stream affect a prudent investor’s investment strategy and capacity for risk taking. In Axelrod’s third lesson, ‘Passing go’, he discusses further the role of salary in investment risk taking and the management of regular income. The potential for the lesson has been incorporated into the gameplay of Possession v Poverty.

As in Monopoly and The Landlord’s Game, the ‘jail’ space presents an opportunity for someone to visit another and not be impacted, or for a player to be sent there by landing on ‘Arrested – go to jail’, delaying their progress around the board. Jail is therefore positioned at the first corner after the salary and the ‘Arrested – go to jail’ square at the diagonally opposite corner.

The parkland square presents a brief break, a square where nothing specific happens. While technically nothing happens in the parkland or the jail, both squares play an important role in Possession v Poverty, as they effectively force players to sit out of gameplay, unable to make purchases or, potentially, further losses. This may be welcomed as a time-out from intensive play; however, as with every roll of the dice there are opportunities and opportunity costs associated with every action or inaction. Axelrod is particularly critical of players seeking safety in jail, proposing that ‘inaction [only] confers the illusion of safety’ (Axelrod 2002, p. 88).

**Taxation**

Landing areas for income tax and capital gains tax are included as a close approximation of the taxation that relates to property ownership in Australia. In such a way, players may witness the effect of taxation in basic simulation (2.6.3). The income tax landing point in Possession v Poverty is positioned just after the salary square to accommodate payment at the same time as receipt. The capital gains tax square is located near the end of a full cycle, prior to the salary square.

The income tax fee has been estimated with reference to the provided salary and the respective taxation rate of 45 per cent as inferred from the Australian Taxation Office (ATO 2013a). The income tax liability equates to $135,000.
Capital gains tax relates to specific capital gains tax events. As such, after considering the details from the ATO (2013b), a single rate of 20 per cent based on the value of improvements has been applied in Possession v Poverty. While this is a simple measure of capital gains it supports Axelrod’s 10th lesson, where he speaks of there being ‘no surer way to get yourself in trouble in business than by remaining blissfully unaware of just what your assets and liabilities are every single day’ (Axelrod 2002, p. 82).

**Systemic and unique risk**

The risk landing points are treated in a similar manner to latter variants of Monopoly where a card pick-up is required to define set events. The events are specifically tied in to the two categories to assist the players with understanding objective categories of risk: systemic and unique. The systemic risk events relate to greater market impacts, beyond the control of the player or property owner (Lee, Robinson & Reed 2008). The unique risk cards represent non-systemic risk events, for which a property owner may have made a choice or which they may have control over.

6.3.2.3 Constructing the game

Game board design

The Possession v Poverty game board is presented in a clear and simple manner with subtle design influences. The colours chosen for the properties broadly represent the theme of each region, with Noosa region coloured a dark green, as prescribed by their prior council. Similarly, the shopping centres are coloured red to represent the debt accrued on credit cards. For the risk landing areas grey is used to reflect uncertainty, with the cyclone design representing systemic risks and the tightrope walker denoting the taking of a non-systemic or unique risk.

The board is printed on canvas, in a similar manner to Charles Darrow’s early variants of Monopoly (5.3.1). Figure 6.5 illustrates the Possession v Poverty game board design, while Figure 6.6 presents a photograph of the completed game and its parts.
Figure 6.5. Possession v Poverty game board design.
Figure 6.6. Possession v Poverty game board and parts.

Apparatus

Risk cards

As discussed in Architecture, the systemic risk events relate to greater market impacts, beyond the control of the player or property owners, while the unique risk cards represent non-systemic risk events for which a property owner may have made a choice or which they may have control over.

In selecting systemic and unique risks and events, the search engine Factiva (Dow Jones & Company 2013) was utilised with the terms 'property and sunshine adj coast and risk' selected during the previous two years, May 2011 to May 2013. In addition to Factiva popular topics were selected to embed learning lessons. An example of a modified, or embedded, learning lesson is the consideration of leverage in the unique risk card, which represents practice through:

You invest $100,000 in a highly geared (95% loan @7.0% interest) '6 pack' apartment complex. Roll the dice and receive the corresponding return ($1,000). 2(-$95) 3(-$75) 4(-$55) 5(-$35) 6($15) 7($5) 8($25) 9($45) 10($65) 11($85) 12($105).
Table 6.3 and Table 6.4 present the systemic and unique risk narratives and the influences that led to their selection.

Table 6.3

<table>
<thead>
<tr>
<th>Systemic risk card narrative</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>EARLY BIRD BURNS… shortselling Phoenix #5 stocks nets a quick $25,000</td>
<td>Short selling in the wake of the financial crisis (Investopedia US 2013)</td>
</tr>
<tr>
<td>CROCKS ON THE ROCKS… Riverine flooding. Your property is insured 'new for old'. Receive $50,000</td>
<td>Tropical storms impact on property (Hall, Williams &amp; Price 2012)</td>
</tr>
<tr>
<td>MILA WRECKS HAVOC… Tropical storm Mila devastates the Sunshine Coast. Pay repairs of $25,000 per improvement</td>
<td>Tropical storms impact on property (Hall, Williams &amp; Price 2012)</td>
</tr>
<tr>
<td>MAKES A MEAL OF IT…breakfast talk show host talks down your market. Pay $20,000 for advertising and an editorial to abuse him</td>
<td>Market sentiment (Schlesinger 2012)</td>
</tr>
<tr>
<td>POST MATERIALISM BITES… Lose $50,000 trading your V8 saloon in for a hybrid minivan</td>
<td>Trends in consumer behaviour (Encyclopaedia Britannica 2013)</td>
</tr>
<tr>
<td>SHOPS ARE TOPS…Retail spending up. Each shopping centre owner receives turnover rental of $50,000</td>
<td>Retail spending impact on property</td>
</tr>
<tr>
<td>TIDE TURNS LEAVING BUBBLES… coastal housing bubble. Bank forces you to contribute $100,000 equity</td>
<td>Property leverage in a receding market</td>
</tr>
<tr>
<td>ACT GAFF NETS 'FISHING DAY'… Rogue public servant passes new 'public holiday', advance to Parkland</td>
<td>Politics and the potential for errors in having only one house in the Queensland political structure</td>
</tr>
<tr>
<td>NOTHING… A productive investment strategy. …do nothing. Watch the grass grow and pocket $100,000 in capital gains</td>
<td>Effect of rising markets on property prices</td>
</tr>
<tr>
<td>SEA LEVELS RISE…Your home is now ocean front. Receive equity uplift of $250,000</td>
<td>Comical jibe at global warming and the impact on coastal communities</td>
</tr>
<tr>
<td>PAY DIRT… Mineral development licence issued. Receive $100,000</td>
<td>(Queensland Government: Natural Resources and Mines 2013)</td>
</tr>
<tr>
<td>AUD UP… 'Staycation' with the kids. Move to Hastings Street and miss a turn</td>
<td>The Australian dollar and effect on tourism spending (Investopedia US 2013)</td>
</tr>
<tr>
<td>SUBLIME SUBPRIME… Recovery gathering steam. Inflation is up as are your commercial rents. Receive $30,000 per retail property and $50,000 per office property</td>
<td>Relationship between inflation and commercial rents</td>
</tr>
</tbody>
</table>
Table 6.4  
Possession v Poverty Unique Risk Cards

<table>
<thead>
<tr>
<th>Unique risk card narrative</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain indefeasible title to your neighbour’s property. Move to the next unimproved property. You may purchase the property at the prescribed price regardless of current ownership.</td>
<td>The Australian Torrens ownership system and the <em>Land Title Act 1994</em></td>
</tr>
<tr>
<td>Clive initiates a street party. Fun, but damaging. If you are Clive’s avatar pay each Kim $20,000.</td>
<td>Risk tenants behaving inappropriately</td>
</tr>
<tr>
<td>You invest $100,000 in a highly geared (95% loan @7.0% interest) ‘6 pack’ apartment complex. Roll the dice and receive the corresponding return x $1,000. 2(-$95) 3(-$75) 4(-$55) 5(-$35) 6($15) 7($5) 8($25) 9($45) 10($65) 11($85) 12($105)</td>
<td>Leverage in property investment and its ability to boost gains and losses</td>
</tr>
<tr>
<td>Broken sleep, Kim invents a turkey mind-controlling helmet. If you are Kim’s avatar sell your invention to the national park ranger for $75,000.</td>
<td>Prevalence of brush turkeys in the Sunshine Coast region</td>
</tr>
<tr>
<td>You transfer contract risk to the other players. Your builder walks off for a surfing trip in Bali. Each other player must pay $20,000 in flights and legal bills.</td>
<td>Risk mitigation and risk transfer</td>
</tr>
<tr>
<td>It turns out ‘buying, painting and on selling’ is not a sustainable investment strategy. Pay stamp duty of $20,000.</td>
<td>The high entry costs associated with owning property. (Queensland Government 2013)</td>
</tr>
<tr>
<td>Caught wrestling your property manager. If you are Clive’s avatar pay settlement of $10,000. If not, go to jail for having prior convictions</td>
<td>Inappropriate behaviour</td>
</tr>
<tr>
<td>Teach your daughter to drive. Advance to Kunda Park</td>
<td>The use of quiet industrial estates from vehicle and recreation purposes</td>
</tr>
<tr>
<td>Outremer relatives. Join them at the castle. Move to Bli Bli</td>
<td>The castle and Outremer movement in the suburb of Bli Bli (Sunshine Castle 2012)</td>
</tr>
<tr>
<td>ATO investigating your inappropriate use of the margin scheme. Take a quite trip to the airport.</td>
<td>Aggressive tax avoidance and the margin Scheme (ATO 2012)</td>
</tr>
<tr>
<td>Unexposed ordnance found... During yoga. Go to hospital and miss a turn</td>
<td>Environmental impacts and influence of past uses on land development potential (Australian Government: Defence 2013)</td>
</tr>
<tr>
<td>Your Nigerian ‘bank’ shares boom. Receive $10,000 from each player with email capable device</td>
<td>Fraud and the emergence unethical behaviour on mobile and email capable devices</td>
</tr>
<tr>
<td>You are unsuccessful in your claim for property damages from yarn bombing. Pay each player sporting knitted wares $10,000</td>
<td>Tongue in cheek look at the yarn bombing movement</td>
</tr>
</tbody>
</table>

**Tokens**

Axelrod (2002) presents a psychological interpretation of the Monopoly tokens as being totems. He takes the psychological position further, expressing the token selection as a way of knowing your opponent, and advocating that players take this into consideration: ‘acting in anticipation [confers] far more leverage than acting in reaction’ (Axelrod 2002, p. 124). While the notion is interesting it may be difficult to test in the play of Possession v Poverty. Nevertheless, the opportunity for token selection or creation appeared as a prospect not to be forgone in the design and development of Possession v Poverty.

As an initial iteration, six totems were considered for the game, with the influences and justifications from Oxford University Press (2013) as presented in Table 6.5.
Table 6.5
*Possession v Poverty Tokens*

<table>
<thead>
<tr>
<th>Proposed name</th>
<th>Design influence</th>
<th>Justification</th>
</tr>
</thead>
<tbody>
<tr>
<td>The optimist Bull</td>
<td>Bull</td>
<td>A market in which share prices are rising, encouraging buying</td>
</tr>
<tr>
<td>The predator Shark</td>
<td>Shark</td>
<td>Predatory</td>
</tr>
<tr>
<td>The gentleman/gentle giant Pineapple</td>
<td>Pineapple</td>
<td>A large juicy tropical fruit consisting of aromatic edible yellow flesh surrounded by a tough segmented skin</td>
</tr>
<tr>
<td>The judge Wig</td>
<td>Wig</td>
<td>Typically worn by judges and barristers in law courts or by people trying to conceal their baldness</td>
</tr>
<tr>
<td>The hero Rescue tube</td>
<td>Rescue tube</td>
<td>Saves one from serious difficulty</td>
</tr>
<tr>
<td>The strong Column</td>
<td>Column</td>
<td>An upright pillar, typically cylindrical, supporting an arch, entablature, or other structure or standing alone as a monument</td>
</tr>
</tbody>
</table>

Due to technical delivery issues an alternate, more creative approach was implemented in the final version. Utilising coloured clay, players of *Possession v Poverty* are given the opportunity to sculpt and shape their own tokens, with the player who creates the most popular ‘piece of art’, by popular vote, having the first turn to roll the dice.

**Improvements**

In comparison with *The Landlord’s Game* and *Monopoly*, *Possession v Poverty* provides for a multitude of different improvements due to the inclusion of the property classes of office, industrial, retail, and tourism. Additionally, there are the novel and socially unacceptable improvements, as presented in Table 6.6.

Table 6.6
*Possession v Poverty Improvements*

<table>
<thead>
<tr>
<th>Property Classification</th>
<th>1st improvement</th>
<th>2nd improvement</th>
<th>3rd improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industrial</td>
<td>Shed</td>
<td>Factory</td>
<td>Irradiation plant</td>
</tr>
<tr>
<td>Residential (Light Blue)</td>
<td>House</td>
<td>Medium density</td>
<td>Inland port</td>
</tr>
<tr>
<td>Residential (Blue)</td>
<td>House</td>
<td>Medium density</td>
<td>Canal</td>
</tr>
<tr>
<td>Residential (Purple)</td>
<td>House</td>
<td>Medium density</td>
<td>CSG plant</td>
</tr>
<tr>
<td>Residential (Maroon)</td>
<td>House</td>
<td>Medium density</td>
<td>Toll road</td>
</tr>
<tr>
<td>Residential (Orange)</td>
<td>House</td>
<td>Medium density</td>
<td>Desalination plant</td>
</tr>
<tr>
<td>Retail</td>
<td>Showroom</td>
<td>Regional</td>
<td>Mega mall</td>
</tr>
<tr>
<td>Office</td>
<td>Office</td>
<td>Skyscraper</td>
<td>—</td>
</tr>
<tr>
<td>Tourism</td>
<td>Villa</td>
<td>Hotel</td>
<td>Casino</td>
</tr>
</tbody>
</table>

The sheer number of improvements to be modelled would make the game somewhat cumbersome. While there may be merits in creating a model that clearly represents what the improvement is, for example an industrial shed presenting as a metal clad warehouse,
the advantages do not appear to outweigh the practical challenges of having so many individual pieces. As such, Lego-type stackable bricks are used to represent improvements in this final variant of Possession v Poverty, as shown in Figure 6.7. Further photos depicting the game are contained in Appendix 6.6.

Using Lego bricks provides scope for the improvements to be built and the practicality of their design allows the pieces to be stacked and stored when not in use. Additionally, there is the ability to more accurately represent Axelrod’s 12th lesson, ‘The virtue of shortage’. With a limited number of Lego pieces, a player may create a housing shortage through aggressively ‘developing’ their own properties and restricting the ability of others to develop theirs.

The shortage of bricks, and the associated limited pool of improvements, presents an exaggerated representation of the objective reality. On the other hand, the virtue of shortage is an important consideration for property students. During boom construction cycles, resources and labour are often stretched and even depleted in some cases. Specifically, during the pre-financial crisis construction boom there was a limited pool of tradespersons skilled and qualified in concrete formwork. As such, prices increased for those services and, in selected cases, projects stalled as form workers could not be procured. The skills shortage during the pre-financial crisis period is reflected in the
Davis Langdon Australia (2012) *Blue book* which presents a peak in early 2007 when the shortage reached 70 per cent, and then descended to a stabilised figure of 15 per cent in 2009.

**Money**

For Possession v Poverty, cash has been utilised in place of an electronic card system such as that incorporated in later, electronic editions of Monopoly. While the credit card system may speed up gameplay and may represent the emerging trend towards credit cards in lieu of cash, it does not embrace the numeracy skill set in the game assessment rubric (5.1.1) (Appendix 5.1).

The development of numerous skills is implied through play as trades are made and fees are paid. Furthermore, as Axelrod expresses, players should have an acute understanding of their net position throughout gameplay as: ‘there is no surer way to get yourself in trouble in business than by remaining blissfully unaware of just what your assets and liabilities are every single day’ (Axelrod 2002, p. 82).

For Possession v Poverty the cash denominations and design reflect a stylised version of Australian currency. For example, the $5,000 note assumes the underlying colour of the Australian AU$5 note. A similar approach is taken all the way through to the largest denominations, with similar colours for the $100,000 and AU$100 notes. In keeping with the nature of plastic banknotes, transparencies have been used in place of paper in the Possession v Poverty currency.

**Dice**

Dice, with origins in ancient Greece are, according to Encyclopaedia Britannica (2011), the oldest gaming implements still used today to teach mathematics, in particular probability and statistics. As such, dice are a rational retention in the Possession v Poverty board game where probability and volatility are clear considerations in determining investment choices and ultimately seeking to conquer opponents.

With the roll of dice there is an element of luck but there are corresponding, underlying rules of probability that may be considered, and exploited, in gameplay. When only one die is rolled there is a one-in-six chance of rolling a number from one to six. With the introduction of a second die the balance between luck, or chance, and probability is more evident. For example, in games such as Possession v Poverty, it is far
more likely that a seven will be rolled than a higher or lower number. Of 36 potential outcomes, there are six which could result in a ‘7’. There is only one potential outcome should you wish to roll either a two or a twelve. The probability of rolling set dice totals is illustrated in Figure 6.8.

![Figure 6.8. Possession v Poverty probability of rolling a set number.](image)

In practical terms, on average two out of every three rolls will present a total ranging from five to nine, with seven being the most likely outcome. This may be considered in order to mitigate risk when playing Monopoly and Possession v Poverty. Axelrod also makes the connection between Monopoly and business, citing three lessons: ‘in all ventures, take steps to reduce randomness’, ‘counter chance with knowledge’, and ‘create luck with self-confidence built on understanding’ (Axelrod 2002, p. 39).

Before the game even starts, the roll probability associated with dice correspondingly has a part to play in investment analysis and determining market value, both of which are contained within the knowledge fields (2.6.1). For example, in Possession v Poverty the most common, consistent landing point or resting point is the jail, due to the nature of the rules and instructions to go there. As such, the properties most likely to be landed upon are those that are five to nine spaces further on from the jail: Market, Maleny, Buddina and Currimundi. In assessing whether the prices of such properties are reasonable, a
prudent player would consider the investment potential including returns and the likelihood of another player landing and paying rent.

6.4 Conclusion

This chapter addresses the development of two serious games through the application of design science, specifically the first three activities in the design science methodology of Peffers et al. (2008). In accordance with the first two activities prescribed by Peffers et al. (2008), this chapter commenced by revisiting the problem and objectives from Chapter 3 then described the development of two serious games.

In revisiting the problem, two prominent shortcomings of traditional teaching were identified: the teaching of current market activity; and the misalignment of the teaching system and the non-academic student who does not know how to, or does not wish to, adopt deeper learning practices. On the face of it, the published research and previous chapter lead to the position that playing of serious games with authentic and reflective assessment should overcome one of the two most prominent shortcomings in the teaching of property through traditional university practices. With respect to teaching current market practices a fourth game, titled Playing Property, was created.

The serious games were specifically designed and created to meet the objectives defined in Chapter 3. The primary objective, relating to learning in a more playful and fun way, influenced the core or direction of the gameplay method. To mitigate the risk associated with introducing fun, the serious games in this research were designed from proprietary games or activities with proven ability to motivate or engage participants in play.

The second objective presents a natural fit for the development of serious games, as serious game play has a direct relation with problem-based learning and functional knowledge construction. The challenge, with the property game design, was not whether the games enable analysis but rather whether the representation of the simulation leads the student to the appropriate learning. As such, there is potential for a conflict between what playing a game presents and the objective theory sought after in the first learning outcome and the first tertiary objective.

The conflict between gameplay representation and objective reality may offer an opportunity for reflective learning. Alternatively it may lead to confusion, or even the
learning of inaccurate or superfluous lessons. The challenge and associated conflict were addressed in the game design with the new games created to represent objective theories as closely as is practicable without losing the fun associated with gameplay. This is demonstrated in the explicit and sectorial approach to the design of the games, Playing Property and Possession v Poverty.

To account for the remaining conflict between the gameplay representation and objective realities, students were encouraged to use reflective practices to assess the appropriate answers, as discussed in Chapter 7.
Chapter 7  Demonstration and evaluation

This chapter discusses the implementation of the serious games suite, including the activities developed to leverage the learning potential from two property games that were repurposed, or redesigned, for educating property students. The suite of four games comprises Possession v Poverty and Playing Property as designed in Chapter 6, along with Investorville and SimCity as evaluated in Chapter 5. The serious games were incorporated into a third-year property course, which is a compulsory subject delivered in a face-to-face manner with a traditional lecture and tutorial format.

Included in the chapter is the evaluation of the games suite and analysis of the findings. Numerous prototype testing approaches are adopted, reconciled through triangulation, and appropriately considered in the findings. After analysis and reflection the question, ‘How serious games based activities can be integrated into the student’s higher education learning experience’, is considered. The serious games suite and associated learning activities are finalised in the chapter.

7.1 Games suite implementation

According to Peffers et al. (2008), the fifth design science activity relates to the demonstration of the artefact to solve one or more instances of the problem (3.4). As such, the implementation and subsequent evaluation consider the games suite in the context of enhancing the learning experience for property students (3.5.1). The games suite is not presented as a stand-alone learning method but rather as a learning activity supporting traditional teaching practices (6.1).

The demonstration of learning experience enhancement is discussed in relation to the evaluation tools and previously defined objectives (3.5.1). In practice, this research involves acquiring and analysing feedback from serious game–based activities undertaken.
in the third-year property course, PED321 Property Development and Project Management Processes [PED321]. The course is required as part of the API’s accredited Property Economics and Development program at the USC.

The PED321 course focuses on property development, bringing together a range of knowledge and skills applicable to the processes (USC 2013a). PED321 is not a capstone subject in itself; nevertheless it does have prerequisite courses from which material is reapplied and built. The course is offered on campus with a two-hour lecture and a one-hour applied theory workshop each week. The course outline makes specific reference to the requirement for playing games as learning activities, in particular under the heading ‘Assumed prior knowledge and skills’. It reads: ‘a willingness to participate in practice-based learning activities including group work and playing serious games’ (USC 2013a, p. 3).

