EXISTING AND EMERGING
BUSINESS SIMULATION-GAME DESIGN MOVEMENTS

Jeremy J. S. B. Hall
Hall Marketing

ABSTRACT

Business Simulation-Game design is arguably a creative art and like painting and architecture there are several movements that describe the artistic style of individual business simulation-games. This paper describes that several aspects of Fine Art movements are relevant to business simulation-game design. These (realism, aesthetics and functionalism) can be used to position Business Simulation-Games and define existing and emergent simulation movements. The paper suggests these movements are the established Real World movement and the emergent movements of Teach and Murff's Small Simulations, Serious Games and Hall's Corporate Cartoons. Each of these movements is positioned in the realism, functionalism and engagement (aesthetics) space and parallels drawn with the relevant Fine Art movements. Besides positioning the movements the paper critiques individual movements based on their position in the realism, functionalism and engagement space.

INTRODUCTION

Hall (2008) in a paper entitled "Corporate Cartooning: The Art of Computerized Business Simulation Design" raised the issue of the *artistic* aspects of simulation-game design. And although, in the main, he focused on structural design issues he did raise the issue of the extent to which realism can be abstracted – an abstraction that is paralleled in the fine art movements.

Simulation-Game design has always had a significant artistic element. Bellman et al (1957) stated *"Making models, mathematical or otherwise, of complex systems is an art with a small amount of science to guide one."* Thavikulwal (2004) stated *"Just as the design of an office building is part art and part science, so too is the design of computerized business gaming simulation".* And Bots and Daalen (2007) stated about game design that it is *"more of an art and craft than a science".* As a consequence this paper explores the artistic design aspects using parallels with Fine Art movements to better understand the artistic design issues associated with simulation-games.

FINE ART MOVEMENTS

Two Fine Arts (paintings and architecture) are particularly relevant and provide insights into and parallels with business simulations.

The aspect of paintings that is directly applicable to business simulations is realism. Historically painting movements have ranged from *Realism* through *Impressionism* and *Expressionism* to *Surrealism.* And, like paintings, Business Simulations can be positioned from reality through progressive stylisation towards the surreal.

The aspect of architecture that is directly applicable to business simulations is functionality that, for architecture, ranges from *Functionalism* (Gibberd, p121) to *Baroque* (Chilvers and Osborn (2001), p44). Where Functionalism is exemplified by *"form follows function"* (Sullivan, 1896) and Wittgenstein's contention that *'meaning lies in use'* (quoted by Melvin, p109). Baroque *"is dominated by movement – whether physical, emotional or spiritual"* (Chilvers and Osborn (2001), p42). For Business Simulations, the functionality aspect is replaced by learning purpose and support. And simulation movements it can be positioned from no functionality to directly support the learning process to high functionality (comprehensive learning process support).

Both paintings and architecture have aesthetic (emotional engagement) aspects – for paintings these are typified by the neo-classicism-romanticism polarity (Chilvers and Osborn (2001), p484) where Romanticism *"valued human emotions"* (Little (2004), p72) and Neo-Classicism *"is characterised its emphasis on reason and rational"* (Little (2004), p86). For architecture this is typified by decoration ranging from Minimalist (as exemplified by Mies van der Rohe (Gibberd (1997), p123) to Baroque (Gibberd (1997), p69). Both define the extent to which the design addresses the emotions and for Business Simulations this relates to the conscious design for engagement (or fun).

Therefore business simulations movements can be defined by the way they are positioned in three-dimensional space where the axes are reality, functionality and emotional engagement. Where the reality axis ranges from real to surreal. The engagement axis ranges from a focus on unadorned content to fun. And, the functionality axis defines the extent to which the simulation has functionally built-in to support the learning process.

BUSINESS SIMULATION MOVEMENTS

We suggest that besides an established ***Real World Movement*** there are three *emergent* movements – ***Small Simulations, Serious Games*** and ***Corporate Cartooning***. Each of which is positioned differently on the realism, functionalism and engagement axes.

