

**A scaffold for the novice to enhance perception of artworks when
engaging in Art Criticism**

Marian Reeves, BSc Computer Science, (University of Ulster)

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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 at this or any other university.

Signed: _____
Marian Reeves, BSc Computer Science,
(University of Ulster)

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A very special thank you goes to my husband Denis for his unwavering support and belief in me over the past two years.

We are given to supposing that the perceiver merely takes in what is there in finished form, instead of realising that this taking in involves activities that are comparable to those of the creator.

But receptivity is not passivity. It too is a process consisting of responsive acts that accumulate towards objective fulfilment. Otherwise there is not perception, but recognition.

John Dewey (1934) *Art as Experience*

Abstract

There is widespread interest in art, as evidenced by the multitude of visitors to art galleries worldwide. For many people the gallery visit is a meaningful experience but equally there are those who find it difficult to understand art and to connect with art, and the tools provided do little to assist the visitors understanding.

Art criticism is concerned with examining work of art to determine the meaning and significance and pedagogical art criticism frameworks continue to evolve to assist the learner engage with art.

This qualitative case study examines how technology can be used to enhance perception of artworks by the novice when engaging in art criticism. It evaluates the effectiveness of an interactive web application *ArtThinking*; a scaffold to promote the critical visual concepts and skills and enquiry, to effect enhanced perception.

The study comprised five adults directly observed for 4 one-hour sessions and two adults using the application remotely for 6+ hours each. Multiple methods affording triangulation/corroboratorion included observation, researcher-participant dialogue, participant generated artefacts and participant interviews.

Findings indicate that engaging with *ArtThinking* can foster development of the critical skills to effect enhanced perception. The embodied framework guided the novice seamlessly through the process, from Reaction, through Form, Theme, Context and Significance. Adopting a questioning strategy, varying the type of questions for each strand helped focus participants and in conjunction with tools for exploratory interaction (particularly the zoom and line tools) with the artworks, engendered development of the critical visual concepts and skills and enquiry. Minimal information about the artworks also compelled enquiry; facilitated by web resources.

Teachers may be interested to note that learners in this limited study appreciated working alone, having time to construct and refine opinions and typing helped formulate and clarify thinking. Some felt that a facilitator may be helpful for interpretation of web-researched information and mediation of post-study discussion.

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1. Introduction

1.1. Background and context

Art studies consist of the strands art history, aesthetics, art criticism and art creation (Clark, Day & Greer, 1987). Aside from the pleasure of viewing artworks the main goal of art criticism is understanding; and gaining insight into the significance and what it might say about life and the human condition (Feldman, 1992; Anderson, 1993).

It is difficult for the art novice to understand art (Uusitalo, 2008; Sandell, 2009). A recent study shows that there is little evidence of meaningful experiences at the gallery and highlights the miss-match between the tools provided and the everyday world of the visitor. The gallery literature was described as “information is difficult, inaccessible, complex and elitist” (Van Moer, De Mette & Elias, 2008 p. 46). This is in direct contrast to the need for a quality experience if authentic learning is to take place that can affect future positive experiences (Dewey, 1998 p. 15, 16).

The focus of this study is art criticism. Knowing *how* to see is fundamental to art criticism and art teachers need to ‘re-educate perception of works of art’ (Feinstein (1989). Over time various approaches to art criticism have evolved (Feldman, 1969;1972; Anderson, 1988; 1993; Geahigan, 2002; Prater, 2002; Sandell, 2009) in response to this problem.

There is some evidence that incorporating technology in art studies enhances perception of artworks, for example, using hypermedia of sounds, images, text, instant messaging, and interaction with the art work itself (Carpenter & Taylor, 2007; Ruby, 2008), but without guidance on how to approach the task the novice may not always establish the significance of the artwork. Anderson (1993) claims that providing a methodologically consistent exploratory model of art criticism develops student’s knowledge of art and the critical thinking skills for the development of meaning. Incorporating questioning strategies and emphasising the need for contextual information (Anderson, 1993; Geahigan, 2002; Conn, 2008; Sandell, 2009) promotes enquiry and leads to enhanced understanding.

