# Breathing 'second life' into art investigation:
# Examining the impact of MUVE functionality regarding scale, movement and mood in visual arts

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A Meta project submitted to the University of Dublin, Trinity College, in partial fulfilment of the requirements for the degree of Master of Science in Technology and Learning

# Declaration

I declare that the work described in this document is, except where otherwise stated, entirely my own work and has not been submitted as an exercise for a degree in any other university

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22$^{nd}$ April 2014

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22<sup>nd</sup> April 2014

# Acknowledgements

# Abstract

Art investigation is an integral part of the world of visual arts. First hand exposure to, and engagement with diverse original works of art in a gallery setting is lauded as an ideal learning scenario. However gallery spaces are not designed for interactivity and most museum walls are designed to be seen, but not touched. Classroom spaces are frequently used for art investigation. However, they are not designed as gallery spaces. They are busy, multi-functional places and investigating secondary sources in a classroom setting is limited in terms of facilitating proximity, multiple vantage points, learner autonomy, interactivity, time and limiting teacher bias.

Meaningful art investigation requires prolonged viewing time and guided discovery. Guided discovery entails encouraging viewers to look closely at the work, sharing observations with one another, gradual revelation of information about work, answering and asking questions and eliciting emerging understandings from learners. Secondary sources or copies have always been used in art investigation. However, hard copy and digital reproductions can often mislead learners most especially in relation to actual scale, kinetic movement or mood. Digital copies from Internet searches vary in quality and accuracy. Default digital presentation formats can also deceive.

This explorative case study examines the impact of multi-user virtual environment functionality regarding scale, movement and mood in visual arts. Using convergent parallel mixed methods, it evaluates the impact of a specially designed multi-user virtual gallery in Second Life named *AISLE (art investigation in a second life environment)* in relation to learners' increased *awareness, understating* and *appreciation* of scale, movement and mood related constructs. This study finds that the multi-user virtual gallery *AISLE* has impacted positively regarding increased *awareness* and *understanding* of the more overt and obvious constructs concerning actual scale and movement. The MUVE *navigation* and *camera viewing tools* especially aided this progression. However, the study finds that more time and explicit teaching is required to unpack the more covert and complex constructs relating to implied scale, movement and mood. This study will be of particular interest to art teachers who seek an alternative tool to investigate more accurate approximations of the orginal works or those interested in exploring MUVE functionality to extend their traditional classroom approach.

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# Abbreviations

Art Investigation (AI)

Scale (SC)

Movement (MV)

Mood (MD)

*Art Investigation in Second Life Environment (AISLE)*

*Second Life* (SL)

Multi-user virtual environment (MUVE)

Multi-user virtual gallery (MUVG)

Inter-avatar communication (IAT)

Camera viewing tools (NVT)

Navigation tools (NVG)

Interactivity (INT)

Notecard tool (NCT)

*Scratch for Second Life* (S4SL)

Technology enhance learning (TEL)

Technology enhanced learning experience (TELE)

# Chapter one: Introduction

## 1.1 Art investigation (AI)

Art investigation (AI) has long been 'an established and valued element of visual arts education' (Barnes; 2002; Bloomfield & Childs, 2000; Calloway & Kea, 1999; Colbert, 2001; Long, 2001, p. 257). Orchestrating opportunities for learners to investigate art is deemed critically important to enable students understand visual concepts employed by visual artists (Herz, 2010; Hurwitz & Day; 2007; Kahmi, 2007; Knight, 2010). This research focuses on three specific concepts. These include scale, movement and mood.

Through AI, students can assimilate ideas and techniques concerning these constructs in their own work (Eckhoff; 2007; Efland, 2002; Eisner. 2009; NCCA, 1999; Metclaffe, Simpson, Todd &Toyn, 2013; Mulcahy, 2009, Stevens 2008). It permits students to encounter excellence in relation to scale, movement and mood, leading them to become more discerning consumers of art and to apply related constructs into their own work (Herz, 2010; NCCA, 1999; Joster, 2009). This case study explores the impact of the multi-user virtual environment (MUVE) *Second life* regarding scale, movement and mood in visual arts (see figure 1.1).
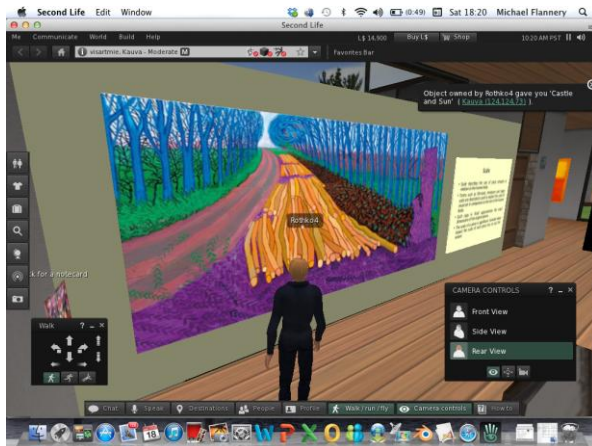


Figure 1.1 Avatar investigates a digital copy of *Winter Trees,* by David Hockney

## 1.2 Three art investigation contexts

Generally, AI happens within a gallery or classroom setting. Effective AI in either scenario entails (i) time to engage with each piece in a prolonged and reflective manner and (ii) guided discovery, facilitated by the teacher (Barbe-Gall, 2005; Costantino, 2008; Clement, 1993; Herz, 2010; IMMA, 2010, NCCA 1999; O Donnell,

2007). This study evaluates a third AI scenario – AI in a specially designed multi-user virtual gallery (MUVG) named *AISLE: Art investigation in second life* (see figure 1.2 and 1.3 or appendix A). This study analyses *AISLE*'s impact regarding scale, movement and mood. It explores what specific MUVE tools or affordances enhance learning about scale, movement and mood. MUVE tools include navigation tools (see figure 1.2), camera viewing tools (see figure 1.3), inter-avatar communication tools (see figure 1.4) and optional 'notecard' tools (figure 1.5). MUVE affordances comprise simulation, learner autonomy and interactivity. It also includes self-determined learning and shared knowledge construction (Boulos, Hetherington, Wheeler, 2007; Gaimster, 2007; Jia & Eder, 2009; Mahon, Bryant, Brown & Kim 2010; Skiba, 2009).
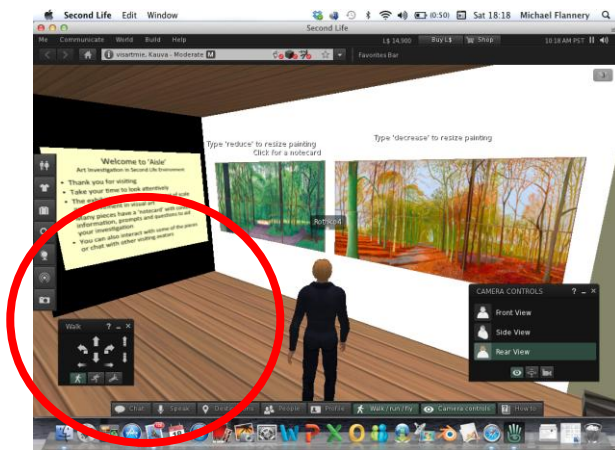


Figure 1.2 Navigation tools
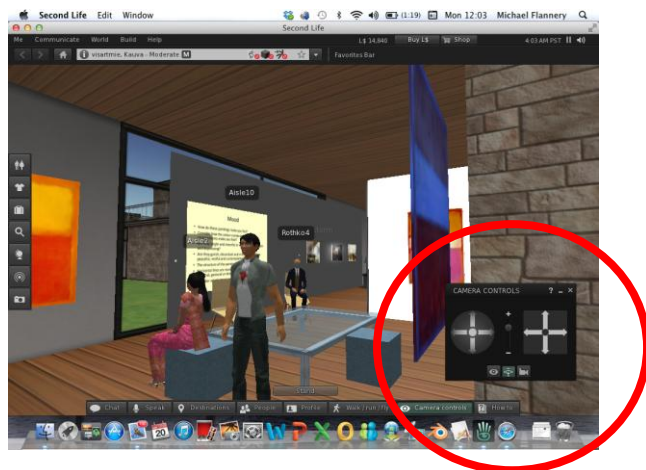


Figure 1.3 Camera viewing tools
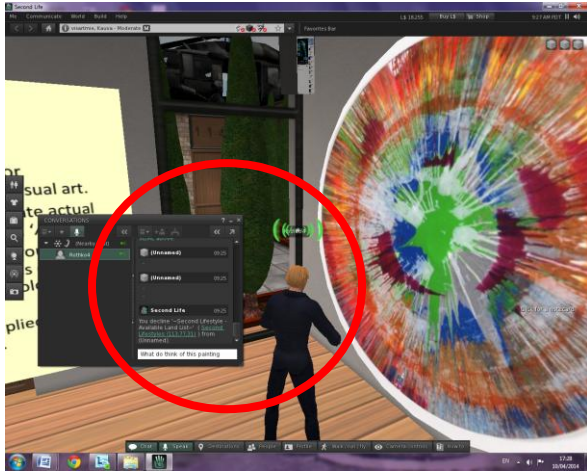
Figure 1.4 Inter-avatar communication tools
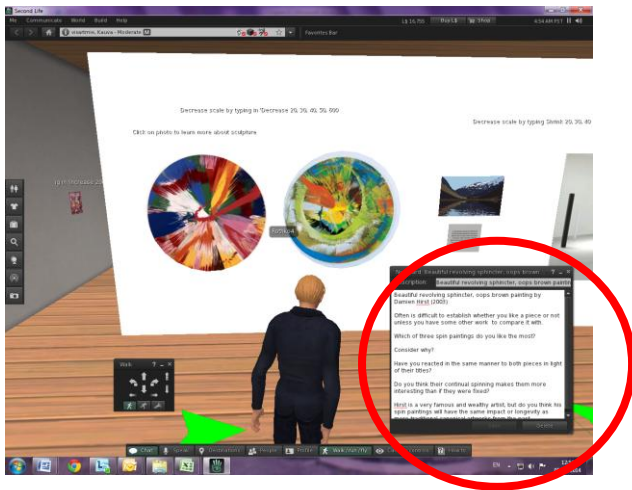


Figure 1.5 Optional 'notecard' tool

## 1.3 Limitations of traditional hard copy secondary sources

While first hand exposure to, and engagement with diverse original pieces in a gallery setting is lauded as an ideal learning scenario (Colbert, 2001; Lai, 2009; Long, 2001; Unrath & Luehrman, 2009), AI has always included engagement with secondary sources or copies for mostly budgetary, geographical or time constraints. Prior the Internet and information and communications technologies (ICT), reproductions of original work were limited to postcards, posters, prints, book illustrations and teacher packs. These included helpful additional contextual information about the work's provenance, suggested questions and activities to aid teaching and learning. However, such hard copy secondary sources often fail to translate actual scale or movement integral to original pieces to the learner. At best, they can only capture a sequence of discrete moments of time of actual motion integral to mobile, digital optical or film based artwork. Figures 1.6 and 1.7 depict just one snap shot in time of these kinetic works in motion. Hard secondary copies often

mislead in relation to mood, as coloured ink on paper may not be the same as the original painted hues on canvas or digital colour on a screen (see figure 1.8).
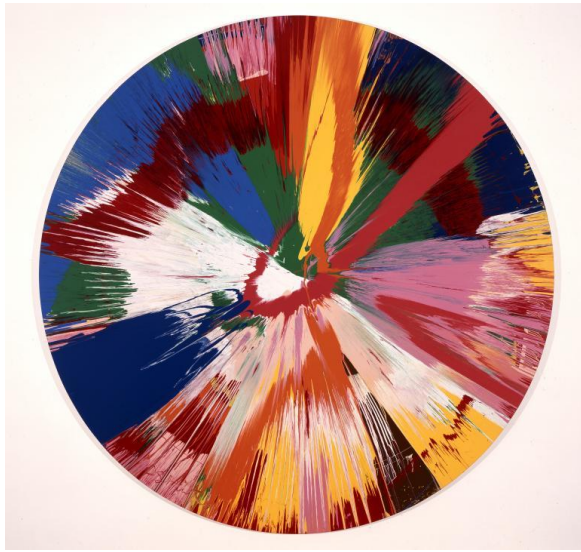

Figure 1.6 Screen shot of a spinning abstract painting by Damien Hirst


Figure 1.7 Screen shot of an animated digital painting by Julian Opie
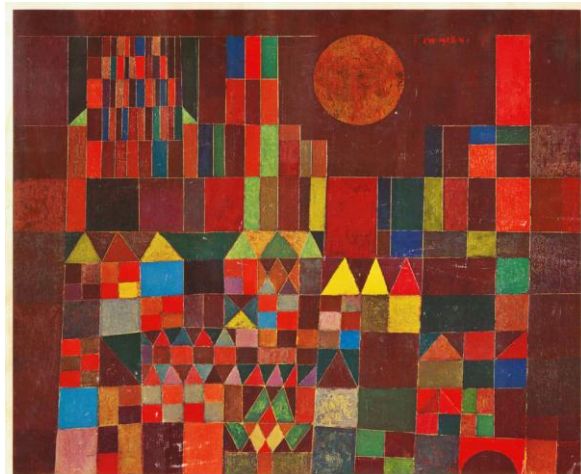

Figure 1.8 Screen shot of Paul Klee's oil painting *Sun and Castle*

## 1.4 Digital distortions

ICT have been instrumentalised to exhibit and promote visual arts. However, digital reproductions are often misrepresented in *Powerpoint* or other ICT presentation software. For example, the paintings *Rose Garden* by Paul Klee (490 x 425 mm) and *Whaam* by Roy Lichtenstein (1727 x 4064 mm) have very different dimensions yet the default layout format in *Powerpoint* or *Prezi* automatically inserts both works into the same fixed picture space (see figure 1.9). Consequently, the learner can be inadvertently misled into thinking that both paintings are of a similar actual scale when looking at them in on an interactive whiteboard in the classroom or on computer screen in a gallery setting (see figure 1.10).



Figure 1.9 Secondary copies viewed on an interactive whiteboard



Figure 1.10 Secondary copies viewed on a slideshow in a gallery setting

Internet searches allow learners to investigate canonical work very easily from their homes. However, searches often result in a plethora of copies of varying quality and accuracy (Duncum, 2004; Whitworth, 2009). For example, figure 1.11 displays two

Internet copies of *Rose garden* by Paul Klee which are shared differently thus affecting mood. Figures 1.12 and 1.13 show 'image search' results for two different canonical works. The results yield a mixture of images, some of which are cropped, stretched, shaded or manipulated in some other manner. It is difficult to decipher the most authentic copy. The Internet does not quality assure in relation accuracy. Therefore, this study explores the impact of embedding quality assured digital copies that have the same dimensions or incorporate any actual movement as the original work within a specially designed MUVG.



Figure 1.11 Two very different moods resulting from a *Paul Klee Rose Garden* Google images search
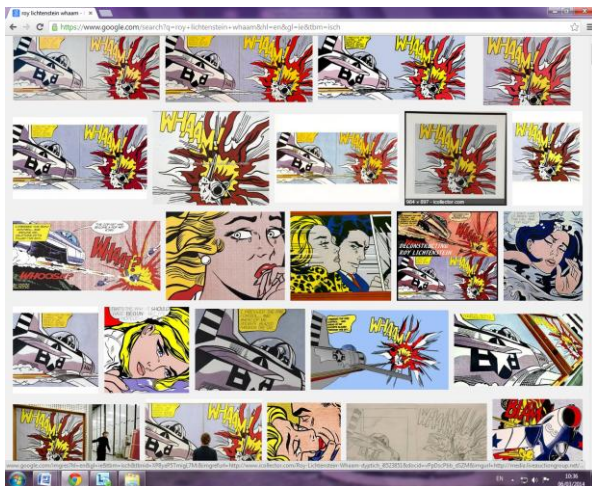


Figure 1.12 A Roy Lichtenstein *Whaam* search results in cropped, stretched and misleading scale
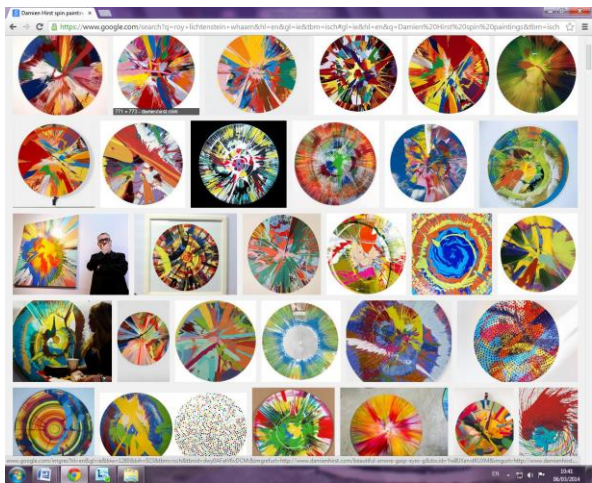


Figure 1.13 Many search results do not convey the kinetic movement integral to Hirst's spin paintings.

## 1.5 Limitations of AI in the classroom

Despite the adoption of social constructivist approaches, AI in the classroom is still limited by typical constraints including class size, time, proximity and design. It affords little opportunity for interactivity. Leaving one's seat to look more closely impedes others' viewing opportunities. Everyone is restricted to investigating the same piece, at the same time, in the same way and for the same length of time. There is no opportunity for individuals to engage or revisit a particular exhibit alone and in their own time. A typical classroom design does not have a gallery feel. It is packed with physical distractions as opposed to white walled spaces (see figures 1.14 and 1.15). This research examines the impact of a specially designed multi-user virtual 'gallery' inspired space (MUVG) within a MUVE that is intended specifically with AI in mind. It affords greater access, proximity; prolonged looking, learner autonomy yet accommodates tools for group think and discussion.



Figure 1.14 a typical primary classroom with many displays and stimuli, group table arrangements and one interactive whiteboard



Figure 1.15 Researcher's art room with many displays and stimuli, group table arrangements and one interactive whiteboard

## 1.6 I-museums

Visual artists and educators are creatively harnessing emerging information and communication technologies (ICT) into their practices (Black & Browning, 2011; Choi & Piro, 2009; Flood and Bramford, 2007; Gude, 2007; Leornard & Leonard, 2006; Lu, 2005; Mayo, 2007; Sung, Chang & Yu, 2008). There are virtual or digital counterparts of galleries (Ciolfi & Bannon, 2007) or so named new-seums (Mileham, 2009) or imuseums (Hume & Mills 2011) that exhibit digital copies of their exhibits. The general public is invited to visit online and investigate artworks aided with optional contextual information (Swami, 2013) or audio guides about each work in their own time. Some galleries or museums employ haptic technologies that permit increased interaction with rare or fragile art pieces (Brewster, 2005; Butler & Neave, 2008, Hayward, Astley, Cruz-Hernandez & Robles-De-La-Torre, 2004; Herne, Cox & Watts, 2009). However, teachers cannot manipulate these virtual spaces around particular constructs and many are limited in comparsion to MUVE navigation and communication affordances.

## 1.7 Methodology overview

This case study (Creswell, 2014; Cohen et al, 2007; Yin, 2002) adopts a mixed method design combining qualitative and quantitative research and data within a relatively short period of time spanning two months. The quantitative data is in the form of post *AISLE* written questionnaire. The qualitative research comprises of researcher's observation of both groups' avatar activity in *AISLE* with the aid of *Camtasia* screen capturing software and comparing participants' pre and post *AISLE* written art appraisal exercises. It also includes a focussed group discussion post questionnaire analysis (see figure 1.16).
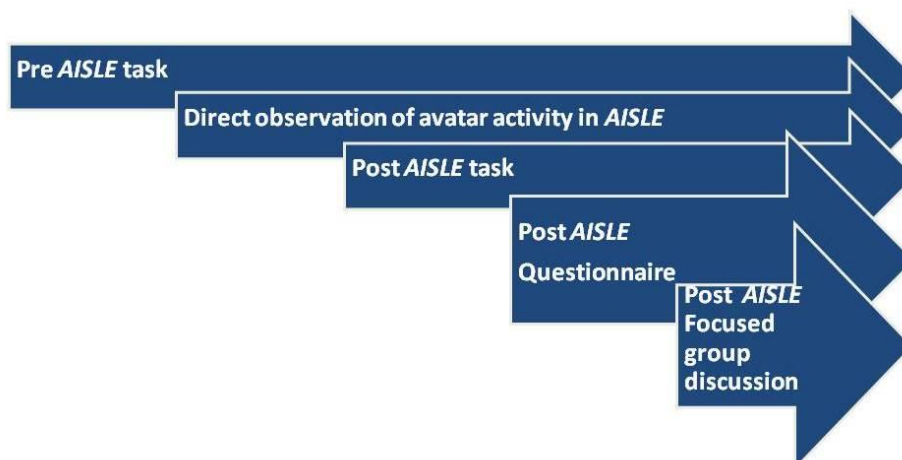


Figure 1.16 Mixed methods used

All data is examined in light of literature review and reflection (Creswell, 2014; Cohen et al, 2007). The study is explorative in nature (Creswell, 2014; Cohen et al, 2007; Dawson, 2009) as it unpacks which, how and why questions (Arthur, Warring, Coe and Hodges; 2012). It analyses which particular scale, movement or mood related constructs (see table 1.1) are progressed by *AISLE*? Which specific MUVE tools enhance such learning? How do they enhance learning? Which MUVE affordance facilitates such learning? How do they enhance learning? Are there limitations to art investigation within an MUVE setting?

Table 1.1 Scale, movement and mood related constructs addressed in *AISLE*

| Construct | Code |
|---|---|
| Scale is an important component of any piece | SC 1 |
| Amending size fundamentally changes the nature of the work | SC 2 |
| Large scale work elevates the subject matter | SC 3 |
| Large scale work usually commands attention and dominates the space | SC 4 |
| Small scale work is often more intimate, subtle and discrete | SC 5 |
| Either extremes in scale can disorientate | SC 6 |
| Implied scale with a piece can be created by different techniques: linear perspective, relative heights, gradient texture or inter positioning | SC 7 |
| Movement is an important consideration in any piece | MV 1 |
| Decisions about actual or implied movement are for the most part intentional | MV 2 |
| Amending actual motion or implied movement signifiers fundamentally changes the nature of the experience of the work | MV 3 |
| Some artworks incorporate actual or digital motion while others imply movement | MV 4 |
| Movement can be implied using diagonal, directional or gestural lines | MV 5 |
| Movement can be implied through the repetition of shape or contrasting colour | MV 6 |
| Mood is an important consideration of any piece | MD 1 |
| Different colour combinations evoke different moods | MD 2 |
| People may not necessarily experience the same mood | MD 3 |
| Harmonious or analogous colour can communicate a mood of tranquillity | MD 4 |
| Complimentary colour can energise a work or disorientate the viewer | MD 5 |
| Warm colours can communicate warmth, happiness or anger | MD 6 |
| Cool colours communicate aloofness or sadness | MD 7 |

## 1.8 Findings

This study finds that AISLE has impacted positively regarding *awareness* of specific scale, movement and mood related constructs. It finds increased *understanding* and *appreciation* among some participants in relation to the more obvious constructs concerning actual scale and movement. However, there is less evidence of increased

*awareness, understanding* or *appreciation* in relation to the more covert and complex constructs concerning implied scale, movement or mood. It finds that the navigation and camera viewing tools were especially helpful in increasing their awareness, understanding and appreciation as they permitted proximity, multiple viewpoints and prolonged viewing. Technical troubleshooting, time constraints and users' inexperience in using MUVE functionality were the key impediments to art investigation. The research asserts that there is still a need for an expert presence, guided discovery and more explicit teaching of the more abstract scale, movement and mood related constructs. It purports that appropriate MUVE induction and extended time or revisits are key pre-requisites for successful art investigation within a MUVE. It proclaims that the old adages of 'less [exhibits] is more' and 'size [of exhibits] matters' apply to art investigation within a MUVE.

## 1.9 Roadmap to chapters

The following chapter explains scale (SC), movement (MV) and mood (MD) in greater detail. It unpacks art investigation (AI) pedagogy in relation to semiotics and social constructivist learning theory. It examines the affordances associated with MUVEs to enhance learning. Chapter three describes the design and development of a multi-user virtual gallery (MUVG) named *AISLE* (art investigation in Second Life environment). Chapter four explains why convergent parallel mixed methods approach was adopted (Creswell, 2014, Cohen et al, 2008) and describes procedures undertaken in relation to implementation and data collection. Chapter five describes and discusses the systematic processes used for quantitative and qualitative data analysis and eventual triangulation. It discusses the key findings. Finally, chapter six posits explanations based on triangulated data and draws conclusions regarding the impact of MUVE tools and affordances in relation to scale, movement and mood. It also addresses the limitations of the study and suggests avenues for continued research.

# Chapter two: Literature Review

## 2.1 Introduction

Art investigation (AI) is an integral part of the world of visual arts (Adams, Worwood, Atkinson, Dash, Herne & Sage, 2006; Anderson, Kauffman & Short, 1998; Danko-McGhee, 2006; IMMA, 1999, NCCA, 1999; Hickman, 2004). Good art education in schools operates in two modes; the productive and the critical (Barnes, 2002; Bloomsfield & Childs, 2000; DES, 1999; Grigg, 2004; IMMA, 1999; Hickman, 2004; Hurwitz & Day, 2007; Koster, 2009; NCCA, 1999; Tallack, 2006). While the productive includes drawing, painting, constructing, sculpting, creating with textiles or print making, the critical mode concerns AI. Students look at, and talk about their own artwork, work by their peers and pieces by other professional artists (see figure 2.1) (Barnes, 2002; Bloomsfield & Childs, 2000; DES, 1999; Grigg, 2004; IMMA, 1999; Hickman, 2004; Hurwitz & Day, 2007; Koster, 2009; NCCA, 1999; Tallack, 2006). AI is deemed critically important to inform their own art making and equip them to look at, examine and critique visual art with openness, curiosity and sensitivity (Barnes, 2002; Bloomsfield & Childs, 2000; DES, 1999; Grigg, 2004; IMMA, 1999; Hickman, 2004; Hurwitz & Day, 2007; Koster, 2009; NCCA, 1999; Tallack, 2006).
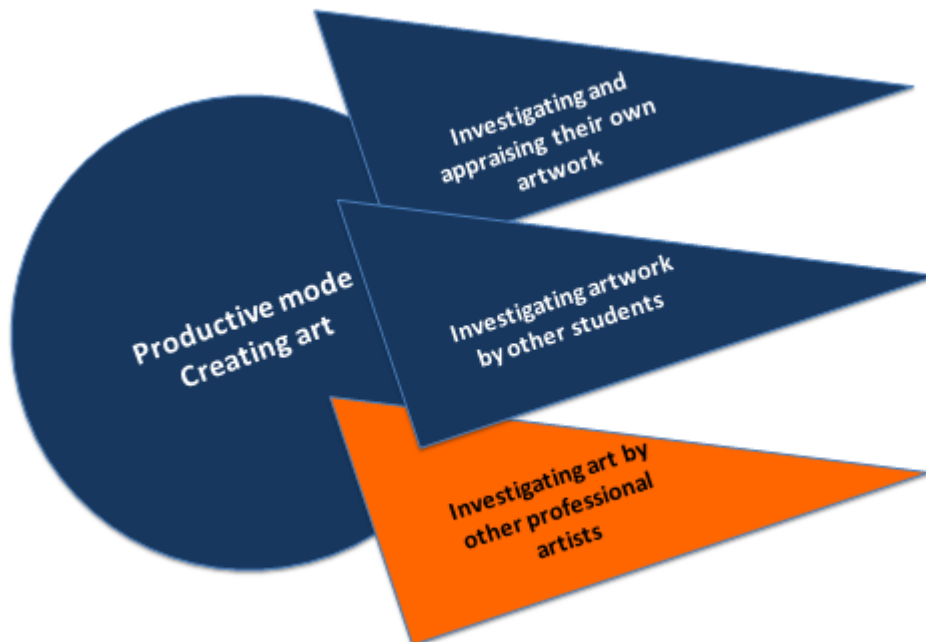


Figure 2.1 the productive and critical modes of visual arts

This chapter examines scale, movement and mood and their related constructs in visual arts. It examines AI in relation to visual perception, semiotics and cognition. It outlines traits and conditions for effective AI. It examines theory regarding AI

development and assessment criteria used to evaluate such progression. It explains the limitations of AI within a gallery and traditional classroom setting. It also explores the perceived affordances of multi-user virtual environments (MUVEs) for teaching and learning.

## 2.2 Scale and scale perception

*Scale* is concerned with size (Acton, 2009; Flux, 2007; Lake 2013; Laneyrie-Dagen, 2007; Lowery, 2012). It is the term usually used to describe an artwork's physical size. It can also refer to the size of the work in relation to any object being portrayed. However, it can describe the size of piece in relationship to the viewer. Terms such as *life-sized, miniature* and *large-scale* are descriptors are often used to explain scale in comparison to the size of the human body. Therefore, to truly become aware, understand or appreciate or the actual or relative size of any artwork, the learner ideally needs to experience and compare a work's size to the actual size of any subject portrayed and the human body.