REAL WORLD MOVEMENT

The Real World Movement is based on the established view is that Business Simulation-Games should replicate reality. Chiesl (1979) stated *"Ideally all gaming techniques attempt to obtain a 100% realistic copy of the object system being simulated".* Miller and Leroux-Demers (1992) stating that *"management simulations are valid pedagogic tools provided they are complex and realistic."* And Decker et al (1987) saying about simulations *"..... all have the common objective of making*
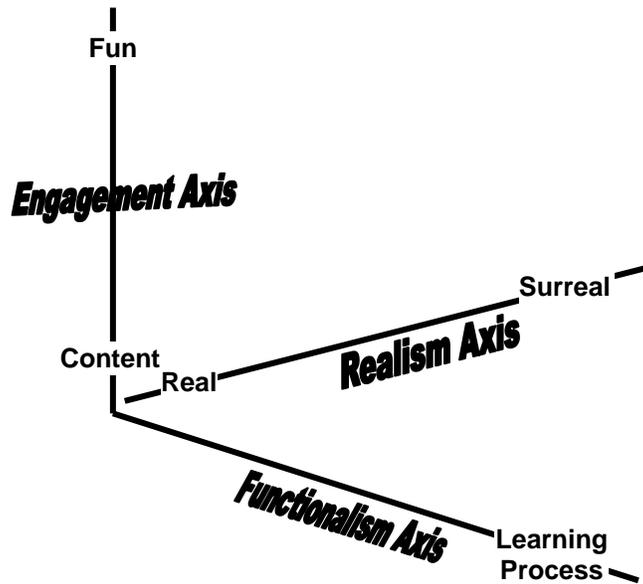
Figure 1: Simulation Movement Space

their model as realistic as possible". Vaughan (2006, p28) when describing why simulations work asserts that simulations should *"closely approximate the real world".* And, Aldrich (2004, p102) asserts that *"Simulations will become increasingly realistic).* These statements and others position a simulation movement the firmly at the reality end of the reality axis – the Real World Movement. In realism terms, this movement parallels fifteenth-century Naturalism (Little (2004), p36), nineteenth-century Realism (Little (2004). p80) and twentieth-century Superrealism (Chilvers and Osborn (2001), p544) movements. In emotional engagement terms, this movement parallels the fifteenth and sixteenth-century Classicism and the early nineteenth-century Neo-Classicism Movements in that realism is seen as *intrinsically motivating* (Raybourn, 1997). Prensky (2005) argues that *"complex games force players to make interesting and important decisions".* Consequentially in terms of engagement, reality is seen as self-motivating and positions the Real World Movement simulations at the content end of the emotional engagement axis. In the context of functionalism, Miller and Leroux-Demers (1992) assertion about pedagogic validity indicates that realism and complexity are sufficient for learning. The stance on engagement and functionalism suggests that for many, the Real World Movement is an aesthetic art form (*"l'art pour l'art"* Cousin, 1836). This is also exemplified by Thavikulwat's (2004) statement that *"a gaming simulation's purpose can well be the last consideration in its development rather than its first".* And later, in the same paper, suggesting that a simulation's learning purpose is discovered after its design and that this is a common situation. For architecture this post design discovery of purpose was explored in the book and a BBC series entitled "How Buildings Learn" (Brand, 1994) that posited and explored for buildings *"what happens after they are built"* and that, commonly, an architect's purpose does not reflect user needs. Additionally, the Real World Movement parallels *Academic Art* where the complexity of some simulation–games parallels paintings that are *"large scale narratives from history, the Bible or*

mythology" (Pook & Whitham, 2003, p150). In turn this desirability of complexity (Leroux-Demers, 1992) leads to complex simulations with many decisions (Teach and Murff, 2008b) and this again is paralleled by painting's Realism movement. With, for example, Gustave Courbet's enormous *Burial at Ornans* that contained *thirty life-size figures* (Read, 1994) in a painting 10'3" by 21' 9". A consequence of this complexity is the time taken to play the simulation-game (Teach and Murff, 2008b). And as design time correlates with playing time (Hall, 2007), the time and cost to design the simulation-game is significant.