1.2. Research Question

Considering the above, there is a case for examining the use of technology to scaffold the novice when in engaging in art criticism. The overall question is:

In what way can technology assist the adult art novice to enhance perception of artworks?

Sub questions:

- How can it effectively scaffold the learner through the processes of art criticism?
- In what ways does it foster critical looking and enquiry?
- What is the role of a facilitator when the novice is using the technology?

1.3. Investigation

With these questions in mind the researcher reviewed the literature and some existing technologies and designed *Art thinking*, a web-based application facilitating exploration and interaction with artworks and enquiry, to effect enhanced perception. This qualitative case study comprised five adults directly observed for four one-hour sessions and two adults using the application remotely for six+hours each. Data analysis reveals that *ArtThinking* can promote enhanced perception of art, afforded by the embodied interactive framework, tools, questioning strategies with enquiry facilitated by access to rich and varied content on the web.

1.4. Dissertation Roadmap

Chapter two presents the literature review in relation to art criticism. It outlines the problem and the strategies and tools adopted in the gallery and in education to assist the learner.

Chapter three describes the design of *ArtThinking*; a web base application underpinned by the literature engendering development of the critical skills and enquiry.

Chapter four describes the research methodology, conditions of implementation and methods of data collection and analysis employed.

Chapter five presents the findings from an in-depth analysis of the multiple data sources followed by discussion and evaluation in relation to the literature.

The final chapter draws conclusions and identifies limitations of the study and suggestions for further research are presented.

2. Literature Review

This study examines how technology can be used to enhance perception of artworks by the novice when engaging in art criticism.

This chapter reviews the literature in relation to Art Criticism, set in context of art education. The scope of this review is limited to western art traditions and literature from the 1970's to date, with some references to earlier works. The difficulty for the novice in engaging with art is discussed followed by an outline of the strategies and tools adopted by the galleries to assist the visitor. An analysis of pedagogical art criticism frameworks is undertaken and an outline of some technologies currently used in art studies is presented. The chapter concludes with a review of the literature on scaffolding and evaluation of reviewed content influencing the artifact design.

2.1. Art Education

Art education was first introduced in the USA and UK 1830's/1840's for teaching practical/mechanical drawing for utilitarian purposes (Seabolt, 2001; Hallam, Lee & Das Gupta, 2007) and over time evolved from subject-centred pedagogy into a more creative self-expression approach. In the USA in the 1980s a discipline-based art education (DBAE) approach was promoted by the Getty Centre for Education in the Arts. DBAE, comprising the four disciplines; aesthetics, art criticism, art history and art production had a major influence on art education and has since rippled out to other countries (Hickman, 2004). DBAE has a formal structure, curriculum and standards with more emphasis on the concepts, enquiry processes and knowledge construction central to aesthetics, art history and art criticism than the subjective and affective elements of schooling (Clark, Day & Greer, 1987) who state

“The goal of discipline-based art education is to develop student’s abilities to understand and appreciate art. This involves a knowledge of the contexts and theories of art and abilities to respond to as well as create art”

Critics of DBAE felt that the core element ‘art production’ was sidelined and that the formal structure and sequence approach was at odds with the dynamic and multifaceted processes of creating and responding to art (Delacruz & Dunne, 1996).

‘Critical Studies’ is seen as the UK equivalent of the DBAE (Hickman, 2004) but has developed in a less rigid and more holistic manner. A brief review of the Irish Leaving Certificate art curriculum reveals that much emphasis is on art production while an art history/appreciation section provides opportunities for the expression of the candidates’ own opinions of works. (Dept. of Education curriculum 2009)

2.2. Art Criticism (AC)

Art criticism is defined by Risatti as ‘it seeks to inform and educate people about art, by providing insights into its meaning so as to increase the understanding and appreciation of art and illuminate the cultural and social values reflected in it’. It is concerned with understanding art in the context of the present to which a historical viewpoint cannot always be applied. Art theories are formulated over time and used by the critic when engaging in the practice of AC (Clark et al, 1987). Increasingly there is a blurring between many aspects of art criticism and art history as many critics engage with both contemporary and historical works of art (Stinespring, 1992; Sandell, 2009) and feel the need to explain the social, political economic and historical context of the art work.