Our perception of scale depends closely on our *perception of depth* (Riou, Lesourd, Brunel & Versace, 2011). Depth cues employed to ascertain size can be divided into three different categories. These include *ocularmotor, binocular and monocular* cues (Blythe, Holliman, Jainta, Tbaily & Liversedge, 2012) Oculomotor cues are due to what is termed *convergence* and *accommodation* (see figure 2.2). Both eyes move inwards when looking at near objects. This is called *convergence*. Both eyes move outwards or *accommodate* when looking at distant objects. Usually, large scale artwork demand the viewer to look from a greater distance and small scale pieces command a closer examination. Large works demand accommodation and small artworks invite convergence.
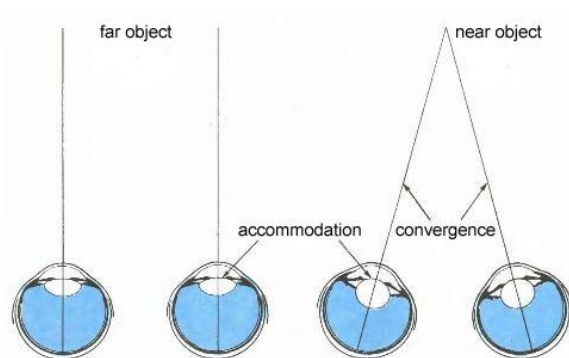


Figure 2.2 convergence and accommodation

*Binocular cues* (Heinen & Vinken, 2011) depend on the images from both eyes. Since humans have frontal eyes, the overlap of the view from both eyes is significant while the viewpoint is different. This difference is called *binocular disparity* and this is converted into depth information called *stereopsis*. This information helps the viewer ascertain information about scale (figure 2.3).
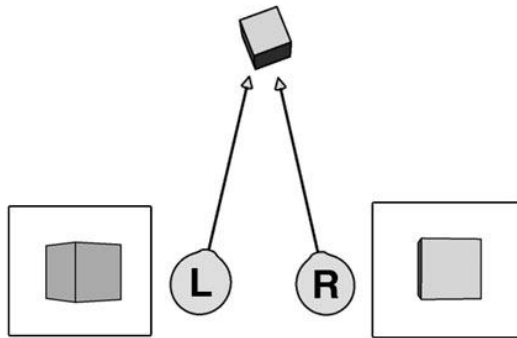


Figure 2.3 binocular disparity

*Monocular cues* are obtained from the two-dimensional image from either eye (Heinen & Vinken, 2011). Pictorial depth cues are monocular cues that concern distance portrayed in a flat picture. These include linear perspective and height in plane (figure 2.4), light and shadow inter-positioning (figure 2.5), texture gradients (figure 2.6) and relative size as these have particular relevance to AI.
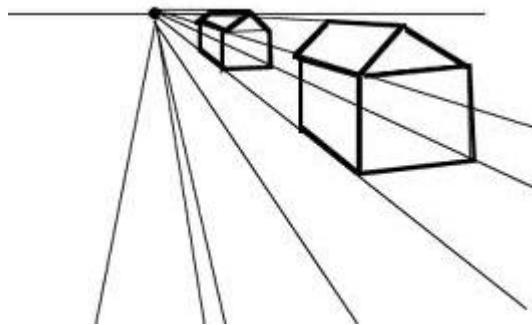


Figure 2.4 linear perspective and relative height

*Linear perspective* concerns actual parallel lines that appear to meet as they travel into the distance (Acton, 2009; Flux, 2007 Laneyrie-Dagen, 2007; Lowery, 2012). The closer together the two lines appear, the greater the distance will seem. Many artists employ linear perspective in their work to create the illusion of depth or three-dimensionality on a two dimensional plane. *Relative height* describes psychological effect whereby objects that are further away are seen both higher and smaller in perspective. Many artists paint distant objects higher and smaller in their paintings. *Inter-positioning* is a visual signal whereby an object appears closer than objects

behind it because the closer object overlaps part of the other objects. Overlap is a strategy employed by artists to denote depth (see figure 2.5). Lightness also makes objects appear closer, while shadow makes seem farther away.
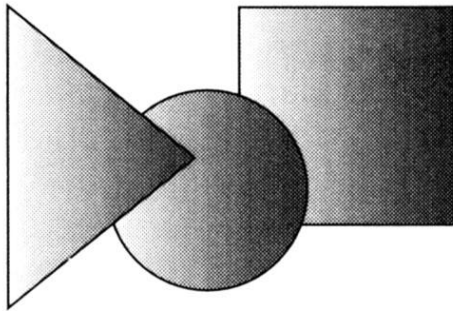


Figure 2.5 inter-positioning and light and shadow

*Texture gradient* is a monocular cue whereby an object's, or landscape's gradual textural change from coarse to fine gives the illusion of implied depth. Artists often exploit this illusion by deliberately texturising paint for the foreground (*impasto painting*) and applying diluted paint *(wash)* to the background for example.
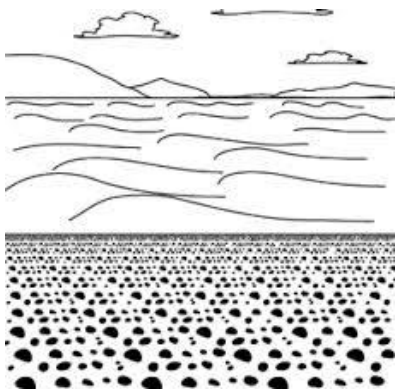


Figure 2.6 texture gradient

Our perception of scale also entails considering *relative size* (Acton, 2009; Flux, 2007 Laneyrie-Dagen, 2007; Lowery, 2012). It can be difficult to ascertain the scale of any object in a photograph or artwork unless we have other objects or cues to measure against. As soon as a human or another famliar object is included, its size can be perceived or measured more easily. The viewer's prior knowledge regarding that person or object helps him or her decipher the size of the other object. Often, figurative artists include such cues in their artwork so that the viewer can appreciate the scale of the mountain or building depicted. Our size perception is quite dependable but can be tricked by visual illusions such as the Muller-Lyer or Ponzo

Illusions (figure 2.7) Optical artists often exploit this weakness through clever use of repeated directional lines, shapes and colours.
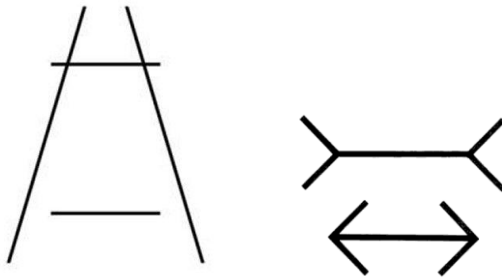


Figure 2.7 Muller-Lyer or Ponzo Illusions


## 2.3 Important AI constructs relating to scale

Scale is a key consideration for many artists and may depend on many reasons (Acton, 2009; Flux, 2007 Laneyrie-Dagen, 2007; Lowery, 2012). The theme or subject matter may influence decisions around scale. It may simply be a personal professional preference. Sometimes decisions around scale are informed by the physical space for which the work is commissioned. Irrespective of the background behind those decisions, the impact of scale has certain consistencies. While no two people looking at the same painting, sculpture, installation, print, performance or drawing will necessarily have the same experience of scale due to their physical size or previous encounters of scale; through AI, students become *aware, understand and appreciate* scale related constructs and associated techniques. They can apply them to their discussions or to their own artwork. Effective AI enables students to become aware, understand or appreciate the following constructs. For the purposes of this study, each scale related construct is denoted by 'SC' and a number.

1. Scale is an important component of any piece (SC1)
2. Amending size fundamentally changes the nature of the work (SC2)
3. Large scale work elevates the subject matter (SC3)
4. Large scale work usually commands attention and dominates the space (SC4)
5. Small scale work is often more intimate, subtle and discrete (SC5)
6. Either extremes in scale can disorientate  (SC6)
7. Implied scale with a piece can be created by different techniques: linear perspective, relative heights, gradient texture or inter positioning (SC7)

(Acton, 2009; Dewitte, D., Larmann, R. & Shields, K. 2011; Flux, 2007; Larkin, 1981; Martin, 2000; NCCA, 1999; Ní Chartaigh & O'Sullivan, 2011; Prince, 2008; Wilkes, Duffy, Kruger & Wilkinson, 2011)

## 2.4 Movement and motion perception

In order ascertain *actual movement*, our perceptual system looks for objects which are known to be fixed, such as signboards, houses or trees to ascertain or verify another object's actual movement. The *oculomotor system* directs eye movements to follow moving objects or stationary objects that need tracking because the viewer is moving (Kozbelt, 2001; McManus, 2011; Seeley & Kozbelt, 2008). *Fixation* is the ability to maintain steady visual attention on a target. *Saccadic visual skills* enable the eye to jump from one stationary or moving target to another quickly and accurately. *Implied movement* are illusions of movement in which there is the perception of motion without any actual movement. There is perceived motion despite steady eyes, head, and body and with no physical movement of the subject.

For example, the *auto-kinetic effect* describes how after a time we perceive a fixed spot of light to move within a dark room despite having no other frames of reference present. *Stroboscopic motion* (figure 2.8) is the implied moving effect generated by a series of stationary images that are presented in rapid succession. This is the kind of motion seen in video and film. *The phi-phenomenon* (figure 2.9) is another illusion of implied movement created by rapid sequential presentation of visual stimuli whereby light appears to move in a continual flow.
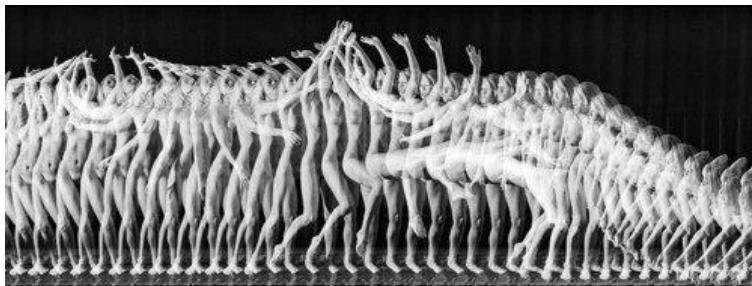


Figure 2.8 stroboscopic motion



Figure 2.9 the phi-phenomenon

## 2.5 Important AI constructs relating to movement

All visual art exists within time as well as space. Time infers that change and movement occurs while movement implies the passage of time. Movement and time, whether *actual* or *illusionary*, are critical constituents in visual art. Some artworks do incorporate actual movement. For example, kinetic mobiles may be triggered naturally by air currents or activated mechanically using technology. Kinetic artworks powered by natural forces tend to spark surprise as the piece continuously changes in an unpredictable pattern. Mechanically powered movement is generally more predictable or predetermined. Some contemporary artists explore viewer driven movement in their work; inviting them to become part of the artwork itself.

Movement is also *implied* in art through a variety of clever techniques (Acton, 2009; Flux, 2007 Laneyrie-Dagen, 2007; Lowery, 2012). It can be suggested through the use of *diagonal, gestural, and directional lines* (Flux, 2007; Ní Chartaigh et al, 2011; Prince, 2008; Wilkes et al 2011). Horizontal lines are often calm and relaxing. Vertical lines create tension.  Diagonal lines appear to slide and move (figure 2.10). Gestural lines can imply the movement of water or body parts (figure 2.11). The line curvature dictates how a body gesture appears. For example, longer fluid curved lines feel more relaxed. Sharp curves express more energy and tension. Zigzagged lines indicate sudden changes in movement. *Repetition of shape* is also used to imply movement in visual arts. The density, arrangement, size and colour of repeated shapes create different impressions regarding the direction, proximity and speed of motion portrayed.
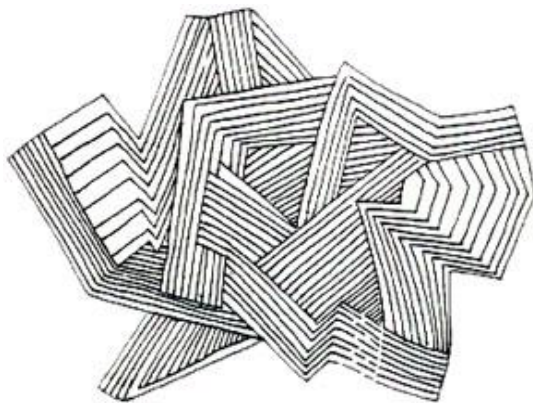


Figure 2.10 Directional lines (Cook, A. 2014)

Figure 2.11 Gestural lines

Effective AI enables students to become *aware, understand, and appreciate* these effects and to *apply* these to their own artwork. AI enables students to understand the following constructs. Each movement related construct is denoted by 'MV' and a number for research purposes.

1. Movement is an important consideration in any piece (MV1)
2. Decisions about actual or implied movement are for the most part intentional (MV2)
3. Amending actual motion or implied movement signifiers fundamentally changes the nature of the experience of the work (MV3)
4. Some artworks incorporate actual or digital motion while others imply movement (MV4)
5. Movement can be implied using diagonal, directional or gestural lines (MV5)
6. Movement can be implied through the repetition of shape or contrasting colour (MV6)

(Acton, 2009; Dewitte et al 2011; Flux, 2007; Larkin, 1981; NCCA, 1999; Ní Chartaigh et al, 2011; Prince, 2008; Wilkes et al 2011)

## 2.6 Mood and important AI constructs relating to mood

Mood is prevailing feeling that is interpreted by the viewer. Colour contributes very significantly to mood (DES, 1999, Flux 2007; Hickman, 2004; Larkin, 1981; Prince 2008). Content expressed using warm as opposed to cool colours will create very different moods. Many artists such as Wassily Kandinsky, Robert Delaunay, Pablo Picasso and Mark Rothko (see figure 2.12) have experimented with colour and explored its influence on mood.
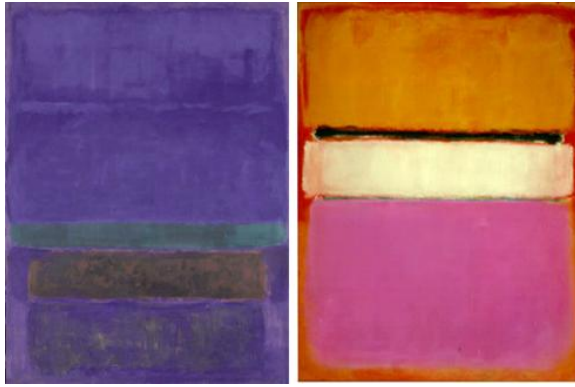
Figure 2.12 Mark Rothko's paintings communicate different moods through colour

While mood may be interpreted uniquely by each viewer, some artists explore and exploit commonly known properties and possibilities of colour to convey a particular mood. Colour impacts us psychologically and behaviourally and many industries including branding, advertising, marketing and colour therapy take colour's impact on people's mood very seriously. Effective AI enables students to become *aware, understand and appreciate* colour's influence on mood and can *apply* it to their discussions or appraisals about art as well as their own artwork. AI enables students to understand the following constructs and for the purposes of this study each one is denoted by 'MD' and number.

1. Mood is an important consideration of any piece (MD1)
2. Different colour combinations evoke different moods  (MD2)
3. People may not necessarily experience the same mood (MD3)
4. Harmonious or analogous colour can communicate a mood of tranquillity (MD4)
5. Complimentary colour can energise a work or disorientate the viewer (MD5)
6. Warm colours can communicate warmth, happiness or anger (MD6)
7. Cool colours communicate aloofness or sadness (MD7)

(Acton, 2009; Dewitte et al 2011; Flux, 2007; Larkin, 1981; Martin, 2000; NCCA, 1999; Ní Chartaigh et al, 2011; Prince, 2008; Wilkes et al 2011)

## 2.7 AI and visual perceptual skills

Visual perceptual skills are crucial to AI as they are required in order to understand, analyse, and interpret what is seen (Riou, Lesourd, Brunel & Versace, 2011).  Basic *visual discrimination* skills help in identifying differences between objects that certain commonality (see figure 2.13). *Visual memory* (riou, Leosourd, Brunel & Versace, 2011) helps to recall what has been seen such as scale, movement and colour.

*Figure ground* pinpoints details without getting confused by the background or surrounding imagery (Kozbelt, 2001; McManus, 2011; Seeley & Kozbelt, 2008). Many gallery spaces accommodate figure ground by having white wall spaces and artwork so that one does not distract or detract from another. *Binocularity* permits the brain to fuse two separate pictures coming in from each eye into one more encompassing image.

The *focusing system* helps to see clearly at different distances over extended periods of time. It also allows one quickly shift focus when required (Kozbelt, 2001; McManus, 2011; Seeley & Kozbelt, 2008). Ideally, AI is conducted from a number of different fixed vantage point and over an extended period of time to develop awareness, understaning or appreciation. *Visual Closure* is the ability to visualise a complete whole when given incomplete information or a partial picture. It comprehends things quickly so that the visual system does not have to process every detail to recognise what one is seeing. Optical illusions concerning perceived actual movement in digital optical pieces usually exploit this limitation in the visual system.
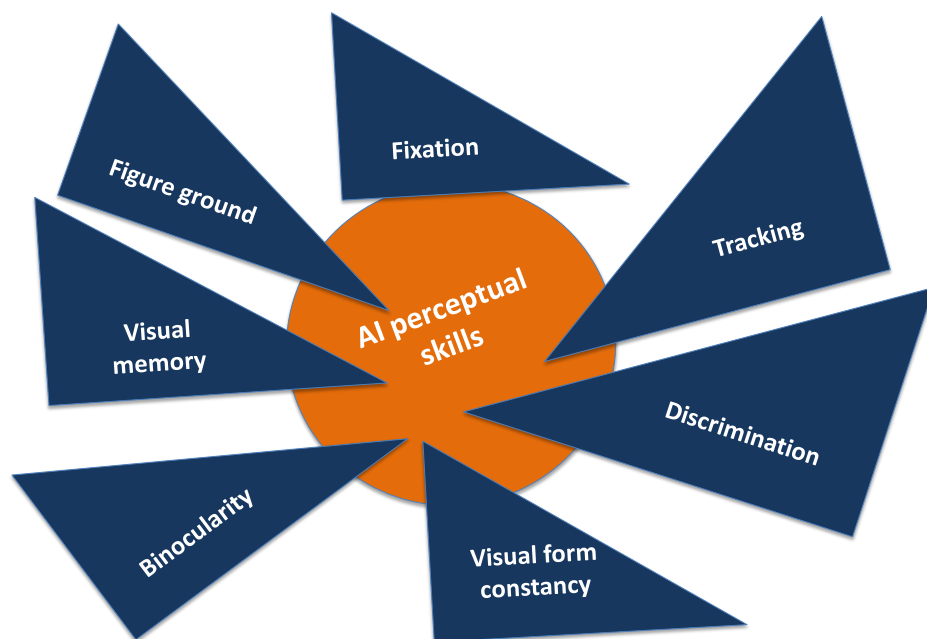


Figure 2.13 Visual perceptual skills required for AI

Other key skills entailed include *visual form constancy* to cognitively manoeuvre forms in our minds and picture what they would look like. This helps distinguish differences in actual or implied scale. *Tracking skills* allows one to follow lines denoting actual or implied movement. The *oculomotor system* accurately directs eye

movements (Kozbelt, 2001; McManus, 2011; Seeley & Kozbelt, 2008). *Fixation* is the ability to maintain steady visual attention on a target and *pursuit* is the ability to track a movement with ease.

## 2.8 Art investigation (AI) and social constructivism

AI approaches and emphases have evolved in parallel with the very development of art itself (Arnold, 2004; Freeland, 2001; Heller, 2002; Pooke & Whitham, 2003; Thornton; 2008). However, there remains general agreement that both a work's *content* and *form* affect the viewer and both should be explored in AI (Barnes, 2002; Eisner 2002; Green & Mitchell, 1997; Hurwitz & Day; 2007; Koster, 2005). What is conveyed [content] and how it is expressed [form] are essentially two sides of the one coin (Eisner; 2002). Hence any work's attributes such as scale, movement and mood really do matter. They affect content and alter meaning. Identical content conveyed using a different scale, incorporating different movement or projecting a different mood is no longer the same work and will impact the viewer very differently. Hence, it is critical that learners develop *awareness, understanding* and *appreciation* regarding the influence of scale, movement and mood in visual arts.

Meaningful AI hinges on *time* and the *teacher* (Barnes, 2002; Bloomsfield & Childs, 2000; DES, 1999; Grigg, 2004; Hickman, 2004; Hurwitz & Day, 2007; Hubbard, 2008; IMMA, 1999; Koster, 2009; NCCA, 1999; Tallack, 2006). Unlike advertisements, works of art do not aim to communicate so obviously, specifically, universally or immediately. Consequently, they require more time to interpret, decode and decipher their meaning(s). Often unfamiliar or avant-garde works pose more questions than provide answers. Therefore prolonged and uninterrupted *time* is required to engage and re-engage a work for greater understanding.

A key role of the teacher is to *mediate* learners' evolving understanding through *guided discovery* (Barnes, 2002; Colbert, 2001; Constantino, 2008; Danko-McGhee 2006; Eisner 2002; Green & Mitchell, 1997; Hurwitz & Day; 2007; Koster, 2005, Mulcahy, 2009; NCCA, 1999). This is enabled through

1. Encouraging viewers to look closely and attentively
2. Allowing viewers to share observations with one another
3. Gradually revealing contextual information about work
4. Answering and asking questions
5. Eliciting emerging understandings from the group  (See figure 2.14)
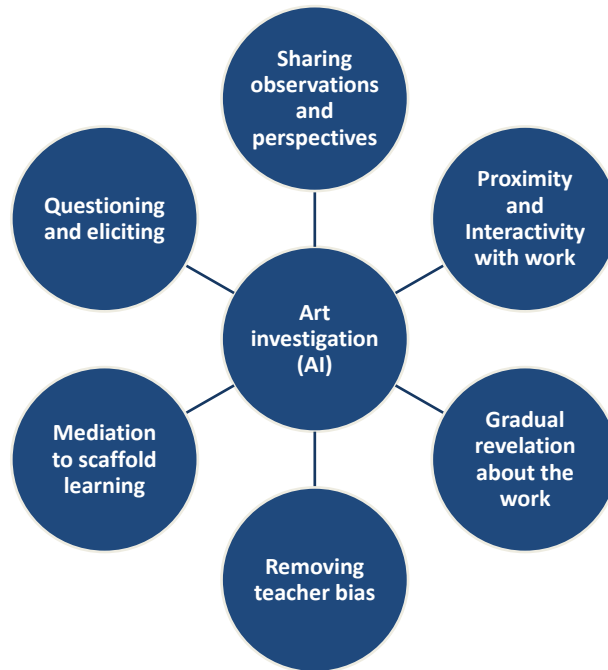
Figure 2.14 Characteristics of effective AI

Effective AI is underpinned by social constructivist learning theory. It purports that learning is socially constructed. It is a process of socialisation mediated through membership of a particular group. It is facilitated by guided learning and *scaffolding*. The latter are temporary supports provided by the teacher which enables the learner construct new understandings. These include providing more time, permitting self determined learning, encouraging dialogue and inquiry, seeking elaboration and demonstration (Jordan et al, 2008).

## 2.9 Assessment in Art investigation (AI)

AI should be assessed like any other curriculum area (NCCA, 1999). AI assessment concerns four key areas. These include perceptual awareness, expressive abilities and skills, aesthetic and critical awareness and disposition towards art (Bloomfield & Childs; 2000, Hurwitz & Day, 2007; NCCA, 1999, Ní Bhroin; 2012). *Awareness* concerns the learner's ability to perceive and analyse concepts such as those outlined relating to scale, movement and mood. Expressive abilities and skills concerns the learner's ability to *understand* such constructs through description or application. Aesthetic and critical awareness concerns *appreciation* - the learner's ability to investigate art with openness and sensitivity and to use discriminatory powers to appraise what she or he sees. *Disposition* includes curiosity and interest as well as a willingness to take creative risks.

## 2.10 Limitations of AI in gallery settings

While first hand exposure to, and engagement with diverse original works of art in a gallery setting is lauded as an ideal learning scenario (Clement, 1993; Colbert, 2001; Findlay 2012; IMMA, 2010; Lai, 2009; Unrath & Luehrman, 2009), visual arts inquiry has always included engagement with secondary sources or copies in the classroom because of budgetary, geographical or timetabling constraints. Galleries afford opportunities to engage original pieces in an authentic situated-learning setting (Unrath & Luehrman, 2009, Paris & Hapgood, 2002). However, gallery spaces are not designed necessarily originally for interactivity and 'most museum walls are designed to be seen, but not touched' (Ferris, Bannon, Ciolfi, Gallagher, Hall, & Lennon, 2004; Sack, 1997, p.10). Proximity and interactivity is usually prohibited as it can damage the work and physical movement is controlled for health and safety, security and commercial reasons (see figure 2.15). Prolonged viewing time is not permitted in very popular exhibits. Visitors can spend more time queuing and viewing. Surveillance awareness is palatable and this influences viewer's behaviour. Museum rules of conduct curtail people's natural curiosity (Colifi & Bannon, 2007). 'Places both constrain and enable us' (Cofili & Bannon, 2007, p. 164). While galleries have much improved in terms of providing contextual information in the form of signage, guided tours, audio tours and activity packs, these are not necessarily tailored or differentiated for the individual or particular class grouping. They are designed to meet the needs of the general public and one might say underpinned by promotional as opposed to pedagogical priorities.



Figure 2.15 Crowds hampering the possibility of investigating an original piece

## 2.11 Limitations of AI in classroom settings

Prior the Internet and information and communications technologies (ICT), secondary sources were limited to postcards, posters, prints, book illustrations and teacher

packs. While helpful, they usually cannot replicate the work in its totality and frequently mislead. They cannot replicate scale. They cannot capture any actual continuous movement. More often than not, the print does not match the hues of the original piece thus communicating a different mood.

Similarly, digital reproductions as presented in *Powerpoint* or other ICT presentation software also mislead. Their layout formats inserts any digital copy of very different sized pieces into a fixed space (see figure 2.16). Consequently, the viewer can be inadvertently misled in relation to scale. One known strategy used by teachers is to recreate the size of paintings by measuring and cutting it out using newspaper but while effective, this can take a lot of time with large-scale work. Another strategy is to place a person or object of relative size in the slide so that students can decipher its scale, but this can be distracting.

However, viewing either hard or digital secondary copies from the classroom does not equate to the visceral first hand encounter with original pieces. There is no opportunity to exercise *proximity*. The learner is bounded by space and time and the learning experience is limited in terms of *interactivity, multiple viewing points* and *learner autonomy*.
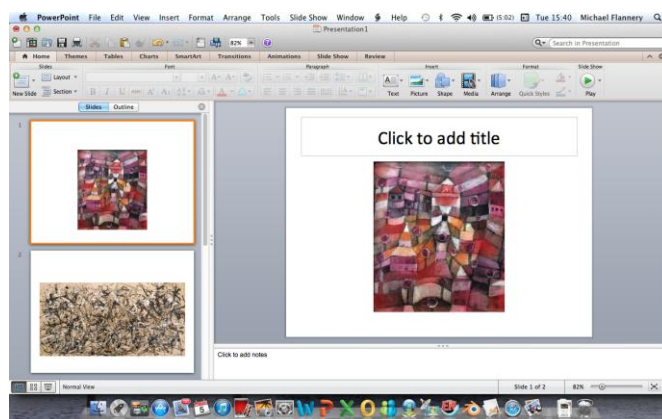


Figure 2.16 *Rose Garden* by Paul Klee (49 x 42.5 cm) and *Autumn Rhythm 30*
by Jackson Pollock (266.7 x 525.8cm)

## 2.12 The affordances and liabilities of multi user virtual environments

Multi-user virtual environments (MUVEs) integrate graphics and sound simulation and networks to suggest the experience of real-time interaction between many users in a shared three-dimensional virtual world (Boulos *at al*, 2007; Fishwick, 2007; Gaimster, 2007; Jia & Eder, 2009; Mahon *et al*, 2010; Skiba, 2009). An interface

programme simulates the experience of immersion within that virtual environment by rendering images and sounds of the environment as perceived from the user's simulated viewpoint. There is wide range of MUVEs available from open source projects to proprietary vendors including *OpenSIM, Croquet Consortium, Active Worlds, Project Wonderland, There, Olive and Twinity*. MUVEs have been categorised in different ways such as *purpose, place, population* and *profit* (Porter, 2004).

Warburton's typology divides MUVEs into four types with some overlap. These are *Flexible narrative, Social world, Simulation and Workspace* (Warburton, 2009, p. 417; see table 2.1). He identifies *Second Life (SL)* as a social world as it may have both a fictional and physical world. It exists primarily for social interactions to occur and avatars are an extension of the participants. However, many identify it as a simulation or workspace in that it can provide a close representation of the physical world governed by the same rules and it can provide the necessary tools for collaborative activity (Boulos *et al*, 2007; Gaimster, 2007; Nash 2009).