The program and schedule of learning activities for the course are presented in Table 7.1. Consideration is given to the alignment of concepts and content with the learning activities, including the serious game–based activities.
Table 7.1
PED321 Schedule Program

<table>
<thead>
<tr>
<th>Week</th>
<th>What key concepts/content will I learn?</th>
<th>What activities will I engage in to learn the concepts/content?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Directed study activities</td>
<td>Independent study activities</td>
</tr>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Lecture SimCity learning activity</td>
</tr>
<tr>
<td></td>
<td>• Overview of course</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Defining project and development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Project and development lifecycles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Stakeholders</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Initiation</td>
<td>Lecture Applied theory workshop</td>
</tr>
<tr>
<td>3</td>
<td>Initiation and ideas</td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td>4</td>
<td>Organisational strategy and project</td>
<td>Playing Property learning activity</td>
</tr>
<tr>
<td></td>
<td>alignment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Selecting property and projects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Investigating and securing the 'land'</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Project charter and business case</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Planning &amp; design</td>
<td>Lecture Applied theory workshop</td>
</tr>
<tr>
<td>6</td>
<td>Concept refinement and defining the</td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td>7</td>
<td>scope</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Time planning</td>
<td>Texts and handouts Possession and Poverty learning activity</td>
</tr>
<tr>
<td></td>
<td>Gross realisation, cost and finance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Quality planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Resource and team planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Communication planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Risk identification, analysis and</td>
<td></td>
</tr>
<tr>
<td></td>
<td>response planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Contract planning</td>
<td></td>
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<tr>
<td></td>
<td>• Project (management) plan</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Delivery</td>
<td>Lecture Applied theory workshop</td>
</tr>
<tr>
<td>10</td>
<td>Directing and managing</td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td></td>
<td>Quality assurance</td>
<td>Texts and handouts Possession v Poverty tournament</td>
</tr>
<tr>
<td></td>
<td>Acquiring, developing and managing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>teams</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Managing stakeholders</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Contract performance and administration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monitoring and controlling risks</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Finalisation</td>
<td>Lecture Applied theory workshop</td>
</tr>
<tr>
<td></td>
<td>Closing the contract</td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td></td>
<td>Finalising the project</td>
<td>Texts and handouts</td>
</tr>
<tr>
<td></td>
<td>Reviewing the development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Realising the property</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Built asset in use</td>
<td>Lecture Applied theory workshop</td>
</tr>
<tr>
<td></td>
<td>Ongoing management and change</td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td></td>
<td>Final group presentations</td>
<td>Texts and handouts</td>
</tr>
<tr>
<td>13</td>
<td>Course review</td>
<td></td>
</tr>
</tbody>
</table>

The serious game–based activities were implemented during the 13-week semester commencing July 2013 and ending in October 2013. The participants were advised that there would be four to five sessions where their feedback would be sought by way of completing questionnaires and rubrics, in addition to the assessed reflective journal. The anticipated duration for feedback was estimated at around one hour per session, equating to an overall duration of four to five hours.
A total of 16 students enrolled in the PED321 course for semester 2, 2013. The enrolled students broadly represented the demographic of Australian property programs with males (three-quarters of the class) dominating the gender mix and a generally even spread of mature age students and school leavers.

All of the students were invited to take part in the project due to their enrolment in the course. In agreeing to take part in the research, the students were asked to make available their feedback by way of reflective exercises, including questionnaire responses, rubric scoring and journal entries.

7.1.1 SimCity learning activity

The SimCity learning activity was scheduled for week 1 of the semester, as the lecture material addressed development management and development lifecycles, both topics that aligned with the simulated city development in SimCity. The first lecture included the sharing of declarative knowledge, specifically in the domain of town planning. As such, the lecture related to the first learning outcome, aiming to encourage students to describe and explain objective theories of town planning and the practical skills required for a career in property (2.6.2).

In support of the lecture, the SimCity learning activity was set to apply some of the objective theories presented and align with the second learning outcome, ‘Analyse the functioning of [investment and development] property and apply practical skills to make the best decisions in real-life property situations’ (2.6.2). The game-based activity was intentionally sequenced to follow the lecture, so as to provide the students with the declarative understanding first, reducing the likelihood of students learning inaccurate principles associated with the game’s play later (6.2.2).

Due to university timetable scheduling there were no tutorials relating to the first week’s lecture. As such, it seemed reasonable to present the SimCity learning activity as a ‘take home’ tutorial, and as a contingency the tutorial was proposed to span two weeks. Due to the inherent off-campus nature of this activity, there was a resourcing risk, relating specifically to the need for a device and software program to play SimCity (see screen images, Appendix 7.1). Students were not required to purchase software and it was conceivable that not all students would have access to a suitable personal computer or SimCity compatible device. The activity was therefore structured in a manner that allowed students to choose the device and game version they would use, with the default...
being a free version of Micropolis. Micropolis is the earliest version of SimCity readily available for download from the web.

The game-based activity had a specified task and set directions, as modelled, with consideration given to the previous Adams (1998) study. As one of the ‘experiments’ Adams had his class:

Try to create a green city. Put in large and small parks in appropriate spots. Plant trees. If you have heavy industry, you might want to build a railroad through your industrial area and terminate it with depots at either end to reduce pollution from trucks. Expand the Industries window and levy a heavy tax on industries that you suspect would create pollution. (Adams 1998, p. 48)

For the PED321 students the adopted tutorial exercise was related back to their local region, and local council, through tasking the students as follows:

Utilising SimCity endeavour to develop a sustainable virtual city aligned to the vision of the Sunshine Coast ‘to become Australia’s most sustainable region—vibrant, green, diverse’ (Sunshine Coast Council 2013). Feel free to work with another but create, and critique your own city. Additionally the questions and reflection exercise are to represent your own personal perspectives.

You are welcome to use any available variant of SimCity, on any platform. For those familiar with the simulation I would recommend you utilise the modern variants or iPad version. If you are new to simulation and games I recommend downloading Micropolis (the earliest version of the SimCity series) which is available free from the internet. (USC & Boyd S 2013b, p. 1)

The directions for the learning activity were relatively simple with a bias towards constructivism (2.2), providing little scaffolding or guided support. The students were directed to:

When starting the simulation select the appropriate terrain and commence the city development from the ground up (do not load an existing city).

During the development maintain a brief log or journal noting any points of interest, questions, queries or opinions (for later reference to assist the questions, rubric and formative comments).

After a reasonable duration, assumed to be between 1 and 2 hours, take a screen shot of your city (print screen or other) and reflect upon the status of the development and your ability as mayor to achieve the vision. As part of the reflection process please answer the set questions and then consider how the simulation has assisted your learning when completing the rubric and formative comments. (USC & Boyd S 2013b, p. 1)

In practice there were minor issues relating to the tutorial. Initially, completion and submission rates were low with some students only finalising the activity in weeks three and four. The reasons, or excuses, for not submitting varied from ‘having just not got around to it’ to software download issues. One particular student reportedly did not
initially have access to an appropriate mobile device or computer. After overcoming the issues, the response rate increased to 81 per cent, or 13 out of the class of 16.

The activity had no formal summative or formative assessment; nevertheless, the students’ reflective journals showed they considered the gameplay had contributed to their knowledge development. As such, there was a further connection to the fifth learning outcome, ‘Reflect on your role as a property student and initiate transformative practices to guide your actions in an unknown future’ (2.6.2), and the final tertiary objective (3.5.1).

### 7.1.2 Playing Property learning activity

The Playing Property learning activity was initially scheduled to occur during the lecture for week 3 as the subject material covered securing the land and, more specifically, selecting property and projects. During the lecture the top-down approach to property acquisition was discussed in conjunction with the perceived merits of analysing property markets to better inform feasibility analysis. With Playing Property relating to trading properties and analysing markets there appeared to be clear alignment between content and skill. Unfortunately, the lecture for week 3 had to be adapted as the API was providing a ‘State of the market’ seminar for the Sunshine Coast region. The event, chaired by the author, presented an authentic learning opportunity for the class to witness the current position of the market and partake in discussions with industry peers. Additionally, the event included an audience response session where attendees used the same TurningPoint system (6.3.1) to vote on market position. The Playing Property activity was subsequently rescheduled for the lecture in week 7.

The learning activity associated with Playing Property took place towards the end of the lecture in week 7, with the task and instructions contained in the lecture slides. As a later lecture activity, an inducement, a single chocolate bar, was offered as a prize to the winner, being the person who read the market best and accrued the largest score by the game’s end. The modest prize was included, not to entice players, but rather to support the fostering of a fun and playful atmosphere as sought after in the first objective (3.5.2).

Playing Property was run as an interactive and facilitated session. While the technology and slides provide a level of automation, the game requires direction and control from the presenter to supplement the visual material with discussions and to close
off the ‘voting’. The technology and session ran seamlessly with full participation and the winner selecting asset classes in each year, except one (2011), which gained in value.

Notably the scores from the 12 participants were towards the higher end of the recorded sample which includes results from 118 participants. These include first- and second-year property students as well as the attendees of the university’s open days. Due consideration is given to the probability that the third-year students are more likely to have played the game in previous years. A comparison of the median and average scores from the various sessions and cohorts is presented in Table 7.2.

Table 7.2

<table>
<thead>
<tr>
<th>Measure</th>
<th>Experience day</th>
<th>Open day</th>
<th>PED120</th>
<th>PED220</th>
<th>PED321</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>38</td>
<td>14</td>
<td>42</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Max.</td>
<td>17.00</td>
<td>21.00</td>
<td>23.00</td>
<td>19.00</td>
<td>23.00</td>
</tr>
<tr>
<td>Median</td>
<td>11.00</td>
<td>11.50</td>
<td>11.88</td>
<td>12.25</td>
<td>14.00</td>
</tr>
<tr>
<td>Min.</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>9.00</td>
</tr>
<tr>
<td>Average</td>
<td>8.22</td>
<td>12.14</td>
<td>10.56</td>
<td>12.21</td>
<td>15.17</td>
</tr>
</tbody>
</table>

As per the published research from Chapter 2, rapid feedback and the relationship between reward and self-confidence and self-efficacy may translate to a higher level of accomplishment (2.6.4.1). Accomplishment is not necessarily a measure of functional knowledge construction; however, engagement and self-efficacy are readily associated with deeper learning and the functional knowledge teaching activities presented by Biggs and Tang (2009) (2.6.4.1).

7.1.3 Possession v Poverty learning activity

Following a lecture on project delivery, Possession v Poverty was introduced to the class in week 9, being the students’ first week back from mid-semester break. Facilitated discussion during the lecture covered the determination of project progress, and the directing and managing of teams. As discussed in Chapter 6, the game was introduced with a narrative regarding the deities Clive and Kim and instructions were then given with the aid of the slides shown in Figure 7.1.
Specifically, the objective or mission of Possession v Poverty was shared as:

**To play**: make a totem then perform as an avatar for either Kim or Clive, the 2 deities.

**Clive**
**Dominator of financial markets**
**Mission**: become ruthlessly rich, eliminate my competition and dominate the activities of the financial markets.

**Kim**
**Supreme leader and dictator**
**Mission**: financially defeat my opponents, ruining their capitalist system and ultimately instating my dictatorship.

(University of the Sunshine Coast & Boyd S 2013a, s. 57)

To facilitate the game, it was necessary to rearrange some classroom furniture rearranging and the groups formed broadly resembled the groups they were assigned to for the major assessment. There were three absentees, which is common for lectures,
leaving three groups, comprising two groups of four players and one group of five. The classroom and formed groups are depicted in Figure 7.2.

Once the game commenced there was little need for the facilitator apart from answering the occasional question regarding contested play rules. The groups were predominantly self-managed, setting their own interpretations of any unclear, or ‘grey’, rules. Besides simple comments, such as ‘this was fun’, there were four primary observations or comments forming the feedback. The first two related to Monopoly approximating gameplay, with the others being simple practical issues.

The players learnt quickly that the Monopoly-centric tactic of ‘purchase all the property you can’ did not hold as a prudent investment strategy in Possession v Poverty. Purchasing properties, in particular the higher-priced office and tourism properties, limited the players’ opportunities to acquire other properties or create improvements and the returns achieved were not adequately reflected in the capital outlay. As the game progressed, the returns listed on the cards were considered in greater detail and properties

Figure 7.2. Possession v Poverty groups.
were frequently being passed in or achieving sale prices at auction well below the listed price.

The role of jail and the penalty applied for having to move there was a topic of conversation, with each of the groups adopting different house rules. One group in particular considered no rental income and three missed turns to be appropriate.

From a practical sense there were two identified flaws in the design presentation of the Possession v Poverty game. The final printed colours of the $20,000 and $50,000 notes were too similar, making differentiation difficult. There were also typing errors on the game board, with Bulcock priced at $700,000 where the title card more accurately reflected $500,000.

The game bridged the allotted time for the tutorial and lecture, spanning around 1.5 hours. As the conclusion of play approached it was evident the students, especially groups 1 and 3, enjoyed the experience; the questionnaires and matrix were provided to the students.

7.1.4 Investorville learning activity

Due to the rescheduling of other activities the Investorville tutorial was postponed. It was delivered in week 10 and did not represent a direct link to the material shared during the lecture. The tutorial took place in a university computer lab with 12 participants playing Investorville. Screen images are contained in Appendix 7.2. The participants were instructed to select a prescribed profile and play the game as:

*Utilising the Investorville game increase your overall net worth (over a 15 year period).*

Directions

_As per Investorville instructions (https://www.investorville.com.au/) and choose the Solo high flyer profile. When the simulation completes print screen and email the simulation results including ‘Game Summary’, ‘Property’, and ‘History’._

(USC & Boyd S 2013c, p. 1)

Besides initial queries about loading the game, few issues were identified. Correspondingly there was little discussion or engagement in the exercise as the students quietly followed the game instructions, buying and selling virtual property, and undertaking property management duties.
Notwithstanding the instructions, a single student selected the incorrect profile, and was therefore disadvantaged by commencing with only $50,000 as opposed to the other students who started with $71,000. A further two students completed the tutorial and feedback without sharing their results. All of the remaining nine participants underachieved the game’s ‘community average’ return of 9.0 per cent, reflecting the point totals as analysed in Table 7.3.

Table 7.3

Investorville Final Score Comparison

<table>
<thead>
<tr>
<th>Measure</th>
<th>Final net worth</th>
<th>Cash invested</th>
<th>Profit</th>
<th>Annual growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max.</td>
<td>$1,244,275</td>
<td>$400,218</td>
<td>$790,441</td>
<td>8.0%</td>
</tr>
<tr>
<td>Median</td>
<td>$954,968</td>
<td>$371,359</td>
<td>$541,114</td>
<td>7.0%</td>
</tr>
<tr>
<td>Min.</td>
<td>$730,022</td>
<td>$303,933</td>
<td>$313,440</td>
<td>5.0%</td>
</tr>
<tr>
<td>Average</td>
<td>$1,003,045</td>
<td>$363,441</td>
<td>$568,604</td>
<td>6.8%</td>
</tr>
</tbody>
</table>

7.2 Games suite evaluation

For this project, the primary evaluation method incorporates a questionnaire and scoring rubric provided at the conclusion of the respective learning activities and a reflective journal handed in towards the end of the subject course. The questionnaire was broadly structured on the evaluation tool applied by Adams (1998) when assessing the learning potential of incorporating SimCity in an introductory university class (2.6.4). In addition to the questionnaire, a scoring rubric, as defined in Chapter 5 (5.1.1) (Appendix 5.1), was presented to participants to assess the activities’ potential to enhance learning. The third and final evaluation tool utilised was a reflective journal. The journal was structured to draw from critical reflections throughout the course in accordance with the final learning outcome (2.6.2) and final tertiary objective (3.5.2). While there was no set format, the Boud (1985) ‘DIEP’ reflection strategy was suggested to encourage deeper reflection.

7.2.1 Questionnaire

A uniform questionnaire was adopted to assess the participant’s perceptions of learning from the activities. The questions specifically reflected the study conducted by Adams (1998). In a similar fashion, the questions asked in the subject evaluation were rather general and framed to encourage a level of reflection rather than testing the specifics of the game. The questions asked of the participants, in the form of a handout, are discussed in further details in Chapter 3 (3.5.5).
7.2.2 Rubric

The provided questionnaire handout also contained the games assessment rubric from Chapter 5 (5.1.1) (Appendix 5.1). The rubric was specifically created to assess the learning potential of property games for undergraduate property students. No amendments or tunings were undertaken; rather, the scoring rubric, as utilised in the author’s review of the initial games suite and evaluation of Monopoly, was incorporated verbatim as detailed in Appendix 5.1.

7.2.3 Reflective journal

The final evaluation tool applied was a reflective journal. The journal was structured to draw from critical reflections throughout the course and to enable the property students to reflect and initiate transformative practices to guide their actions in an unknown future (3.5.2). While there is no set format, the Boud (1985) DIEP (3.5.5) reflection strategy was promoted to encourage deeper reflection, and potentially uncover additional learnings and perspectives. The reflective journal was further addressed in the prescribed course outline, as discussed in 3.5.5.

7.2.4 Triangulation

The triangulation of results considered three primary connections between the evaluation tools, published research, a larger sample and across the sample. The relationship between the primary and alternative evaluation tools and the triangulation connections is illustrated in Figure 7.3.
Figure 7.3. Evaluation triangulation.
7.2.4.1 Published research triangulation

Published research was utilised as an implied triangulation point throughout the research project. With respect to the previous research findings by Adams (1998), a more formal triangulation opportunity arose as the adopted questionnaire and gameplay activities were compared. Adams (1998) introduced SimCity 2000, a variant of SimCity, as a tool for teaching urban geography concepts (2.6.4). The introductory urban geography class was presented with activities, such as ‘try to create a green city’. They were then instructed to provide critiques addressing whether they enjoyed using SimCity, and what they thought SimCity teaches people about urban processes. Specifically, the students were asked, ‘after doing the experiments, identify two or three ideologies which you feel are “between the lines” of the SimCity software’ (Adams 1998, p. 51).

At the time of the Adams study, in 1996, 13 out of 45, or 29 per cent of the class, had played SimCity before. This compares with six out of 13, or 46 per cent in the PED321 class. The increase would appear reasonable given the growth in market acceptance of the simulation during the past 17 years.

When asked ‘Did you enjoy using SimCity?’, back in 1996, 83 per cent (38/46) responded in the affirmative, as liking SimCity without reservations (Adams 1998, p. 7). In the PED321 subject study, 69 per cent said they enjoyed the experience. While still representing the majority, and broadly supporting the attainment of fun and play in the primary objective (3.5.2), the reduction may relate to the decline in novelty value as students become more familiar with the SimCity variants.

With respect to learning, Adams (1998) found approximately 30 per cent of the students identified an increased respect for urban planners, municipal leaders, and civic decision-makers. Similar results were witnessed in the recent study, with 38 per cent noting an increased respect for the respective roles. In particular, in response to the question about ‘what ideologies inferred’, a student expressed:

*The general population are always going to be complaining about the way the government is doing things. It is very difficult to please everybody and create a region that they are 100% happy to live in.* (Student A 2013, participant)

Similarly, 30 per cent of Adams’s (1998) students saw SimCity as helping people to appreciate the complexity of urban processes. In the more recent study the results were comparable, if not a bit higher with six out of 13, or 46 per cent, making reference to the
complexities of urban processes. In answering the question, ‘What do you think undergraduate students may learn from playing Sim City?’, a property student noted:

*the greatest lesson learnt concerned the gravity of the task it is to conceptualise all the interests and needs of the society and balancing the needs and desires of the population* (Student B 2013, participant).

With respect to the published research, in particular the study by Adams (1998), there were synergies between the responses given and the responses from the questionnaire utilised in this study.

### 7.2.4.2 Larger sample triangulation

The serious game, Playing Property, had been trialled and played in numerous settings including classroom activities for various property-related university subjects, as well as for information and marketing purposes. With respect to the marketing exercises a broad range of players participated in the game and provided feedback. Feedback was collected using four primary methods. These are:

- oral, formative feedback
- anonymous recommendations written on ‘Post-it notes’
- summative responses to feedback questions recorded in the game
- externally collated satisfaction survey.

The findings from each of the tools were considered in the ongoing refinement of the game. The written, summative, and survey responses lent themselves to comparisons with the primary objective (3.5.2), as to whether the activity was enjoyed, or not, and whether the experience was perceived as educational, assisting learning, or not.

Of the 68 written, anonymous recommendations collected in 2013, twenty-five made specific reference to having fun or being bored, and 12 made reference to the game as supporting learning or education. Ninety-six per cent of the responses relating to fun or boredom supported the perspective that the game was fun. Of the responses relating to education and learning, 92 per cent considered the game to be educational. The remaining comments were rather diverse including expressed opinions on the setting and prize allocations.

The later versions of the Playing Property game included two slides where participants could confidentially register whether they enjoyed playing and whether or not
they learned more about property through playing the game. Of the 27 respondents, 15 (56 per cent) strongly agreed, with the remainder more generally agreeing that they did enjoy playing Playing Property (see Table 7.4). As illustrated in Table 7.5, all of the participants agreed or strongly agreed that they learnt more about property through playing the game, although the proportion who strongly agreed was lower at 11 per cent.

Table 7.4

_Summative Response to ‘Did You Enjoy Playing “Playing Property”?’_

<table>
<thead>
<tr>
<th>Session</th>
<th>Yes, strongly agree</th>
<th>Yes, agree</th>
<th>No, disagree</th>
<th>No, strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>PED120 tutorial A 5 Sep 13</td>
<td>7</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PED120 tutorial 6 Sep 13</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PED120 tutorial B 5 Sep 13</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PED220 lecture 26 Sep 13</td>
<td>5</td>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>12</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Proportion</td>
<td>56%</td>
<td>44%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 7.5

_Summative Response to ‘Did You Learn More about Property?’_

<table>
<thead>
<tr>
<th>Session</th>
<th>Yes, strongly agree</th>
<th>Yes, agree</th>
<th>No, disagree</th>
<th>No, strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>PED120 tutorial A 5 Sep 13</td>
<td>2</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PED120 tutorial 6 Sep 13</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PED120 tutorial B 5 Sep 13</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PED220 lecture 26 Sep 13</td>
<td>0</td>
<td>11</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>3</td>
<td>25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Proportion</td>
<td>11%</td>
<td>89%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

The satisfaction survey was externally administered and collated by the university’s marketing and communications department, relating to workshops held during the Experience USC days, in June 2013 (USC Marketing and Communications 2013). The property workshops comprised four 50-minute sessions of the Playing Property game. In total, there were 48 responses to the survey which included a 5-scale satisfaction rating and formative response capture. The responses from the sessions, as depicted in Table 7.6, were positive with 98 per cent considering the session as being ‘good’ to ‘excellent’ and one remaining person rating the session as ‘average’.
Table 7.6
Survey Results from ‘Playing Property’ Sessions

<table>
<thead>
<tr>
<th>Session</th>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Average</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 June 2013, AM</td>
<td>5</td>
<td>6</td>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5 June 2013, PM</td>
<td>10</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 June 2013, AM</td>
<td>4</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6 June 2013, PM</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>18</td>
<td>7</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Proportion</td>
<td>46%</td>
<td>38%</td>
<td>15%</td>
<td>2%</td>
<td>0%</td>
</tr>
</tbody>
</table>

With respect to formative comments, six responses made specific reference to the game contributing to learning or education while two responses made note of not learning much or ‘not much actual learning about economics and development’.