‘Criticism’ is understood in the positive sense; and is a procedure for revealing the expressive significance of works of art (Lankford, 1984), with informing and expanding perceptions of works of art (Feinstein, 1989), a personal encounter with a work of art resulting in a linguistic analysis or interpretation of the work (Anderson, 1991).

Art criticism in education is talking or writing about art where the fundamental questions asked are: What is this? What does it mean? What is its significance? (Anderson, 1993) and is looking at art to determine the significance of the work and what it might say about the human condition. On the other hand, **Art critique** is generally carried out by the teacher/class to evaluate the student/artist artwork with the goal of improving techniques, motivation or “to help the student make art better” (Barret, 1988), while public professional **art critics** talk to an audience and extend the scope beyond interpretation to include opinions and appraisal of the artists skill.

This study concentrates on art criticism in education. Assessing the artists skill or learning about different styles (art history) or indeed deciding if the work is Art, is left to the field of aesthetics. This simplistic stance does however appreciate that there is

not always a clear divide between the four disciplines (Stinespring, 1992; Delacruz & Dunn, 1996)

2.3. The Problem

A work of art is one of the most creative expressions by man and it represents the artist's vision of the subject (Anderson, 1989); who asserts that it sheds light on the human condition and as metaphors for various life visions and experiences the visual arts have the wisdom of the ages buried in them. But artworks are inherently problematic; they can be understood in different ways (Geahigan, 1989) who states the critic tries to ascertain the intentions of the artist and to look at artworks as reflections of larger cultural ideas or manifestations of underlying principles. Artistic intention is but one of several factors (Charman & Ross, 2006) whose study identified that the biggest stumbling-block is having confidence in the concept of multiple interpretations.

Perception, the sensory aspect of knowing and being aware is more than just seeing and it involves judgements and recognition of differences and similarities (Jamieson, 2008) and draws upon past experiential knowledge. Each individuals intellectual capacity and values are different and perception is largely shaped by ones social, cultural, physical environment and prior experiences (Prater, 2001; Uusitalo, 2008) and an encounter with art is not only influenced (if not mediated) by the entirety of past visual experiences but the totality of the personal human experience as well (Venable, 1998).

Knowing *how* to see is fundamental to art criticism (Feinstein, 1989) and art teachers need to 're-educate perception of works of art' as exploration of an artwork is a complex phenomenon grounded in human experience (Hubbard, 2006). Venkatachalam (2004) cites Japanese studies in 1953 exploring prolonged viewing of art which resulted in changes of pattern and symmetry and where previously unseen patterns emerge. A recent study (Lachapelle, Douesnard & Keenlyside, 2009) concludes that 'prolonged viewing periods had a positive impact on most of the participant's cognitive dispositions and had a dramatic influence on the participant's production of interpretative hypotheses'.

Looking alone however does not solve the problem, hence many different pedagogical approaches have evolved to engender the skills and promote critical enquiry and effect enhanced perception. These are discussed later in this chapter.

2.4. The Gallery and Museum

2.4.1. Role of the Gallery

Galleries and museums are broadening focus beyond their traditional role of for example, collections and research, to serving the needs of the public with respect to art education (Tbl.1 next page).

Chang (2006) cites many investigations into meaning-making experiences at the gallery and the studies confirm earlier finding above; that it is personal experience mediated by individual life context (Age, gender, education, occupation, personal and cultural history, previous experience and skills etc.) Similar to the classroom situation, it is these multiple factors, interactions and interrelations (Freebody, 2003) and time, attention, behaviour and social contexts (Change, 2006) that shape the gallery learning experience.

2.4.2. Strategies and tools adopted by the Galleries

Advances in technology enable the galleries to extend their services. While much is made of these technological offerings (Riley-Huff, 2009) a strong case is argued by Venkatachalam (2004), specifically with respect to HIPS (Table 1) technology, and who asks ‘what is the role of the viewer’? The question must be asked also, that while listening to an audio device or reading text can provide for an informative visit, does it foster real learning to enhance future encounters with a work of art?