SMALL SIMULATION MOVEMENT

The Small Simulation Movement was described by Teach and Murff (2008a) where he suggested an movement paralleling minimalist architecture (Bertoni, 2002) with simulations focussing on a limited range of learning objectives and consequentially are short and simple. Minimalist Architecture is exemplified by Ludwig Miles van der Rohe's motto *"Less is More"* (quoted in Glancy, 2000, p178). Teach and Murff argue that the limited complexity of these simulations ensures that learners are not overwhelmed and discouraged and so these simulations are positioned somewhere up both the engagement and functionalism axes (although the need to build in engagement and learning support functionality is not explicitly advocated). Teach and Murff allow one to position *Small Simulations* on both the engagement and learning axes but not directly on the realism axis. But positioning on the reality axis is possible by referring to other papers by Teach (1984, 1990 and 2000) and Murff et al (2007) where they espouse (algorithmic) reality. And so Small Simulations are likely to be positioned at the high reality end of this axis. This means that Small Simulations are the equivalent of paintings *miniatures* (*"a very small painting, particularly a portrait"* (Chilvers and Osborn (2001), p371)). Architecture's Minimalist Movement was attacked by Robert Venturi's architectural contention that *"less is a bore"* (quoted in Glancy (2000), p198). And, equally, for

Simulation-Game Movements	Fine Art Movements
Real-World	Realism (mid to late 19th Century)
Small Simulations	Architectural Minimalism
Serious Games	Expressionism (1905 – 1920)
Corporate Cartoons	Impressionism/Functionalism (1860 – 1900)

Table 1: Fine Art/Simulation-Game Movement parallels

simulation-games Prensky (2005) argues that *"Complexity Matters: Mini-games are Trivial – but "Complex Games" Are Not"*. Prensky's argument for complexity is that *"a complex game requires a player to learn a wide variety of often new and difficult skills"*. Yet Teach and Murff argue (persuasively) that an alternative is to use a sequence of Small Simulations with each focussing on different learning objectives.

SERIOUS GAME MOVEMENT

For Business Simulation-Games, the Serious Game Movement applies video game approaches to their design. Because of it's grounding in video games this movement is very concerned with aesthetics (sensory aspects) and therefore parallels painting's *Expressionism* (Little (2004), p104) and on occasion *Mannerism's* concentration on style rather than content (Lucie-Smith, 1988). Further some would seem to border Surrealism with its simultaneous *"real and bizarre"* elements (Little (2004), p118). In an architectural context the movement parallels Postmodernism's *"architecture rich in symbolism, layering, ambiguity and allusion"* (Robert Venturi quoted by Melvin (2005, p128)). Although it is possible that Serious Game supporters concur with Vasari's use of Mannerism to denote *"elegance and sophistication"* in paintings (Little (2004), p38). Key to this movement for simulation-games is Csikszentmihalyi's concept of *flow* (1975) and the general assertion that *fun* is necessary to learning. Quinn (2005, p11) suggests that *"at best, learning is a wildly enjoyable experience"*. However, Cryer (1988, p118) discusses the *"problem of over-motivation"* citing Vroom and Deci (1978) showing that several studies have shown that increasing motivation *"it first leads to an increase in productivity, but then a decrease"*. A second weakness is that the fun aspect encourages *addictive* play (Kelly, 2004) and although this serves to reinforce learning ultimately it wastes the learners' time as they spend more time than necessary to learn. As a consequence, Serious Games are positioned at the top of the engagement axis, towards the bottom of the learning functionality axis and widely spread on the realism axis.

CORPORATE CARTOON MOVEMENT

The **Corporate Cartoon Movement** was described by Hall (2008) where he suggests that the business simulation-game's structures and forms parallel those of the comic strip – a situation paralleling that of Impressionism and in particular Post Impressionism. Little (2004, p94) states that the focus of Impressionism is on communicating emotion with *"a focus on design and structure and a refusal to imitate nature*. Later he states *"Cézanne approached his paintings as something which had to be designed and given a shape"* and stated *"Likewise,*