The primary testing sample for the PED321 evaluation comprised 12 students. All except one of the students, or 92 per cent, recorded having enjoyed participating in the Playing Property game. This proportion is broadly in line with the responses recorded through the alternative feedback tools, which reflect that nine to 10 out of 10 participants enjoyed or had fun playing the game Playing Property.

From a learning or educational perspective, the comparison across feedback methods is somewhat more complicated and contestable. Nevertheless, the alternative methods reflect eight to 10 out of 10 participants consider that Playing Property contributes to learning or education. The primary testing sample included one respondent’s comment under ‘What do you think undergraduate students may learn?’ as ‘not much’, with all others drawing positive responses. As such, the proportion of students who consider the game to contribute to learning may be expressed as 83 per cent, this being well supported by the findings from the other evaluation instruments.

7.2.4.3 Inter-sample triangulation

As a third stage of triangulation, the relationship between the responses to the questionnaires and rubric scores are examined along with the findings of the university-initiated and coordinated student evaluation of the course (USC Strategic Information and Analysis Unit [USCSETAC] 2013). The questionnaire and rubric were issued as a single document at the completion of the respective learning activities. The student course evaluations were issued online towards the end of the assessment. Due to the voluntary nature of the course evaluation, participation rates are inherently low with this particular response rate generally below half of the enrolled students.
Within the questionnaire there was a question reading ‘Did you enjoy playing …?’ Similarly, in the rubric there was a category ‘Motivation’, from which the participants could choose a score from 3 to 0 equating to ‘fully immersive, sustaining continued and repeated playing’ to ‘lacking engagement’. While there are subtle differences between the two, the findings present a moderate correlation of 0.6, when the ‘yes’ and ‘no’ answers are allocated values of 1 and 0. More explicitly, the results in Table 7.7 demonstrate that the matrix score prescribed by participants who did not enjoy playing ranged from 0 to 1 or ‘lacking engagement’ to ‘relatively engaging and/or engaging for set periods’. There were no instances of participants considering they enjoyed playing, yet prescribing a matrix score relating to ‘lacking engagement’.

Table 7.7
Comparison of Questionnaire ‘Did You Enjoy …?’ and Rubric ‘Motivation’

<table>
<thead>
<tr>
<th>Game</th>
<th>SimCity Question</th>
<th>SimCity Rubric</th>
<th>Playing Property Question</th>
<th>Playing Property Rubric</th>
<th>Possession v Poverty Question</th>
<th>Possession v Poverty Rubric</th>
<th>Investorville Question</th>
<th>Investorville Rubric</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student A</td>
<td>Y</td>
<td>1</td>
<td>Y</td>
<td>1</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Student B</td>
<td>Y</td>
<td>2</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Student C</td>
<td>N</td>
<td>1</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
</tr>
<tr>
<td>Student D</td>
<td>Y</td>
<td>3</td>
<td>Y</td>
<td>1</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
</tr>
<tr>
<td>Student E</td>
<td>Y</td>
<td>1</td>
<td>N</td>
<td>1</td>
<td>Y</td>
<td>3</td>
<td>Y</td>
<td>1</td>
</tr>
<tr>
<td>Student F</td>
<td>Y</td>
<td>1</td>
<td>Y</td>
<td>1</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>Student G</td>
<td>Y</td>
<td>1</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
</tr>
<tr>
<td>Student H</td>
<td>N</td>
<td>0</td>
<td>Y</td>
<td>3</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
</tr>
<tr>
<td>Student I</td>
<td>Y</td>
<td>1</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>2</td>
</tr>
<tr>
<td>Student J</td>
<td>N</td>
<td>1</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>3</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>Student K</td>
<td>N</td>
<td>0</td>
<td>Y</td>
<td>3</td>
<td>Y</td>
<td>2</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Student L</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Student M</td>
<td>Y</td>
<td>3</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>3</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>Student N</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>3</td>
<td>Y</td>
<td>3</td>
</tr>
<tr>
<td>Student O</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
</tr>
<tr>
<td>Student P</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Y</td>
<td>2</td>
<td>Y</td>
<td>2</td>
</tr>
</tbody>
</table>

The sample size for the externally administered student course evaluation was small at seven with a participation rate of only 44 per cent. Nevertheless, the response to the open question, ‘The serious game-based activities (based on SimCity/Metropolis, Playing Property, and Possession v Poverty) enhanced my learning experience’ (USCSETAC 2013, p. 3), presented six quantifiable responses. The majority, 83 per cent, or five responses, were positive and affirmative with a single response in the negative. Affirmative comments include ‘yes and they were a good way to break up the lecture to
keep you engaged’ (Anonymous) and ‘the games were an alternative way to think about property’ (Anonymous). The negative response reads:

No. The games had no relevance to project management practices and seemed more to be a waste of time. I would understand if they could be related back to my studies and learning in project management but none of the games were relevant to project management. The games and our results seemed more important to the lecturer than our learning. If I wanted to play games I would have remained at home and played video games. I pay money to come to [university] and learn, not to play games and waste half of the semester doing so. (Anonymous)

The formative comment was supported by the rating for the same survey’s statement, ‘overall, I was satisfied with the quality of this course’, which included a single response as ‘disagree’ with the remainder extending from ‘agree’ to ‘strongly agree’.

The inter-sample correlation, and third stage of triangulation, was somewhat complicated by differences in terminology and small samples. On the other hand, the findings across the three evaluation tools were somewhat consistent, with perceptions on whether the games were fun and whether they contributed to learning being reflective of the other triangulated responses.

7.3 Games suite findings

7.3.1 Questionnaire findings

In analysing the responses to the questionnaires the findings were considered primarily on a question-by-question, cross-sectional basis with consideration given to individual games and how they contributed to the games suite. The questions asked of the participants form the headings as detailed.

7.3.1.1 Have you played ...?

Have you played ... before? If so how frequently, which versions and on which platforms?

The students were relatively inexperienced in playing the games that make up the suite. For only one game, Possession v Poverty, had more than half the class played a variant of the game before. Fifty-four per cent of the participants had played Possession v Poverty earlier in a Property Economics and Development course, in an education setting.
Nearly half of the cohort had previous experiences with SimCity. The previous recorded play was orientated toward earlier years and not set in an education environment or as a serious game–based activity. Rather, terms such as ‘for recreation’ or ‘for procrastination’ were shared, with one participant noting:

*Yes, in my youth I played SimCity. For a phase of approximately 6 months, I played SimCity up to 6 hours a week. This was not a regular play with set times it was more so something to procrastinate or fill in spare time. Version was SimCity4.* (Student C 2013, participant)

One-third of the students had previously played Playing Property and Investorville in an educational, classroom setting. In particular, connections were made to the use of the audience response systems, or ‘clickers’, being used earlier in the property industry event, ‘State of the market: Sunshine Coast’ (7.1.2). For the 33 per cent who had previously played Investorville, the responses related to the voluntary use of the game during a tutorial in another property course.

### 7.3.1.2 Did you enjoy...?

*Did you enjoy using ...? What do you enjoy or not enjoy about it (be specific)?*

When asked whether they enjoyed playing Possession v Poverty and Investorville, all responders chose the affirmative. With Possession v Poverty, three students spoke of liking the negotiations and two specifically enjoyed the opportunity for interaction. While all students reported enjoyment in playing Investorville, one of the responders qualified their answer with a yes and no. In playing Investorville, students appreciated the real-life measures (4), the action of buying and selling (3), the strategic nature (2), and authentic representation and ability to structure loans. Specifically, Student D (2013, participant) spoke of applying investment strategies, with a response of, ‘yes, I enjoyed playing it. It was interesting to experiment with different investment strategies’.

The Playing Property activity was enjoyed by all but one participant. The single adverse response was provided by an international student who expressed, ‘there was too [little] information to [choose in] the last period. No knowledge about the very early years’ (Student E 2013, participant). With respect to the other 92 per cent, broad reasons for enjoying Playing Property related to: the competitive nature (3), gambling (2), being informative, recalling the past, drawing upon logic and trends, reality, making choices, winning, history, and watching others’ choices. ‘Watching others’ and other responses may similarly be considered in the category of receiving immediate feedback.
The least popular of the four games was SimCity, with 69 per cent enjoying the activity. Interestingly, there was a relatively weak correlation of 0.14 between players who enjoyed the game and those who had played it before. Those that disliked the SimCity tutorial cited ‘growing frustrated’ in some manner, whether it was gameplay or the lack of scaffolding or simply the activity appearing irrelevant. There was a relatively strong correlation of 0.59 between students enjoying the game and their rubric rating of motivation.

7.3.1.3 Describe the results ...?

Describe the results of your task
In describing their results from playing Possession v Poverty, students made reference to the zero-sum nature of the game, with gain coming from another’s loss. While this criticism is shared with Monopoly (Axelrod 2002; BoardGameGeek cofounder Derk Solko, cited in Curry 2009) (5.3.2), it was not considered by the students as a deterrent to playing Possession v Poverty. Rather, students made reference to performance against others and were generally positive in describing their results, making reference to holdings and equity reserves. A few responders commented on the time allocated as being too short to finish the activity.

SimCity incited a range of responses when students were asked to describe their results from the gameplay. Two responses were depicted as positive, three were average, with the remainder including reflections on starting well then fading to a level of ‘failure’. Student D, an experienced SimCity player, reflected on his results, reporting:

[I] was able to make the simulation work at a profit, however it did come at a cost to the environmental sustainability of the city. To start off with the city was not very sustainable at all, but as time went on I was able to make more money, neighbourhoods deals were struck to eliminate the need for heavy polluters such as power stations. Other steps were also taken such as manipulation of tax rates to encourage less industrial demand and more commercial demand; these were however unsuccessful. As time goes on and other functions unlock further into the simulation such as access to subways and light rail I think air pollution may also be to be reduced. (Student D 2013, participant)

Descriptions of results collected from Playing Property and Investorville were rather shallow. Primarily, reference was made only to positions on the leader board or return measures as percentage of growth. With Playing Property, occasional comments were noted such as, ‘my results reflected my knowledge or lack of knowledge in some markets
i.e. [homes] was good sheds not as much’ (Student F 2013, participant). As illustrated in Table 7.3 (7.1.4), each student underperformed the ‘community average’ reported on the Investorville simulation, which may have contributed to the lack of depth in the reflections on positive results.

### 7.3.1.4 ... think students learn ...?

*What do you think undergraduate property students learn from playing ... (this may be something correct or incorrect in your view; in either case, explain)?*

Discussions regarding Possession v Poverty were rich with insightful considerations of the relationships between worth, value and risk. Negotiations, strategy, risk, and yields were other prominent discussion points in considering what students may learn from playing the board game. Other points of interest included the necessity for undertaking a level of due diligence before acquiring property, consideration of the development potential of each property, forced sale values, and portfolio management. Student G (2013, participant) summarised many of the shared points in noting that they ‘learn how to bid in an auction and how to manage a portfolio of properties. It makes you think strategically’. Student H (2013, participant) reflected on the parallels between the gameplay and greater property market: ‘[the] property market is a reflection of what someone is willing to pay’.

The SimCity exercise presented an array of responses to the question of what students may learn. Two responders simply answered nil, implying they did not think undergraduate property students learn anything from playing SimCity. The more frequently reported potential learnings from the gameplay included: a developed understanding of the need for [town] planning ahead (5), considered stakeholder management (3), balancing the needs of stakeholders (2), and the value of infrastructure (2). Other suggested potential learnings relate to social issues, decision-making, budgeting, and considered prioritisation. Specific responses to ‘What do you think undergraduate property students learn?’ from playing SimCity include:

*The greatest lesson learnt concerned the gravity of the task it is to conceptualise all the interests and needs of the society and balancing the needs and desires of the population.* (Student B 2013, participant)

*The challenges of spatial planning and the issues faced by planners. I think it gives property student a basic understanding of the issues planners face. However, I believe the game could be strengthened in particular aspects such as conflicting desires/needs of stakeholders – but, this is not fun!* (Student I 2013, participant)
When considering learning from Playing Property, market information and trends dominated the participants’ responses. The game was considered to assist with learning the necessity for quality of analysis (3), consideration of market history (3), quality of material, nature of property cycles, the view that ‘media isn’t always right’, and how difficult it is to predict market movements. In sharing the view that the media is not always correct, Student F (2013, participant) considered players ‘learn to see through the headlines too [sic] make decisions’. Similarly, Student J (2013, participant) speaks of ‘reading/remember the property market. Consider the quality of quoted information’. Interestingly, the only student who recorded not enjoying the exercise proposes that students may learn ‘that the market is very hard to predict and underlies huge variations’ (Student E 2013, participant).

The proposed learnings from Investorville may be regarded as somewhat complementary and fairly extensive. The most popular considerations of what students may learn from playing include finance and investment lessons. Specifically, it was acknowledged that students may learn about investing (4), loans-to-value ratios (4), cash flows (3), property market (2), and property management (2). Less acknowledged considerations include yield analysis, real-life applications, using informed decisions, and considerations of risk. Conversely, a town planning student acknowledged the game’s bias toward numbers and finance, quoting Investorville as being:

Rather emotionless - most students went quite [quickly], it was all about numbers - which may suit some, whereas others may invest with picture i.e. - that looks like a good house/apartment/investment. (Student I 2013, participant)

7.3.1.5 … ideologies inferred …?

After completing the task, identify two or three ideologies which you feel are inferred or, ‘between the lines’.

The students’ proposed ideologies, inferred from gameplay, were generally similar to their considerations in what they ‘think students learn’ from the prior question. With regard to Possession v Poverty, popular ideologies related to negotiation (4), aggressive growth and strategy (3), development potential and profit (2), and over-leveraging (2). Considerations were also given to cash flow, worth, return, ownership, risk, value, potential and emotional attachment to particular areas. Student K (2013, participant) and Student G (2013, participant) captured elements of ideologies inferred from playing Possession v Poverty, in their responses:
Develop to obtain profit. Negotiation skills. The aggressive growth strategy needs to be sustainable. (Student K 2013, participant)

Market prices are fictional or may not be exact representations of real locations. The bidding at auction gives a false sense of buying properties heavily discounted which may rarely happen. (Student G 2013, participant)

With SimCity, the dominant ideologies relate to sustainability, in particular social and environmental considerations. Two students considered the simulation to promote unsustainable development; a further two considered the model to have a lack of reality. Student F (2013, participant) supports the assertion of conflict with sustainability, noting ‘efficient communities with limited non-economic producing infrastructure [are] encouraged’ in SimCity. Others considered the principles of balance (2), the role of infrastructure (2), stakeholder management, a monochromatic society, and development model (segmentation) as inferred ideologies. Student D (2013, participant) made a specific reference to designers of the simulation game, describing:

In the version I [played] there was not really any option to build a fully environmentally friendly city from the very beginning. This is due to the fact that none of the environmentally friendly options such as recycling plants and wind turbines are available at the very beginning of the game. Instead they only become available when the city reaches a certain size. This would suggest to me that the game creators believe cities must grow and then become environmentally friendly if they wish to remain financially sustainable. (Student D 2013, participant)

Inferred ideologies from Playing Property had a bias towards market trends and the impact of the global financial crisis. Four students shared the view that personal comments and market material shared in the media are not accurate. Additional ideologies expressed from gameplay include the value of inaction (2), the role of guessing, market sectoring, and the requirement for a holistic understanding of all markets. Quoted ‘ideologies’ associated with the playing of Playing Property include:

Separating the market sectors. Considering the change in market sectors. Gambling is part of property! (Student J 2013, participant)

You cannot predict property by analysing historical cycles. (Student D 2013, participant)

Sometimes making no action is best. Knowledge of all markets is key. (Student L 2013, participant)

Controversial ideologies were uncovered during the identification of ideologies from the Commonwealth Bank of Australia game, Investorville. For example, a town planning student questioned the direction of the bank, and game, in a similar manner to the
responses uncovered in the evaluation for Chapter 5 (5.5), expressing that it presents the illusion of ‘easy investing’, in that it makes investment appear:

   easy - so easy you don’t really need to really look at the numbers. The emotionless nature of property investment - I think the program lacks a ‘human’ element - maybe introduce conflict with renters or even an auction event. (Student I 2013, participant)

Similarly, two students identified unpredictable results and shared a view of scepticism, specifically with regard to the bank providing such a game. More positive identified ideologies were related back to the consideration of leveraging and loan structure (3), property selection (2), varying sector (unit v house) returns, the concept of time value of money, capital expenditure, market risk, suburb, and local issues impacting returns, price, and cash flow.

7.3.1.6 Formative comments

The formative comments which were shared regarding Possession v Poverty, Playing Property and Investorville, were principally gameplay and technical recommendations. Recommendations for Possession v Poverty extended to issues with money colour choices, terms for the jail and reserve price setting for auctions. With respect to Investorville a planning student, who identified the lack of social aspects as a weakness, suggested the integration with social networking, noting ‘Facebook integration I think would increase the social aspect’ (Student I 2013, participant).

SimCity attracted more formative comments. One student made the connection between local council’s strategy and the gameplay of the simulation. Student A discussed the learning activity and required foresight by council in:

   I think this is quite a good exercise for students to undertake as it does represent a number of relevant aspects of the property environment, and it also does represent that it would be quite a task for the Sunshine Coast to become the most sustainable region and it would take a lot of planning and commitment to achieve. (Student A 2013, participant)

Student J, a mature age student, expressed the technical and technological issues she faced in the exercise as she purported:

   I would not have persevered past the first 10 minutes if I had not needed to complete the rubric as I did not or could not locate enough information to keep going. I did not understand the income and spending! Age and not growing up with computers may influence my perspective!!! (Student J 2013, participant)
7.3.2 Rubric scoring

In an aim to assess the learning potential of property games, the students completed a rubric at the conclusion of the serious game–based activities. No amendments or tunings were undertaken, rather the scoring rubric, as utilised in the author’s review of the initial games suite and evaluation of Monopoly, was incorporated verbatim as detailed in Appendix 5.1.

The aggregated results, presenting the average scores from the scale of 0 (poor) to 3 (excellent) are depicted in Table 7.8 and Figure 7.4. The highest scores are generally attributed to knowledge of property practice, in playing Possession v Poverty and Investorville. The lowest scores relate to numeracy in Playing Property and teamwork in SimCity. As addressed in the development of the scoring rubric (5.1.1) (Appendix 5.1), it is prudent to note that no further tuning has been undertaken, as such summated totals do not necessarily reflect one game being better than another.

Table 7.8 Rubric Score – Average

<table>
<thead>
<tr>
<th>Rubric average</th>
<th>SimCity</th>
<th>Playing Property</th>
<th>Possession v Poverty</th>
<th>Investorville</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Knowledge…practice</td>
<td>1.85</td>
<td>2.00</td>
<td>2.46</td>
</tr>
<tr>
<td></td>
<td>Knowledge…market</td>
<td>1.08</td>
<td>2.08</td>
<td>1.96</td>
</tr>
<tr>
<td>Skills</td>
<td>Communication</td>
<td>1.08</td>
<td>1.75</td>
<td>2.31</td>
</tr>
<tr>
<td></td>
<td>Numeracy</td>
<td>1.46</td>
<td>0.58</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Interpersonal</td>
<td>1.23</td>
<td>1.83</td>
<td>2.08</td>
</tr>
<tr>
<td>Attributes</td>
<td>Problem-solving</td>
<td>1.92</td>
<td>1.92</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>Teamwork</td>
<td>0.54</td>
<td>1.33</td>
<td>1.54</td>
</tr>
<tr>
<td></td>
<td>Awareness</td>
<td>1.69</td>
<td>1.83</td>
<td>1.38</td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
<td>1.31</td>
<td>1.83</td>
<td>2.31</td>
</tr>
<tr>
<td>Total</td>
<td>12.16</td>
<td>15.17</td>
<td>18.04</td>
<td>16.17</td>
</tr>
</tbody>
</table>

The average scores from Investorville are not dissimilar to the scores prescribed in the initial games review from Chapter 5 (5.1.2). Of the nine categories, only three present variations of more than one point from study to study. The variations relate to numeracy, social and environmental awareness, and motivation. In each case, the earlier study conducted by the author presented modestly more conservative ratings.

From the students’ scoring, the individual games present some synergies in being bundled as a suite. As illustrated in Table 7.8, weaknesses in some games may be offset by strengths in others. For example Playing Property, with a low score of 0.58 out of 3 for numeracy, is complemented by the relatively high score from Investorville at 2.21. A
similar relationship is presented in the category of communication, where Possession v Poverty rates 2.31 to offset a relatively low score of 1.08 for SimCity.

Even with grouping the games, there are categories in which the accumulated rubric scores are still relatively low. Teamwork stands out as one such attribute not addressed to the same extent as others. While the games may be reset with learning activities encouraging teamwork, it may be more effective to achieve the attribute through other non-gaming learning activities. For example, in PED321, a relatively large proportion, 40 per cent, of a student’s total grade is weighted toward team activities (USC 2013a). Therefore, as part of their overall learning experience it may not be necessary to fill all the gaps in learning attributes through serious game design. Rather, it may be better to focus on designing games that enhance the learning experience for an undergraduate property student who is exposed to both traditional and new forms of learning activities.
Figure 7.4. Rubric score – average.
7.3.3 Reflective journal

7.3.3.1 Knowledge

Connections between gameplay and knowledge creation are evident, at least to some extent, in each of the participants’ reflective journals. In some instances the reflections are holistic, or general in nature, as captured by Student L:

*Playing these games provided an opportunity to ‘put your knowledge into practice’ so to speak. The course reinforces the fundamentals of markets and property however as a student you never really have the opportunity to invest money, make calls on properties and the market, and see these results (even if they were in a pretend environment).* (Student L 2013, participant, pp. 1–2)

There were more situated reflections on knowledge as well. Student M (2013, participant) made reference to the employment of several basic town planning techniques in playing SimCity, commenting that, ‘overall I think the task was successful in getting us thinking about basic development concepts and town planning techniques’ (Student M 2013, participant, p. 3).