Beyond web sites for orientation and information provision, the creation of lesson plans, virtual galleries and blogging extends the classroom to the contextual environment (Chang, 2006). More promising (for those who can visit the gallery) is a recent case study (Pringle, 2009) of an artist-led pedagogic process in the gallery which explicitly facilitates enhanced perception and meaning making through active looking, questioning, enquiry and reflection, largely informed by the frameworks in the literature. (Section 2.5 below)

Strategies & Tools	Overview	Learning
Labels	Showing Artist, artwork title, date created and very brief note about the artwork.	Reading information about the creation of the artwork not about the meaning, but labels often set an agenda for discussion. (Chang, 2006)
Printed Literature	Literature/sheets containing more detailed information than labels (e.g. Accademia Gallery , Venice)	Similar to Labels but with more comprehensive information. Can hinder learning and undermine the experience if seen as: 'difficult, inaccessible, complex, and elitist' (Van Moer, De Mette & Elias, 2008 p. 46).
Guided Tours, Workshops, Lectures etc	Expert Guides imparting knowledge and instruction and practical exploration.	Learning through listening, some scope for questioning, discourse. Workshops facilitate more practical / hands-on learning by doing or discussion.
HIPS (Hyper Interaction within Physical Spaces) (Palm Pilot ™ & headphones)	Nomadic information system providing contextual information by tracking viewer movement throughout the gallery, profiles viewer (duration, type of artwork) and viewer can record his views on the painting.	Suggestion of viewer control. Can call up different types of information about an artwork e.g. Form, Content, historical etc. Passive learning through listening with no hermeneutic/interpretation assistance. Some interaction as viewer can record his views on the painting. (Venkatachalam, 2004)
Web Application	Digital images, text descriptions and links to associated content, lesson plans, blogging from the VMC (Virtual Museum of Canada) Tate Gallery, other major galleries	Teaching and Learning facilitated through the creation of a virtual classroom, submission/use of lesson plans, student interaction, underpinned by constructivist learning theory. (Riley-Huff, 2009) (Venkatachalam, 2004)
Web Site	Metropolitan Museum of Art, New York Tate Online	Orientation in the gallery facilitates time management. 3-D model for orientation in the gallery and zoom into the collection, where appropriate metadata and images are included as rollover fly outs or sidebars. (Riley-Huff, 2009)
Hand held audio guide	Museum of Modern Art, (MOMA) New York & many galleries worldwide	Passive listening/learning to descriptions of the exhibits. (Venkatachalam, 2004)
ArtView	Developed by Cornell University provides an online tour of the museum	Computer facilitated communication whilst viewing digital images online: an online tour. (Venkatachalam, 2004)
Cleopatra	Art Institute of Chicago. Interactive touch screen of ancient art with background information and different perspectives.	Reading information and enhanced viewing from different perspectives. (Venkatachalam, 2004)
Artist-Led Pedagogic Process	Tate Gallery - Artists promote constructive learning through active looking and questioning.	Facilitates learners to actively engage in looking, enquiry, dialogue & reflection to generate meaning from knowledge embodied in the artwork and the experience and understanding of the viewers. (Pringle, 2009)

Table 1: Strategies & Tools adopted by the galleries

2.5. Pedagogical Art Criticism Frameworks

2.5.1. Overview of Frameworks

Frameworks for teaching and learning art criticism continue to evolve. Six frameworks are selected for analysis (Table 2). The source/title is shown at the top and the strands within the framework are listed vertically beneath. Cell size does not denote importance and strands can be revisited randomly.

Feldman 1969;1972	Feinstein 1989	Anderson 1988;1993	Geahigan 1999	Prater 2002	FTC Sandell 2006;2009
		Reaction	Personal Response		
Description	Description	Perceptual Analysis: Representation	Student Research Concept & Skill Development	Prepare to Critique Examine Literal Qualities Examine Functional Qualities	Form
Analysis	Analysis of Form	Formal Analysis Formal Characterisation		Examine Formal Qualities	
Interpretation	Metaphoric Interpretation	Personal Interpretation Contextual Examination		Examine Expressive Qualities	Theme
		Synthesis: Resolution			Context
Judgement	Evaluation	Synthesis: Evaluation		Determine Relevant Theories	
	Preference				

Table 2: Comparison of Art Criticism Frameworks

2.5.2. Framework Analysis

While the frameworks differ in approach and complexity, they share a common purpose; teaching students to read art, to enable them to discuss it intelligently and construct multiple meanings (Feinstein, 1989).