Gauguin structured his works to convey what he though was the spiritual truth of his subject matter". For Corporate Cartoons the focus on design and structure focus exactly parallels this with a focus on cognitive development. And a focus on psychological validity (Schroynens, 2004) rather than exact replication parallels Gauguin's views on conveying the spiritual truth. Additionally, Corporate Cartoons parallel architecture's Functionalism Movement (Gibberd (2005), p121). A movement exemplified by the phrase *"form follows function"* (Sullivan, 1896). This focus on functionalism is reflected in other work by Hall (1994, 2004). With a focus on simplicity and stylisation this movement is the antithesis of the Real World Movement. And with a focus on functionality rather than extreme emotional engagement this movement is positioned below Serious Games on the engagement axis. But, perhaps just as cartoons (comics) are not viewed a serious art form (Eisner, 1995), Corporate Cartoons may be regarded as pedagogically invalid. However, interestingly, the term *Impressionism* was *"first used by hostile critics to described as 'unfinished' by the Academic standards of the day"* (Little (2004), p84). In terms of realism, the stylisation and simplification advocated by Hall positions Corporate Cartoons in the middle of the reality axis, towards the top of the functionalism axis and in the middle of the engagement axis.

Figure 2 positions the four simulation-game movements approximately in realism, functionalism, engagement space.

CONCLUSIONS

The paper has separated simulation-games into four broad movements but has made no attempt to assign individual simulation-games into a particular movement. If this is done, it is likely that additional simulation-game movements will be revealed as will sub-movements and further evolving movements.

Just as Table 1 indicates time lines for fine art movements, it is possible that there are similar evolutionary trends occurring between the simulation-game movements. Also it is probable that the artistic styles of simulation-game designers evolve over time. For paintings, this can be illustrated by the artist Picasso whose work evolved from academic realism (before 1900), through his Blue and Rose Periods (1901-1906), Cubism (1907-1912) to Surrealism (1918-36). This movement from realism to surrealism might be paralleled in simulation-games by a movement from business modelling (for corporate planning and budgeting) to progressively more abstract models where the focus is on providing learning and engagement rather than just replicating the real world.
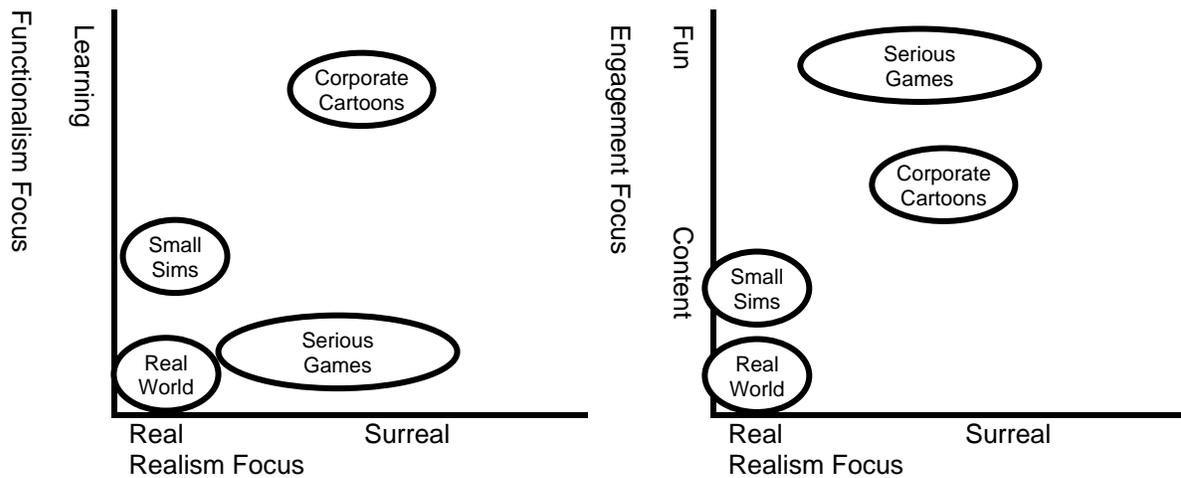
Figure 2: Movement positions in Realism/Functionalism/ Engagement Space

As simulation-games from all the movements have demonstratively delivered excellent learning, the need for reality is arguably more an artistic interpretation than a scientific assessment. And it provides an opportunity to critique and explore simulation-game design in terms of three dimensions – realism, functionalism (learning support) and engagement.

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