Table 2.1 Typology of MUVE (Warburton, 2009)

| Flexible Narrative | Social world | Simulation | Workspace |
|---|---|---|---|
| The world is a setting in which the story unfolds within the constraints of the rules set by designer | The world may have elements of both a fictional and physical world mostly designed for social interaction | The world is a close representation of the physical world and governed by the same rules | Virtual workplace setting for collaborative activity supported by necessary tools |
| Avatar is a character | Avatar is an extension of owner | Participant is him or herself | Participant is him or herself |

Many agree that SL 'represents the most mature of social virtual worlds thus explaining its dominance in the educational world' (Schiller, 2009; Warburton 2008, p.416; Wood, Solomon & Allan, 2008). Hence, many universities and galleries have created virtual representations of themselves in SL (Hay & Pymm; 2010/2011; Wang, 2012). The perceived advantages of learning in SL relate to social learning, learning communities, satisfying the need for affiliation, self-determination, self-efficacy, engagement, simulation of real life environments and cultural diversity (Deci & Ryan, 2004; Nash, 2009; Sanchez, 2009). Many embrace SL because they see benefits to education in it in relation to its imaginative aesthetics, less inhibiting atmosphere, potential for collaborative creativity and communication (Nash, 2009; Warbuton 2009). SL engagement can be classified around *sense of presence, technology issues* and *enhanced access* to faculty and subject matter specialists.

Many of the affordances identified are made possible by three *presence* layers in SL. These include the physical, the communication and the status layers. The first is characterised by visual and physical proximity provided by the camera viewing tools (CVT) and mini map locator. The second layer is attributed to local synchronous, distant synchronous and asynchronous communication aided by the inter avatar-communication tools (IAT) including voice and local chat, instant message and group notice. The third layer is connected with the *in world/ out of world* status permitted by the contacts on/off line and SL*friends* online tools (Nash, 2009; Warbuton 2009).

The educational potential of MUVEs or multi-user virtual learning environments (MUVLEs) is widely recognised and embraced by educators and institutions across many subject domains (Boulos *at al*, 2007; Fishwick, 2007; Gaimster, 2007; Jia & Eder, 2009; Mahon *et al*, 2010; Skiba, 2009). Most MUVEs share common features that reflect their roots in the gaming worlds of multi-user dungeons and massively multi-player online games (MMOs) including

- Persistence of the in-world environment
- A shared space allowing multiple users to participate simultaneously
- Virtual embodiment in the form of an avatar
- Interactions that occur between users and objects in a 3D environment
- Immediacy of action mirroring interactions in real time
- Similarities to the real world such as topography, movement and physics

(Smart, Cascio, & Paffendorf, J. 2007; Warburton 2009)

It is these very traits that make MUVEs appealing from a pedagogical perspective. They 'offer an opportunity to redesign pedagogical approaches rather than simply reproducing traditional teaching methods' (Dreher, Reiners, Dreher, & Dreher, 2009, p. 216). Both students and teachers like MUVEs because they provide new communication channels and opportunities for collaboration. They facilitate exploration, experimentation and simulation. They recognise the social and emotional dimensions of learning. They permit an embodied social presence as well as the establishment of learning communities. Learners, via their avatars, can meet with, chat, discuss, exchange, ideate or reflect together in a synchronous or asynchronous manner (see figures 17). They can interact with and respond to objects within the MUVE (see figure 18). They can meet in a shared space allowing multiple users to participate and interact simultaneously (See figure 19). They accommodate dialogic

reflection and shared knowledge construction (Eaton, Guerra, Corliss & Jarmon, 2011; Hay & Pymm 2010; Yuanqiong & Braman, 2009).



Figure 2.17 Avatars meet with, chat, discuss, exchange, ideate or reflect together in a synchronous or asynchronous manner
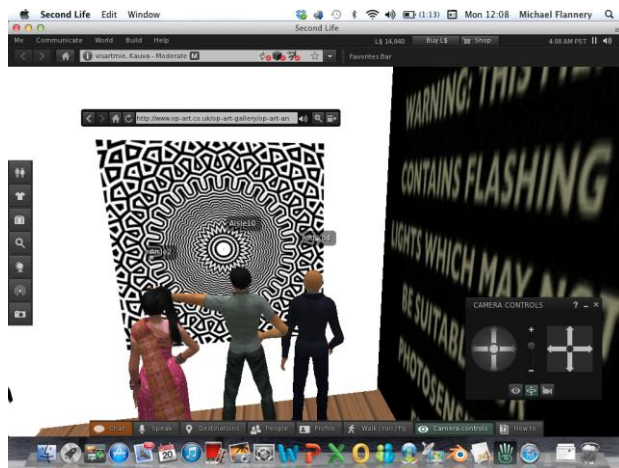


Figure 2.18 Avatars can interact with and respond to objects



Figure 2.19 Avatars can meet in a shared space allowing multiple users to participate and interact simultaneously

However, there are recognised barriers (Hay & Pymm, 2010/2011; Yuanqiong & Braman, 2009). *Technical troubleshooting* is a key impediment. Initial set up for SL can cause a lot of stress for some students. Machine-related client-side issues include bandwidth, hardware and firewall challenges. Server-side issues include down time and lagging. User-related issues include navigation, creating objects and manipulating one's avatar. *Time* is another key issue as the learning curve for SL orientation, familiarity and autonomy is considered to be steep. Learning how to walk, run, fly, touch, talk, alter the environment all take time and 'all inept movements are painfully public' (Nash, 2009, p. 27). The very affordances relating to communication, collaboration and embodied social presence are prone to all its equivalent real life scenarios concerning bullying, shaming, isolation, non-cooperation or cultural confusions (Eaton *et al* 2011; Nash, 2009; Warbunton, 2009). The last category regarding *enhanced access to faculty specialists* refers to students' appreciation in gaining greater access to subject specialists in real time adding to the existing subject experience (Hay & Pymm, 2010/2011).

# Chapter three: Design of AISLE (Art investigation in Second Life)

## 3.1 Introduction

Considering that learners are afforded few opportunities to investigate original canonical pieces due to bugetary, time and geographical constraints, there is a need to ensure that learners encounter the best possible secondary copy. Considering the limitations of both hard and digital copies in relation to scale, movement and mood as outlined in chapter two, there is a need to explore an alternative art investigation (AI) learning experience that enables learners ecnounter a more accurate and visceral copy of the orginal piece.  As MUVE functionality permits objects to be rendered with specific measurements within a three-dimensional space and allows learners to enter and move within that virtual environment to experience its relative size and any actual movement, this research exmaines how might  a specially designed multi-user virtual gallery (MUVG)  has potential for increasing awareness, understanding or appreciation of scale and movement related constructs.

Knowing that MUVE users can exercise proximity to examine any rezzed object up close and interact or modify it within that three-dimensional virtual space,  this study examines how affording learners the opportuniy to examine and modify digital reproductions in relation to their size or colour impacts their awareness, understanding and appreciation of constructs relating to scale or mood. Appreciating that MUVE users can exercise proximity using navigation tools, this study explores how permitting learners to examine digital exhibits more closely impacts their awareness, understanding and appreciation of techniques employed by artists to imply scale or movement. Acknowledging that MUVE functionality affords learners autonomy and social interaction, a specially deigned MUVG has potential for learners to view digital copies of canonical work at their own pace and discuss them with other users. All this potential, has led to the design and development of a MUVG in Second Life. Named *AISLE (Art investigation in a second life environment),* the MUVG comprises of three gallery spaces with three distinct emphases. The first gallery (Gallery SC) concerns actual and implied scale (see figure 3.1), the second area (Gallery MV) concerns actual and implied movement (see figure 3.2) and the third space or room (Gallery MD) concerns mood (see figure 3.3).

AISLE building in MUVG

Reception to AISLE
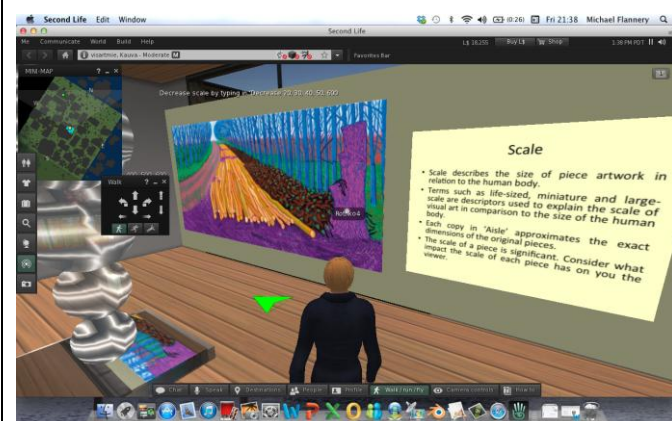
Large scale painting by Hockney
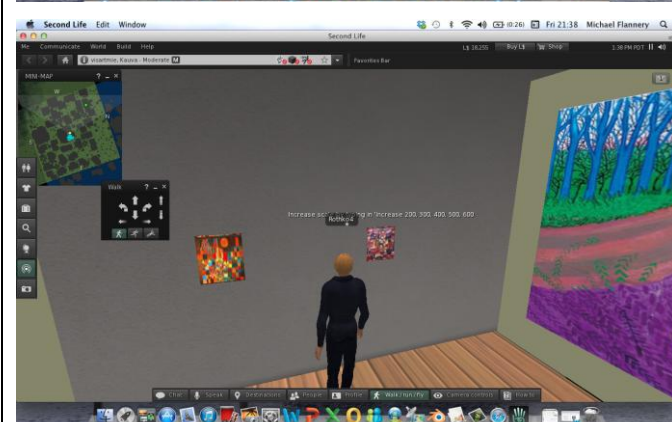
small scale paintings by Klee

Figure 3.1 Screen shots of gallery SC (scale)
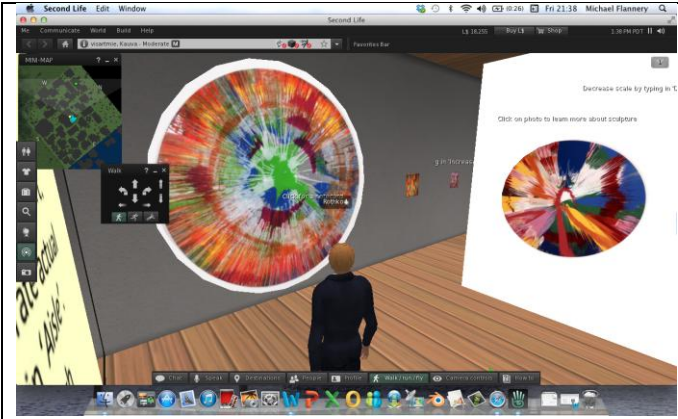
Kinetic spin painting in AISLE
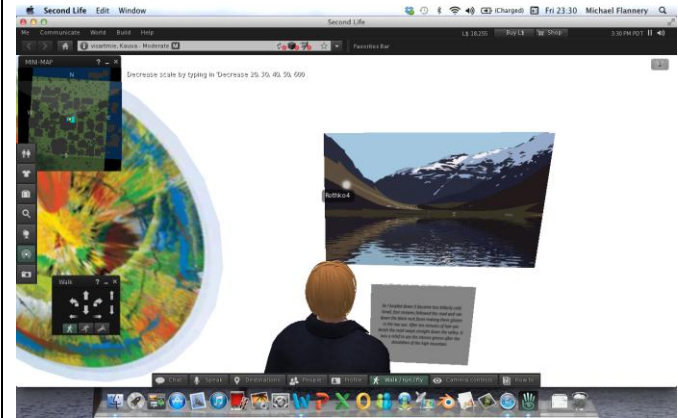

Digital animated painting in AISLE
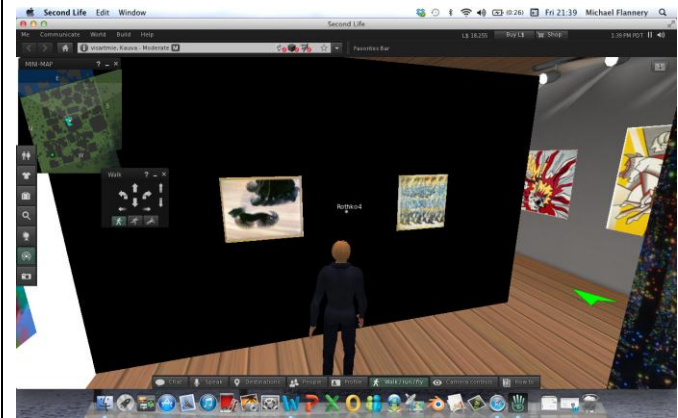

Implied movement in paintings
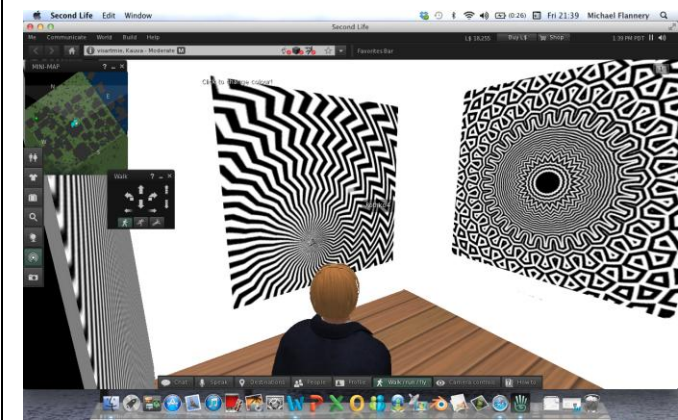

Digital optical art in AISLE

Figure 3.2 Screen shots of gallery MV (Movement)

Rothko Colour field gallery

Another angle of Gallery MD
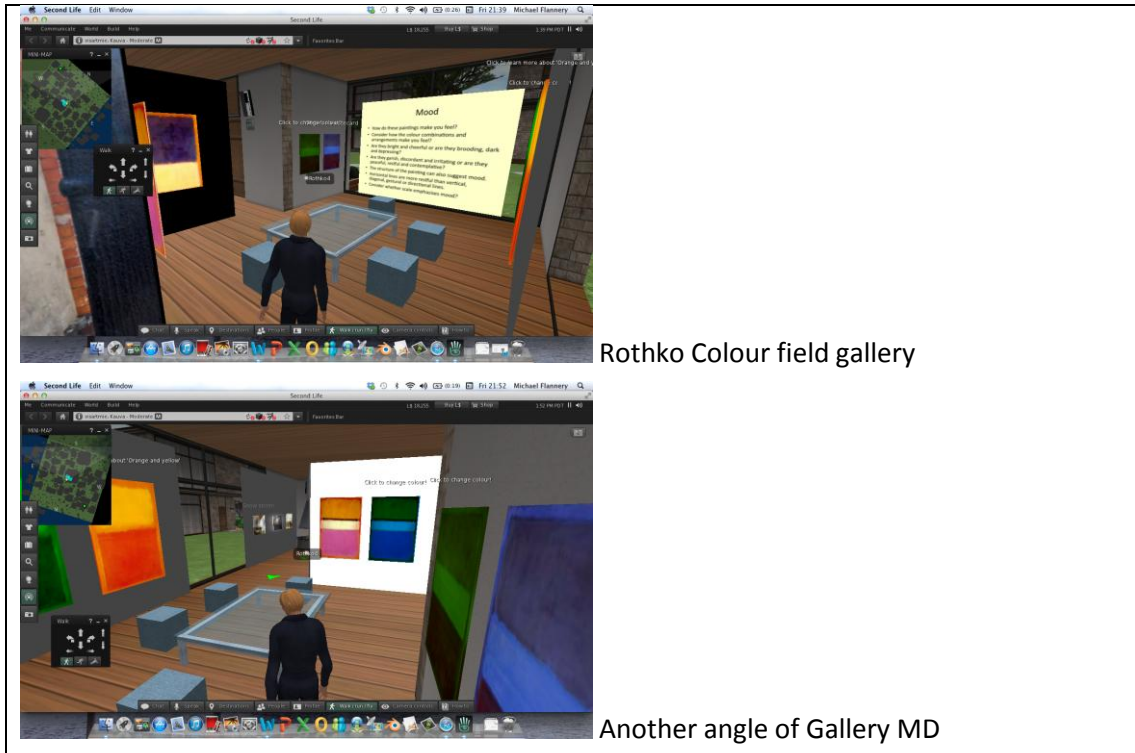
Figure 3.3 Screen shots of gallery MD (Mood)

## 3.2 Overview of TELE design

The design process underpinning the MUVG *AISLE* and overall technology enhanced learning experience (TELE) design adheres to Passerini and Granger's (2000) hybrid model of instructional design as well as Gagne's learning theory applied to instructional design (Jordan et al, 2008). It also informed by Technology Acceptance Theory (TAM) concerning perceived ease of use and perceived usefulness of MUVG's affordances (Davis & Venkatesh, 1996; Shen & Eder 2009). Just as the art teacher would investigate secondary copies with whole class group in the classroom before and after their first hand engagment with the original pieces within an actual gallery setting, the five phased TELE design in this study frames learner's virtual immersion in the MUVG *AISLE* with a pre and post classroom based investigation of the same exhibits (see figure 3.4). Therefore, the overall TELE design is also influenced by blended learning theory as well as sound inquiry based learning pedagogy as outlined in chapter two. The pre and post classroom based AI exercise doubles as a self evaluation exercise as learners can ascertain any increase in their awareness, understanding or appreciation of particular scale, movement or mood related constructs. The research focus of this study is phase three of the complete TELE, the multi-user virtual gallery (MUVG) *AISLE*.
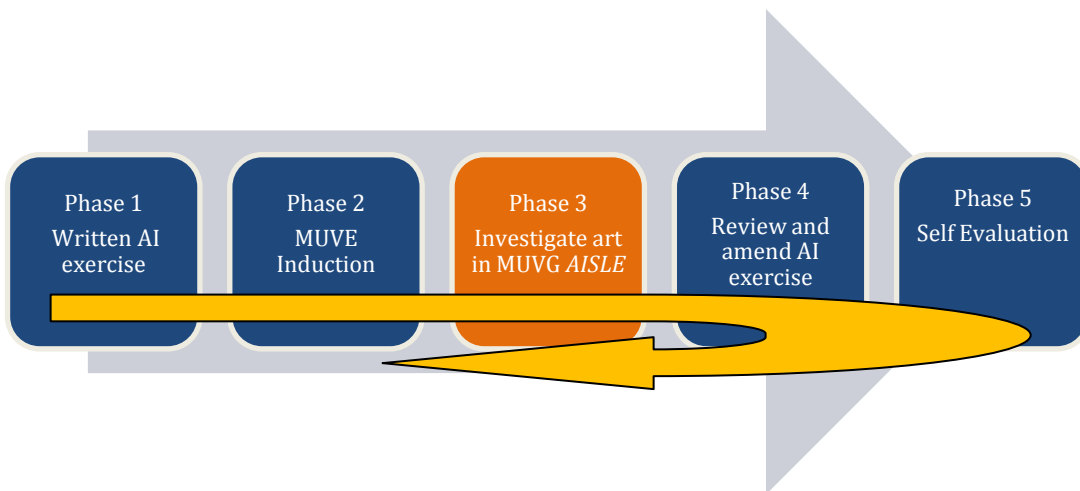
Figure 3.4 TELE overview including MUVG *AISLE*

## 3.3 Description of MUVG *AISLE*
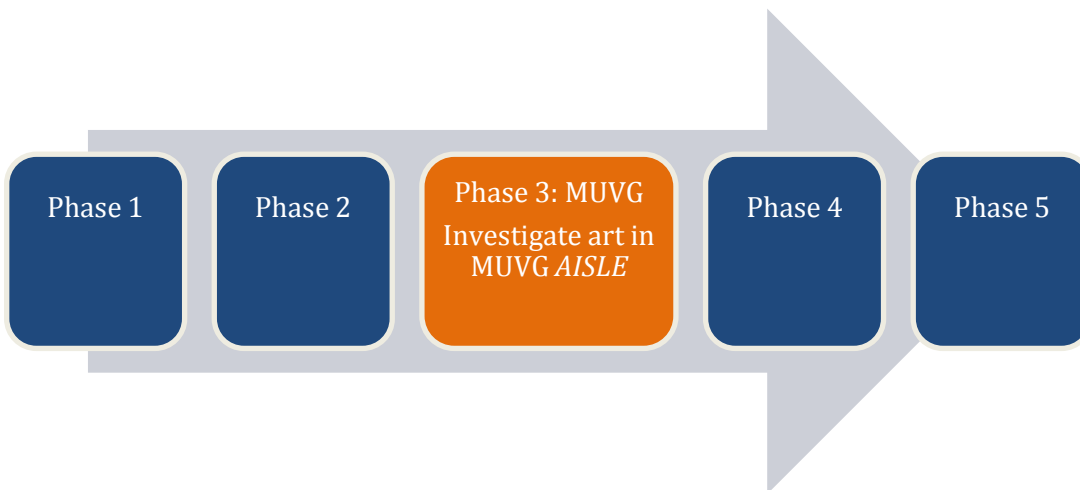


Figure 3.5 Stage three: Art investigation in Second Life environment *(AISLE)*

In phase three (see figure 3.5), learners are encouraged engage with the three exhibtions and other visitng avatars. They are encouraged to use all MUVG tools to investigate the exhibitions. These include

· Navigation tools (NVT) to examine artworks from different viewpoints

· Camera viewing tools (CVT) to examine or photograph artworks from different viewpoints

· Inter-avatar communication tools (IAT) to converse with other students

· Note card tool (NCT) to read about scale, movement and mood or the provenance of each piece

· Interactivity (INT) to clatter the size of certain large scale and small scale pieces or change the colour of certain paintings to explore its impact on mood

They are encouraged to exploit other well recognised MUVE affordances including

- Relative scale, whereby all of the copies have the exact dimensions of the original pieces for greater authenticity and accuracy
- Leaner autonomy and self directed learning whereby visitors can learn about the artworks and scale, movement or mood related constructs at their own pace and in their own time
- Shared knowledge construction whereby learners can discuss what they experience or read in AISLE with one another or help each other with any troubleshooting issues

As the MUVG 'parcel' permits a maximum of twelve avatars at any given time, learners select different times to visit the MUVG from their own homes but knowing that others will be there to look and respond to the exhibitions together.

AISLE contains three exhibition spaces. Gallery SC (scale) includes seminal pieces of different sizes and dimensions by the artists Paul Klee and David Hockney. (see figure 3.1). Participants can temporarily resize some pieces to see how scale impacts the viewer. Scale is also explored in a specially constructed digital approximation of Yayoi Kusama's *Infinity Room* (see figure 3.14). It aims to teach specific overt and covert scale related constructs concerning actual and implied scale (see table 3.1)

Table 3.1 Scale related constructs address in gallery SC

| Phase three | Learning component | Learning outcomes and constructs addressed |
|---|---|---|
| AISLE area one: Exploring scale<br><br>20 minutes Investigating scale in visual arts | Investigate scale in visual arts<br>• Investigate three large scale landscape paintings by David Hockney<br>• Investigate two small scale paintings by Paul Klee<br>• Investigate other work concerning scale | 1. Scale is an important component of any piece (SC1)<br>2. Amending size fundamentally changes the nature of the work (SC2)<br>3. Large scale work elevates the subject matter (SC3)<br>4. Large scale work usually commands attention and dominates the space (SC4)<br>5. Small scale work is often more intimate, subtle and discrete (SC5)<br>6. Either extremes in scale can disorientate (SC6)<br>7. Implied scale with a piece can be created by different techniques: linear perspective, relative heights, gradient texture or inter positioning (SC7) |

Gallery MV (movement) comprises of different works that illustrate overt and covert constructs concerning actual or implied movement (see table 3.2). This gallery includes include pieces by Damien Hirst, Julien Opie, Wassily Kandinsky, William Turner, Giacomo Balla and Brigid Riley and Roy Lichenstein (see figure 3.2). It also

includes an optional digital optical art room. It is in a discrete space of its own so that those who are photo-sensitive can avoid that area if they so wish. There is virtual signage to forewarn learners about motion triggered epilepsy (see bottom screen shot in figure 3.2). This caution is also communicated in participant information/ consent forms.

See Table 3.2 Movement related constructs address in gallery MV

| Phase three | Learning component | Learning outcomes and constructs addressed |
|---|---|---|
| AISLE area two: Exploring movement<br><br>20 minutes Investigating movement in visual arts | Gallery two: Investigate movement in visual arts<br>• Investigate kinetic spin paintings by Damien Hirst<br>• Investigate kinetic digital landscape by Julian Opie<br>• Investigate 3D Infinity approximation by Yayoi Kusama<br>• Investigate digital optical art by<br>• Investigate implied movement in painting by Giacometti Balla<br>• Investigate implied movement in painting by Roy Lichtenstein<br>• Investigate implied movement in painting by William Turner<br>• Investigate other pieces concerning movement | 1. Movement is an important consideration in any piece (MV1)<br>2. Decisions about actual or implied movement are for the most part intentional (MV2)<br>3. Amending actual motion or implied movement signifiers fundamentally changes the nature of the experience of the work (MV3)<br>4. Some artworks incorporate actual or digital motion while others imply movement (MV4)<br>5. Movement can be implied using diagonal, directional or gestural lines (MV5)<br>6. Movement can be implied through the repetition of shape or contrasting colour (MV6) |

Gallery MD (Mood) comprises of digital copies of pure abstract 'colour field' paintings by Mark Rothko (see figure 3.3). In gallery MD, participants can explore the relationship between mood and colour. Learners can create their own colour field painting by altering their colour. This area aims to teach a number of mood related constructs concerning in particular colours relationship and impact on mood (see table 3.3).