Investorville incited an array of reflections, from a simple statement that the game presents a ‘more realistic interpretation of property investment’ (Student L 2013, participant, pp. 1–2), to an acknowledgement that the simulation ‘helped me gain a deeper appreciation of the importance of demographics, amenity, suburb profiles and market value’ (Student N 2013, participant, p. 8). Student M (2013, participant) went further in her critique, finding an application for the acquired knowledge in saying Investorville:

*demonstrated a level of uncertainty and volatility in the market. After playing the game, I can see the importance in starting out in a small investment. I will take this into consideration when I am ready to purchase my first property.* (Student M 2013, participant, p. 10)

Student L (2013, participant) made extended reflections on the playing of Possession v Poverty, connecting game practices with the fundamental economic principles of supply and demand and the effect of auctions. More specifically though, Student L considered the game to demonstrate:

*how different properties yields need to be assessed when considering an investment, just because a property appears a sound investment and fits within your budget, you have to look deeper at way[s] you can extract the most return on your investment potentially through realizing a highest and best use. Further I found it showed the nature of property markets quite well (although*
to a basic extent). The effects of supply and demand came through strongly whilst [playing]. (Student L 2013, participant, pp. 1–2)

As discussed by Student C (2013, participant), sometimes the learning bridges knowledge and skills and graduate attributes. In her discussion of Playing Property she made the simpler connection to problem-based learning (2.6.3.2), but went further to discuss the experience of playing the game with other students present: ‘it is relatively easy to say we know where the market has or does stand, however it’s another thing to be tested on this with your peers present’ (Student C 2013, participant, p. 7).

7.3.3.2 Skills

As a novel reflection on interpersonal skills, Student J (2013, participant) spoke of playing the personality as opposed to the game. Regarding the play of Possession v Poverty, Student J responded:

The game was a lot of luck requiring only a little expertise, each player was reading each other’s personality and playing the personality rather than the game! It was interesting to see the others reading each other’s personality and playing the personality rather than the game! Competitiveness over takes common sense in game play! Some people don’t play to win – just to make sure others loose [sic]. (Student J 2013, participant, p. 4)

Other interpersonal reflections related to critical thinking and the judgment of actions and approaches adopted in the gameplay (Student G 2013, participant). In particular instances there appeared to be a conflict between the reflections where judgement was made that the game did not contribute to learning, while the reflection itself demonstrated a development of knowledge or skills. For example, Student K (2013, participant) was generally critical of the role of games in the learning process for property students. Nevertheless, the student appeared to experience constructive failure in playing SimCity, with the reflective comment:

I attempted and failed. I couldn’t get anybody to move into my city and it just looked like a barren wasteland. On a learning perception I struggled to draw any conclusions on what I was learning from this process and how it related to project management. (Student K 2013, participant, p. 5)

Student K (2013, participant) arguably gained more than he or she had perceived through the playing of Possession v Poverty. The interpersonal reflection on ingrained concepts and game design appears to be overlooked in the reflective journal as the student reflection reads:

I feel for the game to be a success a shift needs to be made away from the Monopoly template. It’s hard to break that concept that has been deeply
ingrained in us from childhood. [Possession v Poverty] has a more thorough concept behind the workings of property and replicates the market more realistically. For myself I struggle to draw a learning outcome from the game but find it engaging and fun. (Student K 2013, participant, p. 19)

Possession v Poverty was clearly the game most considered in reflections on skill development. The ability of the game to encourage engagement with others and even provoke competition featured prominently. This opportunity for engagement with classmates may be considered more relevant for larger classes or those that are delivered in a blended or online manner. On the other hand, even in a small class such as PED321 there are students who spoke of the opportunity ‘to socialise with some other fellow classmates who I don’t usually talk to so much which was a good experience as well’ (Student D 2013, participant, pp. 7–8).

Student C (2013, participant) reflected further on the interaction between players and the competitive nature of playing Possession v Poverty. In making reference to an in-house rule the student said, ‘even though this rule didn’t last long as the [adjudicator] stepped in, it showed the competitiveness of team members’ (Student C 2013, participant, p. 9). In support of ruthless play and related fun, Student C spoke of Possession v Poverty as:

a hands on board game that enabled team members to interact with one another. I found however that regardless of the rules that were set out for play team members, me included, would try and find ways to cheat the game or otherwise get more for our buck. (Student C 2013, participant, p. 9)

7.3.3.3 Attributes

Student M (2013, participant) and Student G (2013, participant) discuss the strategic thinking and problem-solving inherent in the playing of Possession v Poverty. Similarly, Student J (2013, participant) considers strategy in gameplay and the connection with business dealings through the reflection:

Looking to see what strategies are in place, reading other’s personalities and formulating a strategy that is ethically sound might be what is lacking in a lot of business dealings? (Student J 2013, participant, p. 4)

Besides comments regarding engagement with peers, there appeared a void in the discussion and reflection on teamwork. As previously noted, Possession v Poverty was highlighted as an engaging activity to play with peers (Student C 2013, participant; Student D 2013, participant; Student J 2013, participant); conversely, there was no evidence of deeper reflection in how teams form or operate in the gameplay. The
reflective journal may be regarded as supporting the assertion from the questionnaire and rubric that teamwork is an attribute not sufficiently realised through the playing of the assigned serious games suite.

Student I (2013, participant) and Student B (2013, participant) reflect upon land use and the complexity of sustainability in discussing the SimCity activity. Specifically, Student I speaks of SimCity as ‘[showcasing] the somewhat unattainable balance between the private and public realm’ (Student I 2013, participant, p. 2). Through the serious game–based activity Student B asserted to ‘now understand the complexities involved in land use and its allocation’ (Student B 2013, participant, p. 3).

In the reflective journals, the discussion around the serious games frequently referenced motivation, or enjoyment. While overwhelmingly the reflections are supportive of the engaged play, there are opposed considerations which are, arguably, more important. As demonstrated in the modestly negative relationship correlation between academic achievement and acceptance of the serious games suite, discussed earlier in this chapter, it was noteworthy to consider who was less engaged in the experience. Student C (2013, participant), Student K (2013, participant) and Student J (2013, participant) each reflected upon an occasion where their motivation in play lapsed. This was captured in a reflection by Student K in playing Investorville:

\[ I \text{ travelled well with the game until halfway through when I stopped caring then my performance dropped. I suppose that’s a lesson to take out of it. When you stop caring things go wrong.} \text{ (Student K 2013, participant, p. 21) } \]

Both Student K and Student J may be regarded as academic performers or, as Biggs and Tang (2009) note, ‘Susans’, due to them having the highest grade point average leading into the subject (2.1). Conversely, some of the most detailed expressions of engaged play reflected upon were by students with the lower entry grade point averages, including Student L (2013, participant) and Student B (2013, participant). Student L’s general reflection on gameplay in PED321 was supportive of serious games in learning and detailed as:

\[ \text{Whilst these games are a novel approach to learning property, I believe that they provide a sound alternative for gaining insight into the fundamental aspects of these markets. The learning’s are reinforced to a much greater extent when playing the games as you feel as though you have a vested interest in the outcome. This is opposed to say [being] described the negative effects of investments in lectures. It is through this reinforcing of the fundamentals that I see the games having the most impact later in life as I move towards investing. I can see these lessons being applied to future investment considerations bring} \]
In discussing the SimCity exercise, Student B (2013, participant) made reference to the benefits of the learning activity over reading texts, in the reflection:

This was a good interactive learning experience that may not have been able to be achieved through texts because of the scope the game could provide. It gave me an appreciation of the role of the town planner and I now understand the complexities involved in land use and its allocation. (Student B 2013, participant, p. 3)

In further consideration of motivation in gameplay, Student M (2013, participant) used terms such as ‘a refreshing activity that kept me engaged’ (Student M 2013, participant, p. 9). Student E (2013, participant) was similarly appreciative of the novel addition:

The games like SimCity, Investorville and Possession and Poverty have given the course a nice variation and required the application of the learnt theory in a playful manner. They have often been the highlight on a university day and were motivating and fun. (Student E 2013, participant, p. 2)

Student E’s (2013, participant) reflection is particularly noteworthy, as he or she is an international student who was initially critical of the in-class game Playing Property (7.3.1.2).

7.4 Conclusion

This chapter discusses the implementation of the serious games suite, including the development of learning activities to leverage the educational potential from two property games. The four serious games were incorporated into the curriculum of the third-year, undergraduate property course.

A total of 16 students agreed to take part in the research; the students were asked to make available their feedback by way of reflective exercises, including questionnaire responses, rubric scoring and journal entries. The feedback was reconciled through triangulation, with connections between the evaluation tools, published research, a larger sample and across the sample being examined. The findings across the evaluation tools were generally consistent with the adopted evaluation approaches and the reconciliation provides a rigorous base for considered assertions. The assertions do not, however, constitute conclusive findings as the sample may be regarded as too small, and the duration of the study too short.
In the same way, while there were extenuating influences on the sample, a comparison across cohorts revealed that later-year property students outperform students in introductory years, in anticipating property market trends. Notably, the scores from the final-year participants, in playing Playing Property, were toward the higher end of the recorded sample which includes results from 118 participants in first- and second-year property courses as well as the attendees of the university’s experience day and open days.

A comparable trend was not experienced in the playing of Investorville. There were no comparisons across student cohorts, and issues were raised with regard to the authenticity of the simulation’s assumptions. Nevertheless, it may have been anticipated that the property students might do well in playing a property investment simulation game. Yet the third-year students underachieved, with no one meeting or exceeding the game’s prescribed ‘community average’ return.

The findings were more conclusive when considering whether the suite may be classified as games, and meet part of the primary objective, ‘to support the learning processes of property students in a fun, more playful way’ (3.5.2). According to the participants, three of the serious game–based activities, relating to Possession v Poverty, Playing Property and Investorville, conclusively meet the Oxford University Press (2014) definition of a game, being activities ‘that one engages in for amusement’. The learning activity related to SimCity, for the majority of the participants, may also be regarded as a game, or fun problem-solving activity. In future applications due consideration must, however, be given to the delivery of the SimCity learning activity to ensure that fun prevails over frustration.

The potential learnings identified in the students’ questionnaire responses, reflective journals and scoring of the rubrics, lead to the conclusion that the serious games suite supports learning. As such, the suite may be regarded as meeting the serious games criteria with each of the ‘games [aiming] to support learning processes in a new, more playful way’ (Poplin 2011, p. 195).

While the findings support the view that the serious games suite may enhance the learning experience of undergraduate property students, another significant finding emerged from the few responders who were more critical of the exercise. The conflict between the reflections was well captured in the formative comments in the questionnaire and reflective journal. Where judgement was made that the game did not, in the student’s
perception, contribute to learning it was followed by a reflection that demonstrated a development of knowledge or skills.
Chapter 8  Conclusion

This chapter presents the significant findings of the research, specifically the findings that will be of interest to property educators and property researchers. The contribution of this research is first considered with reference to the research methodology and question. Subsequently, the salient findings are discussed in both practical and research applications with future research opportunities identified.

This research endeavoured to demonstrate how to design serious games to enhance the learning experience for undergraduate property students, in Australian universities (2.7). Fundamental to this endeavour was the principle that knowledge and understanding of the problem and its solution are acquired in the process of designing and building an artefact. As such, this research comprised the design and development of a serious games suite for use in Australian higher education. The project utilised principles and activities of design science, a novel but accepted approach in the property discipline, although soundly based on traditional experimental and design approaches to education and an established method in Information Technology (3.3). The design science method was supported by explanatory theories from education research. This methodology has been applied in this research to the property discipline in a comprehensive, analytical and measured approach.

8.1  Research structure

This research relates to designing serious games to enhance the learning experience for undergraduate property students, in Australian universities. At the commencement of this research it was necessary to determine an appropriate research structure.

Design science research methodology, as proposed by Peffers et al. (2008) (3.4), has been applied as the overarching methodological framework. The design science method
was supported by explanatory theories from education research. Theories and approaches assigned to this project include constructivism (2.2), as learning and teaching theory, and constructive alignment (2.3), as the systematic approach to the alignment of teaching/learning activities, and the assessment tasks to the learning outcomes, according to the learning activities.

The design and development of the games suite take place with the author, as the designer, embedded in the domain of property education. In practice, the serious game designer is an educator in higher education, simultaneously educating and researching. As such, the emergent findings of the research project are considered, in transformative reflection, to influence further learning and teaching practices. Nevertheless, the primary goal of the research project relates to the artefact design (3.3).

The design of the artefact, or games suite, relies on existing theories of constructivism and constructive alignment. Constructivism, as applied in this research, supports the notion that knowledge is not transmitted to the student, but rather is constructed through the activity or social interaction (2.2). Constructive alignment is the model and framework utilised for reflecting on property education and uncovering opportunities to enhance learning though serious games.

The salient expression of design science activities and how they were applied in this research project is depicted in Table 8.1. The problem identification and research motivation emerged in chapters 1 and 2 and were progressively refined throughout the duration of the research. The objectives for the solution were established in Chapter 3, as an elaboration of the role of serious games (2.6.3) and the intended learning outcomes for an Australian property program (2.6.2). As the problem evolved and solutions were considered, the research extended to the design and development of two serious games, Playing Property and Possession v Poverty, in order to test applied theory. To complete the serious games suite, a further two proprietary games were repurposed for Australian property students. The suite was subsequently demonstrated and evaluated with the assistance of property students, as described in Chapter 7.
### Table 8.1

*Design Science Research Methodology (DRSM) Activities*

<table>
<thead>
<tr>
<th>DSRM Activity</th>
<th>As applied in the design of the serious games suite</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Problem identification and [research] motivation</td>
<td>The needs of a new student cohort are not expected to be met by the current teaching methods alone (1.2) and there is an implied directive to find the right pedagogical tools to engage students and develop them as deeper learners (2.1). Serious games present as one solution for universities aiming to support learning processes in a more playful way (2.6.3). As such this research endeavours to contribute to extant research by demonstrating how serious games may be designed to enhance the learning experience for undergraduate property students, in Australian universities.</td>
</tr>
<tr>
<td>2. Define the objectives for a solution</td>
<td>Primary objective: To support the learning processes of property students in a fun, more playful way. Secondary objective: To enable property students to analyse the functioning of [investment and development] property and apply practical skills to make the best decisions in [real-life property situations]. (3.5.1)</td>
</tr>
<tr>
<td>3. Design and development</td>
<td>Two purpose-built serious games, Playing Property and Possession v Poverty.</td>
</tr>
<tr>
<td></td>
<td><strong>Game</strong></td>
</tr>
<tr>
<td>Playing Property</td>
<td></td>
</tr>
<tr>
<td>Possession v Poverty</td>
<td></td>
</tr>
<tr>
<td>4. Demonstration</td>
<td>The purpose-built serious games along with the repurposed SimCity and Investorville games implemented as learning activities.</td>
</tr>
<tr>
<td></td>
<td><strong>Game</strong></td>
</tr>
<tr>
<td>SimCity</td>
<td></td>
</tr>
<tr>
<td>Investorville</td>
<td></td>
</tr>
<tr>
<td>5. Evaluation</td>
<td>The primary evaluation method incorporates a questionnaire and scoring rubric and a reflective journal (7.2). The triangulation of results considered three primary connections between the evaluation tools, published research, a larger sample and across the sample being examined (7.2).</td>
</tr>
<tr>
<td>6. Communication</td>
<td>The structured thesis provides the primary communication mechanism, being explicitly structured to align with design science guidelines and activities (3.6).</td>
</tr>
</tbody>
</table>

*Source: Peffers et al. 2008, p. 54; Author.*

### 8.2 Research conclusions

The fundamental research question is: ‘How to design serious games to enhance the learning experience for undergraduate property students, in Australian universities’ (2.7). In answering the question and demonstrating ‘how’, initial research was required to elaborate on and extend existing research on property education, prior to commencing the design and development of the serious games (3.4). As addressed in design science research, the design of an innovative artefact, such as the serious games suite, is dependent upon an understanding of the specific problem domain.
Chapter 1, and the literature review, Chapter 2, sought to define the problem and the domain. While the review of published research supported the notion that serious games may enhance the learning experience for property students, there was insufficient empirical support to define what skills, attributes and knowledge are sought after by property graduates, let alone how well their playing of serious games contributes to satisfaction of the intended learning outcomes (2.7). As such, the design activity associated with the research question, and overarching design science method, could not be approached without extending and elaborating on extant research, as illustrated in Figure 1.1 (1.3).

Due to the staged and dependent nature of this research the conclusions are considered in pre-design and design stages.

8.2.1 Pre-design stages

The three dependent, pre-design stages that contributed to the conclusions are:

1. **Extend** property education research to define a concise set of intended learning outcomes for a property program (2.6.2) and define the design objectives (3.6.2).
2. **Elaborate on the knowledge, skills and attributes** sought after for, and by, graduates of undergraduate property programs in Australian universities (4).
3. **Extend** serious games research to identify what an undergraduate property student may learn from playing domain-situated games (5).

8.2.1.1 Extend ... research to define ... intended learning outcomes

The first dependent research task related to the constructive alignment approach to learning and teaching, in particular the statement of intended learning outcomes for a property program (2.3) (2.6.2). The formation of the intended learning outcomes was approached through a review of published research as detailed in Chapter 2. By applying constructive alignment to the discipline of property education, program level intended learning outcomes were formed. The five, property program intended learning outcomes adopted in this research, and their development, are discussed in 2.6 and re-presented as:

1. Describe and explain objective theories of property custodianship and the practical skills you require for a career in property.
2. Analyse the functioning of [investment and development] property and apply practical skills to make the best decisions in real-life property situations.
3. Communicate effectively as a professional with clients and colleagues in addressing real-life property situations.
4. Operate effectively and ethically as a team member in real-life property situations.
5. Reflect on your role as a property student and initiate transformative practices to guide your actions in an unknown future.

The review of published research into serious games presented a range of ways in which playing games may enhance learning. In particular, serious games were categorised as problem-based learning activities that support learning processes in a new, more playful manner (2.6.3). More specifically, the attributes associated with the playing of serious games aligned with the second intended learning objective. As such, in framing an objective-centred solution, the primary and secondary objectives related to supporting learning processes of property students in a fun, more playful way, and enabling property students to analyse the functioning of [investment and development] property and apply practical skills to make the best decisions in real-life property situations. The remaining program level intended learning outcomes were re-phrased as tertiary objectives. The objectives for a solution, and artefact development, are discussed in Chapter 3 and presented in Table 8.2.

Table 8.2

<table>
<thead>
<tr>
<th>Priority</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>To support the learning processes of property students in a fun, more playful way</td>
</tr>
<tr>
<td>Secondary</td>
<td>To enable property students to analyse the functioning of [investment and development] property and apply practical skills to make the best decisions in real-life property situations</td>
</tr>
<tr>
<td>Tertiary</td>
<td>To enable property students to describe and explain objective theories of property custodianship and the practical skills they require for a career in property</td>
</tr>
<tr>
<td></td>
<td>To enable property students to communicate effectively as professionals with clients and colleagues in addressing real-life property situations</td>
</tr>
<tr>
<td></td>
<td>To enable property students to operate effectively and ethically as team members in real-life property situations</td>
</tr>
<tr>
<td></td>
<td>To enable property students to reflect on their role as property students and initiate transformative practices to guide their actions in an unknown future</td>
</tr>
</tbody>
</table>

8.2.1.2 Elaborate on the knowledge, skills and attributes ...

The second dependent research task in pre-design stage 1 required an elaboration on the extant research with a more detailed investigation into Australian property programs. The
investigation sought to identify knowledge, skills and attributes which would be suitable to build a framework for assessing the effectiveness, or otherwise, of learning activities such as serious games (Chapter 4). The identification of such knowledge, skills and attributes was initially discussed in the literature review with the answer sought through a review of published research. Studies by Tu et al. (2009), Poon, Hoxley and Fuchs (2011), and Poon and Brownlow (2014), among others, provided some guidance, although there were clear limitations as acknowledged in their respective research papers. A common limitation of the published studies related to the nature of the samples informing the findings (2.7).

The findings of the property education investigation, in particular the identified gaps between required attributes and skills, and traditional teaching and assessment practices, presented an opportunity for the design of the games suite. With respect to knowledge, an understanding of both property practice and the property market were sought after. Desired graduate skills were broadly covered through the categories of communication, numeracy and interpersonal skills. A successful graduate of a property program may be said to possess the attributes of creative/critical problem solving, working in a team, and demonstrating social and environmental awareness. The tabulated and categorised findings from the investigation are shown in Table 8.3.

Table 8.3

Knowledge, Skills and Attributes of Graduates

<table>
<thead>
<tr>
<th>Category</th>
<th>Subcategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>… of property practice</td>
</tr>
<tr>
<td></td>
<td>… of property market</td>
</tr>
<tr>
<td>Skills</td>
<td>Communication</td>
</tr>
<tr>
<td></td>
<td>Numeracy</td>
</tr>
<tr>
<td></td>
<td>Interpersonal</td>
</tr>
<tr>
<td>Attributes</td>
<td>Creative/critical problem-solving</td>
</tr>
<tr>
<td></td>
<td>Team work</td>
</tr>
<tr>
<td></td>
<td>Social and environmental awareness</td>
</tr>
</tbody>
</table>

Source: Tu et al. (2009); API accredited program or course outlines; Poon, Hoxley and Fuchs (2011); Author.

The investigation identified two of the most prominent shortcomings of traditional teaching practices in property education: the deficiencies in the teaching of current market activity; and the misalignment of the teaching system and the student who does not know how to, or does not wish to, adopt deeper learning practices. These shortcomings presented a case for the deeper consideration of what property students may
learn from other learning and teaching activities and assessments, including those associated with the playing of serious games.

8.2.1.3 Extend ... to identify what a ... student may learn from ... games

As the third dependent research task, there was a residual need to develop a better understanding of the tasks, activities, skills and operations associated with playing property games that contribute to an enhanced student learning experience (Chapter 5). Chapter 5 comprised an evaluation of property games with consideration given to what may be learnt from play and, specifically, how the learnings relate to the intended learning outcomes (2.6.2) and the sought-after knowledge, skills and attributes defined in Chapter 4. As this was an initial design searching stage, the scope of the evaluation did not extend to empirical testing. Rather, the evaluation drew from a broad and diverse range of published research as well as the findings of the author, discovered as the property games were played. Specifically, the evaluation included observations from situated gameplay and lessons learnt from the game development process. The evaluation utilised a purposely created rubric (Appendix 5.1) as a means of assessing how closely the gameplay aligned with the knowledge, skills and attributes sought after by stakeholders in property education.

Following the initial review, three games were provisionally selected for the games suite, based on their potential to enhance learning through aiding the development of prescribed skills, attributes and knowledge. The three games, Monopoly, SimCity and Investorville, were considered to have the potential to enhance the learning experience for property students through aiding in the development of skills, attributes and knowledge as re-presented in Table 8.4.

Table 8.4
Learning Enhancement Opportunities

<table>
<thead>
<tr>
<th>Learning</th>
<th>Category</th>
<th>Monopoly</th>
<th>SimCity</th>
<th>Investorville</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>…of property practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>…of property market</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skills</td>
<td>Communication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Numeracy</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Interpersonal</td>
<td></td>
<td></td>
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<tr>
<td>Attributes</td>
<td>Creative/critical problem-solving</td>
<td></td>
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<tr>
<td></td>
<td>Team work</td>
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<tr>
<td></td>
<td>Social and environmental awareness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Shaded areas denote potential to enhance learning experience*
At the same time, the research in Chapter 5 presented a narrative of the property games’ conception and design, and how the games evolved to inform the subsequent design stage of this research. The evaluation discussed inaccuracies and perceived flaws in the games, such as fundamental inaccuracies in how Monopoly represents the property market. In particular, Monopoly was considered for rebuilding as a serious game, utilising its precursor, The Landlord’s Game, as the foundation.

8.2.2 Design stages

Having refined the research problem, and having identified the attributes that playing property games may contribute to students’ learning, Chapter 6 led to the development of the artefact, or serious games suite. Chapter 6 demonstrated the design journey, utilising design science as a methodological paradigm, to uncover how the findings from published research, an investigation into undergraduate property programs in Australian, and the evaluation of existing property games may be applied in the design of a suite of serious games.

Playing Property and Possession v Poverty were specifically designed and developed to enhance the learning experience for undergraduate property students. Playing Property, a property investment game, utilises audience response technology to enable students to buy, sell and hold virtual property. Possession v Poverty is a board game developed from Monopoly’s predecessor, The Landlord’s Game.

Chapter 7, ‘Demonstration and evaluation’, discussed the implementation of the serious games suite, including the activities developed to leverage the learning potential from two property games that were repurposed, or redesigned, for educating property students. The final suite of four games comprised Possession v Poverty and Playing Property as designed in Chapter 6, along with Investorville and SimCity as evaluated in Chapter 5, and presented in Table 8.5.
Table 8.5
Serious Games Suite

<table>
<thead>
<tr>
<th>Game</th>
<th>Platform/venue</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>SimCity</td>
<td>Mobile device/computer</td>
<td>Proprietary game repurposed by author as property learning activity</td>
</tr>
<tr>
<td>Playing Property</td>
<td>Theatre and computer</td>
<td>Designed by author for educating property students</td>
</tr>
<tr>
<td>Possession v Poverty</td>
<td>Board game</td>
<td>Designed by author for educating property students utilising The Landlords Game as a foundation</td>
</tr>
<tr>
<td>Investorville</td>
<td>Computer lab</td>
<td>Proprietary game repurposed by author as property learning activity</td>
</tr>
</tbody>
</table>

The serious games were introduced into a third-year property course, a compulsory subject, delivered in a face-to-face manner with a traditional lecture and tutorial format. A total of 16 students agreed to take part in the research, each of whom was asked to make available their feedback by way of reflective exercises, including questionnaire responses, rubric scoring and journal entries. The feedback was reconciled through triangulation, with connections between the evaluation tools, published research, and a larger sample. The findings across the evaluation tools were generally consistent, with the adopted evaluation approaches and reconciliation providing a rigorous base for considered assertions.

As a significant finding, the suite met part of the primary objective, ‘to support the learning processes of property students in a fun, more playful way’ (3.5.2). According to the participants, three of the serious game–based activities, relating to Possession v Poverty, Playing Property and Investorville, conclusively met the Oxford University Press (2014) definition of a game being activities ‘that one engages in for amusement’. The learning activity related to SimCity, for the majority of the participants, was also regarded as a game or a fun problem-solving activity. In future applications due consideration must, however, be given to the delivery of the SimCity learning activity to ensure that fun prevails over frustration.

8.3 Contributions of this research

8.3.1 For application by property educators

The findings of this research project support the notion that serious games may enhance the learning experience for undergraduate property students. Gaming which is related
authentically to course content can help a student gain a fresh perspective on the material and potentially engage them in the content in more complex and nuanced ways. The complication with respect to property education relates to the process of embedding serious games into the course curriculum.

Through constructive alignment, serious game–based learning activities and respective assessments may be embedded in property courses to enhance the learning experience of undergraduate students. Conversely, while this research extends to present program level learning outcomes, there are no generic intended learning outcomes across Australian property courses. In the absence of set course-specific alignment, there are two alternative pathways for property educators considering the implementation of serious games activities in their curriculum.

The first, and preferred, approach relates to the review of existing course aims or learning outcomes from the respective property programs to uncover similarities with the learning categories formed from the findings of this research project, as identified in Appendix 8.1. The identified learning outcomes, and categories, presented in matrix are primarily drawn from the findings of chapters 5 through 7. The majority of the learning outcomes were uncovered through the review of published research, in Chapter 2, and supported through the later stages of this research project. An example of a learning outcome identified early in this study relates to the skill development associated with playing SimCity, where a student may ‘assume a position of authority and practise leadership decision-making to realise goals that may not be achieved in real life’ (Appendix 8.1, 2.6.3).

A few salient learning outcomes appeared later in the research. In particular one was only considered after being identified by a student during evaluation (7.3.3). During the play of Possession v Poverty one student uncovered the skill associated with reading the play of others in applying appropriate negotiation tactics for financial gain (Appendix 8.1).

Where comparative learning outcomes are sought in property courses and programs, serious game–based activities may be included and incorporated into assessment.

The alternative approach considers alignment with knowledge fields, as opposed to learning outcomes. While this method does not strictly conform to the approach suggested by Biggs and Tang (2009), the API prescribed knowledge fields do provide a
common comparative base for the inclusion of serious game–based activities across API endorsed programs. The alignment between knowledge potentially gained from playing the serious game–based suite and the API prescribed knowledge fields is demonstrated in Table 8.6.

Table 8.6
*Game Alignment with API Knowledge Fields*

<table>
<thead>
<tr>
<th>API Knowledge Fields</th>
<th>SimCity</th>
<th>Playing Property</th>
<th>Possession v Poverty</th>
<th>Investor-ville</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building construction</td>
<td></td>
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<tr>
<td>Finance and accounting</td>
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<td></td>
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<tr>
<td>Commercial law</td>
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<tr>
<td>Property valuation fundamentals</td>
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<tr>
<td>Foundations of real property value</td>
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<tr>
<td>Elements of the valuation process, definitions of real property value</td>
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<tr>
<td>Highest and best use, forced sale</td>
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<tr>
<td>Data collection and quantitative techniques for property valuation</td>
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<tr>
<td>Property investment</td>
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<tr>
<td>Principles of investment analysis</td>
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<td>Income producing properties, components of income</td>
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<tr>
<td>Financial mathematics, computer application for property investment analysis</td>
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<tr>
<td>Property economics</td>
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<tr>
<td>Property markets as integrated systems incorporating residential and commercial real estate space</td>
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<tr>
<td>Urban decay and regeneration</td>
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<tr>
<td>Supply and demand theory in determination of rents and prices</td>
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<tr>
<td>Property market cycles</td>
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<tr>
<td>Housing and transportation</td>
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<tr>
<td>Demography and forecasting</td>
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<td>Taxation, infrastructure funding</td>
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<td>Property law</td>
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<td>Property management</td>
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<tr>
<td>Overview of asset management techniques for value maintenance</td>
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<td>Budgeting</td>
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<tr>
<td>Property market analysis</td>
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<td></td>
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<tr>
<td>Statistical analysis techniques</td>
<td></td>
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<tr>
<td>Case study analysis of local property markets</td>
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<tr>
<td>Computer techniques and application for analysis of property data</td>
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<tr>
<td>Land use planning and development</td>
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<tr>
<td>Planning impact on property development economics, impact on valuation</td>
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<tr>
<td>Land use theory, theories of urban development decay and regeneration</td>
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<tr>
<td>The property development process, development guidelines processes and restrictions, land use planning and transportation</td>
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<tr>
<td>Environmental issues</td>
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<tr>
<td>Valuation applications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Statutory valuation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note:* Darker shading denotes a greater opportunity to enhance learning. API; Author
The highlighted areas in Table 8.6 present opportunities for the inclusion of serious games–based activities in the course curriculum to enhance the learning experience for property students.

Following the alignment of intended learnings or their equivalent, the next stage of embedding games in the curriculum relates to assessment. In playing the serious games there are numerous sources of feedback, from rapid summative feedback in choosing investments, with Playing Property, to formative feedback arising from peer discussion on choices, in Possession v Poverty. Feedback implied through gameplay may contribute to engagement and learning and may even be quantified through the awarding of grade points. Nevertheless, to encourage deeper learning, alternative assessment methods should be adopted to ensure that students do learn the intended outcomes rather than how to be ‘best’, or perform better in the game. Similarly, if the serious games are to become an integral component of a course, then a portion of the student’s grade should be allocated to the activity. Aligning assessment with the game-based activities helps demonstrate to the students that the serious game is not just a game for amusement, but also a learning activity tasked with providing an intended learning outcome. For the student, having a portion of their course grade attached to the activity may provide the ‘buy-in’ required to overcome some of the barriers to adoption, including the perception that the game is just there to make the class more fun.

The findings further support the notion that, if serious games are to be applied, a reflective journal presents as an effective and well aligned assessment task which provides the assessor with insight into what the student learned from the intervention. With any further application of assessment to serious games, it is important to consider not just the relevance through constructive alignment, but also to make sure that the assessment does not become overly onerous or take away from the fun inherent in the gameplay.

The opportunity to enhance learning in Australian property programs will be shared with the API as a post research exercise. Specifically the salient findings of this research, including the serious game alignments with respective knowledge fields from Table 8.6, are to be shared with the related national education committee of the professional body. The findings will be presented in a policy paper suggesting that, in the contemporary environment, there are new ways to encourage students to attain knowledge in the
prescribed fields. One of the practical ways promoted will include the use of problem-based learning activities such as serious games as enhancers of learning and assessing.

8.3.2 For researchers

This research should be considered in light of the interests of the research stakeholders, including researchers in property education and information systems. For researchers in property education, this research demonstrates the application of a novel research approach, design science, to a familiar disciplinary problem, namely enhancing learning. Researchers in other disciplines, including design and information systems, may see this work as a case study presenting the application of design science as a research approach to a cross-disciplinary problem.

As a cross-disciplinary research project, theories, findings and practices from education and information technology fields are applied to property. In the process, extant research is extended and elaborated on. The primary contributions from this research relate to the application of constructive alignment, as a learning and teaching approach, and design science as the research method.

8.3.2.1 Contribution to constructive alignment

Intended learning outcomes for a property program are presented in Chapter 2, and subsequently applied as a frame to focus the literature review. This was achieved through applying constructive alignment to the body of the review to provide a conceptual framework for reflecting on property education and the role for serious games. The reflection uncovered a series of shortcomings and opportunities to better align learning and teaching activities with assessment, to enhance the learning experience for property students. Specifically, from the published studies, it is found that the second learning outcome may be better achieved through structured, problem-based learning activities relating to the playing of serious games (2.6.2).

Similarly, the review of published research failed to sufficiently uncover the knowledge, skills and attributes sought after for, and by, graduates of undergraduate property programs in Australian universities. As such, further research was undertaken to extend the findings of previous literature and define a concise set of desired knowledge, skills and attributes. While the list of knowledge, skills and attributes was not as expansive as those presented in other studies it provides a basis for comparing learning
and teaching activities. The application of the desired knowledge, skills and attributes to a rubric for assessing the learning enhancement potential for games is discussed in Chapter 5 and manifested as a games assessment rubric in Appendix 5.1.

In this research, constructive alignment was applied as an effective conceptual framework to guide reflection on property education. The intended learning outcomes were informed by a rigorous constructive alignment process; however, they present as an initial casting, influenced by the author’s interpretation of the published research. As such, the intended learning outcomes from Chapter 2 were presented in a related, peer-reviewed proceeding, ‘Learning outcomes and opportunities in property education through constructive alignment’ (Boyd S 2015a). Nevertheless, further empirical testing of the intended learning outcomes would provide a more rigorous foundation for the design and development of the serious games suite. Similarly, the rubric created sufficiently informs the design process but lacks the calibration, or tuning, that comes from extensive application and testing. Further empirical testing of the rubric may lead to more explicit and defined alignment with the intended learning outcomes, learning and teaching approach, and assessment.

8.3.2.2 Contribution to design science

Design-based research and design science, as applied in this research project, suited the design of a problem-based learning and teaching activity to enhance the learning experience for students studying property in Australian higher education. In application, design-based research examined the impact of the design, or intervention, on the learning process. Lessons learned were cycled back into the next iteration of the design innovation (Barab et al. 2005). And, as they advocate, further application of design experiments in property pedagogy may lead to interventions that are trustworthy, credible, transferable, and ecologically valid.

In this research the design science method proposed by Peffers et al. (2008) was complemented by constructive alignment. Specifically, constructive alignment is an approach to outcomes-based learning and teaching, so it translated well to an objective-based design method. The learning outcomes prescribed in constructive alignment were seamlessly adapted to the design objectives. The synergy between the educational approach and design method may relate to the rational underpinnings. Biggs created constructive alignment to assist with planning learning activities and making clear the
intended outcomes (2.2). Similarly, design science is based on traditional experimental and design approaches, with an emphasis on structure and communication (3.4).

While design science proved to be an appropriate overarching method to address the research question, complications arose in application, interpretation and communication. Specifically, the objectives-based approach of Peffers et al. (2008), as applied in this research, is not universally accepted as design science methodology. Similarly, the parameters for evaluation in a design science method are not clearly defined, with evaluation and testing carried out towards the end of the design horizon (3.3).

As a methodology, the approach of Peffers et al. (2008) may be enhanced through explicitly including two more stages and merging the demonstration and evaluation stages, as presented in Table 8.7. The additional stages reflect the journey in this research project, and the necessity for an upfront review of previous research and a pre-design evaluation of existing artefacts. The review of previous research may assist with defining the objectives while the earlier evaluation stage may identify existing artefacts for repurposing. The inclusion of the new stages may have an adverse impact on projects, with an extension of pre-design planning requirements, and may even present justification for an early project termination. Nevertheless, further upfront planning is likely to mitigate the risk of embarking on an ill-informed design endeavour.

<table>
<thead>
<tr>
<th>Process</th>
<th>DSRM activity (Peffers et al. 2008)</th>
<th>Proposed activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Problem identification and motivation</td>
<td>Problem identification and motivation</td>
</tr>
<tr>
<td>2.</td>
<td>Define the objectives for a solution</td>
<td>Review previous research</td>
</tr>
<tr>
<td>3.</td>
<td>Design and development</td>
<td>Define the objectives for a solution</td>
</tr>
<tr>
<td>4.</td>
<td>Demonstration</td>
<td>Evaluate existing artefacts</td>
</tr>
<tr>
<td>5.</td>
<td>Evaluation</td>
<td>Design and development</td>
</tr>
<tr>
<td>6.</td>
<td>Communication</td>
<td>Demonstration and evaluation</td>
</tr>
<tr>
<td>7.</td>
<td>—</td>
<td>Communication</td>
</tr>
</tbody>
</table>

Source: Peffers et al. (2008); Author

With respect to this project, the prototype testing sufficiently informs the design activity and demonstrates the highly interdependent outcomes of a complex social and cognitive intervention. Conversely, due to the small population and relatively short duration for the evaluation, the explanatory significance of the observations is limited. As such, the empirical testing of the serious games suite and associated learning activities is recommended as a stand-alone postdoctoral research project. To enable rigorous testing,
the artefacts, or serious games, and learning activities are provided in conjunction with
the thesis.

8.3.2.3 Contribution to serious games

From the review of published research, in Chapter 2, it is evident that serious games may
be effective learning tools. On the other hand, it is not clearly presented how the games
contribute to learning or how serious game–based activities should be applied to specific
disciplines. Connolly et al. (2012) presented a pathway for this research project and
others, through noting that:

> it is essential to develop a better understanding of the tasks, activities, skills
and operations that different kinds of game[s] can offer and examine how
these might match desired learning outcomes. As with other educational
interventions, it will also be important to consider the detail of how games are
integrated into the student's learning experience. (Connolly et al. 2012, p. 672)

This research has advanced along the Connolly et al. (2012) ‘pathway’. The serious
games suite, as presented, was designed with respect to desired learning outcomes for
property education. Similarly, the research extends to how the games may be integrated
into the curriculum to enhance the student learning experience.

Specifically, Chapter 5 demonstrated the evaluation of a suite of games to identify
where opportunities reside to enhance the learning experience for undergraduate property
students. As a salient, novel addition, a rubric, Table 5.3, was developed, not to address
generic learnings, but rather to delve deeper, to aid in the alignment of learnings from
playing games with the knowledge, skills and attributes desired from property programs.
The approach to creating such a rubric may be considered by subsequent artefact
designers seeking to develop technology-based solutions to important and relevant
business problems, outside their core fields of knowledge.

The subsequent chapters discuss the design of a serious games suite tasked with
enhancing the learning experience for property students, concluding with a matrix of
learnings considered achievable through the structured playing of the games (Appendix
8.1). The serious games suite and learnings from the matrix may be adopted for testing as
a stand-alone postdoctoral research project.
8.4 Further research

This research relates to the design of a serious games suite intervention to inform the practice of educating property students, in Australian universities. The emergent findings support the assertion that the serious games suite may enhance the learning experience for property students. While the potential of game-enhanced learning has emerged, there remain numerous opportunities for future research to empirically confirm, or refute, the claim and design new games and artefacts for analysis. As this research emerges, the limitations associated with this study will become less relevant. However, it is important to note that early-stage and cross-disciplinary projects such as this research endeavour are inherently subject to numerous limitations.

A defining and controversial aspect in qualitative research of this nature relates to the active role of the researcher and their potential to influence the results of the study. With the main aim of qualitative research being to discover the perceptions and experiences of the participants so that the researcher can then extract themes (Levy 2006), the researcher becomes embedded in their study. As such, the interpretive nature of the qualitative research approach is affected by the researcher’s interpretations, leading to potential misrepresentations of data, however unintentional (Brown 1992).

With the intention of mitigating the influence of bias and misrepresentation, a soundly-based research approach, design science, is incorporated. Even so, the application of design science is not uniform, with the objectives-based approach of Peffers et al. (2008), as applied in this research, not universally accepted as design science methodology. Similarly, the parameters for evaluation in a design science method are not clearly defined.

With regard to this research project, further limitations extend from the broad scope of the research project. Specifically, in answering the research question, assumptions and limitations emerged from the:

- interpretation of the problem domain
- adoption of learning theory and associated ‘planning’ approach
- definition of intended learning outcomes
- calibration of the games assessment rubric
- evaluation of the games suite.
An initial limitation of this research may be considered in the interpretation of the background, or problem domain. In Chapter 1, an argument is presented to assert that the needs of a new student cohort are not expected to be met by the current teaching methods alone. While there is support for this view in published research, some stakeholders in higher education may see little justification for meeting the needs of an expanding and diversifying cohort. Rather, some may consider higher education as a functioning system in its current form, with the problem relating not to the education system but rather to the expansion of the student cohort. Should such a view be assumed, then the application of this research and approach to learning and teaching is limited.

This research focuses on a second, related limitation: the learning theory of constructivism and the approach of constructive alignment. This research concludes that knowledge is not transmitted to the student, but rather is constructed through activity or social interaction. For proponents of more pragmatic, or objectivist, teaching practices, such a theory and approach may be considered antecedent to academic chaos.

The critique of previous research and investigation into higher education provide a level of support for the defined intended learning outcomes. Conversely, the level of empirical support for the proposed learning outcomes is not commensurate with the reliance placed on such. The intended learning outcomes and related design objectives present the foundation for the design of the serious games suite. In a preferred situation, the intended learning outcomes would have been sourced directly from a peer-reviewed and empirically tested study, rather than being developed as part of this research project.

The games assessment rubric, as applied in the evaluation and testing phase, is a novel addition of the author. While the rubric has been structured with consideration given to published research findings and the investigation into property education, from Chapter 4, the matrix lacks the empirical support and calibration associated with utilising an existing, tested model. Further research in this field, as for the intended learning outcomes, is necessary to provide more conclusive justification for the relevance of the design artefact.

While the prototype testing sufficiently informs the design activity and demonstrates the highly interdependent outcomes of a complex social and cognitive intervention, the small population limits the explanatory significance of the author’s observations. As such, the empirical testing of the serious games suite and subsequent testing of the associated learning activities is recommended as a stand-alone postdoctoral research project.
Finalisation

This research presents a serious games suite as a means to enhance the learning experience for property students. The serious games provide a motivating activity that may develop the students’ knowledge in the practice of property. Additionally, the individual games present opportunities for students to develop sought-after skills and attributes, such as communication through playing the board game Possession v Poverty, and creative/critical problem-solving through playing the simulation Investorville.

More specifically, the learning gains vary from game to game and, on testing to date, from student to student. The game-to-game variances are addressed in detail; however, the learning gains from student to student provide a sound foundation for a postdoctoral research assignment. Should empirical testing find that serious games appeal to the non-academic and encourage deeper learning, then the value proposition for the inclusion of serious games in the new and transforming higher education environment may be defined. Serious games may then be regarded as supporting good teaching, as they encourage the non-academic students to ‘use the level of cognitive processes needed to achieve the intended outcomes that more academic students use spontaneously’ (Biggs & Tang 2009, p. 11).

Overall, this research has addressed an emerging issue, and opportunity, in educating property students in a challenging new environment. The study demonstrates the application of a substantial body of knowledge to research, investigate and develop new knowledge, and advance that into a new and specific field of undergraduate property education. This cross-disciplinary research presents the artefact and journey for subsequent empirical testing.
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Games


Legislation

*Land Title Act 1994* (Queensland).
Appendices

Appendix 2.1 Functional knowledge teaching activities

<table>
<thead>
<tr>
<th>Apply</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Case-based learning</td>
<td>Case study problem presented to encourage interactive discussion, to draw out what happened, who the participants were and their differing perspectives on an issue.</td>
</tr>
<tr>
<td>Group work</td>
<td>Buzz, syndicate groups, jigsaw groups, problem-solving groups, learning cells, reciprocal questioning, and spontaneous collaboration.</td>
</tr>
<tr>
<td>Workplace learning</td>
<td>Workplace learning is an active learning experience focusing on student participation in situated work activities (Billet 2004, cited in Biggs &amp; Tang 2009).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Creativity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Open-ended</td>
<td>An intense interest and involvement in a specific area, accompanied with an open-ended process, and resulting in an original product or artefact.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Lifelong learning</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic study skills</td>
<td>Self-directed learning through systematic note taking and reference collection, managing time, and strategically searching information.</td>
</tr>
<tr>
<td>Content study skills</td>
<td>Capturing the main ideas in a passage of text or media, using concept maps to derive major structure, and composing essays according to pre-planned structure; using review and revise, not first drafts.</td>
</tr>
<tr>
<td>Reflective learning</td>
<td>Reflective diaries, selecting critical incidents and suggesting how to deal with them.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Problem-based learning</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem-based learning</td>
<td>Reflects on the way people learn in real life. In problem-based learning, the learner seeks the knowledge of disciplines, facts and procedures that are needed to solve the problem(s).</td>
</tr>
</tbody>
</table>
Appendix 2.2 Findings of research into Monopoly use in accounting

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Activity</th>
<th>Sessions’ duration</th>
<th>Team size</th>
<th>Domain</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albrecht (1995)</td>
<td>12</td>
<td>Project using Monopoly</td>
<td>7-11 weeks</td>
<td>2</td>
<td>Accounting</td>
<td>Postgraduate</td>
</tr>
<tr>
<td>Albrecht (1995)</td>
<td>74</td>
<td>Project using Monopoly</td>
<td>7-11 weeks</td>
<td>2</td>
<td>Accounting</td>
<td>Undergraduate</td>
</tr>
</tbody>
</table>

Findings:
Students use financial accounting information to make investment decisions in a manner similar to the real-world process.
They are actively included because they are creating the financial information that they later use.
Students’ cognitive development is enhanced because the exercise is in the higher levels of the cognitive domain: analysis, evaluation, and synthesis.
Use of this game gives students a chance to develop a greater appreciation of and affinity for financial accounting information.
Students are forced to interact because of the group activities.