Table 3.3 Scale related constructs taught in gallery MD

| Phase three | Learning component | Learning outcomes and constructs addressed |
|---|---|---|
| AISLE area three: Exploring mood<br><br>20 minutes Investigating mood in visual arts | Gallery three: Investigate colour's influence on mood<br>• Investigate abstract colour field paintings by Mark Rothko | 1. Mood is an important consideration of any piece (MD1)<br>2. Different colour combinations evoke different moods (MD2)<br>3. People may not necessarily experience the same mood (MD3)<br>4. Harmonious or analogous colour can communicate a mood of tranquillity (MD4)<br>5. Complimentary colour can energise a work or disorientate the viewer (MD5)<br>6. Warm colours can communicate warmth, happiness or anger (MD6)<br>7. Cool colours communicate aloofness or sadness (MD7) |

## 3.4 Phase two: Induction to *MUVE*

As MUVE requires users to create and use avatar within a virtual world, it requires an induction phase to ensure that users can visit and operate within the MUVG (De Lucia et al 2006; Shen & Eder 2009, Wang & Shao, 2012). Phase two is classroom based. Participants bring their own devices and learn how to use different MUVE tools through demonstration using an interactive whiteboard (see figure 3.7) and direct practice. They are presented with simple challenge that necessitates or encourages them to practice these tools but also to remove the novelty of exploring the not-so-necessary-tools for AI such as flying and running before visiting the MUVG *AISLE.*
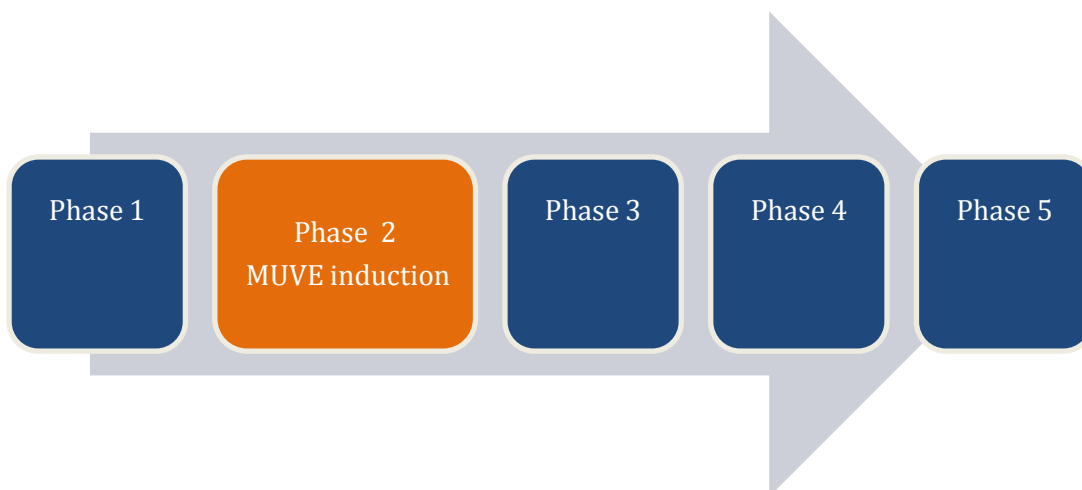


Figure 3.6 Phase two of TELE: MUVE Induction

Figure 3.7 Demonstrating MUVE tools using the interactive whiteboard

The tools demonstrated include the

- Navigation tools (NVT) to enter gallery areas and investigate artwork from different distances and locations
- Camera viewing tools (CVT) to investigate artwork from different viewpoints
- Inter-avatar communication tools (IAC) to converse with other avatars or class teacher using internal avatar-to-avatar VoIP service or typing
- Chat tool to alter the scale or colour of certain artworks (INT= interactivity)
- Note card retrieval tool (NCT) to obtain contextual information about the artwork or constructs relating to scale, movement and mood
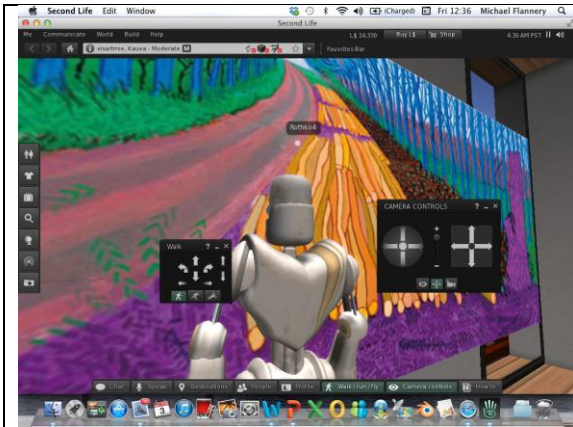
Navigation and camera viewing tools (NVG/ CVT)


Inter-avatar communication tools (IAC)
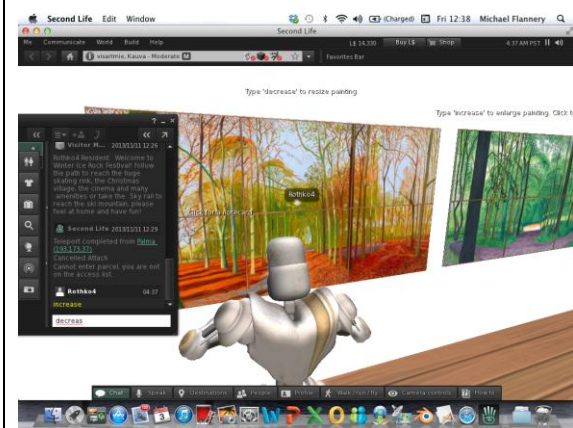

Chat tool to alter size or colour (INT)
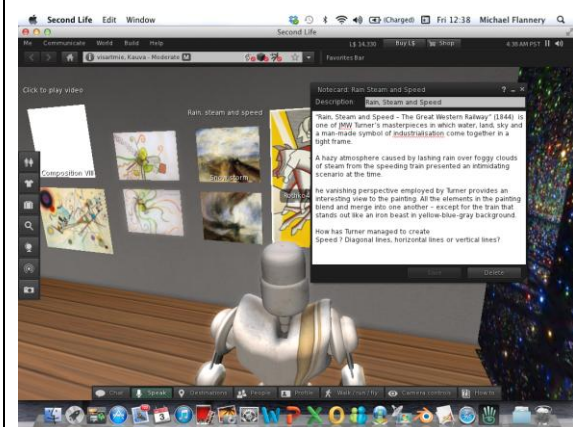

Note card tool (NCT)

Figure 3.8 MUVE tools

## 3.5 Phases one, four and five
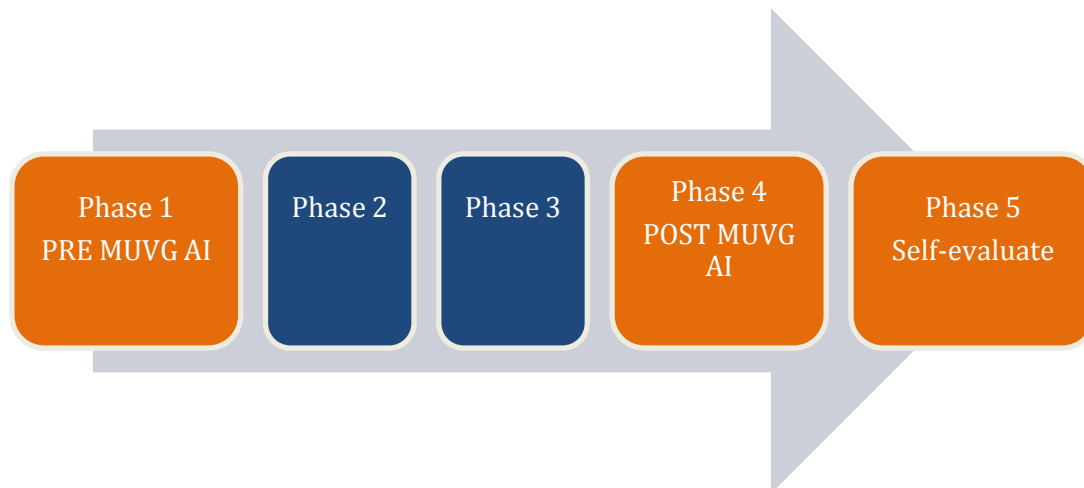


Figure 3.9 Phases one, four and five of TELE

In phases one and four (see figure 3.9) participants are asked to examine coloured copies of canonical works of art. They are asked to write about each piece in relation to scale, movement or mood. They are encouraged to do this individually within a set time frame of twenty minutes. The title, dimensions, year and artist are indicated below each piece. This task is to ascertain their current awareness, understanding or appreciation of scale (SC), movement (MV) and mood (MD). The key difference between stage one and stage four is that the participants will have investigated digital copies of these artworks via an avatar in *AISLE* alongside other participants. In stage four, they will revisit their pre *AISLE* written AI exercises and are invited to add to, amend or detract statements from it using a different coloured pen. This post AISLE appraisal task is also twenty minutes. This exercise is to ascertain what impact AISLE has regarding their awareness, understanding or appreciation of SC, MV or MD. They are also asked to indicate to what SL tool(s), if any, they attribute each addition or amendment.

The final phase concerns self-evaluation (see figure 3.9). Participants are asked to examine and self evaluate their pre and post AISLE written work to ascertain any increased *awareness, understanding or appreciation* of SC, MV or MD. They are asked to what tools they might attribute any increased *awareness, understanding or appreciation*. Participants are encouraged to pair, share and compare their self evaluations with one another. The TELE concludes with a discussion about what they learned in terms of SC, MV and MD related constructs and other non discovered constructs are explained.

## 3.6 Implementation of TELE

The *Second Life* induction/ orientation took the full hour to ensure participants could use the various tools with any degree of confidence and competence. All but a few participants successfully downloaded *Second Life viewer* and created their avatar in advance of the orientation session. Duirng orientation, participants teleported to an agreed public 'sandbox' to explore basic tools such as flying, running, changing appearance or voice tone and the various building tools. The interactive whiteboard was very effective for demonstrating the various MUVE tools to the whole class in real time. Participants were challenged to co-construct large scale structures at the public sandbox as a means of getting them acquainted with the tools necessary for AISLE (see figure 3.10). There were some technological troubleshooting issues. Some participants' personal laptops had older graphic cards that were not able to display MUVE graphics. Others had delays in accessing and operating within MUVE on campus.
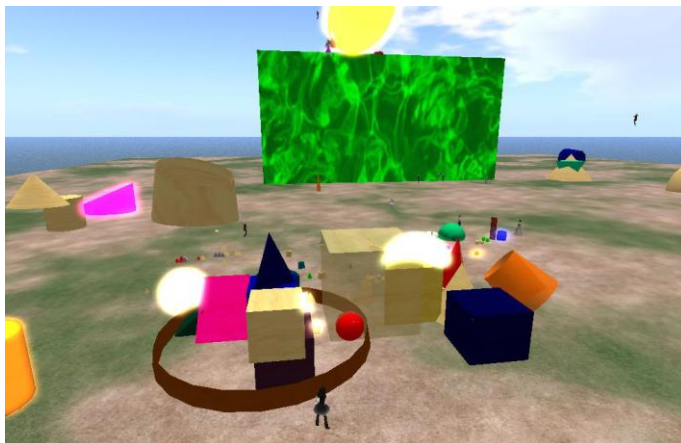


3.10 Participants practising SL to collaboratively construct large scale structures.

Participants were invited by email to an opening virtual drinks reception to generate some excitement about their visit to *AISLE* (see figure 3.13). The researcher selected an avatar that closely resembled his own appearance so that students could locate and identify him easily in *AISLE*. The initial novelty and anxiety factor prevailed longer than expected upon entering *AISLE*. Many were still getting acquainted with basic navigation. Some participants found their virtual selves caught between gallery interior walls, frozen for a time in the flying mode or appearing naked to the amusement of the other participants. Some had Wi-Fi lagging issues at home and so they could not communicate so easily. There were occasions when their avatars froze mid conversation and many participants' microphones were not working so there was greater reliance on the text chat tool than anticipated. Interestingly,

Virtual drinks reception


Participants arrive to MUVG


Another cohort explore AISLE


Inter avatar conversation

Figure 3.11 Gallery of screen shots showing participants invtesigating art in *AISLE*

Participants also used email and mobile phone to contact researcher when they had initial teleporting issues. Some uninvited neighbours entered *AISLE* during one particular session which distracted participants from investigating the exhibition. Overall, the implementation went better than expected and participants seemed to enjoy their engagement with the large scale kinetic pieces especially. Figure 3.11 shows screen shots of participants visiting AISLE.

# Chapter four: Methodology

## 4.1 Introduction

The key purpose of this chapter is to explain and discuss the research methods and procedures adopted for this study. It also describes the processes of data gathering and analysis used in proving that *Second Life* functionality provides affordances that enhance AI and that are deemed critical for effective and meaningful visual arts inquiry as outlined in chapter two. This chapter applies Dawson's (2009, p. 5) five 'W' questions concerning what, why, who, where, and when to describe what kind of research type is entailed, why a mixed methods approach is adopted, who are the participants and respondents, where is the research taking place and when are the various procedures employed (see figure 4.1).
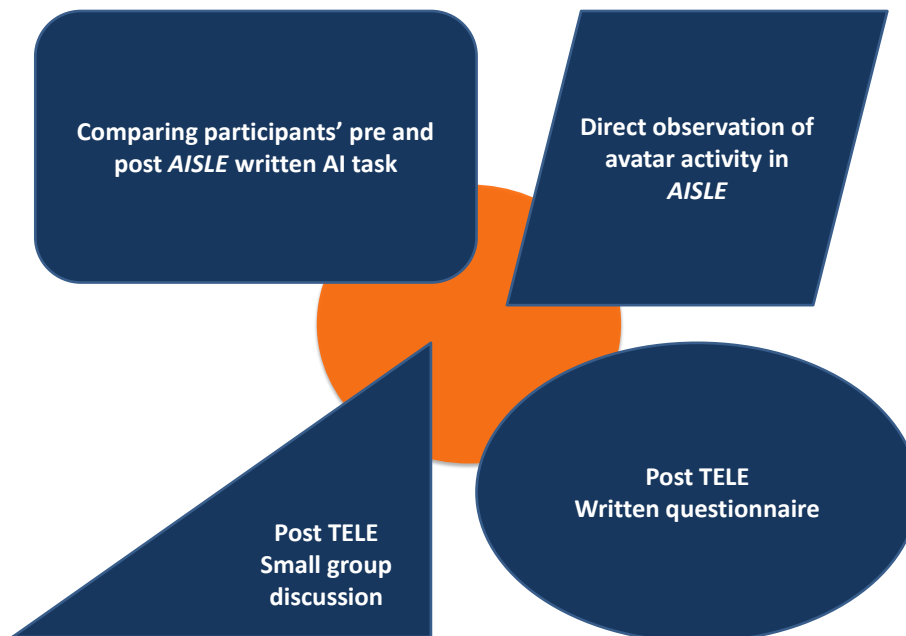


Figure 4.1 Dawson's five Ws applied to this research

## 4.2 Case study design

Case studies are a design of inquiry often applied in the area of evaluation in which the researcher acquires an in-depth understanding of a programme component or learning experience (Creswell, 2014). This research aims to acquire detailed understanding as to why MUVEs can be a credible alternative to the gallery or classroom for AI. Case studies have a particular strength in answering *why* and *how* research questions (Arthur, Warring, Coe and Hedges, 2012; Cohen, Mannion & Morrison, 2007; Yin 2009). They have the potential to explain *why* and *how* a

particular programme component such as a TELE does, or does not succeed (Arthur et al, 2012). This study aims to explain *why* and *how Second Life* functionality and affordances offers a technologically and pedagogically enhanced learning experience for AI. A case study was also considered to be the most appropriate approach for this research as it affords a certain degree of eclecticism regarding investigative methods, tools and triangulation of findings to either confirm or contradict a particular hypothesis (Cohen *et al*, 2014; Dawson, 2009; Yin, 2009). Case studies are often employed for research conducted over shorter but sustained periods of time (Creswell, 2002; Creswell, 2014). There are perceived to case studies primarily because they are usually restricted to a particular context. In this case, the context is situated in a medium sized Irish third level higher education institute (HEI).

## 4.3 Participation in the study

This study is conducted on volunteer third level students who are studying education. They were considered to be an ideal grouping as they the fall within the typical age profile of MUVE users and they examine the arts in education and the use of technology in education as part of their programme. The study was conducted on two groups organised around their availability. As the study was conducted slightly later with group B, it was an opportunity to examine data from group A and amend questionnaire to obtain more specific information in relation to MUVE tools used. Participation was voluntary at all stages of the study. They had the option of withdrawing at any stage of the research without any repercussions. Every participant was provided with one signed copy of the participant information/ participation sheet (see appendix B). The researcher obtained ethical clearance from two ethics committees in order to conduct this research. Ethics approval was obtained from the School of Computer Science and Statistics' Ethics Committee at University of Dublin, Trinity College and the higher edcuation institute where the study was conducted (see appendix C).

## 4.4 Mixed methods approach

This study adopts a *convergent parallel mixed methods* design (Creswell, 2014). This was considered to be the best research design for this study as all data is obtained within quite a short time frame.  A mixed methods design provides both qualitative and quantitative data which has potential in this study for obtaining rich description about *AISLE* as well as ascertaining patterns regarding which particular MUVE's tools impact participants' awareness, understanding or appreciation in relation to scale, movement and mood.  Data from four methods are compared and contrasted

with the aim of possible *triangulation* and *complementarity* to strengthen conclusions (Biesta, 1999; Creswell & Clark, 2007; Gorard & Taylor, 2004).

The mixed methods employed for this study comprise of a pre and post-AISLE written art appraisal task, a post-TELE questionnaire, a small group discussion and researcher's direct observation with the aid of *Camtasia Studio Screen* software (Dawson, 2009). The pre-*AISLE* activity (see figure 4.2) aims to ascertain a formative measure of participants' *awareness, understanding* or *appreciation* of SC, MV and MD constructs as explained in chapters two and three.

Pre *AISLE* task

Direct observation of avatar activity in *AISLE*

Post *AISLE* task

Post *AISLE* Questionnaire

Post *AISLE* Focused group discussion
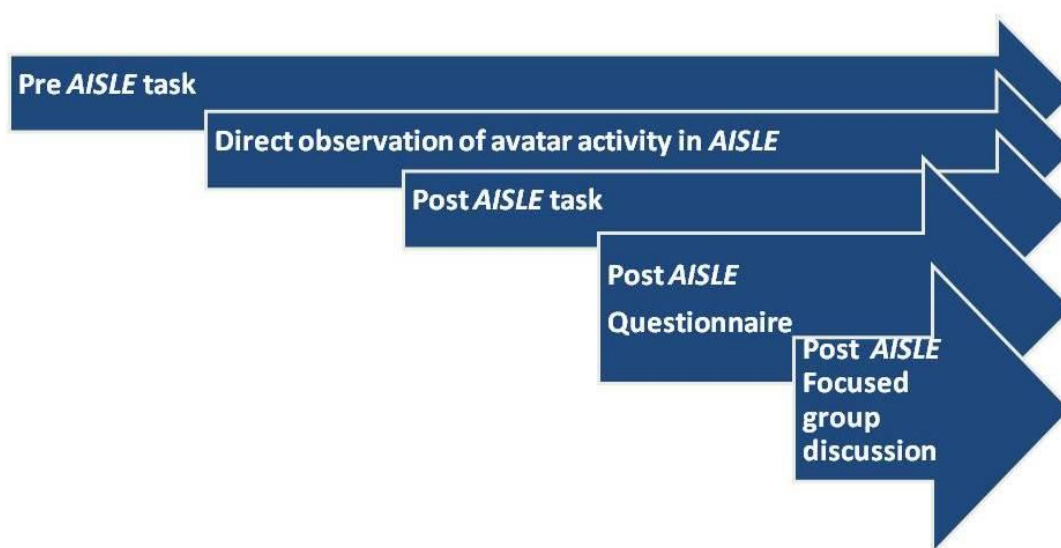
Figure 4.2 Order of mixed methods used

Participants are asked to examine and write about a number of artworks in relation to SC, MV & MD. The title, date, artist and dimensions of each artwork will be presented underneath each colour photocopied image. The complete this AI writing task in a colour photocopied booklet using a pseudonym for anonymity. They revisit this exercise post-*AISLE* and are afforded the opportunity to add to or amend that written having encountered digital copies of the artworks in *AISLE.* It is anticipated that this summative exercise will measure any increased awareness, understanding or appreciation. To ensure it is not just the second viewing that triggers new understandings, group B are asked to indicate to which *AISLE* tool or SL affordance, if any, they attribute any progression (see appendix D). The analysis entails a detailed examination of their pre AISLE appraisals and then comparing those with their post AISLE re-appraisals with the aim of deciphering any development that can be attributed to AISLE. It entails examining, coding, categorising, calculating and concluding (Cohen et al, 2007; Creswell, 2014) in relation to

1. Measuring pre and post *AISLE* standards with respect to SC, MV and MD
2. Types of progression identified (increased awareness, understanding or appreciation)
3. Which specific SC, MV and MD related constructs were progressed
4. Which AISLE tools aided such progression

(see appendix H, I and J for samples)

A second research method employed consists of a post-TELE written questionnaire comprising open, closed or *Likert* question types evaluating their learning experience in *AISLE* (see appendices D and F). Group B's questionnaire contains more closed and likert types questions than group A. Both questionnaires seek participants' perspectives regarding their experience of *AISLE* and its affordances. They ascertain their opinions regarding the perceived usefulness and perceived ease of use of its available tools (Venkatesh, 2000; Venkatesh, Morris, Davis & Davis, 2003) (see Table 4.1). Both also survey regarding enjoyment, novelty, effectiveness, learner autonomy and comparing AI in *AISLE* with prior gallery or classroom based AI experiences.

Table 4.1 MUVE functions

| | |
|---|---|
| Navigation tools (NVT) | *Increased proximity and Multiple viewpoints* |
| Camera viewing tools (CVT) | *Multiple viewpoints and Document learning* |
| Inter-avatar communication tools (IAC) | *Dialogic reflection and Shared knowledge construction* |
| At you own time and pace (OPOT) | *Learner autonomy and Self directed learning* |
| Note-card tool (NCT) | *Guided discover, Mediation and Scaffolding* |
| Script coding for interactivity (INT) | *Interactivity with artworks e.g. alter size or colour* |
| Primitive editing tools | *Three dimensional feel, Relative size, More exact scale and Includes animation* |

A third method employed is direct observation of avatar activity in *AISLE* (see figure 4.3). This is supported by informal note taking and *Camtasia Studio* screen recording clips when appropriate and with participants' consent. Observation is deemed important to ascertain patterns regarding participants' learning behaviours in *AISLE* that may explain emergent findings.
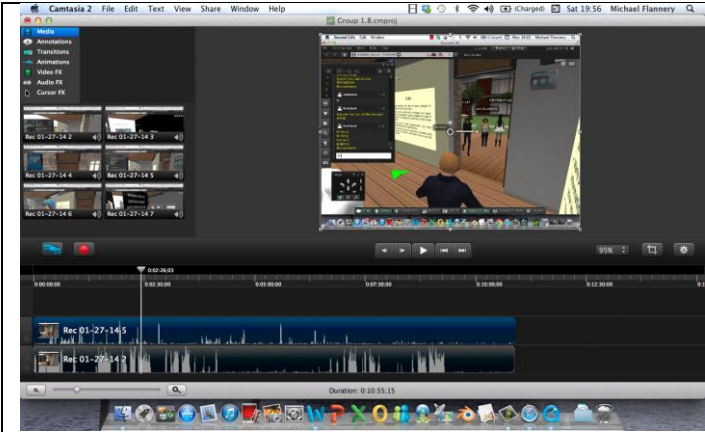
Camtasia screen shot 1 recording arrival of one grouping
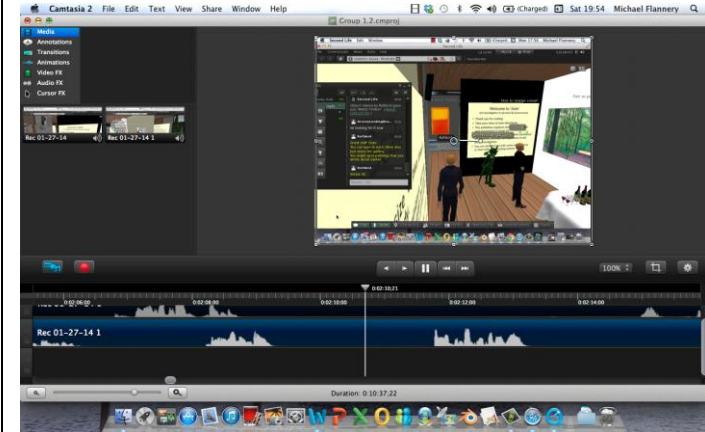


Camtasia screen shot 2 recording viewing patterns and conversations
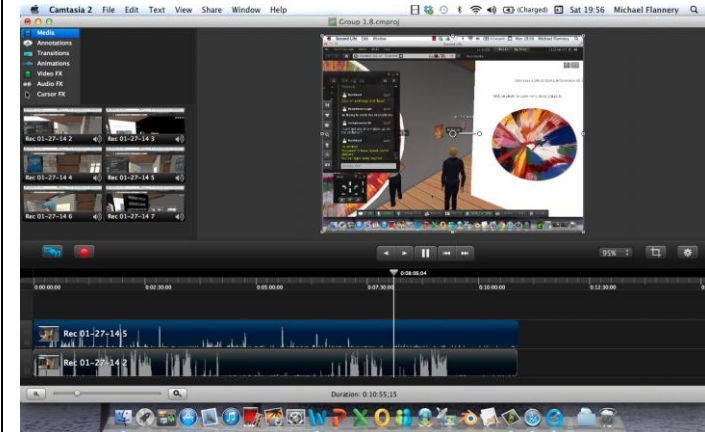


Camtasia screen shot 3 evidencing participant exercising proximity to view work

Figure 4.3 Screen print of *Camtasia Studio Screen* recording used to observation

The fourth method employed is a small group discussion after questionnaire analysis (see figure 4.2). This is qualitative research method aims to acquire further detail or clarification regarding patterns, findings or ambiguities resulting from the previous research methods. All data findings are triangulated to obtain a more complete and in depth picture to draw robust answers to the research questions and sub questions

(Arthur et al, 2012; Bell, 2005; Cohen et al, 2007; Creswell, 2014; Dawson, 2009). Table 4.3 summarises the research tools, rationale and time frame.

## 4.5 Procedures: Pre and Post AISLE exercises and written questionnaire

Both cohorts completed a pre and post *AISLE* written AI exercise and post TELE questionnaire. Nearly all of them had no previous experience of *Second Life*. Group A were invited to appraise eight hardcopy copies of artworks on exhibition in *AISLE* (see appendix F). They were also provided with a coloured photocopy of the image, the dimensions of the work (scale), medium used as well as artist and date of work. Group B completed a similar exercise. They were invited to appraise five out of an available ten pieces specifically in relation to SC, MV & MD. (See appendix D). Both groups were asked to revisit and add to, or amend each written appraisal post *AISLE.*

Table 4.3 Research tools, rationale and time frame with Group A and B

| Research tool | Rationale | Group A Time location | Group B Time location |
|---|---|---|---|
| Pre- *AISLE* AI task | *Formative evaluation regarding their awareness, understanding or appreciation regarding scale, movement and mood in visual arts* | February week 1 In art room | February week 3 In art room |
| Observation | *Observe, record and reflect on actual avatar engagement within technology enhanced learning experience* | February week 1 Online | February week 3 Online |
| Post *AISLE* AI task | *Summative evaluation regarding their awareness, understanding or appreciation regarding scale, movement and mood in visual arts* | February week 2 In art room | February week 4 In art room |
| Post *TELE* questionnaire | *Perceived learning Perceived usefulness Perceived ease of use* | February week 2 In art room | February week 4 In art room |
| Small group discussion | *Further information about questionnaire results Clarity regarding any ambiguities from questionnaire* | February week 3 In art room | Not available |

## 4.6 Procedures: Researcher observation and focused group discussion

Direct observation was conducted during phases two and three when participants visited a public sandbox for SL orientation and *AISLE* exploration. *Camtastia* screen capturing software was used occasionally as an aid to observation, but more often the researcher simply observed and took informal notes. Observation even with the aid o*f Camtasia* was limited in the sense that the researcher could only observe avatar activity visible to his avatar. The interior walls prevented observation of the other gallery areas. Therefore, there was often more reliance on active listening than anticipated. The researcher decided not to video record when there were very small

numbers visiting *AISLE*. While all participants signed consent, he felt that recording was not appropriate when the numbers were small.

The focused group discussion was organised with group A only. It was not possible to organise a meeting with group B. The focussed group discussion provided another tool to ascertain impressions of *AISLE's* affordances and compare it with traditional AI experiences such as the classroom or gallery excursion. Appendix J highlights some of the notable impressions expressed regarding *AISLE*'s affordances and limitations and what improvements or exhibit additions they would like to investigate in *AISLE*.

## 4.7 Summary and conclusions

The research tools employed were effective in obtaining a rich description of the impact of MUVE functionality. Time was the main key challenge as there was limited free time during their day for participants to complete post MUVG questionnaire and focussed group discussion. Participants had already volunteered their time to access *AISLE* online from their homes and the pre and post exercises, follow up questionnaire and focussed group discussion all demanded more of their time. Happily, both cohorts enjoyed learning about MUVE functionality and the opportunity to appraise MUVE's potential for AI. Direct observation was informative in terms of observing arrival, orientation, navigation, communication, grouping arrangement and art investigation patterns of participants (see figures 4.4).
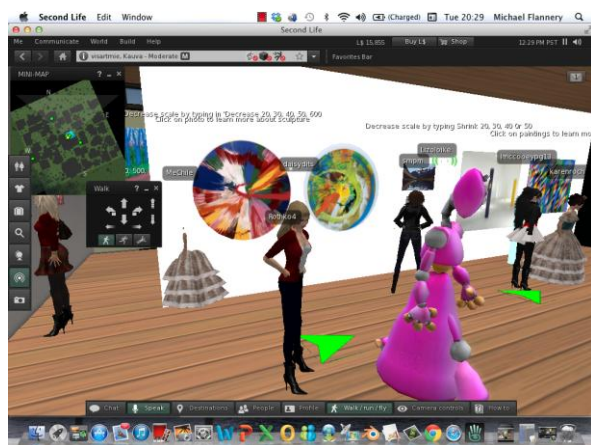


Figure 4.4 Direct observation of participants

However, there were times that direct observation aided by *Camtasia* screen capturing software felt awkward, intrusive or that it might impede their AI experience in *AISLE.* In order to observe and record, the researcher needed to navigate his avatar so that the participants were in his avatar's sight. More often, it felt more

appropriate and effective to withdraw and allow them to interact and communicate with eachother without the researcher's immediate presence (see figure 4.5).



Figure 4.5 Less intrusive observation of participants

# Chapter five: Data analysis and discussion

## 5.1 Introduction

This chapter analyses data obtained using four tools to ascertain the impact of art AISLE regarding scale (SC), movement (MV) and mood (MD) with two groups (see figure 5.1 and table 5.1). Both groups were third level students studying education. Both cohorts have studied a little about AI. The data analysis for this study entailed an examination of any written amendment or addition to participants' post *AISLE* art appraisal exercise that indicated any increased *awareness, understanding* or *appreciation* in relation specificSC, MV or MD related constructs as presented in chapters two and three.
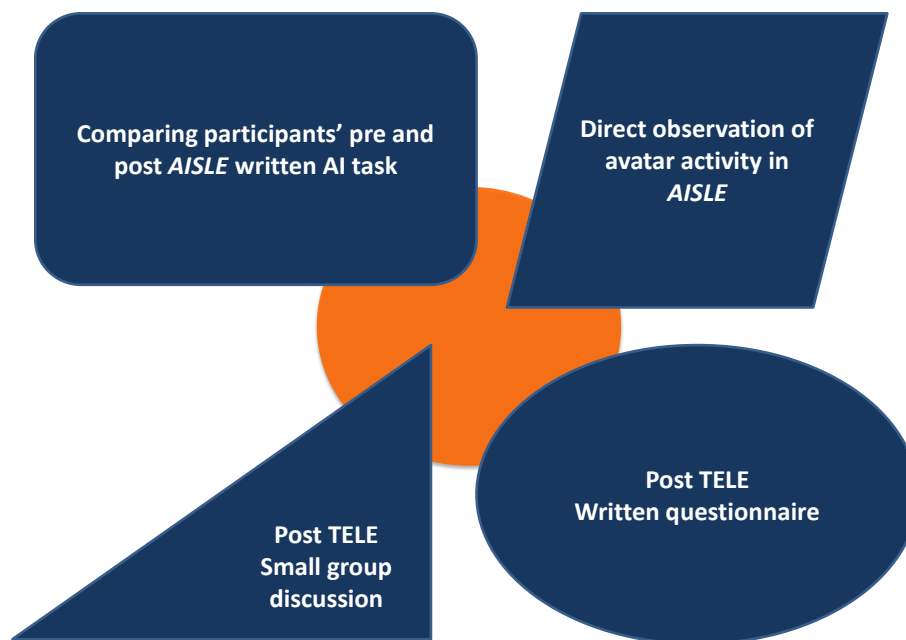


Figure 5.1 Four tools employed for this case study

It included an examination of both groups' post TELE questionnaire regarding AISLE's affordances for AI. It incorporated a scrutiny of researcher's direct observations of participants' avatar activity in *AISLE.* It also included an analysis of notes taken from a post TELE focussed group discussion (see appendix K). The merging and converging of these qualitative and quantitative data provides a comprehensive analysis to draw specific conclusions and discuss the value and limitations of the study in chapter six. This chapter presents findings from all the fore mentioned tools *AISLE'*s impact regarding scale first, movement second and mood

third. Participant availability was a key challenge during this research and so not all participants were able to partake in all phases of TELE or research modes. Figure 5.1 details the number of participants that partook at each stage of the research.

Table 5.1 Breakdown of participation

| Sample group | Completed TELE Pre and post AISLE art appraisals and post TELE questionnaire | Visited *AISLE* only and completed components of post TELE questionnaire | Partook in a focussed group discussion | Total |
|---|---|---|---|---|
| Group A | 20 | 10 | 20 | 30 |
| Group B | 18 x 2 | 4 | 0 | 40 |

## 5.2 Findings from post *AISLE* appraisals regarding increased *awareness* in relation to scale

Twelve out of eighteen respondents (66%) from group B commented on scale post *AISLE* with respect to the large scale painting entitled *Winter Trees* by David Hockney (see figure 5.2 and table 5.2). Nine respondents (50%) commented that it appeared more powerful, stronger or more impressive in *AISLE*. Nine respondents (50%) remarked that it appeared more vibrant, intense or colourful. All twelve respondents (66%) attributed any new observations relating to scale (awareness) to both the navigation (NVG) and camera viewing tools (CVT). Only two respondents attributed this awareness to the inter-avatar communication (IAC) or note-card tools (NCT). No one attributed increased awareness, understanding or appreciation to the option of altering the size of the painting (Interactivity; INT).

Figure 5.2 David Hockney's *Winter Trees*

Table 5.2 Group B: Scale related responses to David Hockney's *Winter Trees*

| Group B | Number of specific reference to scale | NVG | CVT | IACC | NCTT | INT |
|---------|---------------------------------------|-----|-----|------|------|-----|
| 18 | 12 | 12 | 12 | 2 | 2 | |

Six out of a possible eighteen respondents (33%) from group B remarked that Paul Klee's miniature painting entitled *Rose garden* (see figure 5.3) was smaller than anticipated or that it was more difficult to see (see table 5.3). Interestingly, four respondents remarked that they did see it in *AISLE.* One respondent remarked that *AISLE* did not do the painting justice even though its dimensions in the virtual gallery approximate its actual size in reality more closely than on paper or *PowerPoint* presentation. Two other respondents remarked that there was no significant difference in viewing *Rose Garden* in *AISLE.* All those who noted its miniature scale in *AISLE* attribute this observation to the navigation (NVG) and camera viewing tools (CVT) (see table 5.3).



Figure 5.3 Paul Klee's *Rose Garden*

Table 5.3 Group B: Scale related responses to Paul Klee's *Rose Garden*

| Group B | Number of specific reference to scale | N V G | C V T | I A C | N C T | I N T |
|---|---|---|---|---|---|---|
| 18 | 6 | 6 | 6 | | | |

Eight participants from group B made observations regarding actual scale in relation to Roy Lichtenstein's rather large scale *Whaam* painting (see figure 5.4 and table. 5.4). Eight remarked that it appeared larger than anticipated and five respondents commented that it appeared more powerful, loud, effective, energetic or commanding as a result.  However, one respondent expected it to be larger. Those who made new comments in relation to scale attribute the navigation (NVG) and camera viewing tools (CVT) to their increased *awareness, understanding* or *appreciation* of its scale (see table 5.3).



Figure 5.4 Roy Lichtenstein's *Whaam*

Table 5.4 Group B: Specific references made about scale from group B

| Group B | Number of specific reference to scale | N V G | C V T | I A C | N C T | I N T |
|---|---|---|---|---|---|---|
| 18 | 8 | 8 | 8 | | | |

Participants in group A completed a more open ended pre and post *AISLE* written Art appraisal exercise. They were simply asked to write about eight *AISLE* exhibits pre *AISLE* and reappraise them post *AISLE.* Nine out of a possible twenty respondents from group A remarked that Hockney's *Winter trees* (see figure 5.2) was bigger than expected (see table 5.5). Six respondents remarked that Hirst's spin painting was

larger than anticipated (see figure 5.5). Three respondents mentioned that Turner's painting was smaller than expected (see figure 5.6). Two respondents mentioned that Balla's painting was smaller than anticipated. Interestingly, there was a mixed response regarding the anticipated scale of Roy Lichtenstein's *Whaam* painting (see figure 5.4).  Some expected it to be bigger.

Table 5.5 Group A:  Specific observations made about scale post AISLE

| Group A | HIRST | TURNER | BALLA | HOCKNEY | MYOSHKA | Lichtenstein |
|---|---|---|---|---|---|---|
| Number | 6 'Bigger' | 3 'Smaller' | 3 'Smaller' | 9 'Bigger' 1 'Smaller' | 1 'Bigger' | 2 'Bigger' 2 'Smaller' |
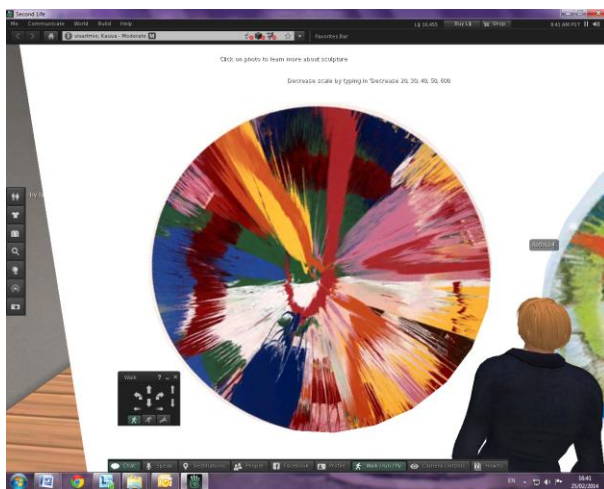


Figure 5.5 Hirst's spin painting
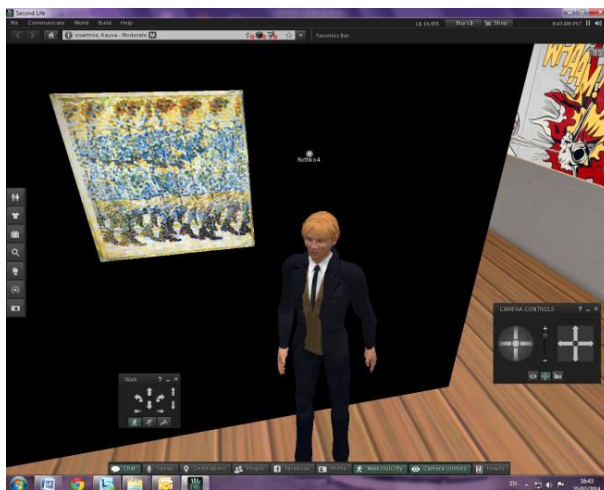


Figure 5.6 Balla's painting

## 5.3 Findings from post *AISLE* appraisals regarding increased *understanding* or *appreciation* in relation to scale

There was increased *understanding* among some of group B in relation to the scale related constructs - SC1, SC2 , SC4 and SC5 and SC7 (see table 5.6). For example some respondents wrote

> *The scale of this picture online was much bigger in Second Life. This meant that everything was much bigger and more effective.*
>
> Penelope, group B, (SC1/ SC2)

> *The scale was much more obvious and the road looked as though it was very long and disappearing into the distance [linear perspective]*
>
> John, group B, (SC7)
>
> *Seeing the image large scale [in Second Life] made it more powerful.*
>
> Bran, group B, (SC1/ SC 2)

> *Seeing the image in its true scale on the gallery wall in AISLE really added to the idea I had before. It really dominated AISLE and was one of the first to catch my eye.*
>
> Pepsi, group B, (SC1/ SC4)

Table 5.6 Group B: Increased understanding (Scale)

| Art work | Description | Construct | Number of respondents | Awareness | Understanding | Appreciation |
|---|---|---|---|---|---|---|
| *Winter Trees* by David Hockney | Large scale painting with implied scale | **SC1** | 18 | 7 | 1 | 7 |
| | | **SC2** | 18 | 1 | 1 | 1 |
| | | **SC3** | 18 | | | |
| | | **SC4** | 18 | 9 | 6 | 6 |
| | | SC6 | 18 | | | |
| | | SC7 | 18 | 4 | 3 | 4 |
| *Rose Garden* by Paul Klee | Small scale painting with implied scale | **SC1** | 18 | 1 | 1 | 1 |
| | | **SC2** | 18 | 1 | 1 | 1 |
| | | **SC5** | 18 | 2 | 2 | 2 |
| | | SC6 | 18 | | | |
| | | SC7 | 18 | | | |

There was less written evidence among group A indicating increased *understanding* in relation to specific scale related constructs (see table 5.7).  Many understood the impact of scale on colour which has links with constructs SC4 concerning large scale works' tendencies to command attention.

> *The picture was very big…I think the size of the picture emphasised the strong colours used*
>
> 2468, group A (SC2/ SC4)

> *In the virtual learning space, this painting was bigger than I had originally anticipated and the colours stood out more and the whole painting was more appealing*
>
> 123s, group A (SC2/ SC4)
>
> *[Large scale painting] was more eye catching [in AISLE]*
>
> 2695, group A (SC2/ SC4)

Table 5.7Group A: Increased understanding (Scale)

| Art work | Description | Construct | Number of respondents | Awareness | Understanding | Appreciation |
|---|---|---|---|---|---|---|
| *Winter Trees* by David Hockney | Large scale painting with implied scale | **SC1** | 20 | 12 | | 9 |
| | | **SC2** | 20 | | | |
| | | **SC3** | 20 | | | |
| | | **SC4** | 20 | 12 | 1 | 9 |
| | | SC6 | 20 | | | |
| | | SC7 | 20 | | | |
| *Beautiful Cyclonic Bleeding Slashing Hurricane Dippy Cowards Painting* by Damien Hirst | Large scale kinetic painting (mechanical) | **MV1** | 20 | 12 | 3 | 9 |
| | | **MV4** | 20 | | | |
| | | MV2 | 20 | | | |
| | | | 20 | | | |

There was some increased recognition for the qualities of large scale work [appreciation] among group A and B. However, their increased awareness from AISLE regarding the actual size of small scale work triggered disappointment. For example

> *I found this [Small scale - Rose Garden] piece to have little impact on me in Second Life. This is rather surprising considering my previous [appraisal]. I would attribute this to the scale of the piece which felt diminished.*
>
> Eileen, group B

> *Viewing this piece in SL gave me a chance to see [large scale - Beautiful Bleeding Slashing Hurricane Dippy Cowards painting] as it was supposed to be viewed. It was much bigger than expected; you notice more when you see it properly.*
>
> Nailer, group A

> *This [Large scale - Winter Trees] painting takes up a whole wall in Second Life. Vibrant colours!*
>
> Ocook95, group A

> *This [Large scale - Winter Trees] was much more impressive in AISLE. The scale of the painting made much more of an impact on me. The colours were so vibrant. It felt like you could walk into*
> *The scene.*
>
> Jamil2, group B

> *This painting [Small scale - Rose Garden] was a lot smaller in scale than I had expected…it looked more impressive when it was blown up [interactive option]*
>
> Zooki, group B

Interestingly, their post *AISLE* remarks containing either increased appreciation or subsequent disappointment mirror those often articulated by people viewing original canonical works of art for the first time in a real gallery setting.

## 5.4 Findings from questionnaire responses regarding scale

The post TELE questionnaire completed by group B provided positive findings about *AISLE's* impact regarding scale in visual arts (SC). Over ninety percent of group B (n37) indicated that *AISLE* increased their *awareness* of SC (see table 5.8). Over seventy percent of group B (n29) thought that it increased their *understanding* of SC (see table 5.9).

Table 5.8 Group B: Increased awareness regarding scale

| Awareness of scale | Percentage | Number |
|---|---|---|
| Strongly agree | 30% | 12 |
| Agree | 62.5% | 25 |
| Unsure | 7.5% | 3 |
| Disagree | 2.5% | 1 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

Table 5.9 Group B; Increased understanding regarding scale

| Understanding of scale | Percentage | Number |
|---|---|---|
| Strongly agree | 17.5% | 7 |
| Agree | 55% | 22 |
| Unsure | 22.5% | 9 |
| Disagree | 2.5% | 1 |
| Strongly disagree | 2.5% | 1 |
| No answer recorded | 0% | 0 |

Group A were asked whether *AISLE* impacted them in anyway regarding scale in visual arts (see table 5.10). This grouping gave mixed opinions. While approximately half (n14) think it did impact, the other half are unsure or think it has not impacted in any way. Disappointingly, this vast majority of this grouping did not offer any qualitative explanation in the questionnaire. However the focused group discussion reveals some explanation for these mixed opinions. Some explained that the found the navigation hard and so kept walking into walls and they could not work out how to change size of certain pieces, even though instructions are on display over each painting. Others commented that they liked the interactive elements to amend scale seeing exhibits from different viewpoints and distances.

Table 5.10 Group A: *AISLE's* impact regarding scale

| Scale | YES | NO | UNSURE | BLANK |
|---|---|---|---|---|
| Group A | 14 | 5 | 11 | 0 |

## 5.5 Findings from researcher's direct observations and focussed group discussion in relation to scale

Researcher's observations of, and focussed group discussion with sample group A (n20) revealed that technical troubleshooting impeded the possibility of perceiving, understanding or appreciating scale. At times, some participants could not decipher the *AISLE* exhibits from the interior walls. Their graphics card was too old to decipher detail and they could only see blocks of colour. Consequently, their post AISLE reappraisal had no evidence of increased awareness, understanding or appreciation. Unreliable Wi-Fi was another key impediment to learning about scale in Second Life. Those who were logged out time a number of times became de-motivated and consequently did not spend prolonged time investigating art in AISLE.

## 5.6 Discussion of findings relating to scale

What the findings indicate firstly is that participants developed preconceptions and misconceptions regarding the actual scale of each piece presented to them in class prior their MUVG experience in *AISLE*. Secondly, the participants were more were more greater aware of the actual scale of those pieces when they encountered many works in AISLE due to the fact that both the navigation and camera viewing tools enabled participants to establish depth cues as our perception of size depends closely on our perception of depth. The three dimensional nature of MUVG *AISLE* permitted users to note actual scale more accurately as they could triangulate pictorial depth cues such as *relative height, interpositioning* and *linear perspective.* This in turn enabled many participants to understand and appreciate that

- Scale is an important component of any piece
- Amending size fundamentally changes the nature of the work
- Largescale work usually commands attention and dominates the space

The findings indicate fourthly that 'size matters' in the sense that participants were more impressed by the MUVG copy than the secondary hard copy and they were less impressed with any piece that turned out to be smaller in actual scale than they anticipated. Interestingly, some smaller pieces were overlooked by some participants in the MUVG. Coincidently, this can often happen in a real gallery scenario, whereby larger works command greater attention from the public and smaller works tend to get less focus. Fifthly, the findings evidence that despite overt signage in *AISLE* and optional notecards embedded in every exhibt, participants did not increase their awareness, understanding or appreciation of the more covert and complex constructs relating to implied scale with the exception that implied scale can be created using

linear perspective. This suggests that the more complex *implied* related constructs require more explicit teaching.

## 5.7 Findings from post *AISLE* appraisals regarding increased *awareness* in relation to movement

Four out of a possible eighteen respondents commented that *AISLE* brought the Damien Hirst's large scale kinetic spin painting to life while another eight respondents made specific reference to its kinetic movement (see figure 5.5 and table 5.11). Surprisingly, two respondents remarked that they did not see this piece in *AISLE* considering its large size. They may have had some technical troubleshooting issues when accessing the gallery or they spent their time investigating other pieces and spaces. Seventeen out of the eighteen respondents wrote about this piece in a positive manner. Some commented that it was more effective in *AISLE.* Others commented that it was more hypnotic, mesmerising or dramatic in *AISLE.* Three respondents specifically stated that they had acquired increased *understanding* or *appreciation* about this piece from *AISLE.* Seventeen of the eighteen respondents who saw this work attributed both the navigation (NVG) and camera viewing tools (CVT) for their increased awareness, understanding or appreciation.

Table 5.11 Group B: Specific reference to movement in Hirst's spin painting

| Group B | Number of specific reference to movement | NVG | CVT | IACT | NCTT | INT |
|---|---|---|---|---|---|---|
| 18 | 8 | 8 | 8 | | | |

Six respondents made a specific MV related comments in relation to Julian Opie's animated digital landscape in *AISLE* (see figure 5.7 and table 5.12). Three respondents commented that they did not see it. Perhaps, this is not surprising as it is a small scale piece exhibited alongside large kinetic works by Damien Hirst and Briget Riley. They commented that it appeared less flat, more interactive, more encompassing or very visible in *AISLE*. One respondent remarked that she or he could look at it all day because the actual movement was both relaxing and soothing. Respondents attributed their increased *awareness*, *understanding* or *appreciation* about MV to the navigation (NVG) and camera viewing tools (CVT).
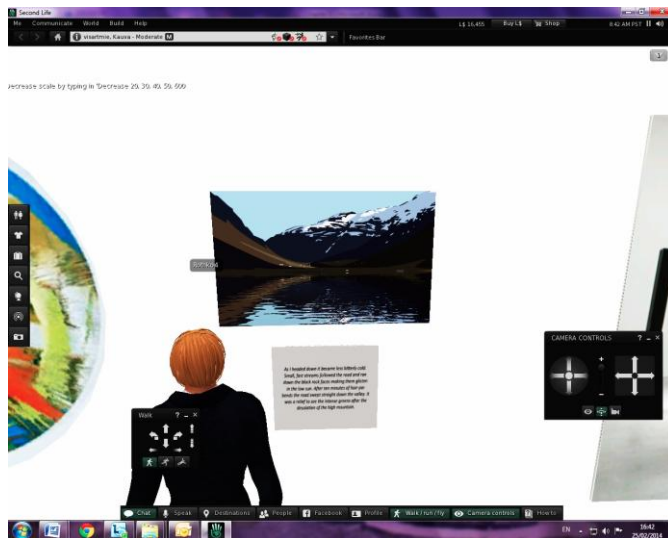
Figure 5.7 Opie's animated digital landscape

Table 5.12 Group B: Responses to Opie's animated digital landscape

| Group B | Number of specific reference to movement | | NVG | CVT | IAC | NCT | INT |
|---------|------------------------------------------|--|-----|-----|-----|-----|-----|
| 18 | 6 | | 6 | 6 | | | |

Seven out of a possible eighteen respondents commented on the kinetic movement in the digital optical artwork entitled *Blazed again* by Mysohka post *AISLE* (see figure 5.8 and table 5.13). Their response to this animation varies. Some describe it as empowering and hypnotising. Others describe it as unsettling and uneasy. Interestingly, three respondents did not see it this work in *AISLE.* The researcher decided to create a separate optional room for the digital optical artworks in case some participants were photosensitive. The only tools they attribute their observations (awareness) are the navigation and camera viewing tools.
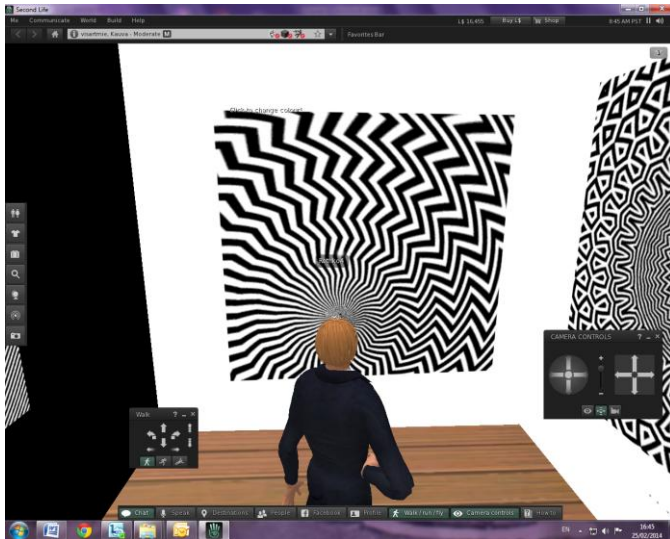
Figure 5.8 Blazed again by Mysohka

Table 5.13 Group B: Responses to digital optical artwork

| Group B | Number of specific reference to movement | N V G 7 | C V T 7 | I A C | N C T | I N T |
|---------|------------------------------------------|---------|---------|-------|-------|-------|
| 18 | 7 | 7 | 7 | | | |

Many in group A amended their appraisals in relation to two exhibits that had actual kinetic movement. Twelve out of a possible twenty respondents became aware of kinetic movement in Hirst's spin painting post *AISLE* (see table 5.14). Seven out of possible twenty respondents commented on the kinetic movement in relation to the digital optical artwork (see figure 5.8). However, none of this cohort evidenced in writing any increased awareness or understanding regarding implied movement in Turner's, Balla's, Lichtenstein's or Hockney's paintings.

Table 5.14 Group A: Responses in relation to movement

| Group B | HIRST | MYOSHKA |
|---------|-------|---------|
| 18 | 12 | 8 |

## 5.8 Findings from post *AISLE* appraisals regarding increased understanding or appreciation in relation to movement

There was increased *understanding* among some of group B in relation to the movement related constructs – MV1, MV2, MV3, MV4, MV5 and MV6 (see table 5.15). For example some respondents wrote

> *It seemed like a real road stretched out in front of you. It adds to the movement in the painting as the eye is brought down the length of the road [directional lines].*

> Zooki, group B, MV6

Table 5.15 Group B: Increased understanding (Movement)

| Art work | Description | Construct | Number of respondents | Awareness | Understanding | Appreciation |
|---|---|---|---|---|---|---|
| *Beautiful Cyclonic Bleeding Slashing Hurricane Dippy Cowards Painting* by Damien Hirst | Large scale kinetic painting (mechanical) | **MV1** **MV2** **MV4** | 18 18 18 | 17 17 17 | 10 10 10 | 17 17 17 |
| *As I headed down it became less bitterly cold...* by Julian Opie | Small scale digital painting with animation | **MV1** **MV3** MV2 | 18 18 18 | 6 6 6 | 6 6 6 | 6 6 6 |
| *Girl Running on a Balcony* by Giacometti Balla | Small sale painting with Implied movement | **MV6** **MV1** MV2 MV4 | 18 18 18 18 | 2 2 2 2 | 2 2 2 2 | |
| *Blazed Again* by Myoshka | Digital optical artwork Actual movement | **MV1** **MV4** MV2 | 18 18 18 | 6 6 6 | 3 3 3 | 6 6 6 |
| *Whaam* by Roy Lichenstein | Large scale painting with Implied movement | **MV1** **MV4** MV5 | 18 18 18 | 6 6 6 | | 6 6 6 |
| *Rain Steam and Speed the Great Western Railway* by William Turner | Small scale painting with Implied movement | **MV1** **MV5** MV2 | 18 18 18 | 5 5 4 | 4 4 4 | 5 5 4 |

However, there was little to no written evidence among group A indicating increased *understanding* in relation to specific movement related constructs (see table 5.16).

There was some understanding in relation to MV1 and MV3 constructs only. Interestingly many of their comments still concerned scale and colour.

Table 5.16 Group A: Increased understanding (Movement)

| Art work | Description | Construct | Number of respondents | Awareness | Understanding | Appreciation |
|---|---|---|---|---|---|---|
| *Beautiful Cyclonic Bleeding Slashing Hurricane Dippy Cowards Painting* by Damien Hirst | Large scale kinetic painting (mechanical) | **MV1** **MV4** MV2 | 20 | 12 | 3 | 9 |
| *Girl Running on a Balcony* by Giacometti Balla | Small sale painting with Implied movement | **MV6** **MV1** MV2 MV4 | 20 20 20 20 | 3 2 1 1 | 1 1 1 1 | 2 2 1 1 |
| *Blazed Again* by Myoshka | Digital optical artwork Actual movement | **MV1** **MV4** MV2 | 20 20 20 | 8 8 8 | 2 2 2 | 8 8 8 |
| *Whaam* by Roy Lichenstein | Large scale painting with Implied movement | **MV1** **MV4** MV5 | 20 20 | 2 2 | | 2 2 |
| *Rain Steam and Speed the Great Western Railway* by William Turner | Small scale painting with Implied movement | **MV1** **MV5** MV2 | 20 | 1 | 1 | 1 |

As there was less evidence of increased awareness and understanding from both groups in relation to movement related constructs, it was not surprising that there was little evidence of increased *appreciation* of exhibits in relation to movement. Interestingly, analysis of their appraisals also evidence that they commented more about scale and colour than implied movement in static work such as *Girl Running on a Balcony* by Giacometti Balla *or Rain, Steam and Speed the Great Western Railway* by William Turner even though these were located in the 'Movement' gallery area of *AISLE.*

## 5.9 Findings from questionnaire responses in relation to movement

The post TELE written questionnaire from group B provided positive findings about *AISLE's* impact regarding movement in visual arts (MV). Over eighty percent (n35)

thought that *AISLE* increased their *awareness* regarding movement in visual arts (see table 5.16). Ten percent (n4) indicated that they were unsure. One respondent felt it did not increase awareness or understanding. However, over seventy per cent (n31) indicated that it did increase their *understanding* in relation to movement (see table 5.18). Two-thirds of group A also indicated that *AISLE* impacted them regarding movement in visual arts (see table 5.19). They commented that *AISLE* allowed them to view kinetic work in a more real and interactive manner. Some commented that they did not know about kinetic work before they visited *AISLE.* A few remarked that *AISLE* allowed them to see the work more completely. None of the group mentioned any of the constructs relating to implied movement directly. Some made observations about implied movement but not constructs that explain them.

Table 5.17 Group B: Increased awareness regarding movement

| Awareness of movement | Percentage | Number |
|---|---|---|
| Strongly agree | 17.5% | 7 |
| Agree | 70% | 28 |
| Unsure | 10% | 4 |
| Disagree | 2.5% | 1 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

Table 5.18 Group B: Increased understanding regarding movement

| Understanding of MV | Percentage | Number |
|---|---|---|
| Strongly agree | 12.5% | 5 |
| Agree | 60% | 26 |
| Unsure | 15% | 6 |
| Disagree | 5% | 2 |
| Strongly disagree | 2.5% | 1 |
| No answer recorded | 0% | 0 |

Table 5.19 Group A: *AISLE's* impact regarding movement

| Scale | YES | NO | UNSURE | BLANK |
|---|---|---|---|---|
| Group A | 20 | 3 | 6 | 1 |

## 5.10 Findings from researcher's direct observations and focused group discussion in relation to movement

Researcher's observations and focussed group discussion (n20) reveal that Wi-Fi troubleshooting impeded the possibility of learning about actual movement in *AISLE.* Those who had inconsistent or poor internet access were not able to notice kinetic movement or animation. They were not able to see embedded video. Those few who had older graphics cards were not able to see kinetic movement or implied movement in still images. Participants were more vocal and excited about actual

movement in art as opposed to implied movement in still work. There were no observed inter-avatar conversations regarding implied movement in paintings by Balla, Lichtenstein or Opie (see figures 5.9, 5.10 & 5.11). Large scale kinetic works dominated their discussions.