Conversely disadvantages:
The simulation game takes 14-16 hours of student time.
Student attrition has a negative impact on the administration of the game.
Simulation game requires a substantial amount of instructor time. This can be mitigated by using graders, if possible.

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Activity</th>
<th>Sessions’ duration</th>
<th>Team size</th>
<th>Domain</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clayton (2003)</td>
<td>192</td>
<td>Project using Monopoly</td>
<td>4 weeks</td>
<td>1 &amp; 4</td>
<td>Accounting</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>Clayton (2003)</td>
<td>29</td>
<td>Project using Monopoly</td>
<td>4 weeks</td>
<td>1 &amp; 4</td>
<td>Accounting</td>
<td>Undergraduate</td>
</tr>
<tr>
<td>Clayton (2003)</td>
<td>42</td>
<td>Project using Monopoly</td>
<td>4 weeks</td>
<td>1 &amp; 4</td>
<td>Accounting</td>
<td>Undergraduate</td>
</tr>
</tbody>
</table>

Findings:
Students very positive about their experience.
Considered an effective way of learning balance sheets and profit and loss accounts.
Easier to link theory and practice.
Fun with positive social aspects.
Being active and creating (i.e. owning) their business transactions effective way to learn.

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>Activity</th>
<th>Sessions’ duration</th>
<th>Team size</th>
<th>Domain</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tanner and Lindquist (1998)</td>
<td>36</td>
<td>Team based project using Monopoly</td>
<td>3 weeks</td>
<td>3</td>
<td>Accounting</td>
<td>Undergraduate</td>
</tr>
</tbody>
</table>

Findings:
Students’ attitudes toward financial accounting and learning, mutual concern for fellow students and perceived achievement were very positive upon completion.
Appendix 2.3 Principles of learning literacy inherent in … games

<table>
<thead>
<tr>
<th>Learning principles</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Active, critical learning</strong></td>
</tr>
<tr>
<td><strong>2. Design</strong></td>
</tr>
<tr>
<td><strong>3. Semiotic</strong></td>
</tr>
<tr>
<td><strong>4. Semiotic domains</strong></td>
</tr>
<tr>
<td><strong>5. Metalevel thinking about semiotic domains</strong></td>
</tr>
<tr>
<td><strong>6. ‘Psychosocial moratorium’</strong></td>
</tr>
<tr>
<td><strong>7. Committed learning</strong></td>
</tr>
<tr>
<td><strong>8. Identity</strong></td>
</tr>
<tr>
<td><strong>9. Self-knowledge</strong></td>
</tr>
<tr>
<td><strong>10. Amplification of input</strong></td>
</tr>
<tr>
<td><strong>11. Achievement</strong></td>
</tr>
<tr>
<td><strong>12. Practice</strong></td>
</tr>
<tr>
<td><strong>13. Ongoing learning</strong></td>
</tr>
<tr>
<td><strong>14. ‘Regime of competence’</strong></td>
</tr>
<tr>
<td><strong>15. Probing</strong></td>
</tr>
<tr>
<td><strong>16. Multiple routes</strong></td>
</tr>
<tr>
<td><strong>17. Situated meaning</strong></td>
</tr>
<tr>
<td><strong>18. Text</strong></td>
</tr>
</tbody>
</table>
Learning principles

19. Intertextual
The learner understands texts as a family ('genre') of related texts and understands any one such text in relation to others in the family, but only after having achieved embodied understandings of some texts. Understanding a group of texts as a family (genre) of texts is a large part of what helps the learner make sense of such texts.

20. Multimodal
Meaning and knowledge are built up through various modalities (images, texts, symbols, interactions, abstract design, sound, etc.), not just words.

21. ‘Material Intelligence’
Thinking, problem-solving, and knowledge are ‘stored’ in material objects and the environment. This frees learners to engage their minds with other things while combining the results of their own thinking with the knowledge stored in material objects and the environment to achieve yet more powerful effects.

22. Intuitive Knowledge
Intuitive or tacit knowledge built up in repeated practice and experience, often associated with an affinity group, counts a great deal and is honoured. Not just verbal and conscious knowledge is rewarded.

23. Subset
Learning even at its start takes place in a (simplified) subset of the real domain.

24. Incremental
Learning situations are ordered in the early stages so that earlier cases can lead to generalisations that are fruitful for later cases. When learners face more complex cases later, the learning space (the number and type of guesses the learner can make) is constrained by the sorts of fruitful patterns or generalisations the learner has found earlier.

25. Concentrated Sample
The learner sees, especially early on, many more instances of fundamental signs and actions than would be the case in a less controlled sample. Fundamental signs and actions are concentrated in the early stages so that learners get to practice them often and learn them well.

26. Bottom-Up Basic Skills
Basic skills are not learned in isolation or out of context; rather, what counts as a basic skill is discovered bottom up by engaging in more and more of the game/domains like it. Basic skills are genre elements of a given type of game/domain.

27. Explicit Information On-Demand and Just-In-Time
The learner is given explicit information both on-demand and just-in-time, when the learner needs it or just at the point where the information can best be understood and used in practice.

28. Discovery
Overt telling is kept to a well-thought-out minimum, allowing ample opportunity for the learner to experiment and make discoveries.

29. Transfer
Learners are given ample opportunity to practice, and support for, transferring what they have learned earlier to later problems, including problems that require adapting and transforming that earlier learning.

30. Cultural Models about the World
Learning is set up in such a way that learners come to think consciously and reflectively about some of their cultural models regarding the world, without denigration of their identities, abilities, or social affiliations, and juxtapose them to new models that may conflict with or otherwise relate to them in various ways.

31. Cultural Models about Learning
Learning is set up in such a way that learners come to think consciously and reflectively about their cultural models of learning and themselves as learners, without denigration of their identities, abilities, or social affiliations, and juxtapose them to new models of learning and themselves as learners.

32. Cultural Models About Semiotic Domains
Learning is set up in such a way that learners come to think consciously and reflectively about their cultural models about a particular semiotic domain they are learning, without denigration of their identities, abilities, or social affiliations, and juxtapose them to new models about this domain.

33. Distributed
Meaning/knowledge is distributed across the learner, objects, tools, symbols, technologies, and the environment.

34. Dispersed
Meaning/knowledge is dispersed in the sense that the learner shares it with others outside the domain/game, some of whom the learner may rarely or never see face-to-face.

35. Affinity Group
Learners constitute an ‘affinity group’, that is, a group that is bonded
<table>
<thead>
<tr>
<th>Learning principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>primarily through shared endeavours, goals, and practices and not shared race, gender, nation, ethnicity, or culture.</td>
</tr>
<tr>
<td>36. Insider</td>
</tr>
<tr>
<td>The learner is an 'insider', 'teacher', and 'producer' (not just a 'consumer') able to customise the learning experience and domain/game from the beginning and throughout the experience.</td>
</tr>
</tbody>
</table>

(Adapted from Gee 2003)
Appendix 3.1 Questionnaire (Investorville)

PED321 S2 2013 – Tutorial Exercise

Week 10 – Investorville

Student: 2 October 2013  Date:

Task

Utilising the Investorville game increase your overall net worth (over a 15 year period).

Directions

As per Investorville instructions (https://www.investorville.com.au/) and choose the Solo high flyer profile. When the simulation completes print screen and email the simulation results including ‘Game Summary’, ‘Property’, and ‘History’.

Questions

1. Have you played Investorville or variant before? If so how often, where and when?

2. Did you enjoy playing Investorville? What do you enjoy or not enjoy about it (be specific)?

3. Describe the results of your Task and how you went?

4. What do you think undergraduate property students learn from playing Investorville (this may be something correct or incorrect in your view, in either case, explain)?

5. After completing the Task, identify two or three ideologies which you feel are inferred or, ‘between the lines’ of the Investorville game?
### Rubric

< identify the most appropriate selection>

<table>
<thead>
<tr>
<th>Assessment</th>
<th>3 (Excellent)</th>
<th>2</th>
<th>1</th>
<th>0 (Poor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of property practice</td>
<td>The model underlying the game validly represents property practice</td>
<td>The model underlying the game represents several elements of property practice</td>
<td>The model underlying the game rarely represents property practice</td>
<td>The model underlying the game does not represent property practice</td>
</tr>
<tr>
<td>Knowledge of property market</td>
<td>Simulates real property markets</td>
<td>Simulates property markets</td>
<td>Attempts to simulate a market</td>
<td>Does not simulate a market</td>
</tr>
<tr>
<td>Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Necessitates articulation through numerous communication channels</td>
<td>Encourages articulation through communication channels</td>
<td>Provides scope for articulation through communication channels</td>
<td>No communication channels are provided</td>
</tr>
<tr>
<td>Numeracy</td>
<td>Requires feasibility and investment analysis</td>
<td>Encourages feasibility and/or investment analysis and necessitates mathematical problem-solving</td>
<td>Requires mathematical problem-solving</td>
<td>Does not require mathematical problem-solving</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Necessitates reflection and sharing of emotions and strategies</td>
<td>Encourages reflection and/or sharing of emotions and/or strategies</td>
<td>Provides scope for reflection and/or sharing</td>
<td>No reflection or sharing options</td>
</tr>
<tr>
<td>Attributes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative/critical problem-solving</td>
<td>Large number of original ideas and strategies are required</td>
<td>Several original ideas and strategies are required</td>
<td>Original ideas and strategies are rarely required</td>
<td>No original ideas or strategies are required</td>
</tr>
<tr>
<td>Team work</td>
<td>Necessitates effective teamwork between small and large cohorts</td>
<td>Encourages effective teamwork and cooperation</td>
<td>Provides scope for cooperative multiple playing</td>
<td>No multiplayer option</td>
</tr>
<tr>
<td>Social and environmental awareness</td>
<td>Requires critical reflection on authentic social and ecological environments</td>
<td>Encourages critical reflection on social and ecological environments</td>
<td>Provides scope for critical reflection on social and/or ecological environments</td>
<td>Does not present social or ecological environments</td>
</tr>
<tr>
<td>Motivation</td>
<td>Fully immersive, sustaining continued and repeated playing</td>
<td>Engaging, encouraging continued and repeated playing</td>
<td>Relatively engaging and/or engaging for set periods</td>
<td>Lacking engagement</td>
</tr>
</tbody>
</table>

### Formative comments

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Appendix 3.2 PED321 course outline
1. What is this course about?

1.1 Course description

This course brings together a range of knowledge and skills applicable to the processes involved in the development of property assets. The course offers a mixture of theory and practice-based learning. Using case studies and industry interaction, content focuses on the four phases of the development process, 1) project initiation, 2) planning and design, 3) delivery and 4) finalisation. The concept of a ‘fifth stage’, the ‘management of the asset in use’, is introduced at the end of the course to demonstrate the impact of decisions and actions taken in prior stages on the efficiency and effectiveness of the built asset in use.

1.2 Course content

Introduction
- Overview of course
- Defining Project and Development Management
- Project and development lifecycles
- Stakeholders

Initiation
- Initiation and ideas
- Organisational strategy and project alignment
- Selecting property and projects
- Investigating and securing the ‘land’
- Project Charter and business case

Planning & Design
- Concept refinement and defining the scope
- Time planning
- Gross realisation, cost and finance planning
- Quality planning
- Resource and team planning
Course Outline: PED321 Property Development and Project Management Processes

- Communication planning
- Risk identification, analysis and response planning
- Contract planning
- Project (Management) Plan

Delivery
- Directing and managing
- Quality assurance
- Acquiring, developing and managing teams
- Managing stakeholders
- Contract performance and administration
- Monitoring and controlling risks

Finalisation
- Closing the contract
- Finalising the project
- Reviewing the development
- Realising the property

Built Asset in Use
- Ongoing management and change

2. Unit value
12 units

3. How does this course contribute to my learning?

<table>
<thead>
<tr>
<th>Specific Learning Outcomes</th>
<th>Assessment Tasks</th>
<th>Graduate Qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>On successful completion of this course you should be able to:</td>
<td>You will be assessed on the learning outcome in task/s:</td>
<td>Completing these tasks successfully will contribute to you becoming:</td>
</tr>
<tr>
<td>Communicate through oral and written forms an understanding of the project management knowledge areas and their applicability to the property development process.</td>
<td>Task 1, 2, 3 and 4</td>
<td>Empowered.</td>
</tr>
<tr>
<td>Design and plan a new property development for authorisation.</td>
<td>Tasks 1 and 2</td>
<td>Creative and critical thinkers.</td>
</tr>
<tr>
<td>Interact effectively in leadership and/or subordinate roles within diverse client, employer, professional and community groups including those with competing interests to deliver measurable outcomes.</td>
<td>Tasks 1 and 2</td>
<td>Engaged.</td>
</tr>
<tr>
<td>Analyse and suggest how social, environmental,</td>
<td>Task 3</td>
<td>Sustainability-focussed.</td>
</tr>
</tbody>
</table>
Course Outline: PED321 Property Development and Project Management Processes

| economic and political issues of project management relate to sustainable personal, financial and community assets. | Task 1, 2, 3 and 4 | Ethical. |

Demonstrate high standards of ethical behaviour, independence of thought and professionalism in the assessment of, and dealings with, property assets, their owners and the community

4. **Am I eligible to enrol in this course?**

Refer to the Coursework Programs and Awards - Academic Policy for definitions of “pre-requisites, co-requisites and anti-requisites”

4.1 **Enrolment restrictions**

| Nil |

4.2 **Pre-requisites**

| PED311 |

4.3 **Co-requisites**

| Nil |

4.4 **Anti-requisites**

| Nil |

4.5 **Specific assumed prior knowledge and skills (optional)**

Competent English language skills for oral and written work. A willingness to participate in practice-based learning activities including group work and playing serious games.

5. **How am I going to be assessed?**

5.1 **Grading scale**

Standard – High Distinction (HD), Distinction (DN), Credit (CR), Pass (PS), Fail (FL)

5.2 **Assessment tasks**

<table>
<thead>
<tr>
<th>Task No.</th>
<th>Assessment Tasks</th>
<th>Individual or Group</th>
<th>Weighting %</th>
<th>What is the duration / length?</th>
<th>When should I submit?</th>
<th>Where should I submit it?</th>
<th>Hurdle Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Group Presentations</td>
<td>Group</td>
<td>15%</td>
<td>N/A</td>
<td>Week 4 – 11</td>
<td>In class</td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td>Case Study – Group Report Project Charter</td>
<td>Group</td>
<td>25%</td>
<td>2000-3000 words</td>
<td>Week 12</td>
<td>Safe assign</td>
<td>No</td>
</tr>
<tr>
<td>3</td>
<td>Individual Reflective</td>
<td>Individual</td>
<td>20%</td>
<td>N/A</td>
<td>Week 12</td>
<td>Safe</td>
<td>No</td>
</tr>
</tbody>
</table>
Course Outline: PED321 Property Development and Project Management Processes

| Journal  | Final Examination | Individual | 40% | N/A | Exam Period | assign | In exam venue | Yes | 100% |

Assessment Task 1: Group Presentations

**Goal:** Share your project findings and support your collective recommendations in a clear and professional manner
Teams are to have weekly ‘project’ meetings that are properly convened with minutes maintained and available for perusal by the ‘client’ at their discretion. As a result of these meetings teams will make a 10 minute in class presentation to ‘the client’ and other project teams, indicating the progress being made, any issues arising and any preliminary findings. All teams will present their recommendations and conclusions in a 15 minute final presentation during week 12.

**Product:** Two (2) presentations

**Format:** This is a group assessment delivered in a face-to-face format. See USC Portal (Blackboard) for more information.

**Criteria**
- Communicate an understanding of the project management knowledge areas and their applicability to the property development process.
- Design and plan a new property development for authorisation.
- Interact effectively in leadership and/or subordinate roles within diverse client, employer, professional and community groups including those with competing interests to deliver measurable outcomes.
- Demonstrate high standards of ethical behaviour, independence of thought and professionalism in the assessment of, and dealings with, property assets, their owners and the community.

**Generic skill assessed**
- Communication: Graduate
- Collaboration: Graduate
- Applying technologies: Developing

Assessment Task 2: Case Study – Group Report Project Charter

**Goal:** As a cohesive team, create a professional Project Charter for a real world development opportunity
This is a significant assessment undertaking. Successful delivery of a major development project in the ‘real world’ requires the establishment of a development/project team working in close harmony throughout. Under these circumstances group dynamics and team management are major inputs and can have a significant impact on the successful delivery of the project.

In view of the significance of this group interaction, the assessment is considered to be best undertaken as a group project. The ability of students to interact successfully as a team will be critical during their professional lives and structuring the assessment as a team project provides students with valuable experience.

Students are therefore to form themselves into small project teams (around 4 students). Where possible each team should comprise at least one Property student, one Construction Management student and one Business student (subject to enrolment numbers). Teams are to nominate individual members who will take on particular roles
(areas of responsibility) as the group researches/formulates the ‘Project Charter’. Suggested roles include: Head of Property (internal client); Project Manager; Financial Analyst and Chief Engineer.

A client has asked for a comprehensive written development brief for a development landholding they are considering buying. The client has indicated that the brief should address issues such as:

- the optimal use of the site;
- market commentary / analysis in support of the above;
- identification of any planning, environmental or heritage issues;
- design and construction/engineering issues and recommendations;
- preliminary development costings;
- construction contract – drafting, tender process and letting of contract;
- advice on selection of financial vehicles – short term and long term funding options;
- brief development feasibility; and
- any other matters relevant to the initiation, delivery and finalisation of the project and post completion occupation.

The client has asked to meet with each development team at the client’s offices to provide the team with a full briefing (Week 2 Tutorial). In the meanwhile the client advises that, as a result of the changing funding environment, the project to be undertaken in this instance will be retained by them indefinitely as they seek to strengthen their company’s asset base. This will be the first such development they have retained. They are particularly keen therefore that the Project Charter not only undertakes a development analysis/feasibility but also looks at the project as a longer term property asset. In this regard the report should reflect upon development/construction issues that have any significant ‘in-use’ implications for the owners and/or occupiers and it’s mid to long term performance as an investment.

**Product:** Project Charter

**Format:** This is a Group Assessment. See USC Portal (Blackboard) for more information.

**Criteria**

- Communicate an understanding of the project management knowledge areas and their applicability to the property development process.
- Design and plan a new property development for authorisation.
- Interact effectively in leadership and/or subordinate roles within diverse client, employer, professional and community groups including those with competing interests to deliver measurable outcomes.
- Demonstrate high standards of ethical behaviour, independence of thought and professionalism in the assessment of, and dealings with, property assets, their owners and the community.
- Ability to conduct an effective financial analysis of a property development.
- Professional standard of written presentation utilising relevant literature and industry benchmarks.

**Generic skill assessed**

<table>
<thead>
<tr>
<th>Skill assessment level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem solving</td>
</tr>
<tr>
<td>Organisation</td>
</tr>
<tr>
<td>Collaboration</td>
</tr>
<tr>
<td>Applying technologies</td>
</tr>
</tbody>
</table>

**Assessment Task 3:** Individual Reflective Journal
Goal: Think about and understand your learning experiences
During the various learning activities and assessments students are to maintain a Reflective Journal, or learning log, to encourage deeper reflection and understanding of their learning experiences. Students are encouraged to use the D.I.E.P four step approach as adapted from Boud (1985) as a strategy to describe, interpret, evaluate and plan from these respective learning activities. The Reflective journal may incorporate colloquial language and diagrams and illustrations are welcome.

Product: Reflective Journal

Format: This is an Individual Assessment. See USC Portal (Blackboard) for more information.

Criteria
• Communicate an understanding of the project management knowledge areas and their applicability to the property development process.
• Analyse and suggest how social, environmental, economic and political issues of project management relate to sustainable personal, financial and community assets.
• Demonstrate high standards of ethical behaviour, independence of thought and professionalism in the assessment of, and dealings with, property assets, their owners and the community
• Capacity to construct knowledge through the synthesis of theory and practice.
• Independently uncover salient themes, and questions for further investigation, through the review of experienced successes and failures.

Notes on Reflective Journal

<table>
<thead>
<tr>
<th>Generic skill assessed</th>
<th>Skill assessment level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem solving</td>
<td>Graduate</td>
</tr>
<tr>
<td>Organisation</td>
<td>Graduate</td>
</tr>
</tbody>
</table>

Assessment Task 4: Final Examination

Goal: Demonstrate your construction of knowledge

Product: Two hour final examination that will examine the student’s knowledge of the theoretical, conceptual and practical material covered in the course. It will consist of short answer essay type questions designed to draw on the students analytical and problem solving skills.

Format: This is an Individual Assessment

Criteria
Marks for this assessment task will be allocated on the basis of the relevance and completeness of each answer. The marks allocated to each question will be indicated on the exam paper.

<table>
<thead>
<tr>
<th>Generic skill assessed</th>
<th>Skill assessment level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information literacy</td>
<td>Graduate</td>
</tr>
<tr>
<td>Problem solving</td>
<td>Graduate</td>
</tr>
</tbody>
</table>

5.3 Additional assessment requirements
• *The final exam is a Hurdle task
• Students must submit specified assessment tasks via SafeAssign.
Course Outline: PED321 Property Development and Project Management Processes

*Supplementary assessment/s can only be offered to a student in a course that contains a hurdle assessment task. A student will be offered supplementary assessment when they have obtained 50 percent or more in a course which contains hurdle assessment task/s but has failed a hurdle assessment task.

**LOCATING JOURNAL ARTICLES**
If you have been notified that the journal articles in this course are available on e-reserve, use the on-line library catalogue to find them. For journal articles not on e-reserve, click on the "Journals and Newspapers" link on the Library Homepage. Enter the journal title e.g. History Australia, then search for the volume and issue or keyword as needed.

**ASSIGNMENT COVER SHEETS**
The Faculty of Arts and Business assignment cover sheet can be found on Blackboard or on the USC Portal Faculty of Arts and Business. It must be completed in full identifying student name, assignment topic, tutor and tutorial time. This must be attached securely to the front of each assessment item required to be submitted by hard copy. Claims of loss of assignments will not be considered unless supported by a receipt.