Figure 5.9 Balla's painting demonstrates implied movement through repetition



Figure 5.10 Lichtenstein's paintings demonstrates implied movement using directional and gestural lines
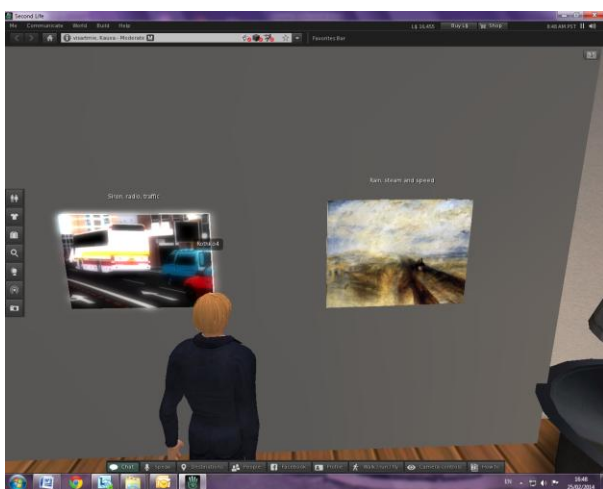


Figure 5.11Turner's and Opies' painting incorporates implied movement using diagonal linear line

## 5.11 Discussion of findings relating to movement

All these findings firstly suggest that learners do not necessarily register that certain artworks have kinetic movement when viewing traditional hard or digital copies even if there is textual clues along side the image. It was only when exercising their *oculomotor system* including *fixation* and *saccadic skills* within the MUVG that participants noticed, experienced and thus appreciated the kinetic charcateristic of the work more. Secondly, the *real time* in addition to the *immersed* dimension of the MUVG permitted participants to view these works as the artist intended and thus better understand and appreciate that

- Some artworks incorporate actual or digital motion
- Movement is an important consideration in some pieces
- Decisions about actual or implied movement are for the most part intentional
- Amending actual motion fundamentally changes the nature of the experience of the work

The findings indicate that 'movement matters' in visual arts in the sense that participants were more impressed with the piece when they saw the work in motion. They found these pieces to be more impressive or effective in *AISLE* than in the classroom.

However, the findings also indicate that those who encountered 'lagging' or persistent 'logging out' due to unreliable Wifi impeded their experience the learning opportunity. Interestingly, the decision to border and include signage within the MUVG cautioning those who were photo-senstive or motion triggered epilepsy was prudent as some participants mentioned that the opitical digital work made them feel dizzy. Viewing digital opitical art in the MUVG was almost too effective. Lastly, similar to findings relating to scale, the results indicate that the more subtle and complex constructs relating to implied movement were not noted by participants despite the presence of explanation signage and optional notecards. It appears that implied movement within artworks require more time and explicit teaching. The two key tools to which participants attribute their increased awareness, understanding or appreciation about movement are the same as those in relation to scale – the *navigation and camera viewing tools*.

**5.12 Findings from post *AISLE* appraisals regarding increased *awareness, understanding* or *appreciation* in relation to mood (MD)**

While all *AISLE* exhibits express mood through content and form as explained in chapter two, the third gallery and smallest space focussed especially on colours' impact on mood. In this gallery space, there were four 'colour field' paintings by Mark Rothko. Alongside each painting there was another copy. They could alter the 'twin's' colour to investigate colour's impact on mood (see figure 5.12). This interactivity combined with the embedded note cards addressed mood orientated constructs. The findings from group A (n18) reveal very little regarding increased *awareness, understanding* or *appreciation* regarding mood. One respondent remarked that the colour field paintings looked better and completely different in AISLE. Five respondents commented that it was interesting and enjoyable to change its colours and make their own colour field painting. However, one of them remarked that despite the interactivity she or he still did not appreciate the abstract nature of the Rothko's paintings post *AISLE*. In contrast, another respondent remarked that changing the colours made her or him appreciate Rothko's work more.
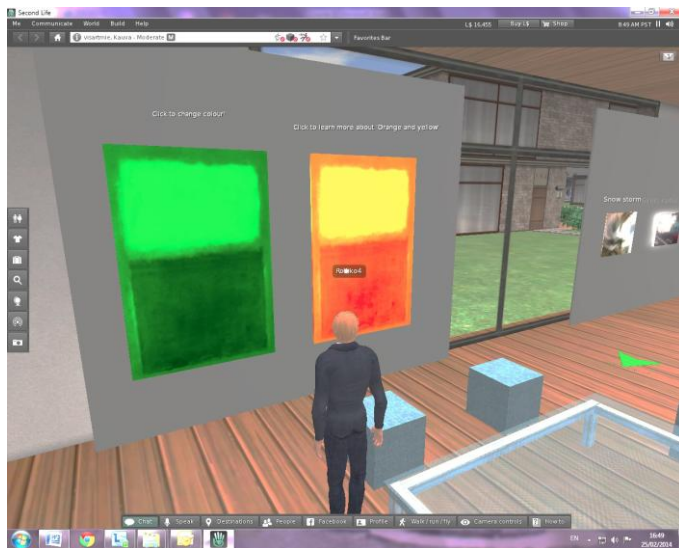


Figure 5.12 Rothko's colour field painting on the right (interactive twin painting on the left)

Very few from either cohort evidenced any increased understanding or appreciation in relation to specific mood related constructs. MD1, MD4 and MD6 were the only constructs that were noted (see tables 5.20 and 5.21).

> *This worked well as a stand-alone piece of art. I think changing the colour gave a different mood*

<div align="right">

Dannic, group B, MD2

</div>

It appeared that while the room was perceived to be novel and enjoyable, there was limited written evidence of learning or progression in relation *awareness, understanding* or *appreciation* of mood following the rather short excursion to *AISLE.*

Table 5.20 Group B: Increased understanding (Mood)

| Art work | Description | Construct | Number of respondents | Awareness | Understanding | Appreciation |
|---|---|---|---|---|---|---|
| *Orange and Yellow* by Mark Rothko | Large scale painting with warm harmonious colour | **MD1** | 18 | 2 | 2 | 2 |
| | | **MD2** | 18 | | | |
| | | **MD3** | 18 | | | |
| | | **MD4** | 18 | 1 | 1 | 1 |
| | | **MD6** | 18 | 1 | 1 | 1 |
| | | **MD7** | 18 | | | |

Table 5.21 Group A: Increased understanding (Mood)

| Art work | Description | Construct | Number of respondents | Awareness | Understanding | Appreciation |
|---|---|---|---|---|---|---|
| *Orange and Yellow* by Mark Rothko | Large scale painting with warm harmonious colour | **MD1** | 20 | 1 | 1 | 1 |
| | | **MD2** | 20 | 2 | 2 | 2 |
| | | **MD3** | 20 | | | |
| | | **MD4** | 20 | | | |
| | | **MD6** | 20 | 1 | 1 | 1 |
| | | **MD7** | 20 | | | |

## 5.13 Findings from questionnaire responses regarding mood (MD)

The post TELE questionnaire completed by group B provided positive findings about *AISLE's* impact regarding mood in visual arts. Over eighty percent of group B (n37) indicated that *AISLE* increased their *awareness* of mood (see table 5.22). Over eighty percent of group B (n29) thought that it increased their *understanding* of mood (see table 5.23). Surprisingly, two-thirds of group A (n30) indicated that *AISLE* impacted them regarding mood in visual arts (see table 5.24). Some commented that it was fun and interesting to interact with art that way.

Table 5.22 Group B: Increased awareness regarding mood

| Awareness of mood | Percentage | Number |
|---|---|---|
| Strongly agree | 22.5% | 9 |
| Agree | 60% | 26 |
| Unsure | 7.5% | 3 |
| Disagree | 5% | 2 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

Table 5.23 Group B: Increased understanding regarding mood

| Understanding of mood | Percentage | Number |
|---|---|---|
| Strongly agree | 12.5% | 5 |
| Agree | 77.5% | 31 |
| Unsure | 7.5% | 3 |
| Disagree | 2.5% | 1 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

Table 5.24 GroupA: *AISLE's* impact regarding mood

| Scale | YES | NO | UNSURE | BLANK |
|---|---|---|---|---|
| Group A | 20 | 3 | 6 | 1 |

## 5.14 Discussion of findings concerning mood

Deciphering mood is more difficult that analysing a work in relation to scale or movement. Unlike the other two gallery spaces, Gallery MD focussed on one artist. Despite, the interactivity to alter colour and as a consequence mood, the participants did not truly evidence any increased awareness, understanding and thus appreciation of any of the mood related constructs. Despite the opportunity to share perspectives, no particpant mentioned that others deciphered the same or different mood from the same piece. This is not surprising as researcher's direct observation noted that most conversations between participants concerned mutual support in relation to using the various available tools as opposed to rich discussion about artwork. As with the more subtle or complex implied scale and movement related constructs, the findings indicate that implied mood needs more explicit teaching. Unless participants spent time reading the available signage and optional notecards and discuss them with other participants, it was unlikely that new understandings or appreciations would have emerged. While the questionnaire findings indicate that they thought *AISLE* increased their understanding of mood, there is no substance to this claim in their written post MUVG art appraisals. The interactivity in gallery MD had in truth limited effect on learning.

## 5.15 Other relevant findings

While not scale, movement or mood specific, group B were asked a number of Likert scale question types about AISLE's affordances as part of a TELE for art investigation (see appendix E). They responses were very positive. A large majority agreed that it progressed their learning and that it was an informative, enjoyable and effective learning experience that facilitated learner autonomy, peer exchange and interactivity. However, one interesting pattern emerged when asked if it was a novel experience only. Half of group B agreed and the other half disagreed, or was unsure. The final chapter will explore this more in light of all the other findings. What impact does MUVE functionality have on art investigation? Is it novelty or technology enhanced learning?

# Chapter six: Conclusions, limitations and recommendations

## 6.1 Impact of MUVE functionality regarding scale, movement and mood

Chapter five analyses the impact of the MUVG *AISLE* regarding scale, movement and mood in visual arts. Analysis and triangulation of findings indicate that MUVE functionality impacts positively. It finds that following one excursion to *AISLE* increased *awareness* among many participants regarding the impact of *actual scale and movement* in visual arts. While participants thought it inceased their awareness in relation to mood, their post MUVG task does not support this impression. Their increased *awareness* concerning scale and movement is attributed mainly to two MUVE tools. These include the *navigation (NVG) and camera-viewing tools (CVT)* as these enabled learners to obtain visual depth cues concerning *relative height, interpositioning* or *linear perspective* to measure scale and exercise f*ixation* and *saccadic skills* to analyse actual movement. Both tools allowed them view the actual scale and movement from different distances and viewpoints within an immersed and real time environment (see figure 6.1). Both functions facilitated *proximity, multiple vantage points* and *prolonged engagement* to investigate and further understand and thus appreciate constructs. These are very affordances that are often limited in classroom or real gallery AI scenarios.
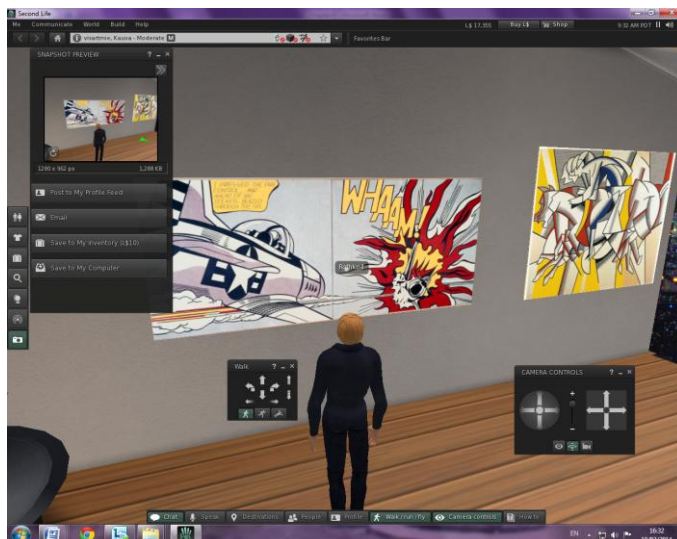


Figure 6.1 Screenshot showing camera viewing navigation tools

This study finds that the online exploration of the MUVG *AISLE* has had some impact regarding increased *understanding* regarding certain scale and movement related constructs (see table 6.1). These increased understandings are attributed mostly to

the navigation (NVG) and camera-viewing tools (CVT). Some impact is attributed to *interactivity* created by the embedded scripts into exhibits whereby visiting avatars can alter the scale or mood of the exhibit (see figures 6.2 and 6.3). *Interactivity* is also an affordance which is not so readily available in the traditional classroom or real gallery AI scenario. However, it should be noted that any increased *understanding* from *AISLE* related to the more obvious and overt constructs concerning *actual* as opposed implied scale, movement or mood (see table 6.1).
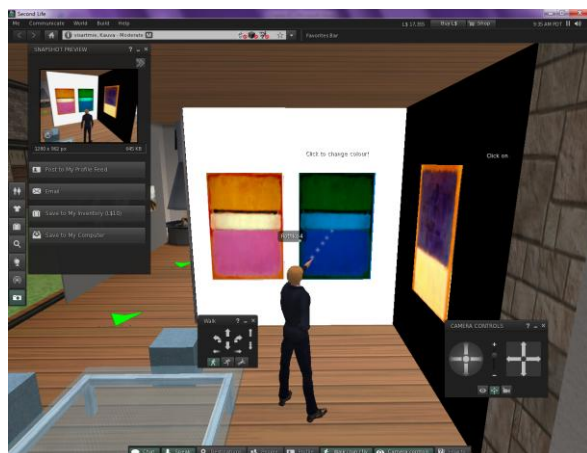


Figure 6.2 Screenshot showing interactivity (changing mood)
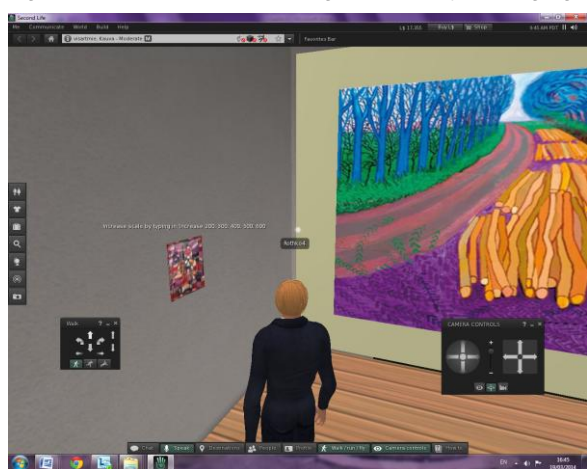


Figure 6.3 Avatars can alter scale of exhibits by typing in decrease or increase instructions

The study finds some evidence of increased *appreciation*. However, while some participants expressed an increased *appreciation* for large scale kinetic pieces, others expressed disappointment upon discovering that the actual dimensions of smaller scale pieces in the MUVG. Some remarked that they liked increasing the size of smaller pieces within *AISLE* and preferred them larger scale. Paradoxically, these reactions parallel those often expressed by visitors who view original canonical small scale work for the first time in a real gallery setting. Many respondents expressed a

heightened appreciation also for kinetic work in *AISLE.* They remarked that the MUVG presented such work in a more effective and authentic manner.

Table 6.1 Impact of TELE (Construct attainment is indicated by **bold** font)

| | AISLE | Constructs addressed |
|---|---|---|
| | AISLE area one: Exploring scale <br><br> 20 minutes Investigating scale in visual arts | **Scale is an important component of any piece (SC1)** <br> **Amending size fundamentally changes the nature of the work (SC2)** <br> Large scale work elevates the subject matter (SC3) <br> **Large scale work usually commands attention and dominates the space (SC4)** <br> Small scale work is often more intimate, subtle and discrete (SC5) <br> Either extremes in scale can disorientate  (SC6) <br> **Implied scale with a piece can be created by different techniques: linear perspective,** relative heights, gradient texture or inter positioning **(SC7)** |
| | AISLE area two: Exploring movement <br><br> 20 minutes Investigating movement in visual arts | **Movement is an important consideration in any piece (MV1)** <br> **Decisions about actual or implied movement are for the most part intentional (MV2)** <br> Amending actual motion or implied movement signifiers fundamentally changes the nature of the experience of the work (MV3) <br> **Some artworks incorporate actual or digital motion while others imply movement (MV4)** <br> Movement can be implied using diagonal, directional or gestural lines (MV5) <br> Movement can be implied through the repetition of shape or contrasting colour (MV6) |
| | AISLE area three: Exploring mood <br><br> 20 minutes Investigating mood in visual arts | **Mood is an important consideration of any piece (MD1)** <br> **Different colour combinations evoke different moods (MD2)** <br> People may not necessarily experience the same mood (MD3) <br> Harmonious or analogous colour can communicate a mood of tranquillity (MD4) <br> Complimentary colour can energise a work or disorientate the viewer (MD5) <br> Warm colours can communicate warmth, happiness or anger (MD6) <br> Cool colours communicate aloofness or sadness (MD7) |

## 6.2 Strengths and limitations of MUVE functionality in relation to AI

This study finds that some traits associated with effective and meaningful art investigation pedagogy can be accommodated in *AISLE.* These include *proximity* and *interactivity* with artworks facilitated by the navigation and camera veiwing tools (see figure 6.4). While theoretically, other MUVE tools might provide other affordances associated with effective AI (see figure 6.4), this study asserts that the teacher is still very much required to unpack the more covert and complex scale, movement and mood related constructs through questioning and eliciting, sharing

observations and perspectives, mediating emerging understandings and gradually revealing more complex constructs.
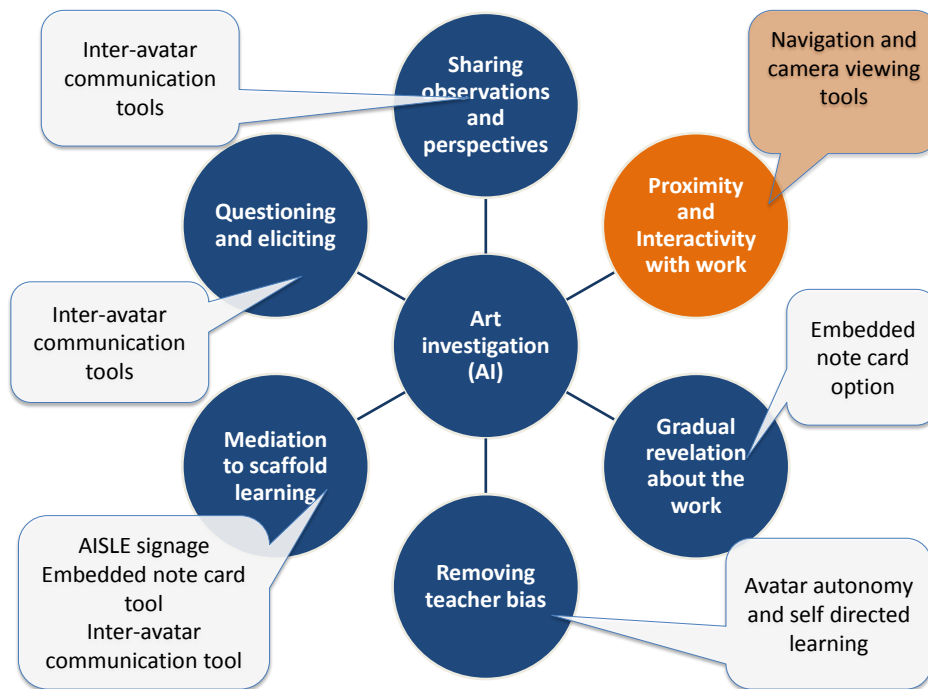


Figure 6.4 Traits of effective art investigation pedagogy aligned with MUVE tools

While the majority of participants in both cohorts appreciated the potential of MUVE functionality and thought it to be an appropriate alternative experience to investigate art, technological troubleshooting was considered to be the key impediment to that experience. Wifi unreliability causing lagging issues and dated laptop graphics cards impeded some participants' capacity to perceive and thus further understand or appreciate scale, movement or mood. Technical troubleshooting isolated some from conversations and potential shared knowledge construction. Repeated technical problems also de-motivated others.

All of the forementioned impediments align with studies concerning the pragmatics of MUVEs for teaching and learning (Dickey, 2010; Shen & Eder, 2009). While inter-avatar communication (IAC) may have potential for dialogic reflection and shared knowledge construction, researcher's direct observations aided by occasional screen capturing recordings and focussed group discussion evidenced that the IAC tools were mostly used for seeking help from one another regarding technical issues, MUVE functionality and navigation. This finding concurs with research on MUVE

limitations as presented in chapter two (Dickey, 2010; Wang & Braman, 2009; Wood, Solomon & Allan, 2008).

The participants for this study were novice MUVE users with little time to become acquainted with its multi-user virtual environment, avatar functionality and MUVE tools. This study recognises that MUVE orientation takes more time. Once students have gained confidence and competence regarding navigation and communication, they are better able to perceive the surrounding environment. This may partly explain why the presence of embedded MUVE signage and optional note-card information about related constructs were of little use (see figures 6.5 and 6.6).
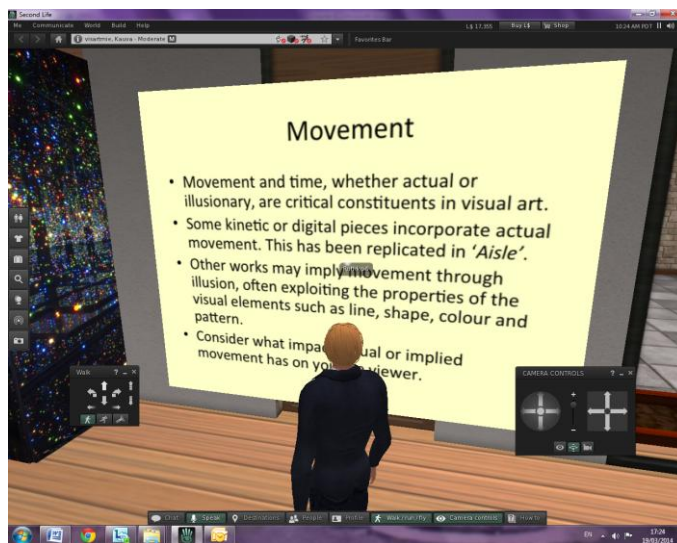


Figure 6.5 Screenshot showing explicit embedded signage
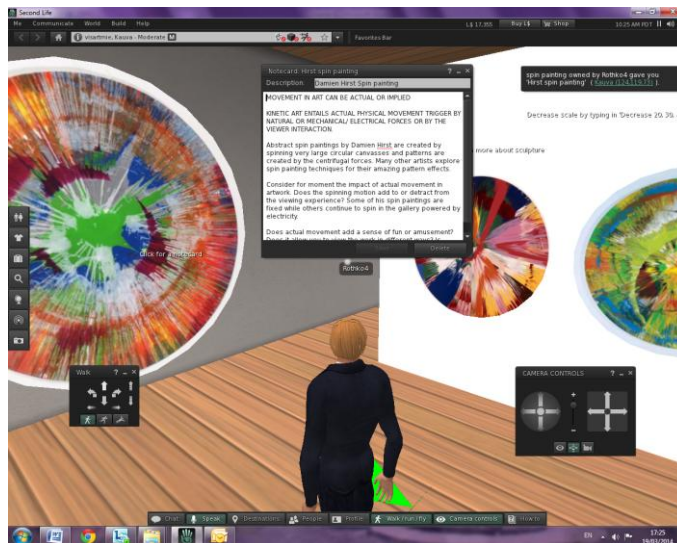


Figure 6.6 Screenshot showing optional note-card tool embedded in each exhibit

## 6.3 Recommendations regarding *Second Life's* potential for AI

The findings obtained from four different tools suggest that there is a need for more explicit teaching to increase understanding in relation to the more complex constructs concerning implied scale, movement and mood. This aligns with literature review concerning laisez faire art investigation approaches whereby the teacher withdraws too much (Barnes, 2002; Bloomsfield & Childs, 2000; Costantino, 2008; DES, 1999; Eckhoff, 2007; Grigg, 2004; Hickman, 2004; Hurwitz & Day, 2007; Hubbard, 2008; IMMA, 1999; Koster, 2009; NCCA, 1999; Tallack, 2006). This is also echoed by research conducted with learners using MUVEs for learning in other subject domains (Dreher et al, 2009; Hay & Pymm, 2010; Wood et al, 2008). There still needs to be more explicit explanation, discussion or demonstration by a teacher either prior to, or within *AISLE* to successfully unpack the more covert and complex constructs. Art investigation within an MUVG is therefore a useful experience to 'extend the capabilities of the traditional classroom teaching environment' (Wang & Braman, 2009, p.246).

Increased orientation time is imperative so that learners become more familiar with *Second Life* navigation and communication before investigating art. Novice MUVE users need to *learn to use MUVE functionality before they use MUVE functionality to learn.* This aligns with other studies (De Lucia, Francese, Passero & Tortora, 200; Wang & Shao, 2012). Learners require sufficient time to orientate themselves within this new learning environment and become acquainted with the different *presence* layers as outlined by Nash (2009) and Warbuton (2009) including visual and physical proximity with MUVG exhibits and inter-avatar communication tools.

Two adages seem to have particular relevance in relation to *AISLE*.
- 'Size [of exhibit] matters' in *AISLE*
- 'Less (exhibits) is more' in *AISLE*

Many of the smaller exhibits did not impress learners within the MUVE setting. Many small pieces went unnoticed by a number of respondents. Larger scale work impressed respondents more even though all exhibits were relative to actual scale in reality. *AISLE* contained twenty-five exhibits in total. Less exhibits might have enabled respondents to spend more time investigating individual works and as a consequence derived greater understanding of other constructs.

## 6.4 Limitations of study and possible future related research

Case studies by nature are related to particular contexts and as such the findings relating to this specific MUVE learning scenario may not be the same in other contexts. The time frame for implementing the TELE and conducting this study was quite short yet the literature review explains that prolonged time and guided discovery are key variables of visual arts inquiry (AI). The design of *AISLE* was an iterative process and is not intended to be visited once. As with real gallery spaces, this MUVG was designed with re-visits in mind so that learners could in time absorb the more subtle constructs that manifest within artworks' content and form. There is potential for further research to ascertain what long term impact MUVE's functionality can have on learners' ability to perceive the more subtle constructs concerning SC, MV and MD. There is potential research regarding what difference an expert presence might have to mediate and guide learners learning or what difference might more explicit *scaffolding* make with more seasoned SL users. There is possible research in further exploring how the relative size of each learner's avatar impacts their perception of each virtual exhibit. There is further study concerning how a MUVG compares with the real gallery setting. How visceral is the virtual experience compared with first hand engagement with orginal work.

One key motive behind this research was to explore MUVE functionality to enhance a visual arts classroom practice and to that end *AISLE* has proven to be a worthwhile consideration. It provides an alternative immersed and real time AI approach that enables the teacher simulate a gallery inspired environment that permits learners to simultaneously explore more approximate secondary copies of canonical works. This is especially inviting when first-hand engagement with the original artworks is not feasible.

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# Appendix A: Screen prints from *AISLE* in MUVE *Second Life*
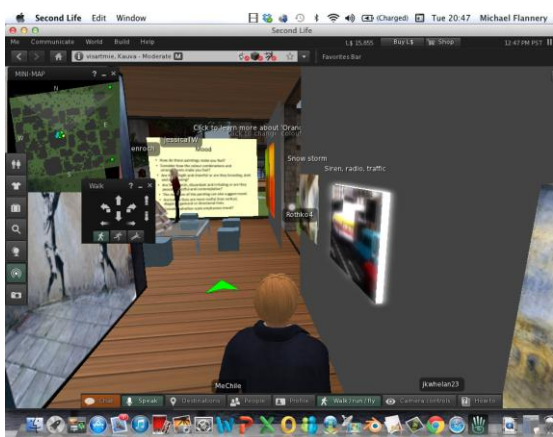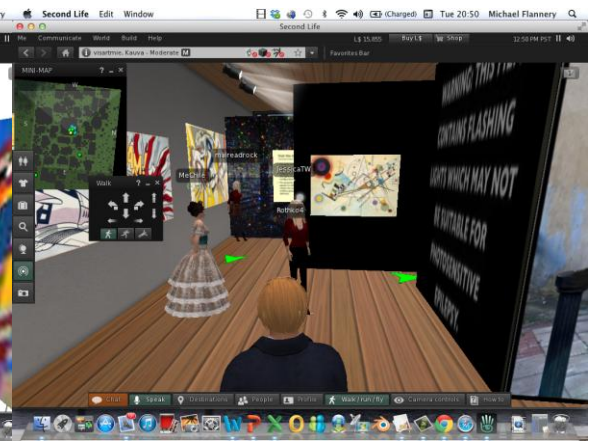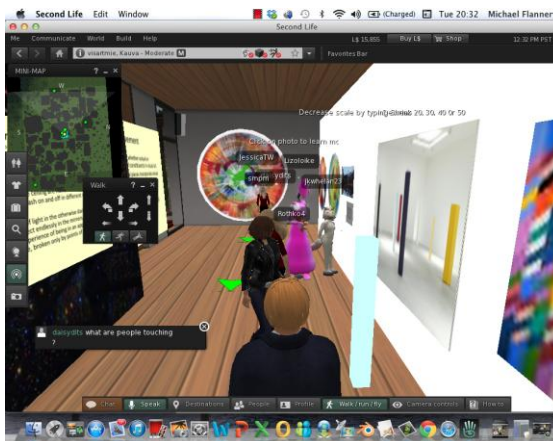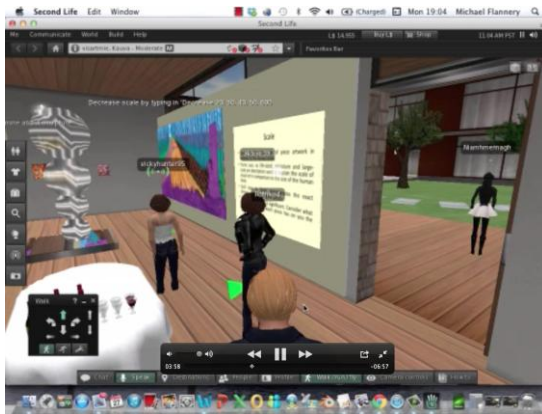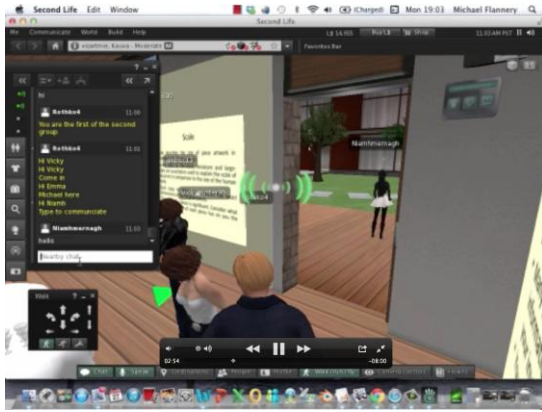
# Appendix B: Invite to *AISLE*

Message

You forwarded this message on 10/02/2014 12:09.
This message was sent with High importance.

From:     Michael Flannery               Sent:   Mon 27/01/2014 10:58
To:        BSc1
Cc:        Katy Fitzpatrick
Subject:     FW: Second Life address to visit AISLE this week

Dear B Sc 1 students
I hope you enjoyed exploring the potential of *Second Life* the other day for nurturing creativity



This week, I'm inviting you to visit *AISLE (art investigation in Second Life environment)* to investigate artwork (critical studies)

There is a virtual drinks reception in the first gallery room which explores scale
The second room explores movement in art (actual and implied)
The third room explores mood in art

Log in using *Second Life* viewer
Cut and paste this address so you arrive at the destination
http://maps.secondlife.com/secondlife/Kauva/128/126/72

If you are lost you can ask me, 'Rothko4' to be teleported to the gallery also

When you arrive, I want you to
1.  Take a tour of the gallery with other avatars  (learner autonomy, student directed learning)
2.  Click on images and 'keep' card to read about some artwork (textual mediation)
3.  Type or speak with one another about each piece using microphone/ speakers or chat typing function (dialogic reflection, shared knowledge construction)
4.  Click on colour field paintings to change colour (interactivity)
5.  Type instructions using chat function to temporarily alter size of paintings  (interactivity)
6.  Take photos using your available camera tool and save to your computer or for your journal

PLEASE DON'T BUILD OR DELETE ANYTHING...THANKING YOU

M ;)

# Appendix C: Ethics approval



Email screenshot 1:

RE: FW: Re your resubmitted application to the Marino Ethics in Research Committee - Message (HTML)

You replied on 06/01/2014 17:03.

From: Tricia Fowler [Tricia.Fowler@scss.tcd.ie]  Sent: Mon 06/01/2014 16:05
To: 'Michael Flannery'
Cc: 'Research Ethics'
Subject: RE: FW: Re your resubmitted application to the Marino Ethics in Research Committee

Dear Michael

Many thanks for this revision. You may now proceed with this study.

We wish you success in your research.

Kind Regards

Tricia Fowler
Executive Officer – Research Unit
School of Computer Science & Statistics
O'Reilly Institute
Trinity College
Dublin 2

Tel: + 353 1 896 1445

From: Michael Flannery [mailto:flannemi@tcd.ie]
Sent: 06 January 2014 15:46
To: Tricia.Fowler@scss.tcd.ie; Macu.Arnedillo@scss.tcd.ie
Subject: Fwd: FW: Re your resubmitted application to the Marino Ethics in Research Committee

Dear Tricia and members of SCSS Ethics in Reseach Committee
I received ethical approval from my college's Ethics in Research Committee this afternoon
See confirmation email below
I also included the declaration for epilepsy on the participant information and consent form as requested previously by SCSS committee
Kind regards

Michael (Msc Technology and Learning)

From: Mai Ralph
Sent: 06 January 2014 15:07
To: Michael Flannery
Cc: Seán Delaney
Subject: Re your resubmitted application to the Marino Ethics in Research Committee

Dear Michael,

Email screenshot 2:

RE: FW: Re your resubmitted application to the Marino Ethics in Research Committee - Message (HTML)

You replied on 06/01/2014 17:03.

From: Tricia Fowler [Tricia.Fowler@scss.tcd.ie]  Sent: Mon 06/01/2014 16:05
To: 'Michael Flannery'
Cc: 'Research Ethics'
Subject: RE: FW: Re your resubmitted application to the Marino Ethics in Research Committee

Michael (Msc Technology and Learning)

From: Mai Ralph
Sent: 06 January 2014 15:07
To: Michael Flannery
Cc: Seán Delaney
Subject: Re your resubmitted application to the Marino Ethics in Research Committee

Dear Michael,

Thank you for submitting an application to study students in MIE. The committee is satisfied to approve the study. We wish you every success with this.

With regard to the query about the Capstone Project we shall revert to you by Monday 13th January 2014.

Best wishes,

Mai

Mai Ralph,

Access Officer, Registrar's Office,

Marino Institute of Education,

Griffith Avenue,

Dublin 9

PH: 00 353 1 8057744

FAX: 00 353 1 833 5290

EMAIL: mai.ralph@mie.ie

# Appendix D: Pre and post *AISLE* art appraisal exercise (group B)

Kindly compose a pseudonym so that we can retrieve your booklet at any stage of the research

Pseudonym _____

Please examine the following nine artworks and write about each artwork in relation to the artist's use of *scale, movement and mood.* You will be reviewing this appraisals having visited AISLE.

1. Please write about this artwork in relation to the artist's use of *scale, movement and mood*.



Hockney, D. (2009) *Winter Timber*, Oil on 15 canvases, 274.32 x 609.6 cm.

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Please amend, or add to your previous written appraisal having engaged this painting in AISLE.

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Please tick what aspect of *AISLE,* if any, helped you amend or add to your first written appraisal?

- o Notecard tool (reading about artwork)
- o Inter-avatar communciation tools (talking with others about artwork)
- o Interactivity with artwork (changing size or colour)
- o Navigation tools (walking around artwork)
- o Camera viewing tools (different viewpoints)
- o Other

2. Please, w ite about this artwork i  e latih n to te  a rtistšs fue  o  *scale, movement and mood.*



Hirst, D. (1992) *Beautiful Cyclonic Bleeding Slashing Hurricane Dippy Cowards Painting,* household paint on canvas, 2,133 cm diameter

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Please tick what aspect of *AISLE,* if any, helped you amend or add to your first written appraisal?
- ○ Notecard tool (reading about artwork)
- ○ Inter-avatar communciation tools (talking with others about artwork)
- ○ Interactivity with artwork (changing size or colour)
- ○ Navigation tools (walking around artwork)
- ○ Camera viewing tools (different viewpoints)
- ○ Other

3. Write about this a twork i relation to te artist's use o *scale, movement and mood.*
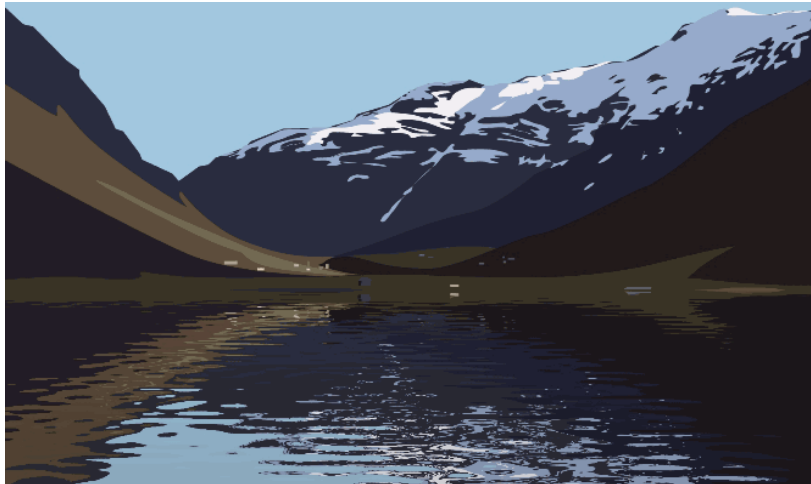


Opie, J. (2005). *As I headed down it became less bitterly cold. Small, fast streams followed the road and ran down the black rock faces making them glisten in the yellow sun. After ten minutes of hair-pin bends the road swept straight down the valley. It was a relief to see the intense greens after the desolation of the high mountain.* Computer animation.

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Please tick what aspect of *AISLE,* if any, helped you amend or add to your first written appraisal?
- o   Notecard tool (reading about artwork)
- o   Inter-avatar communciation tools (talking with others about artwork)
- o   Interactivity with artwork (changing size or colour)
- o   Navigation tools (walking around artwork)
- o   Camera viewing tools (different viewpoints)
- o   Other

4.   Please w ite about this a twork i  e latibn to te  artist's ue  of  *scale, movement and mood.*

Balla, G. (1912) *Girl Running on a Balcony.* oil on canvas,125 cm x 125 cm.

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Please amend, or add to your previous written appraisal having engaged this painting in AISLE.

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- Notecard tool (reading about artwork)
- Inter-avatar communciation tools (talking with others about artwork)
- Interactivity with artwork (changing size or colour)
- Navigation tools (walking around artwork)
- Camera viewing tools (different viewpoints)
- Other

5. Please write about this artwork in relation to the artist's use of *scale, movement and mood.*
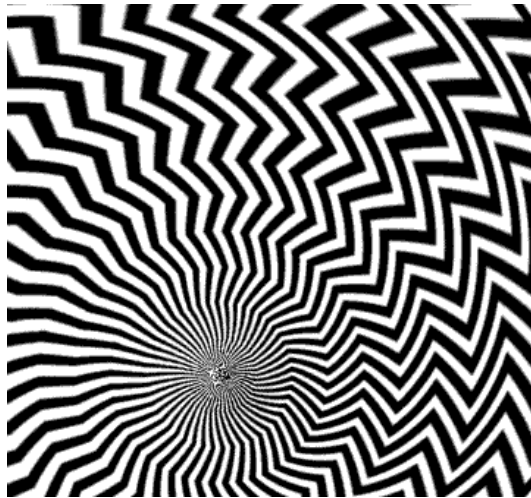


Myoshka, (2010) *Blazed Again,* Animated Gif

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Please amend, or add to your previous written appraisal having engaged this painting in AISLE.

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Please tick what aspect of *AISLE,* if any, helped you amend or add to your first written appraisal?
- o   Notecard tool (reading about artwork)
- o   Inter-avatar communciation tools (talking with others about artwork)
- o   Interactivity with artwork (changing size or colour)
- o   Navigation tools (walking around artwork)
- o   Camera viewing tools (different viewpoints)
- o   Other

6.  Write about this installation i re latin to te artist's fue o *scale, movement and mood.*



Kusama, Y. (2012) *Infinity* installation

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Please amend, or add to your previous written appraisal having engaged this painting in AISLE.

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Please amend, or add to your previous written appraisal having engaged this painting in AISLE.

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Please tick what aspect of *AISLE,* if any, helped you amend or add to your first written appraisal?
- o Notecard tool (reading about artwork)
- o Inter-avatar communciation tools (talking with others about artwork)
- o Interactivity with artwork (changing size or colour)
- o Navigation tools (walking around artwork)
- o Camera viewing tools (different viewpoints)
- o Other

7. Please w ite about this a twork i e latibn to te artist's ue of *scale, movement and mood.*

Whaam! (1963) Roy Lichtenstein,170 x 400 cm

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Please tick what aspect of *AISLE,* if any, helped you amend or add to your first written appraisal?

- o Notecard tool (reading about artwork)
- o Inter-avatar communciation tools (talking with others about artwork)
- o Interactivity with artwork (changing size or colour)
- o Navigation tools (walking around artwork)
- o Camera viewing tools (different viewpoints)
- o Other

8. Please write about this artwork in relation to the artist's use of *scale, movement and mood.*



Turner, J. (1844) *Rain Steam and Speed the Great Western Railway*, oil on canvas, 91 cm × 121.8 cm

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Please amend, or add to your previous written appraisal having engaged this painting in AISLE.

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Please tick what aspect of *AISLE,* if any, helped you amend or add to your first written appraisal?
- o   Notecard tool (reading about artwork)
- o   Inter-avatar communciation tools (talking with others about artwork)
- o   Interactivity with artwork (changing size or colour)
- o   Navigation tools (walking around artwork)
- o   Camera viewing tools (different viewpoints)
- o   Other

9.   Please w ite about this a twork i  re latibn to te  artist's ue  of  *scale, movement and mood.*



Rothko, M. (1961) *Orange and Yellow*, acrylic on canvas, 236.2 cm × 206.4 cm.

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Please amend, or add to your previous written appraisal having engaged this painting in AISLE.

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Please tick what aspect of *AISLE,* if any, helped you amend or add to your first written appraisal?
- o Notecard tool (reading about artwork)
- o Inter-avatar communciation tools (talking with others about artwork)
- o Interactivity with artwork (changing size or colour)
- o Navigation tools (walking around artwork)
- o Camera viewing tools (different viewpoints)
- o Other

# Appendix E: Post TELE questionnaire (group B)

*Breathing 'second life' into art investigations: Examining the impact of 3D virtual world functionality regarding the impact of scale, movement and mood in visual arts.*



Dear participant, I am interested in studying your impressions and experiences of *AISLE (art investigation in Second Life)* as part of some research I conducting as part of a Masters of Science in Technology and Learning thesis requirement. I am examining the impact of 3D virtual world functionality regarding scale, movement and mood in visual arts. I would be delighted if you would complete this questionnaire. This questionnaire should take no more than twenty minutes.

Questionnaire completion is <u>voluntary and anonymous</u>. Each question is optional. Feel free to omit a response to any question; however I would be grateful if all questions are considered. It should be noted that I have obtained ethics approval from Marino's Ethics in Research Committee and the School of Computer Science and Statistics at the University of Dublin, Trinity College. This research contributes to a Masters degree in *Technology and Learning*.

If you are happy to complete the questionnaire, please indicate (tick box) that you have read, understood, signed and received a signed copy of the separate participant consent form.

Kindly record a pseudonym below for anonymity and questionnaire retrieval purposes only. We can retrieve your data should you wish to withdraw at any time before March 1st 2014.

Please think about and answer the questions on the following pages with as much detail as possible.

Many thanks for your participation

Michael Flannery

**Part one: Perceptions of AISLE (Art investigation in Second Life environment)**

1.  Please read the following statements and tick the most relevant opinion only

    a.  AISLE permitted me to learn at my own place and in my own time.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| O | O | O | O | O |

    b.  AISLE was frustrating to explore.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| O | O | O | O | O |

    c.  AISLE was an effective learning environment to investigate art.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| O | O | O | O | O |

    d.  AISLE was an intimidating place to learn.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| O | O | O | O | O |

    e.  AISLE was an enjoyable learning environment to investigate art.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| O | O | O | O | O |

    f.  AISLE has increased my awareness of scale.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| O | O | O | O | O |

    g.  AISLE allowed me to exchange perspectives about art with other
        students.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| O | O | O | O | O |

    h.  AISLE was a novel learning experience only.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    i.   AISLE permitted me to interact with artwork in a more enhanced manner.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    j.   AISLE permitted me to learn additional information about artworks.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    k.   AISLE increased my awareness of mood in visual arts.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    l.   AISLE was does not compare with a real gallery excursion.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    m.  AISLE increased my understanding of how artists create movement.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    n.   AISLE permitted me to learn from others.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    o.   AISLE changed my disposition towards art investigation in a positive way.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    p.   I would like to return to AISLE to learn more about the exhibits.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    q.   AISLE has increased my awareness of movement in visual arts.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

    r.   AISLE has increased my understanding of artist create mood using colour.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

s. AISLE has increased my understanding regarding artists decisions regarding scale.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

t. AISLE is too ill-structured for learning

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

**Part two: Perceived learning from AISLE**

1. When you examine your writing tasks, do you think there is evidence of progression that can be attributed to *AISLE?* Please tick one of the following and explain.

| Strongly agree | Agree | Unsure | Disagree | Strongly disagree |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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2. The first AISLE exhibition area explores scale in visual arts. It includes artwork by Hockney, Klee and Hirst. What did you learn about artists' use of scale in visual arts?

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3. The second AISLE exhibition area explores movement in visual arts. It includes artwork by Hirst, Riley, Kandinsky and Lichtenstein. What did you learn about artists' use of movement in visual arts?

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4. The third AISLE exhibition room explores mood in visual arts. It includes artwork by Rothko. What did you learn about artist' use of mood in visual arts?

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**Part three: Perceived usefulness and perceived ease of use of SL tools**

**Navigation tools:**

5. How helpful was the navigation tool for understanding scale? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very  unhelpful |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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6. How helpful was the navigation tool for understanding movement? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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7. How helpful was the navigation tool for understanding mood? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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8. How easy was the navigation tool to use?

| Very easy to use | Easy to use | Unsure | Difficult to use | Very difficult to use |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

**Camera viewing tools**

9. How helpful was the camera/ viewing tool for understanding scale? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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10. How helpful was the camera/ viewing tool for understanding movement? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
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| ○ | ○ | ○ | ○ | ○ |

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11. How helpful was the camera/ viewing tool for understanding mood? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
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| ○ | ○ | ○ | ○ | ○ |

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12. How easy was the camera/ viewing tool to use? Please tick one of the following and explain.

| Very easy to use | Easy to use | Unsure | Difficult to use | Very difficult to use |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

**Inter-avatar communication tools**

13. How helpful was the inter-avatar communication tools for understanding scale? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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14. How helpful was the inter-avatar communication tools for understanding movement? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
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15. How helpful was the inter-avatar communication tools for understanding mood? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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16. How easy was the inter-avatar chat tool to use?

| Very easy to use | Easy to use | Unsure | Difficult to use | Very difficult to use |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

17. How easy was the inter-avatar chat microphone to use?

| Very easy to use | Easy to use | Unsure | Difficult to use | Very difficult to use |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

**Notecard function**

18. How helpful was the 'notecard' tool for understanding scale? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

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19. How helpful was the 'notecard' tool for understanding movement? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
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20. How helpful was the 'notecard' tool for understanding mood? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
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| ○ | ○ | ○ | ○ | ○ |

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21. How easy was the 'notecard' tool to use? Please tick one of the following and explain.

| Very easy to use | Easy to use | Unsure | Difficult to use | Very difficult to use |
|---|---|---|---|---|
| ○ | ○ | ○ | ○ | ○ |

**Interactivity**

22. How helpful was changing size of paintings in relation to appreciating scale? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
|:---:|:---:|:---:|:---:|:---:|
| ○ | ○ | ○ | ○ | ○ |

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23. How helpful was altering the colour of paintings in relation to appreciating mood? Please tick one of the following and explain.

| Very helpful | helpful | Unsure | Not helpful | Very unhelpful |
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| ○ | ○ | ○ | ○ | ○ |

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24. How would you improve *AISLE*?

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| Thank you for taking the time to complete the questionnaire |

Kindly complete profile

| 1. Please circle which programme you are studying |
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|     a.  Bachelor of Science in Education Studies<br>    b.  Higher Diploma in Education (Primary) |
| 2. Please circle your sex |
|     a.  Female<br>    b.  Male |
| 3. Familiarity with *Second Life:* Please circle one of the following options |
|     a. I knew and explored *Second Life* before AISLE |

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| b. I knew and explored other multiuser virtual learning environments other than *Second Life* such as *Twinity, Meez, Onverse, Gojiyo,* or *Imprudence* before this module. (If so, please name other MUVEs) <br> c. I never explored multi-user virtual environments before AISLE |
| 5. Familiarity with computer gaming: Please circle one of the following options <br>     a. I play computer games once a week <br>     b. I play computer games once a month <br>     c. I play computer games once a term <br>     d. I play computer games once a year <br>     e. Other |
| 6. Familiarity with galleries: Do you visit gallery exhibitions? <br>     a. Visit once a month <br>     b. Visit once a year <br>     c. Visit once every five years <br>     d. Other |

Should you have further questions or wish to withdraw from the study prior March 1st 2014, please contact me at michael@mie.ie

# Appendix F: Pre and post *AISLE* art appraisal exercise (group A)

Art investigation in Second Life (AISLE)

Pre *AISLE* art investigation task

Pseudonym _____

Tell me about this painting



Hirst, D. (1992) *Beautiful Cyclonic Bleeding Slashing Hurricane Dippy Cowards Painting,*
household paint on canvas, 2.13336 cm diameter

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Tell me about this piece



Turner, J. (1844) *Rain Steam and Speed the Great Western Railway*, oil on canvas, 91 cm × 121.8 cm

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Tell me about this piece



Rothko, M. (1961) *Orange and Yellow*, acrylic on canvas, 236.2 cm × 206.4 cm.

Tell me about this piece



Balla, G.  (1912) *Girl Running on a Balcony.* oil on canvas,125 cm x 125 cm.

Tell me about this piece



Hockney, D. (2009) *Winter Timber*, Oil on 15 canvases, 274.32 x 609.6 cm.

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Tell me about this piece



Myoshka, (2010) *Blazed Again,* Animated Gif

Tell me about this piece



Whaam! (1963) Roy Lichtenstein,170 x 400 cm

## Appendix G: Post TELE questionnaire (group A)

*Breathing 'second life' into art investigations:  Examining the impact of 3D virtual world functionality regarding the impact of scale, movement and mood in visual arts.*



Dear participant, I am interested in studying your impressions and experiences of *AISLE (art investigation in Second Life)* as part of some research I conducting as part of a Masters of Science in Technology and Learning thesis requirement. I am examining the impact of 3D virtual world functionality regarding scale, movement and mood in visual arts. I would be delighted if you would complete this questionnaire. This questionnaire should take no more than twenty minutes.

Questionnaire completion is <u>voluntary and anonymous</u>. Each question is optional. Feel free to omit a response to any question; however I would be grateful if all questions are considered. It should be noted that I have obtained ethics approval from Marino's Ethics in Research Committee and the School of Computer Science and Statistics at the University of Dublin, Trinity College. This research contributes to a Masters degree in *Technology and Learning*.

If you are happy to complete the questionnaire, please indicate (tick box) that you have read, understood, signed and received a signed copy of the separate participant consent form.

Kindly record a pseudonym below for anonymity and questionnaire retrieval purposes only. We can retrieve your data should you wish to withdraw at any time before March 1st 2014.

Please think about and answer the questions on the following pages with as much detail as possible.

Many thanks for your participation

Michael Flannery

Michael@mie.ie

1. Kindly describe your experience of *Art investigation in Second Life* (*AISLE*).

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2. When you compare your pre and post-*AISLE* art investigation exercises, do you think there is any evidence of progression, or not, attributed to *AISLE?*

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3. When examine your post-*AISLE* artwork, do you see any application, or not of what you encountered in *AISLE?*

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4. The first virtual space explores scale in visual arts. How do you think it has impacted you, or not regarding scale in visual arts?



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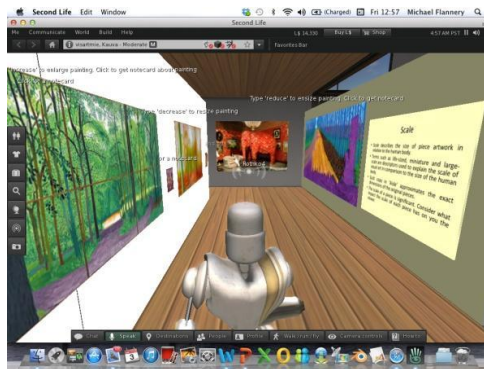
5. The second gallery space explores movement in visual arts. How do you think it has impacted you, or not regarding movement in visual arts?



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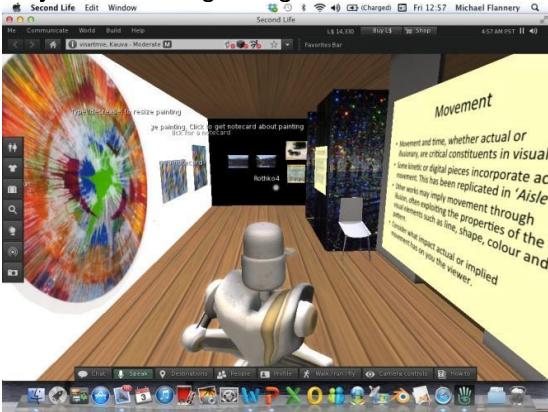
6. The third gallery space explores mood in visual arts. How do you think it has impacted you, or not regarding colour's influence on mood?

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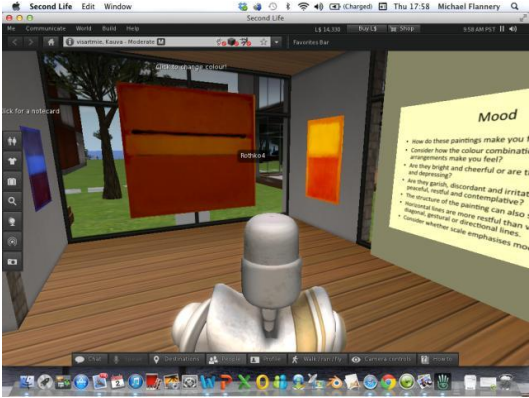
7. What particular aspects of the *AISLE* experience did you find most enjoyable?

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8. Which of three virtual gallery areas did you find most effective?

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9. In *Second Life*, avatars can move around using the available navigation tools. How helpful, or not is this affordance? Please explain.

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10. Please read and 'circle' the letter of any, or none of the following statements if applicable to your experience in *AISLE.*

   a.  The Navigation tools (NT) has helped me to notice scale more
   b.  NT has helped me to understand scale more
   c.  NT has helped me to consider scale more in my own artwork
   d.  NT has helped me to appreciate scale more in visual arts
   e.  NT has not impacted me regarding scale in visual arts

   f.  NT has helped me to notice movement more
   g.  NT has helped me to understand movement more
   h.  NT has helped me to apply movement more in my own artwork
   i.  NT has helped me to appreciate movement more in visual arts
   j.  NT has not impacted me regarding movement in visual arts

   k.  NT has helped me to notice the impact of colour on mood more
   l.  NT has helped me to understand impact of colour on mood more
   m.  NT has helped me to consider mood more in my own artwork
   n.  NT has helped me to appreciate mood more in visual arts
   o.  NT has not impacted me regarding mood in visual arts

11. In Second Life, avatars can communicate with other avatars. How helpful, or not is this affordance? Please explain.

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12. Please read and 'circle' the letter of any, or none of the following statements if applicable to your experience in *AISLE.*

    a. Inter-avatar communication (IAC) has helped me to notice scale more
    b. IAC has helped me to understand scale more
    c. IAC has helped me to consider scale more in my own artwork
    d. IAC has helped me to appreciate scale more in visual arts
    e. IAC has not impacted me regarding scale in visual arts

    f. IAC has helped me to notice movement more
    g. IAC has helped me to understand movement more
    h. IAC has helped me to apply movement more in my own artwork
    i. IAC has helped me to appreciate movement more in visual arts
    j. IAC has not impacted me regarding movement in visual arts

    k. IAC has helped me to notice the impact of colour on mood more
    l. IAC has helped me to understand impact of colour on mood more
    m. IAC has helped me to consider mood more in my own artwork
    n. IAC has helped me to appreciate mood more in visual arts
    o. IAC has not impacted me regarding mood in visual arts

13. In Second Life, digital pieces can have the exact size and dimensions as the original piece. How helpful, or not is this affordance? Please explain.