**HELP:** If you are experiencing problems with your studies or academic work, consult your tutor in the first instance or the Course Coordinator as quickly as possible.

**DIFFICULTIES:** If you are experiencing difficulties relating to teaching and assessment you should approach your tutor in the first instance. If not satisfied after that you should approach in order your Course Coordinator, Program Leader then Head of School.

5.4 Submission penalties
Late submission of assignments will be penalised at the rate of 10% (of total available marks) per day from the date identified as the due date for the assessment task. Week days and weekend days are included in the calculation of days late.

6. How is the course offered?
6.1 Directed study hours
Lecture: 2 Hours
Applied theory workshop: 1 Hour

6.2 Teaching semester/session(s) offered
Semester 2

6.3 Course activities

<table>
<thead>
<tr>
<th>Teaching Week / Module</th>
<th>What key concepts/content will I learn?</th>
<th>What activities will I engage in to learn the concepts/content?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>Directed Study Activities</td>
</tr>
<tr>
<td></td>
<td>Overview of course</td>
<td>Independent Study Activities</td>
</tr>
<tr>
<td></td>
<td>Defining Project and Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Project and development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lecture</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SimCity learning activity</td>
<td></td>
</tr>
</tbody>
</table>
## Course Outline: PED321  | Property Development and Project Management Processes |

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Initiation</td>
<td>Lecture</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Playing Property learning activity</td>
</tr>
<tr>
<td>5</td>
<td>Planning &amp; Design</td>
<td>Lecture</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Texts and handouts</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Possession and Poverty learning activity</td>
</tr>
<tr>
<td>9</td>
<td>Delivery</td>
<td>Lecture</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Texts and handouts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Possession and Poverty tournament</td>
</tr>
<tr>
<td>11</td>
<td>Finalisation</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td>12</td>
<td>Built Asset in Use</td>
<td>Lecture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Applied theory workshop</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Texts and handouts</td>
</tr>
</tbody>
</table>

### 7. What resources do I need to undertake this course?

#### 7.1 Prescribed text(s)

Please note that you need to have regular access to the resource(s) listed below:

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Title</th>
<th>Publisher</th>
</tr>
</thead>
</table>

Please note that the course activities may be subject to variation.
7.2 Required and recommended readings
Lists of required and recommended readings may be found for this course on its Blackboard site. These materials/readings will assist you in preparing for tutorials and assignments, and will provide further information regarding particular aspects of your course.

7.3 Specific requirements
N/A

7.4 Risk management
There is minimal health and safety risk in this course. It is your responsibility to familiarise yourself with the Health and Safety policies and procedures applicable within campus areas.

8. How can I obtain help with my studies?
In the first instance you should contact your tutor, then the Course Coordinator. Student Life and Learning provides additional assistance to all students through Peer Advisors and Academic Skills Advisors. You can drop in or book an appointment. To book: Tel: +61 7 5430 1226 or Email: StudentLifeandLearning@usc.edu.au

9. Links to relevant University policies and procedures
For more information on:

<table>
<thead>
<tr>
<th>Topic</th>
<th>Relevant Policy or Procedure [Links]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment</td>
<td>• Assessment: Courses and Coursework Programs - Academic Policy</td>
</tr>
<tr>
<td></td>
<td>• Assessment: Courses and Coursework Programs - Procedures</td>
</tr>
<tr>
<td>Graduate Attributes</td>
<td>• Learning and Teaching - Academic Policy</td>
</tr>
<tr>
<td>Academic misconduct - plagiarism and cheating</td>
<td>• Student Academic Integrity - Governing Policy</td>
</tr>
<tr>
<td></td>
<td>• Student Academic Misconduct - Academic Policy</td>
</tr>
<tr>
<td></td>
<td>• Student Academic Misconduct - Procedures</td>
</tr>
<tr>
<td>Results and grades</td>
<td>• Assessment: Courses and Coursework Programs - Procedures</td>
</tr>
<tr>
<td></td>
<td>• Grades and Grade Point Average (GPA) - Academic Policy</td>
</tr>
<tr>
<td>Review or appeals</td>
<td>• Assessment: Courses and Coursework Programs - Procedures</td>
</tr>
<tr>
<td></td>
<td>• Student Grievances and Appeals - Governing Policy</td>
</tr>
<tr>
<td></td>
<td>• Student Grievances and Appeals - Procedures and Guidelines for Students</td>
</tr>
<tr>
<td>Disabilities support</td>
<td>• Students with a Disability - Managerial Policy</td>
</tr>
</tbody>
</table>

10. Faculty specific information
Contact your faculty office to access this box.
Appendix 3.3 Ethics approval
9 August 2013

Mr Steven Boyd
Professor Michael Hefferan
Faculty of Arts and Business

Dear Steven and Michael

Expedited ethics approval for research project: Acquiring and analysing feedback from serious game-based activities in PED321 Property Development and Project Management Processes (S/13/515)

This letter is to confirm that on 9 August 2013, following review of the application for ethics approval of the research project, Acquiring and analysing feedback from serious game-based activities in PED321 Property Development and Project Management Processes (S/13/515), the Chairperson of the Human Research Ethics Committee of the University of the Sunshine Coast granted expedited ethics approval for the project.

The Human Research Ethics Committee will review the Chairperson’s grant of approval and the conditions of approval at its next meeting and, should there be any variation of the conditions of approval, you will be informed as soon as practicable.

The period of ethics approval is from 9 August 2013 to 30 June 2014.

Could you please note that the ethics approval number for the project is HREC: (S/13/515). This number should be quoted in your Research Project Information Sheet and in any written communication when you are recruiting participants.

The standard conditions of ethics approval are listed overleaf. If you have any queries in relation to this ethics approval or if you require further information please contact the Research Ethics Officer by email at humanethics@usc.edu.au or by telephone on +61 7 5459 4574 / 5430 2823.

I wish you well with the success of your project.

Yours sincerely

Barbara Palmer
Manager, Office of Research
STANDARD CONDITIONS OF ETHICS APPROVAL

The standard conditions of approval for all human research projects are the following:

1. Conduct the research project strictly in accordance with the research proposal submitted and granted ethics approval, including any amendments required to be made to the proposal by the Human Research Ethics Committee.

2. Inform the Human Research Ethics Committee immediately of anything which may warrant review of ethics approval of the research project, including: serious or unexpected adverse effects on participants; unforeseen events that might affect continued ethical acceptability of the project; and a written report about these matters must be submitted to the Chairperson of the Human Research Ethics Committee by no later than the next working day after recognition of an adverse occurrence/event.

3. Provide the Committee with a written Final Report on the research project by 30 June 2014 using the proforma “Final Report on Approved Research Project Involving Humans”. This may be accessed on the University of the Sunshine Coast portal at: Research and Research Training>Research Ethics>Human Research Ethics>Forms> Annual and Final Report Forms.

4. Advise the Committee in writing as soon as practicable if the research project is discontinued.

5. Make no change to the project as approved in its entirety by the Committee, including any wording in any document approved as part of the project, without prior written approval of the Committee for any change. If you are applying for an amendment to your approved research project, please email your request to the Research Ethics Officer at humanethics@usc.edu.au, detailing the nature of the change and your reasons for the request.

6. Submit a written request for an extension of ethics approval using the proforma ‘Annual Report on Approval Research Project Involving Humans’ (see section 9) or otherwise apply via email. The request for an extension does not alter the need to provide annual reports on the dates referred to in condition (3) above.

Please note that compliance with these conditions of approval is a requirement of the University’s Human Research Ethics - Governing Policy and the National Statement on Ethical Conduct in Human Research.
Playing Property - Acquiring and analysing feedback from serious game-based activities in PED321 Property Development and Project Management Processes

Ethics approval number: HREC: (S/13/515)

Purpose
The research investigates how serious game-based activities may be created and implemented to enhance the learning experience for undergraduate property students in Australia. Specifically the research will involve acquiring and analysing feedback from serious game-based activities undertaken in PED321 Property Development and Project Management Processes.

Contacts
The research team consists of Steven Boyd (Doctorate Candidate) and Professor Michael Hefferan (Supervisor). Please direct questions to:

Steven Boyd    email: sboyd@usc.edu.au    phone: 0423 848 943
Michael Hefferan  email: mhefferan@usc.edu.au    phone: (07) 5456 5169

Participant experience
You have been invited to take part in this project because you are enrolled in PED321 Property Development and Project Management Processes. If you agree to take part in this research, you will be asked to make available your feedback by way of reflective exercises, specifically through a rubric scoring and journal.

Risks and benefits
You may feel obliged to participate in the research with a fear of being identified and or concern that the research responses are in some way linked to grading.

To negate or minimize the risks your data will be made non-identifiable prior to publication. Further your choice to participate or not will not affect your grades. Specifically an additional course moderator will be utilised to review the grades provided for Assessment Task 3, the Individual Reflective Journal.

While you will not receive any direct benefits for participating, your information may help us improve the learning experience for subsequent students.

Duration
The serious game-based activities will be implemented during the 13 week semester, commencing July 2013 and ending in October 2013. There will be 4 to 5 sessions whereby your feedback will be sought by way of completing questionnaires and rubrics, in addition to the assessed journal. It is anticipated that the feedback will take around 1 hour per session to complete equating to an overall duration of 4 to 5 hours.
Dissemination of results
The research outcomes will be made accessible to you in a way that is timely and clear. A brief one or two page summary of results will be made accessible to you as a research participant. Should you wish to view the summary of results then please email sboyd@usc.edu.au and register your interest.

Participation and consent
Participation in the research is voluntary, and you may discontinue at any time, prior to submission of the assessment task 3 - Individual Reflective Journal, without penalty. Consent will be confirmed through the attached Consent to Participate in Research form. Consent is for the use of your results in this project as well as future related research projects.

Confidentiality and results
Your responses will be coded and stored in a re-identifiable manner and then made non-identifiable prior to publication. Non-identifiable results will be included in the thesis and may be presented at external or internal conferences or meetings, or by publication.

Complaints / Concerns
If you have any complaints about the way this research project is being conducted you can raise them with the Doctorate Candidate or Supervisor. If you prefer an independent person, contact the Chairperson of the Human Research Ethics Committee at the University: (c/- the Research Ethics Officer, Office of Research, University of the Sunshine Coast, Maroochydore DC 4558; telephone (07) 5459 4574; email humanethics@usc.edu.au).

Thank you for consideration of this study.
CONSENT TO PARTICIPATE IN RESEARCH

TITLE OF RESEARCH PROJECT AND ETHICS APPROVAL NUMBER

*Playing Property* - Acquiring and analysing feedback from serious game-based activities in PED321 Property Development and Project Management Processes (ethics approval number HREC: (S/13/515))

I have read, understood and kept a copy of the Research Project Information Sheet for the above research project.

I realise that this research project will be carried out as described in the Research Project Information Sheet.

Any questions I have about this research project and my participation in it have been answered to my satisfaction.

I agree to participate in the research project, *Playing Property* - Acquiring and analysing feedback from serious game-based activities in PED321 Property Development and Project Management Processes.

I give consent for data about my participation to be used in a confidential manner for the purposes of this research project, and in future research projects.

________________________________________     __________________
Participant         Date
### Appendix 4.1 Functional knowledge assessment items

<table>
<thead>
<tr>
<th>Presentations</th>
<th>Student presentations – presenting to peers, professionals and teachers with assessment contributions from all parties. Poster presentations – A creative and reflective way of presenting work. Ideally supported with self and peer assessment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical incidents</td>
<td>Keeping records, discussing the influence of critical incidents, and making use of the information.</td>
</tr>
<tr>
<td>Individual/group projects</td>
<td>Hands on piece of research. Group projects aim to teach cooperative skills. In group projects peer evaluation of contribution is considered necessary to account for unbalanced individual contributions.</td>
</tr>
<tr>
<td>Learning contracts</td>
<td>A learning contract, which is negotiated between student and teacher, may take into account where a student is at the start of the course, what relevant attainments are possessed already and what work or other experience (with the context of the course) he or she is to produce.</td>
</tr>
<tr>
<td>Reflective journal</td>
<td>A record of thoughts and incidents that help the student reflect on the content of the course.</td>
</tr>
<tr>
<td>Case study</td>
<td>A case study exercise may be assessed as a project or item of a portfolio. It is essentially a holistic exercise.</td>
</tr>
<tr>
<td>Portfolio assessment</td>
<td>A presentation of the students’ best ‘learning treasures’.</td>
</tr>
<tr>
<td>Capstone final year project</td>
<td>A final year project specifically designed to meet the program’s intended learning outcomes that may have not been assessed in the individual subjects.</td>
</tr>
</tbody>
</table>

(Biggs & Tang 2009)
## Appendix 5.1 Property games assessment rubric

<table>
<thead>
<tr>
<th>Assessment</th>
<th>3 (Excellent)</th>
<th>2</th>
<th>1</th>
<th>0 (Poor)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge of property practice</td>
<td>The model underlying the game validly represents property practice</td>
<td>The model underlying the game represents several elements of property practice</td>
<td>The model underlying the game rarely represents property practice</td>
<td>The model underlying the game does not represent property practice</td>
</tr>
<tr>
<td>Knowledge of property market</td>
<td>Simulates real property markets</td>
<td>Simulates property markets</td>
<td>Attempts to simulate a market</td>
<td>Does not simulate a market</td>
</tr>
<tr>
<td>Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Necessitates articulation through numerous communication channels</td>
<td>Encourages articulation through communication channels</td>
<td>Provides scope for articulation through communication channels</td>
<td>No communication channels are provided</td>
</tr>
<tr>
<td>Numeracy</td>
<td>Requires feasibility and investment analysis</td>
<td>Encourages feasibility and/or investment analysis and necessitates mathematical problem-solving</td>
<td>Requires mathematical problem-solving</td>
<td>Does not require mathematical problem-solving</td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Necessitates reflection and sharing of emotions and strategies</td>
<td>Encourages reflection and/or sharing of emotions and/or strategies</td>
<td>Provides scope for reflection and/or sharing</td>
<td>No reflection or sharing options</td>
</tr>
<tr>
<td>Attributes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Creative/critical problem-solving</td>
<td>Large number of original ideas and strategies are required</td>
<td>Several original ideas and strategies are required</td>
<td>Original ideas and strategies are rarely required</td>
<td>No original ideas or strategies are required</td>
</tr>
<tr>
<td>Team work</td>
<td>Necessitates effective teamwork between small and large cohorts</td>
<td>Encourages effective teamwork and cooperation</td>
<td>Provides scope for cooperative multiple playing</td>
<td>No multiplayer option</td>
</tr>
<tr>
<td>Social and environmental awareness</td>
<td>Requires critical reflection on authentic social and ecological environments</td>
<td>Encourages critical reflection on social and ecological environments</td>
<td>Provides scope for critical reflection on social and/or ecological environments</td>
<td>Does not present social or ecological environments</td>
</tr>
<tr>
<td>Motivation</td>
<td>Fully immersive, sustaining continued and repeated playing</td>
<td>Engaging, encouraging continued and repeated playing</td>
<td>Relatively engaging and/or engaging for set periods</td>
<td>Lacking engagement</td>
</tr>
</tbody>
</table>
### Appendix 5.2 Monopoly lessons as identified by Axelrod

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Discussion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The object of the game</td>
<td>'you have to pony up to buy, rent, and sell’ (p. 23). 'But does aggressiveness invite recklessness’ (p. 24).</td>
</tr>
<tr>
<td>2. All things being equal</td>
<td>While inauthentic to have all players starting off equal, players bring what they have inside (smarter, hungrier, stronger etc.).</td>
</tr>
<tr>
<td>3. A roll of the dice</td>
<td>Three lessons: ‘in all ventures, take steps to reduce randomness, counter chance with knowledge; and create luck with self-confidence built on understanding.’ (p. 39)</td>
</tr>
<tr>
<td>4. Passing go</td>
<td>The role of salary in investment risk taking.</td>
</tr>
<tr>
<td>5. The rule of opportunity</td>
<td>'unless you have a positive, purposeful, affirmative reason to say No, say Yes to every opportunity that presents itself’ (p. 48). The opportunities you forgo are the properties and opportunities of someone else.</td>
</tr>
<tr>
<td>6. Facing reality and paying your debts</td>
<td>What Monopoly really teaches (ruthlessness). Acceptance and learning from controlled risk taking. Can live risk adverse but you will not win Monopoly (opt out). ‘far more compelling lessons of the game are those that expose as illusion the sense of safe haven that comes with avoiding risk.’ (p. 50)</td>
</tr>
<tr>
<td>7. Mortgaging the future</td>
<td>Consider the role of mortgaging. Strategy through elective or just a necessity. 'Foolish fiscal aggression' (p. 61). If the game is drawing to a close and you are behind it may make good sense to mortgage everything in sight. Go for broke, but that usually means just that, you will go broke.</td>
</tr>
<tr>
<td>8. Vigilance</td>
<td>Play to the rules - landing on and not volunteering rent. 'each player takes responsibility for his or her actions and for managing his or her funds and properties’ (p. 68) Tough love - victory cannot be borrowed or loaned.</td>
</tr>
<tr>
<td>9. A random walk</td>
<td>Don't confuse complexity with randomness. Look for useful order. Act on what you know. Consider, is it worth the effort to study.</td>
</tr>
<tr>
<td>10. The taxman cometh</td>
<td>'Think of the luxury tax square and the &quot;bad&quot; community chest and Chance cards not so much as fixed taxes but as booby traps, which you may or may not trip over’ (p. 81). Income tax $200 of 10% ‘before you add up’. 'There is no surer way to get yourself in trouble in business than by remaining blissfully unaware of just what your assets and liabilities are every single day.’ (p. 82)</td>
</tr>
<tr>
<td>11. On sitting out</td>
<td>Missed opportunity and opportunity cost. No rent collected in jail. 'Inaction confers the illusion of safety' (p. 88)</td>
</tr>
<tr>
<td>12. The virtue of shortage</td>
<td>Housing shortage. Consider how your moves impact the market.</td>
</tr>
<tr>
<td>13. Let's talk</td>
<td>'the real object of monopoly is not so much to win as it is to make others lose, to drive them out of the game.’ (p. 99) Sell value, ask questions and focus on the other person’s needs.</td>
</tr>
<tr>
<td>14. Going once</td>
<td>Concept or price v worth. 'Monopoly, like business ... is dynamic ... A static approach to any dynamic system... is bound to fail sooner or later.' (p. 107)</td>
</tr>
<tr>
<td>15. Kicking under the bench</td>
<td>'Monopoly creates a more intense and dramatic situation than real life.’ (p. 109)</td>
</tr>
<tr>
<td>16. The real object of the game</td>
<td>Ethics and you winning through making others lose.</td>
</tr>
<tr>
<td>17. Psych (or who’s the Shlub who chose shoe?)</td>
<td>Know your opponent. 'Acting in anticipation confers far more leverage than acting in reaction’. (p. 124) Tokens as totems.</td>
</tr>
<tr>
<td>Lesson</td>
<td>Discussion</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>psych your opponents</strong></td>
<td>Cheating in games as in business. ‘An ethical game creates good feelings, win or lose. Lose to an ethical player, and you get up from the game board feeling you’ve fought the good fight. Lose to a jerk, and feel robbed and cheated. Which were you.’ (p. 133)</td>
</tr>
<tr>
<td><strong>Gain the world and lose your soul?</strong></td>
<td></td>
</tr>
<tr>
<td><strong>The role of ethics</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Hell is for nice guys</strong></td>
<td>‘Ethical play, in Monopoly as in business, does not mean diluting the will to win. It means defining victory ethically and, within that definition, devoting your efforts to winning, to playing fairly but ruthlessly.’ (p. 135) Making a covenant ‘to do whatever damage is necessary.’ (p. 137)</td>
</tr>
<tr>
<td><strong>Committing to ruthlessness</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Committing to cooperation</strong></td>
<td>Ethical, ruthless cooperation. ~ Capitalism. Brings forward the concept of authenticity in gameplay. Simple logic not applicable in complex multidimensional relationships. ‘Monopoly models capitalism. Winning calls for a combination of ruthless competition and willing cooperation.’ (p. 140)</td>
</tr>
<tr>
<td><strong>Cornering corporate karma</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Committing to cooperation</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Playing the odds</strong></td>
<td>Luck as the result of planning or, ‘the nasty “residue” planning can’t quite resolve’ (p. 147). A good plan for the particular environment.</td>
</tr>
<tr>
<td><strong>The smartest properties to own</strong></td>
<td>What to buy and why ‘The lie of ‘Hard work will reward to you with wealth’ (Horatio cited p. 152). Monopoly as a three-dimensional model of investment for the purpose of building wealth: 1 range of available opportunities (22 streets); 2 your available money resources; and 3 the time you spend assessing 1 and its relationship with 2.</td>
</tr>
<tr>
<td><strong>What to avoid buying and why</strong></td>
<td>What to avoid buying and why Measure probability and don’t forgo a good opportunity in the search for the best. No bad property only bad deals.</td>
</tr>
<tr>
<td><strong>Cash cows and old sows</strong></td>
<td>Advantages of passive investments with regular, albeit lower returns.</td>
</tr>
<tr>
<td><strong>The tried, true, and resolutely unglamorous</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Don’t work from emotion</strong></td>
<td>‘When it is time to sell it is time to sell’ (p. 169) Trophy assets vs. good assets.</td>
</tr>
<tr>
<td><strong>Start-up strategies</strong></td>
<td>Determination and independence first with a direction of buy, buy, buy.</td>
</tr>
<tr>
<td><strong>Turing the corner</strong></td>
<td>Mid-game commences when the first monopoly is crystalized. It brings upon a ‘transition from equal opportunity for all to decreasing opportunity for some.’ (p. 179) Economy of plenty moves to scarcity with a necessity for defence (not ultraconservative though). Time to trade and establish a general precedent of trading.</td>
</tr>
<tr>
<td><strong>Developing an winning strategy at mid-game</strong></td>
<td></td>
</tr>
<tr>
<td><strong>On being a closer</strong></td>
<td>End game begins when there are no potential monopolies left. Does not imply autopilot but rather a ‘highly charged time to player to player trades and alliances’ (p. 184). Choose alliances well, struggle if it can net a monopoly. ‘Whatever your most profitable venture or item may be, spend the proper amount of resources building it up.’ (p. 189)</td>
</tr>
<tr>
<td><strong>Winning the endgame</strong></td>
<td></td>
</tr>
<tr>
<td><strong>How far will this engine get you</strong></td>
<td>‘...who wouldn’t like to have a monopoly of one’s own? To possess all the goodies? To control everything everybody needed or wanted? It’s a naughty notion, to be sure, but naughty notions are the ones that are the most fun. Monopoly lets us play naughty. The object of this game is not to build businesses or create business excellence. It is to build monopolies that add up to the ultimate monopoly, the monopoly to end all monopolies: a world in which only you are left standing.’ (p. 195) Whilst a fun notion. A pure monopoly as such does not just eliminate competition but destroys business. Consider the Soviet Union. It ends the game. It is business Armageddon. ‘winning in monopoly is losing in real life, we must say that here, at this point, Monopoly and real life part company.’ (p. 196)</td>
</tr>
</tbody>
</table>