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14. Please read and 'circle' the letter of any, or none of the following statements if applicable to your experience in *AISLE.*

    a. Accuracy of scale (AS) has helped me to notice scale more
    b. AS has helped me to understand scale more
    c. AS has helped me to consider scale more in my own artwork
    d. AS has helped me to appreciate scale more in visual arts
    e. AS has not impacted me regarding scale in visual arts

    f. AS has helped me to notice movement more
    g. AS has helped me to understand movement more
    h. AS has helped me to apply movement more in my own artwork
    i. AS has helped me to appreciate movement more in visual arts
    j. AS has not impacted me regarding movement in visual arts

    k. AS has helped me to notice the impact of colour on mood more
    l. AS has helped me to understand impact of colour on mood more
    m. AS has helped me to consider mood more in my own artwork
    n. AS has helped me to appreciate mood more in visual arts
    o. AS has not impacted me regarding mood in visual arts

15. In Second Life AISLE virtual gallery, avatars can alter some of the piece's size or colour. How helpful, or not is this affordance? Please explain.

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16. Please read and 'circle' the letter of any, or none of the following statements if applicable to your experience in *AISLE.*

    a. Interactivity with pieces (IWP) has helped me to notice scale more
    b. IWP has helped me to understand scale more
    c. IWP has helped me to consider scale more in my own artwork
    d. IWP has helped me to appreciate scale more in visual arts
    e. IWP has not impacted me regarding scale in visual arts

    f. IWP has helped me to notice movement more
    g. IWP has helped me to understand movement more
    h. IWP has helped me to apply movement more in my own artwork
    i. IWP has helped me to appreciate movement more in visual arts

j.  IWP has not impacted me regarding movement in visual arts

k.  IWP has helped me to notice the impact of colour on mood more
l.  IWP has helped me to understand impact of colour on mood more
m. IWP has helped me to consider mood more in my own artwork
n.  IWP has helped me to appreciate mood more in visual arts
o.  IWP has not impacted me regarding mood in visual arts


17. In Second Life AISLE gallery, visiting avatars can click, keep and read contextual information about each piece.  How helpful, or not is this 'note-card' tool? Please explain.

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18. Please read and 'circle' the letter of any, or none of the following statements if applicable to your experience in *AISLE.*

a.  The note-card function (NCF) has helped me to notice scale more
b.  NCF has helped me to understand scale more
c.  NCF has helped me to consider scale more in my own artwork
d.  NCF has helped me to appreciate scale more in visual arts
e.  NCF has not impacted me regarding scale in visual arts


f.  NCF has helped me to notice movement more
g.  NCF has helped me to understand movement more
h.  NCF has helped me to apply movement more in my own artwork
i.  NCF has helped me to appreciate movement more in visual arts
j.  NCF has not impacted me regarding movement in visual arts

k.  NCF has helped me to notice the impact of colour on mood more
l.  NCF has helped me to understand impact of colour on mood more
m. NCF has helped me to consider mood more in my own artwork
n.  NCF has helped me to appreciate mood more in visual arts
o.  NCF has not impacted me regarding mood in visual arts

19. Avatars can visit the Second Life *AISLE* virtual gallery at their own pace and in their own time. How helpful, or not is this affordance? Please explain.

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20. Please read and 'circle' the letter of any, or none of the following statements if applicable to your experience in *AISLE.*

    a. The 'in your own time and at your own pace' (OTOP) has helped me to notice scale more
    b. OTOP has helped me to understand scale more
    c. OTOP has helped me to consider scale more in my own artwork
    d. OTOP has helped me to appreciate scale more in visual arts
    e. OTOP has not impacted me regarding scale in visual arts

    f. OTOP has helped me to notice movement more
    g. OTOP has helped me to understand movement more
    h. OTOP has helped me to apply movement more in my own artwork
    i. OTOP has helped me to appreciate movement more in visual arts
    j. OTOP has not impacted me regarding movement in visual arts

    k. OTOP has helped me to notice the impact of colour on mood more
    l. OTOP has helped me to understand impact of colour on mood more
    m. OTOP has helped me to consider mood more in my own artwork
    n. OTOP has helped me to appreciate mood more in visual arts
    o. OTOP has not impacted me regarding mood in visual arts

21. Please describe any other *AISLE* affordance you experienced and how has it helped you regarding scale, movement or mood in visual arts?

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22. Please write about any *AISLE* difficulty or weakness you encountered and how it affected your experience?

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Thank you for taking the time to complete the questionnaire

Kindly complete profile below

| 1.Please circle which programme you are studying |
|---|
|     c.  Bachelor of Science in Education Studies<br>    d.  Higher Diploma in Education (Primary) |
| 2. Please circle your sex |
|     c.  Female<br>    d.  Male |
| 3. Familiarity with *Second Life:* Please circle one of the following options |
|     d. I knew and explored *Second Life* before this module<br>    e. I knew and explored other multiuser virtual learning environments other than *Second Life* such as *Twinity, Meez, Onverse, Gojiyo,* or *Imprudence* before this module. (If so, please name other MUVEs)<br>    f.  I never explored multi-user virtual environments before this module |
| 5. Familiarity with computer gaming: Please circle one of the following options |
|     f.  I play computer games once a week<br>    g. I play computer games once a month |

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| h. I play computer games once a term |
| i.  I play computer games once a year |
| j.  Other |
| 6. Familiarity with galleries: Do you visit gallery exhibitions? |
| e. Visit once a month |
| f.  Visit once a year |
| g. Visit once every five years |
| h. Other |

Again thank you for taking the time to complete the questionnaire

Should you have further questions or wish to withdraw from the study prior March 1st
2014, please contact me at michael@mie.ie

# Appendix H: Sample examples of coding, categorising, calculating and concluding process using Excel

| RESPONDENT | No. | Actaul movement | | | | NVT | CVT | IAC | NCT | INT | OTHER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMIL2 | 1 | Really engaging | Movement added to the work | | | 1 | 1 | | 1 | | | 3 |
| BRAN | 2 | Favourite | | More powerful | Larger than expected | 1 | 1 | | | | | 2 |
| JOHN | 3 | Fantastic | Mesmerising | Lots of layers | Very effective | 1 | 1 | | | | | 2 |
| CHUCK BASS | 4 | Totally different | | See more of it | A better appreciation | 1 | 1 | | | | | 2 |
| POLO | 5 | | | | Did not see it | | | | | | | |
| DON | 6 | | | SL brought it to life | Interactive experience | 1 | 1 | | | | | 2 |
| MARY-KATE | 7 | | Collection of similar work | SL brought it to life | Interactive experience | 1 | 1 | | | | | 2 |
| YVONNE | 8 | Dizziness | Mood of energy and vibrancy | Spinning in SL | | 1 | 1 | 1 | | 1 | | 4 |
| PEPSI | 9 | | Spin enhanced colour/ mood | Rotation added a new dimension | Greater understanding in SL | 1 | 1 | | 1 | | | 3 |
| PENELOPE | 10 | | Movement more interesting | Movement more interactive | Scale more effective in SL | 1 | 1 | 1 | | | | 3 |
| ZOOKI | 11 | | Mixing of colours | Rotation added a new dimension | | 1 | 1 | | | | | 2 |
| NOODLES | 12 | Dramatic effect | Spinning enabled colours to mix | SL brought this piece to life | | 1 | 1 | | | | | 2 |
| EILEEN | 13 | Enjoyed | Spinning | Spinning in SL gave a sense of movement | | 1 | 1 | | | | | 2 |
| PATSEY | 14 | Hypnotic | Enjoyed use of colour | Enjoyed actual movement | | 1 | 1 | | | | | 2 |
| ELLAMARIE | 15 | Mesmerising | Grabbed my attention | SL brought this piece to life | | 1 | 1 | | 1 | | | 3 |
| ALEX & ANI | 16 | Really liked | Colours were brighter | Surprised by spinning motion | | 1 | 1 | | | | | 2 |
| SWEETENHERUP | 17 | Cool | Gave me a headache after awhile | Optical illusion | | 1 | 1 | | | | | 2 |
| LUCYGOLUCKY | 18 | Cool | Hard to take my eyes off the work | Implied movement with spatter | Clockwise rotation | 1 | 1 | | | | | 2 |
| | | | | | | 17 | 17 | 2 | 3 | 1 | | 40 |

| RESPONDENT | No. | Miniature | | | | Specific reference to scale | NVT | CVT | IAC | NCT | INT | OTHER | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMIL2 | 1 | Intimate | Engaging | Invites you in closer | Good to increase to see detail | | 1 | 1 | 1 | 1 | | | 4 |
| BRAN | 2 | | | | Colours stood out more | Did not do it justice | 1 | 1 | | | | | 2 |
| JOHN | 3 | | | | | Did not see it in gallery | 1 | 1 | | | | | 2 |
| CHUCK BASS | 4 | | | | Noticed movement more | No diference | 1 | 1 | | | | | 2 |
| POLO | 5 | | | | Further information was useful | Increase controls did not work | 1 | 1 | | | | | 2 |
| DON | 6 | Information useful | | | Did not really change in SL | Interactivity did not work | 1 | 1 | | | | | 2 |
| MARY-KATE | 7 | | | Colours more vivid | Noticed movement more | | 1 | 1 | 1 | | | | 3 |
| PEPSI | 8 | | | | | | | | | | | | |
| YVONNE | 9 | | | | | Did not see it in gallery | | | | | | | |
| PENELOPE | 10 | | | | | The same to be honest | 1 | 1 | | | | | 2 |
| ZOOKI | 11 | | | | More impressive when enlarged | Smaller than anticipated | 1 | 1 | | | | | 2 |
| NOODLES | 12 | Really interesting | | Really interesting | Noticed movement more | Smaller than anticipated | 1 | 1 | | | | | 2 |
| EILEEN | 13 | Less impact | | Felt diminished | | Smaller than anticipated | 1 | 1 | | | | | 2 |
| PATSEY | 14 | Quite small | | | Apprehensive to alter scale | More difficult to see | 1 | 1 | 1 | 1 | | | 4 |
| ELLAMARIE | 15 | More warmth | | More contrast noticed | | More difficult to see | 1 | 1 | | | | | 2 |
| ALEX & ANI | 16 | | | | | Did not see it in gallery | | | | | | | |
| SWEETENHERUP | 17 | Energetic | | | | Enjoyed this painting | 1 | 1 | | | | | 2 |
| LUCYGOLUCKY | 18 | Calming | | | Noticed more detail (content) | Smaller than anticipated | 1 | 1 | | | | | 2 |
| | | | | | | | 15 | 15 | 3 | 2 | | | 35 |

| RESPONDENT | No. | Optical art: *Blazed again.* Mysohka (2010) | | | | NVT | CVT | IAC |
|---|---|---|---|---|---|---|---|---|
| JAMIL2 | 1 | Uneasy and dizzy | Much bigger | | | 1 | 1 | |
| AITCH | 2 | Dizzy | Smaller | Actual movement | | 1 | 1 | |
| MARY-KATE | 3 | Unable to look away | Drew me in | Actual movement | | 1 | 1 | |
| DNS | 4 | Did not see in SL | | | | | | |
| DANNIC2222 | 5 | | | | | | | |
| CHILLI90 | 6 | More hypnotic | kinetic | | | 1 | 1 | |
| BUDDY21 | 7 | Hypnotising feeling | Much larger | Movement impressive in SL | | 1 | 1 | |
| SYDNEY | 8 | Hypnotising feeling | Calming | Did not realise it was kinetic | | 1 | 1 | |
| RAVA | 9 | Empowering | Larger than expected | Rapid swirling | | 1 | 1 | |
| REDNAPP | 10 | Dizzy and uneasy | Much bigger | | | 1 | 1 | |
| KOMEERA | 11 | Unsettling | | Actual movement su | Monochrome | 1 | 1 | |
| MICHAEL | 12 | Hypnotic | Dizzy | Spiral movement | Much larger in SL | 1 | 1 | |
| COCO | 13 | Soothing | Like rippling water | Very big | Impressive in SL | 1 | 1 | |
| MARY-JANE | 14 | Did not see in SL | | | | | | |
| TERRY | 15 | Did not see in SL | | | | | | |
| GERARD P | 16 | NO Additional information | | | | | | |
| | | | | | | 11 | 11 | |

| RESPONDENT | No. | 13 IAC SC | 14 IAC MV | 15 IAC MD | 16 CHAT EAS | 17 MP EASY | 18 NCT SC | 19 NCT MV | 20 NCT MD | 21 NCT EASY | 22 ALTER SIZ | 23 ALTER C | 24 IMPROVE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| JAMIL2 | 1 | H | U | U | EU | EU | VH | VH | VH | VEU | H | VH | _ |
| BRAN | 2 | H | H | U | VEU | EU | H | H | U | EU | U | U | UNSURE |
| JOHN | 3 | VH | H | H | VEU | VEU | VH | H | H | VEU | U | U | _ |
| CHUCK BASS | 4 | H | H | H | H | VEU | H | H | H | EU |  | H | LAGGING |
| POLO | 5 | H | H | H | EU | DU | H | H | H | EU | U | U | NOTHING/ NEW EXPERIENCE |
| DON | 6 | U | VH | H | VEU | EU | VH | _ | H | VEU | U | VH | MOVEMENT AND VIEWING |
| TOASTY 512 | 7 | U | U | H | EU | EU | NH | NH | NH | U | NH | H | _ |
| AITCH | 8 | H | H | H | VEU | VEU | VH | VH | VH | VEU | U | U | FOLLOW UP FACE TO FACE AND THEN RETURN |
| MARY-KATE | 9 | H | _ | VH | EU | DU | H | U | U | EU | U | H | MOVEMENT & TITLE ABOVE PIECE |
| PEPSI | 10 | H | H | H | EU | DU | VH | VH | VH | VEU | U | _ | UNIQUE & DIFFERENT/ WILL CHECK OUT SIM-ON-STICK |
| RABBIT | 11 | H | H | H | EU | VDU | VH | H | VH | EU | NH | VUH | CHANGE MUSIC/ PRIVATE ISLAND/ MICROPHONE |
| YVONNE | 12 | H | H | H | EU | EU | H | H | H | EU | U | U |  |
| PENELOPE | 13 | VH | H | U | EU | EU | H | U | U | EU | U | U | LAGGING IMPEDING MOBILITY |
| SUNFLOWER | 14 | VH | H | H | EU | EU | VH | VH | VH | EU | VH | VH | PC GRAPHICS POOR/ GREAT EXPERIENCE |
| PETER | 15 | H | H | H | VEU | VEU | H | H | H | VEU | VH | VH | MORE CHILD FRIENDLY/ PRIVATE CHAT/ INCREASE ROOM SIZE |
| SANDY BEACHES | 16 | H | VH | VH | EU | EU | VH | VH | VH | VEU | H | H |  |
| AA808 | 17 | NH | _ | U | EU | VDU | VH | VH | VH | VEU | U | VH | CHANGE EXHIBITS WEEKLY/ EASIER TO APPRECIATE 3D |
| DNS | 18 | VH | U | U | VEU | EU | VH | VH | U | VEU | H | VH | VERY ENJOYABLE EXPERIENCE/ STUDENT USAGE |
| DANNIC2222 | 19 | VH | VH | VH | VEU | VEU | _ | H | H | VEU | H | H | CLOSE THE DOOR ON RANDOM AVATARS |
| HDIPVAE | 20 | U | U | U | EU | EU | U | U | U | EU | H | H | ORIENTATION TIME |
| CHILLI90 | 21 | H | H | U | VEU | VEU | U | U | U | U | H | U | MAKE AISLE MORE PRIVATE |
| BUDDY21 | 22 | H | H | H | VEU | EU | U | U | U | U | H | U | IMPROVE TOOLS &NAVIGATION |
| LILY | 23 | H | VH | VH | CEU | VEU | H | H | NH | EU | NH | H |  |
| CLAY | 24 | H | H | H | EU | U | H | H | U | U | H | H | REALLY EFFECTIVE/ MOBILITY |
| ROIS2014 | 25 | _ | _ | _ | _ | _ | _ | _ | _ | _ | H | H |  |
| ZOOKI | 26 | NH | _ | _ | U | EU | H | H | H | EU | H | H | MANOUVER AVATARS/ VIEWING THROUGH INTERIOR WALLS |
| SYDNEY | 27 | H | H | H | EU | EU | H | H | H | EU | U | H | PERMIT MORE AVATARS AT ANY GIVEN TIME |
| DAVE | 28 | VH | VH | _ | VEU | VEU | VH | VH | VH | EU | H | VH | _ |
| LZZ6426 | 29 | VH | VH | H | VEU | EU | H | VH | H | U | H | VH | _ |
| PINK | 30 | H | H | H | EU | EU | U | U | U | U | H | H | _ |
| HEWHODARES | 31 | U | U | U | U | U | U | U | U | U | U | U | _ |
| MAGGIE | 32 | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ | _ |  |
| 12268062 | 33 | _ | _ | H | EU | EU | H | H | H | EU | H | H | ENJOYED AISLE MORE THAN SL |
| RAVA | 34 | H | H | H | EU | EU | U | U | U | U | H | H | BLOCK UNWANTED POSTS IN SL |
| HAPPY | 35 | NH | NH | NH | VEU | U | U | U | U | U | U | H | MOVEMENT |
| NOODLES | 36 | U | _ | _ | VEU | VEU | VH | VH | VH | EU | H | H | _ |
| EILEEN | 37 | VH | VH | VH | EU | EU | H | H | H | EU | H | H | MORE EXPERIENCE IN DIGITAL ENVIRONMENTS |
| XXX | 38 | VH | VH | VH | EU | _ | VH | VH | VH | VEU | U | NH | _ |
| BUZZ | 39 | U | U | H | EU | EU | H | H | U | U | U | H | _ |
| FUZZY | 40 | H | H | H | EU | EU | H | H | H | EU | H | H | _ |

| RESPONDENT | No. | | | | |
|---|---|---|---|---|---|
| JAMIL2 | 1 | AI in SL made a huge difference | See work in a new perspective | Hadn't made the distinction between actual and implied movement before | |
| BRAN | 2 | Aisle made images clearer | | | |
| JOHN | 3 | _ | | | |
| CHUCK BASS | 4 | SL images grab your attention mc | Paintings became alive | Understanding and appreciation grew | |
| POLO | 5 | Surprising how effective how smaller paintings were | Subtle techniques regarding movement | | |
| DON | 6 | Interactivity better in SL | Actual scale is more powerful | Use of lines to portray movemen | Mood strongly determined by colour |
| TOASTY 512 | 7 | _ | | | |
| AITCH | 8 | Many images not available due to poor graphics card | Kandinsky enjoyed musciality | | |
| MARY-KATE | 9 | Easier to walk around and view f | Scale can be viewed properly | Mood was a lot more clear in SL | Explore mood more effectivel |
| PEPSI | 10 | Fascinated by Hockney | Lots of different views | Loved Hirst    Actual movement brought viewing to anotehr level | |
| RABBIT | 11 | Actual movement added to the experience | Wasn't aware before | Came to life | |
| YVONNE | 12 | Completely different experience | Actual movement was portrayed excellently | | |
| PENELOPE | 13 | All paintings together was really interesting | Scale is hugely impressive | Mood is a powerful too | Altering mood helpe |
| SUNFLOWER | 14 | Seeing paintings on wall gave a better understanding | Mood can be subtle or powerful | | |
| PETER | 15 | Particulary regarding scale | Captivating | Altering colour helped appreciate impact of mood | |
| SANDY BEACHES | 16 | Help better understand and appreciate | Actual movement heloped understand paintings | gallery music tranquil | |
| AA808 | 17 | Possible to experience music and Kusama | Only possible to experience spin paintings when moving | | |
| DNS | 18 | Similar to seeing them in a gallery | Brought art to life | | |
| DANNIC2222 | 19 | Better able to critically analyse p | Scale and movement NB | Colour affects mood | |
| HDIPVAE | 20 | Paintings really have a sense of realism in Aisle | | | |
| CHILLI90 | 21 | Was more aware | Had better language to describe work | | |
| BUDDY21 | 22 | Made work appear bigger | Actual movement in AISLE was brilliant | Paintings come to life | You feel a lot more |
| LILY | 23 | Made my understanding much deeper | | | |
| CLAY | 24 | More effective | Easier to examine | How colour is used and explored | |
| ROIS2014 | 25 | How things appear up close | Kandinsky | Lichentstein | |
| ZOOKI | 26 | Seeing movement really helped | Brings you in closer | Movement adds a lot to artwork | |
| SYDNEY | 27 | Totally different perspective | Large scale | NB movement | Different colours represent different moods |
| DAVE | 28 | Powerpoint does not fully portray paintings | Scale | Enjoyed movement | I felt mood |
| LZZ6426 | 29 | Better understanding of scale and movement | Scale can vary | | |
| PINK | 30 | Frustration due to freezing | | | |
| HEWHODARES | 31 | Learnt about actual and implied scale | Movement and mood can be expressed through colour | | |
| MAGGIE | 32 | Didn't realise Hirst work moves | Impact of real gallery experience is missed here | Cannot compare | |
| 12268062 | 33 | Titles of Hirst's work | Movement and time are critical | | |
| RAVA | 34 | Helps to give the perception of a gallery | | | |
| HAPPY | 35 | Better understanding of scale | Surprised by the scale of certain work | Actual movement was fascinating | |
| NOODLES | 36 | Difficult at first | very effective to explore | Altering colour showed how mood can be altered | |
| EILEEN | 37 | Impact of scale | Movement cannot be portrayed on paper | Variety illustrated mood | |
| XXX | 38 | Easier to see 3D | Actual scale changes perceptions of work | Actual movement | |
| BUZZ | 39 | _ | | | |
| FUZZY | 40 | Very effective | Loved paintings | | |

# Appendix I: Instructions regarding script coding using *S4SL*

**Getting Started with Scratch For Second Life (S4SL)**

http://web.mit.edu/~eric_r/Public/S4SL/tutorial/index.html

**1. Set up**
- Download S4SL
- Launch S4SL by double clicking "Scratch for Second Life"
- Log into Second Life

**2. Make an Object**
- In Second Life, switch to build mode
  - click on the blue "build" button at the bottom of your screen
- Create an object (a prim)
  - click the create button at the top of the edit window, pick a shape below that, then click the wand on the ground to create it

**3. Make a Script**
- Switch back to S4SL
- Start with a "hat" block
  - Click "control" to see the control blocks
  - Pick one of the first five of these orange blocks (like "when I am touched"), and drag it to the scripting area on the right.
- Add a command by snapping it onto the bottom of the stack
  - Most of the other blocks are commands.
  - For example, click on "looks" tab, and drag out a "say" block. You can change the text in the say block.
  - If you connect this below the "When I am touched" block, your object will say something when you touch it.
  - Experiment with other blocks!

**4. Copy the script into your object**
- In S4SL, click the **"copy linden script"** button. This puts your code on the clipboard.
- Switch back to SL
- Create a **new script** for your object
  - In the edit window for your object, click more, click on the **content** tab,

and click the **"New Script..."** button.

- o Double click on the **"New Script"** that appears.
- o A script window will open, and your object will run the default script (and say "Hello, Avatar")

- **Paste** in your script
  - o You want to replace the script that is there with the one you have on the clipboard
  - o In the script window, select all, then paste, then save
  - o Once your script has saved, close the window and switch out of build mode

# Appendix J: Other findings

Progression from *AISLE*

| Progression | Percentage | Number |
|---|---|---|
| Strongly agree | 17.5% | 7 |
| Agree | 60% | 26 |
| Unsure | 12.5% | 5 |
| Disagree | 5% | 2 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

Learner autonomy in *AISLE*

| Own time own place | Percentage | Number |
|---|---|---|
| Strongly agree | 65% | 26 |
| Agree | 25% | 10 |
| Unsure | 10% | 4 |
| Disagree | 0% | 0 |
| Strongly disagree | 0% | 0 |

Table 5.17 *AISLE* as an enjoyable learning experience

| Enjoyable | Percentage | Number |
|---|---|---|
| Strongly agree | 55% | 22 |
| Agree | 30% | 12 |
| Unsure | 15% | 6 |
| Disagree | 0% | 0 |
| Strongly disagree | 0% | 0 |

*AISLE* efficacy

| Effective | Percentage | Number |
|---|---|---|
| Strongly agree | 22.5% | 9 |
| Agree | 60% | 24 |
| Unsure | 17.5% | 7 |
| Disagree | 0% | 0 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

AISLE as novel experience only

| Novel only | Percentage | Number |
|---|---|---|
| Strongly agree | 7.5% | 3 |
| Agree | 32.5% | 13 |
| Unsure | 27.5% | 11 |
| Disagree | 30% | 12 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 2.5% | 1 |

Interactivity in AISLE

| Interactivity | Percentage | Number |
|---|---|---|
| Strongly agree | 20% | 8 |
| Agree | 72.5% | 29 |
| Unsure | 5% | 2 |
| Disagree | 2.5% | 1 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

Peer exchange in *AISLE*

| Exchange | Percentage | Number |
|---|---|---|
| Strongly agree | 35% | 14 |
| Agree | 52.5% | 21 |
| Unsure | 5% | 2 |
| Disagree | 7.5% | 3 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

*AISLE* as an informative experience

| Informative | Percentage | Number |
|---|---|---|
| Strongly agree | 32.5% | 13 |
| Agree | 60% | 24 |
| Unsure | 5% | 2 |
| Disagree | 2.5% | 1 |
| Strongly disagree | 0% | 0 |
| No answer recorded | 0% | 0 |

# Appendix K: Notes from small group discussion

Q/ Which do you prefer AISLE or real gallery experience:

- AISLE is better because you can take time and there aren't as many people there. This pupil liked that you could interact and take your time to read the info.

- Has no patience in a gallery, so found AISLE better

- in gallery you can see the real scale of the work, so this person prefers real life

- easier in real life, you can see textures, scale etc

- prefers real life, as the size of the screen and set up for AISLE means you don't feel as if you are really in front of the work

- real life, as you can see the painting

- likes AISLE as you are at home, you can spend as much time as you like and you have more choice

- thought technology distracted from the work

- liked both, autonomy in AISLE v's gallery has a time frame

- liked changing aspects of the work in AISLE. Gallery is too hot, too quiet, too busy, and with less information

- likes gallery in real life, so you can see the original work of art

- liked interaction of AISLE

- likes to see the real scale in the gallery

- thought AISLE is better than a piece of paper as reproduction

- AISLE - they liked that you can go back and read the info any time

- found it frustrating that it was not in real life

- liked the virtual tour and the information first, perhaps this would be useful to prep for a real gallery visit.

- it was hard to get perspective in AISLE, so they preferred the real thing

- found the note cards really useful and easy to read

Q/ Which do you prefer AISLE or real gallery experience:

- likes real work/experience, as it is a more authentic experience, people spend too much time online already.

- liked that in AISLE they could talk to classmates, and that everyone had a voice all at once. Found it an interactive and a learning experience in AISLE

- likes real gallery, it's more focused as you can get distracted online.

- better to see the work in the flesh

- online, being able to sit at home and no-one can see your reactions (so you can have an honest response to the artwork and not worry about people watching you)

- found the technology a struggle

- got stuck in the room with mirrors, so didn't find it easy to use

- prefers online, as it is more relaxed and has more time

- looking on screen is not appealing

- found online distracting and pays more attention in the gallery

- prefers a real gallery, it didn't feel like a real art experience. Took too long and they got stuck in AISLE.

- liked the info card in AISLE

- liked AISLE as could download info on artworks and photos

- liked in person interaction on AISLE

- found the information paragraph too long in AISLE

- liked interactive elements in AISLE

- was good to be able to change and liked seeing from different perspectives in AISLE

# Appendix L: Notes regarding building MUVG *AISLE*

Every object within *Second Life* is created from these primitive forms except for visiting avatars, the natural ground and trees. MUVG interior walls and exhibits were created using prims. This default prim was used to construct any rectangular or square prim-canvas.
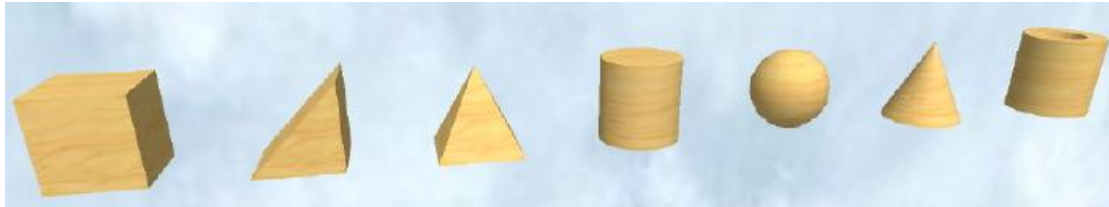


Collection of basic prim types used to construct *AISLE*

Each exhibition piece was created using four key steps

1. Selecting or 'rezzing' a prim and importing digital images of canonical artwork from reputable websites into the *SL* inventory
2. Altering the shape and sizes of each default prim to the match the exact dimensions of a particular artwork in the reality and removing the default plywood prim texture from each prim canvas
3. Embedding the prim 'canvas' with the relevant digital copy as a 'texture' or a video URL into its media option in the case of animated digital work