(Adapted from Axelrod 2002)
### Appendix 5.3 SimCity happiness, wealth and density matrix

<table>
<thead>
<tr>
<th>Reason</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>$$</td>
</tr>
<tr>
<td>Death</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>High taxes</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Crime at building</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Can’t pay rent</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No power</td>
<td>-</td>
<td>-</td>
<td>o</td>
</tr>
<tr>
<td>No water</td>
<td>-</td>
<td>-</td>
<td>o</td>
</tr>
<tr>
<td>Crime nearby</td>
<td>o</td>
<td>-</td>
<td>o</td>
</tr>
<tr>
<td>Garbage uncollected</td>
<td>-</td>
<td>-</td>
<td>o</td>
</tr>
<tr>
<td>Sewerage backed-up</td>
<td>o</td>
<td>-</td>
<td>o</td>
</tr>
<tr>
<td>Low land value</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Injury</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Medium taxes</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Germs</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Sickness</td>
<td>o</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Pollution</td>
<td>o</td>
<td>-</td>
<td>o</td>
</tr>
<tr>
<td>No education</td>
<td>o</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Homeless</td>
<td>o</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No community college</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No university</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Nearby police presence</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Fire marshal visit</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Health outreach visit</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Police outreach visit</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Delivering freight</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
</tbody>
</table>

*Happiness gain ‘+’, complain ‘o’, happiness loss ‘-’.*

(Treyz 2013)
Appendix 6.1 Sunshine Coast house price index workings

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Coast Median (RP Data 2013)</td>
<td>162,000</td>
<td>175,000</td>
<td>230,000</td>
<td>329,275</td>
<td>375,000</td>
<td>380,000</td>
<td>390,000</td>
<td>439,000</td>
<td>465,000</td>
<td>460,000</td>
<td>475,000</td>
<td>450,000</td>
<td>435,000</td>
<td>438,000</td>
</tr>
<tr>
<td>Unit Statistics (RP Data 2013a)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>471,697</td>
<td>462,734</td>
<td>477,542</td>
</tr>
<tr>
<td>House &amp; Land Packages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>452,710</td>
<td>442,750</td>
<td>442,750</td>
</tr>
<tr>
<td>House &amp; Land Packages Median Yr. to Dec. (QTT 2013)</td>
<td>192,500</td>
<td>227,000</td>
<td>322,500</td>
<td>385,000</td>
<td>385,000</td>
<td>412,000</td>
<td>445,000</td>
<td>475,000</td>
<td>467,500</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House &amp; Land Packages Median Yr. to Sep. (QTT 2013)</td>
<td>380,000</td>
<td>389,000</td>
<td>405,750</td>
<td>395,000</td>
<td>439,000</td>
<td>400,000</td>
<td>430,000</td>
<td>422,000</td>
<td>470,000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Houses Jun Q Median (REIQ 2012)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>445,076</td>
<td>470,000</td>
<td></td>
</tr>
<tr>
<td>Houses Mar Q Median (REIQ 2012)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>464,894</td>
<td>437,000</td>
<td></td>
</tr>
</tbody>
</table>

Residential house price index

| 1.00 | 1.08 | 1.35 | 1.92 | 2.24 | 2.27 | 2.37 | 2.52 | 2.71 | 2.61 | 2.74 | 2.63 | 2.62 | 2.63 |

% Increase

| 0    | 8.0% | 24.7%| 42.6%| 16.6%| 1.2% | 4.7% | 6.0% | 7.9% | -3.8% | 4.9% | -4.1% | 0.0% | 0.3% |

Note: QTT refers to Queensland Treasury and Trade
## Appendix 6.2 Sunshine Coast price indices

<table>
<thead>
<tr>
<th></th>
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<td>2.02</td>
<td>2.17</td>
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### Appendix 6.3 Sunshine Coast total return workings

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<td>2.74</td>
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<td>1.37</td>
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<td>2.02</td>
<td>2.17</td>
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<td>2.00</td>
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<td>2.34</td>
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<td>1.70</td>
<td>2.11</td>
<td>2.23</td>
<td>2.28</td>
<td>2.14</td>
<td>1.85</td>
<td>1.87</td>
<td>1.72</td>
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<td>1.63</td>
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<td><strong>Initial yield</strong></td>
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<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
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<td>0.04</td>
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<td>0.08</td>
<td>0.08</td>
<td>0.08</td>
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<td>0.09</td>
<td>0.09</td>
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<tr>
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<td>Sheds (Initial yield)</td>
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<td>0.08</td>
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<td>0.07</td>
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<td>2.30</td>
<td>2.20</td>
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<tr>
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<td>0.16</td>
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<td>0.16</td>
<td>(0.06)</td>
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<td>(0.21)</td>
<td>(0.11)</td>
<td>0.30</td>
<td>0.16</td>
<td>0.05</td>
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<tr>
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<td>(0.12)</td>
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<td>(0.14)</td>
<td>(0.31)</td>
<td>0.02</td>
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<td>(0.08)</td>
<td>(0.03)</td>
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</tbody>
</table>

*Note: The shaded year-on-year returns represent investment selections where a player would gain a point. Conversely the unshaded year-on-year returns represent investment choices where a player would lose a point.

* less rates and notional AU$1000 insurance and other
Appendix 6.4 Playing Property game: slides
Property Game Instructions

Buy, hold and sell Sunshine Coast property to get rich

The player who reads the markets bests wins. If your property’s return goes up gain a point. If it goes down lose a point.

Game starts in 2004 and ends in 2013 with each game year equivalent to 30 seconds

Use the clickers to select property to buy or retain each year

Work as a team, chat and discuss but make your own decision

(C) University of the Sunshine Coast
Picture Source: http://www.screenculture.net
Heat's off nation's favourite sunshine spot

*Sunday Age, 22 August 2004*

TRENDS The nation's property hotspots, the Sunshine Coast and south-east Queensland, are finally cooling as capital gains and population growth decline, says Macquarie Bank property analyst Rod Cornish.
News 2005

GET into the market now. That's the message the analysts are sending buyers...

*The Courier-Mail, 8 January 2005*

GET into the market now. That's the message the analysts are sending buyers considering property investment in south east Queensland. BIS Shrapnel's Angie Zigomanis, the Midwood Queensland Investment Report's Alan Midwood, Matusik ...

2005 Selection

1. HOMES
2. OFFICES
3. SHOPS
4. SHEDS
Costs hurt home-start forecasts

*The Courier-Mail, 1 May 2006*

NEW **housing starts are expected to tumble** 4 per cent in Queensland this financial year, driven by rising costs in the state's southeast, according to forecaster BIS Shrapnel.
Growing pains in paradise

*Australian Financial Review, 7 September 2007*

According to Real Estate Institute of Queensland chairman Lloyd Edwards, the popularity of Queensland's Sunshine Coast is showing no signs of halting. 'It's always been about the huge stretch of coast and the climate,' Mr Edwards said. 'And ...
News 2008

Plenty of Sunshine - Industrial land in big demand

*The Courier-Mail, 9 May 2008*

DEMAND for industrial property on the Sunshine Coast is "still surging ahead", according to a local real estate agent. David C. Smith...

Credit crunch hits big developers - Stalled projects set to reach 40%

*Sunday Mail, 30 March 2008*

QUEENSLAND'S property development industry has a severe case of the jitters, with more than 30% wiped off the value of property stocks..

2008 Selection

1. HOMES
2. OFFICES
3. SHOPS
4. SHEDS

(C) University of the Sunshine Coast
Light at the end of tunnel

*Sunshine Coast Daily, 19 December 2009*

IMPROVING economic conditions will present many new opportunities for the Sunshine Coast property market. Paul Day, head of research for Savills Queensland, told a recent Savills research forum...
THE Sunshine Coast commercial property market finished 2009 strongly compared with a stagnant 2008. Fortunately there was a market rebound in the second half of 2009.
WHILE the 2010 year was one of mixed fortunes for commercial property on the Sunshine Coast, there are clear signs pointing to an **improved 2011** on the back of rising business confidence, according to leading property advisor Savills...

**2011 Selection**

1. HOMES
2. OFFICES
3. SHOPS
4. SHEDS
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<th>Score</th>
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<tbody>
<tr>
<td>8</td>
<td>Participant 773F0</td>
</tr>
<tr>
<td>8</td>
<td>Participant 79917</td>
</tr>
<tr>
<td>8</td>
<td>Participant 77657</td>
</tr>
<tr>
<td>8</td>
<td>Participant 77592</td>
</tr>
<tr>
<td>8</td>
<td>Participant 79A49</td>
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</table>
Juniper launches retail sell-down

*The Australian Financial Review, 31 October 2012*

Juniper Development Group has put its Sunshine Coast retail holdings, which include Mooloolaba's Zanzibar complex, on the block for about $30 million.

The move comes after Juniper's $850 million Soul tower at Surfers Paradise on the Gold Coast fell into the hands of receivers PwC last week.
What % of your points would you like to wager on the last question?

1. 0%
2. 25%
3. 50%
4. 75%
5. 100%
Lifestyle regions to bounce back

*The Australian, 16 March 2013*

It's no secret coastal properties copped the brunt of the financial crisis, but analysts now reckon strong sharemarket gains and the resilient job market could help kick-start lifestyle regions from far north Queensland down the coast to southern Tasmania...
# Final Scores

<table>
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<th>Score</th>
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<tr>
<td>14.5</td>
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<td>13</td>
<td>Participant 77BDB</td>
</tr>
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<td>13</td>
<td>Participant 799A8</td>
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<td>11.5</td>
<td>Participant 78BDF</td>
</tr>
</tbody>
</table>

(C) University of the Sunshine Coast
Picture Source www.triplem.com.au
Sunshine Coast property investment return trend

- Homes (growth)
- Offices (growth)
- Shops (growth)
- Sheds (growth)

Investment Index (income and gain)

Graph showing trends from 2000 to 2013.
Q. Did you enjoy playing *Playing Property*?

1. Yes, strongly Agree
2. Yes, agree
3. No, disagree
4. No, strongly Disagree
Q. Did you learn more about property through playing *Playing Property*?

1. Yes, strongly Agree  
2. Yes, agree  
3. No, disagree  
4. No, strongly Disagree

Bar chart:
- Option 1: 37%  
- Option 2: 40%  
- Option 3: 26%  
- Option 4: 11%
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### Appendix 6.5 Possession v Poverty property comparison

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<th>Improvement Price</th>
<th>Return on Land</th>
<th>Return on Improvement</th>
<th>Return on 2nd</th>
<th>Return on 3rd</th>
<th>Rol.</th>
<th>Rol. (Monopoly)</th>
<th>RolImp.</th>
<th>Return on 2nd</th>
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<td>200,000</td>
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<td>160,000</td>
<td>500,000</td>
<td>1,050,000</td>
<td>5.00%</td>
<td>10.00%</td>
<td>10.00%</td>
<td>20.00%</td>
<td>42.00%</td>
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<td>10.00%</td>
<td>10.00%</td>
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<td>115,000</td>
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<td>10.00%</td>
<td>15.33%</td>
<td>45.00%</td>
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<td>420,000</td>
<td>-</td>
<td>-</td>
<td>10.00%</td>
<td>10.00%</td>
<td>30.00%</td>
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<td>Nambour</td>
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<td>100,000</td>
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<td>-</td>
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<td>10.00%</td>
<td>10.00%</td>
<td>25.95%</td>
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<td>490,000</td>
<td>-</td>
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<td>10.00%</td>
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<td>10.00%</td>
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<td>-</td>
<td>-</td>
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<td>10.00%</td>
<td>30.91%</td>
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<td>5.00%</td>
<td>10.00%</td>
<td>15.33%</td>
<td>45.00%</td>
<td>84.00%</td>
<td>84.00%</td>
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<tr>
<td>Maleny</td>
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<td>150,000</td>
<td>-</td>
<td>45,000</td>
<td>630,000</td>
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<td>-</td>
<td>11.54%</td>
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<td>12.20%</td>
<td>35.71%</td>
<td>94.37%</td>
<td>87.78%</td>
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<tr>
<td>Alexandra</td>
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<td>$300,000</td>
<td>200,000</td>
<td>-</td>
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<td>790,000</td>
<td>-</td>
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<td>12.00%</td>
<td>35.71%</td>
<td>87.78%</td>
<td>87.78%</td>
</tr>
<tr>
<td>Maroochydore</td>
<td>Residential</td>
<td>$260,000</td>
<td>200,000</td>
<td>-</td>
<td>55,000</td>
<td>710,000</td>
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<td>-</td>
<td>11.96%</td>
<td>36.36%</td>
<td>82.56%</td>
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<tr>
<td>Buderim</td>
<td>Residential</td>
<td>$280,000</td>
<td>200,000</td>
<td>-</td>
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<td>750,000</td>
<td>-</td>
<td>-</td>
<td>12.50%</td>
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<td>85.23%</td>
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<tr>
<td>Civic</td>
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<td>250,000</td>
<td>25,000</td>
<td>115,000</td>
<td>1,050,000</td>
<td>5.00%</td>
<td>10.00%</td>
<td>15.33%</td>
<td>45.00%</td>
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<td>84.00%</td>
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<tr>
<td>Maroochydore</td>
<td>Residential</td>
<td>$290,000</td>
<td>200,000</td>
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<td>75,000</td>
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<td>-</td>
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<td>15.31%</td>
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<tr>
<td>Coolum</td>
<td>Residential</td>
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<td>200,000</td>
<td>-</td>
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<td>960,000</td>
<td>-</td>
<td>-</td>
<td>15.31%</td>
<td>44.93%</td>
<td>107.87%</td>
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<tr>
<td>Noosa</td>
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<td>$350,000</td>
<td>200,000</td>
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<td>15.45%</td>
<td>45.33%</td>
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<td>Bulcock</td>
<td>Office</td>
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<td>250,000</td>
<td>25,000</td>
<td>30,000</td>
<td>420,000</td>
<td>-</td>
<td>5.00%</td>
<td>4.00%</td>
<td>12.00%</td>
<td>33.60%</td>
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<tr>
<td>Kawana</td>
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<td>30,000</td>
<td>440,000</td>
<td>-</td>
<td>5.45%</td>
<td>3.75%</td>
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<td>250,000</td>
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<td>35,000</td>
<td>450,000</td>
<td>-</td>
<td>5.00%</td>
<td>4.12%</td>
<td>11.36%</td>
<td>33.33%</td>
<td>33.33%</td>
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<tr>
<td>Plaza</td>
<td>Retail</td>
<td>$500,000</td>
<td>250,000</td>
<td>25,000</td>
<td>115,000</td>
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<td>5.00%</td>
<td>10.00%</td>
<td>15.33%</td>
<td>45.00%</td>
<td>84.00%</td>
<td>84.00%</td>
</tr>
<tr>
<td>Mooloolaba</td>
<td>Tourism</td>
<td>$900,000</td>
<td>300,000</td>
<td>45,000</td>
<td>180,000</td>
<td>2,700,000</td>
<td>-</td>
<td>5.00%</td>
<td>15.00%</td>
<td>45.33%</td>
<td>150.00%</td>
<td>150.00%</td>
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<tr>
<td>Hastings</td>
<td>Tourism</td>
<td>$1,000,000</td>
<td>300,000</td>
<td>50,000</td>
<td>195,000</td>
<td>2,950,000</td>
<td>-</td>
<td>5.00%</td>
<td>15.00%</td>
<td>45.00%</td>
<td>155.26%</td>
<td>155.26%</td>
</tr>
</tbody>
</table>
Appendix 6.6 Possession v Poverty game: photos
Appendix 7.1 SimCity game: screen images
Appendix 7.2 Investorville game: screen images
## Simulation Results

### Game Summary

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting finances:</td>
<td>$71,000</td>
</tr>
<tr>
<td>Final net worth:</td>
<td>$1,228,867</td>
</tr>
<tr>
<td>Cash invested:</td>
<td>$375,948</td>
</tr>
<tr>
<td>Tax:</td>
<td>$89,587</td>
</tr>
<tr>
<td>Profit:</td>
<td>$781,919</td>
</tr>
<tr>
<td>Growth p.a. (high score):</td>
<td>8% (8%)</td>
</tr>
</tbody>
</table>

### Annualised Net Gain (%)

<table>
<thead>
<tr>
<th>Community Average</th>
<th>Your Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>9%</td>
<td>8%</td>
</tr>
</tbody>
</table>

### Thanks for playing Investorville

Overall, your performance was good.

Your net worth increase during this simulation was 8%. A property investor would typically aim to reach a figure of around 8% (although this varies depending on market conditions) and other Investorville players averaged 9% over the same period, so well done.

To maximise your performance next time, you might consider buying more properties, purchasing properties with higher rental yields (higher rent and lower purchase price) or look to add to the value of your properties with renovations.

You can try again and see how much further you can go. Or, why not learn more about investing in property for real?

[Do it for real with the Commonwealth Bank >>]
Simulation Results

Thanks for playing Investorville

<table>
<thead>
<tr>
<th>Property transactions</th>
<th>You</th>
<th>Community average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties bought:</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Properties sold</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Average % profit</td>
<td>77%</td>
<td>60%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property maintenance</th>
<th>You</th>
<th>Community average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renovations completed:</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>ROI on renovations:</td>
<td>22%</td>
<td>33%</td>
</tr>
<tr>
<td>Repairs completed:</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rental summary</th>
<th>You</th>
<th>Community average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rent earned</td>
<td>$25,120</td>
<td>$960,338</td>
</tr>
<tr>
<td>Rental yield</td>
<td>2%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Things to remember when you’re investing for real

Investing is a long-term strategy for building wealth and financial security. Maximising rental income can often be more easily achieved by holding on to consistent and reliable tenants, rather than undertaking expensive renovations or by pricing yourself at the top end of the market.

For a fee, a real estate agent can manage the process and look after your property for you. The agent will perform tenant screenings and present you with recommendations. But if you’re going to manage your own property, make sure all prospective tenants have references from previous real estate agents (although first time renters will have to rely on character references and other relevant information).

Also, any residential property should be ‘fit to live in’. This means that you are legally required to organise any urgent repairs by a qualified tradesperson as soon as you’ve been notified that the repairs are required.

Start New Simulation

Do it for real with the Commonwealth Bank >>
## Appendix 8.1 Learnings from the serious games suite

<table>
<thead>
<tr>
<th>Learnings</th>
<th>Category</th>
<th>SimCity</th>
<th>Playing Property</th>
<th>Possession v Poverty</th>
<th>Investortville</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>…of property practice</td>
<td>Apply planning techniques to the creation and management of a simulated city to test development theories and build strategic knowledge.</td>
<td>Interpret market information and apply foundational knowledge to gain a holistic understanding of commercial and residential property markets.</td>
<td>Dynamically evaluate asset related risk and return profiles to assess market value and investment worth.</td>
<td>Interpret qualitative forecasting information and anticipate the respective effects on the market value of residential property. Apply asset management techniques and budgeting to maintain value in volatile residential property markets. Select mortgage types and calibrate leveraging to optimise investment returns and maintain cash flow.</td>
</tr>
<tr>
<td>…of property market</td>
<td></td>
<td>Gain a deeper understanding of the local property market cycles through predicting market movements, making investment choices and witnessing the successes and failures of self and peers.</td>
<td>Manage cash flow and monitor the financial position of fellow players to take advantage of market imperfections and imbalances in supply and demand.</td>
<td>Analyse income and capital returns from residential property to inform investment decision-making. Apply investment strategies to buy and sell virtual residential property.</td>
<td></td>
</tr>
<tr>
<td>Skills</td>
<td>Communication</td>
<td>Consider the feedback of salient stakeholder groups in managing a virtual city.</td>
<td>Read the play of others and apply appropriate negotiation tactics for financial gain. Interact effectively in leadership and subordinate roles in partnerships to deliver measurable outcomes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Numeracy</td>
<td>Manage the collection and allocation of municipal revenues.</td>
<td>Apply simple statistical and probability analysis to inform strategies to reduce randomness and counter chance with knowledge. Maintain an accurate perspective of your day-to-day assets and liabilities.</td>
<td>Balance income streams with capital expenditure to maintain cash flow.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal</td>
<td>Learn to make more effective decisions through experiencing and reflecting upon constructive failure. Assume a position of authority and practise leadership decision-making to realise goals that may not be achieved in real life.</td>
<td>Experiencing a heightened level of competition and being assessed with your peers present. Through obtaining rapid feedback on choices, build self-confidence and self-efficacy.</td>
<td>Experience and quantify the emotions attached to the seemingly oxymoronic phrase of 'ethical, yet ruthlessly competitive directive' through acting in a ruthless, yet ethical manner. Compare and contrast the actions of others and self to anticipate future moves and behavioural trends.</td>
<td>Observe the emotionless nature of property investment and act based on strategy and mandate as opposed to emotion and popularity.</td>
<td></td>
</tr>
<tr>
<td>Learnings</td>
<td>Category</td>
<td>SimCity</td>
<td>Playing Property</td>
<td>Possession v Poverty</td>
<td>Investorville</td>
</tr>
<tr>
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<td>---------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Attributes</td>
<td>creative/critical problem-solving</td>
<td>Develop and apply abstract imaginative thinking through identifying new and novel solutions to create and maintain a virtual city. Prioritise objectives and plan to provide more effective decision-making.</td>
<td>Draw upon provided market material, demonstrated market trends and past experiences to make informed property investment choices.</td>
<td>Analyse, evaluate and synthesis quantitative data and predict the play of others to exploit opportunities to bankrupt other players.</td>
<td>Experiment with risk seeking and risk averse property investment strategies.</td>
</tr>
<tr>
<td></td>
<td>Team work</td>
<td></td>
<td></td>
<td>Form constructive alliances for player-to-player trades and maintain a positive mutual concern in a ruthlessly competitive simulated business environment.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Social and environmental awareness</td>
<td>Conceptualise the interests and needs of society to promote sustainable development. Witness the complexity of land use sustainability, developing an awareness of the complex ways that any modification of the urban fabric can affect urban processes and patterns throughout a city.</td>
<td></td>
<td>Formulate strategies to sustain aggressive growth through gains from another’s loss.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
<td></td>
<td></td>
<td>Reinforce learnings through a vested interest in the outcome, leading to greater persistence in an intense and dramatic simulated property investment environment.</td>
<td></td>
</tr>
</tbody>
</table>