Analysis is undertaken with respect to the frameworks presented in Table 2.

2.5.2.1. Reaction / Personal Response

Only two of the models consider the viewer's Reaction/Personal Response important. Anderson (1993) recognizes the value of Reaction in informing subsequent processes and while this response is not an interpretation, the viewer reveals much about his perception of the artwork, his experience of art criticism and about himself (Geahigan, 1999; Charman & Ross, 2006). Rather than dismiss naïve or uninformed responses teachers should be sensitive and encourage the learner to explore further (Venable, 1998).

2.5.2.2. Description

Apart from Geahigan's framework, description is integral to all frameworks and involves actively examining the art work to discover what it contains.

Literal language is used to note the thematic content/subject (nonrepresentational artworks are described in terms of the art elements). To build a comprehensive picture Feinstein (1989) includes historical facts (title, year, artist etc.) and Prater (2002) explicitly includes Examine Literal Qualities (where the learner notes how the art object seems to be accurate to the subject) and includes Examine Functional Qualities, to uncover specific functional/social meanings of objects depicted, whereas this may be lost to the viewer using the Feldman model which restricts description to qualities intrinsic to the artwork.

Feldman alleges personal opinion and 'loaded' descriptions must be avoided (leads to rash judgments before finding all that is there to be discovered) but Venable (1998) contests that human instinct is to have some preference/opinion and yields a more natural and interactive learning experience. Anderson (1993) contends neutral language leads to listing qualities with no thread weaving them together for meaning.

Both Feinstein and Anderson propose questioning strategies to prompt critical looking and thinking and Sandell's graphical model identifies salient points to consider.

In contrast to the other frameworks Geahigan (1999) rejects Description as an artificial exercise if the artwork is visible (in the classroom), that the speaker must be better able to fulfil the need than the audience, students find writing descriptions tedious (p. 223-224) and that the critic only uses description if the work of art is not available to the audience or obscured in some way. The researcher would argue; does (younger) learner capacity to really describe match that of the critic? Is learning confined to the classroom?; engaging in description constitutes active looking, thinking and learning on the part of the novice.

Geahigan (1998;1998) asserts that rather than devising procedural frameworks educators should instead create 'the conditions to promote critical enquiry'; but this is surely true for authentic learning experiences. Apart from the Feldman model, implementing the frameworks in an open and exploratory manner can promote critical enquiry to include personal, intrinsic and contextual exploration and adopting appropriate questioning strategies or graphical guides to promote enquiry.

Analysis of the frameworks continues omitting the Geahigan model (refer to 2.6).

2.5.2.3. Formal Analysis

All models include a Formal analysis. Formal analysis is perceptual organization (Anderson, 1988) and entails a deeper description using the visual concepts and skills (art elements and principles of design) to uncover relationships between forms and thematic content (Feldman, 1972). Formal characterization refers to how the style carries the content and suggests different meanings (Anderson, 1993) and Feinstein (1989) recommends analyzing the principles of design applied in relation to each other and also (Prater, 2002) in relation to the art elements.

Form or the 'shaping of materials and ideas into a coherent meaningful pattern' (Richmond, 2009) shows the minds ability to create order, order is the basis of making sense of or understanding the world (p.96). Even Sandell (2009) retains what she terms the 'infamous' visual concepts because it represents the artist's many structural

decisions embedded in the creative process and along with Theme and Context provides a more balanced approach.

2.5.2.4. Interpretation

Interpretation is at the core of engaging with art and perhaps the most challenging (Feldman, 1972) and the fundamental premise of interpretation is that the viewer must be able to justify interpretations with reference to the artwork.

Interpretation builds upon explications from the previous phases to forming a hypothesis of what it might mean or as Anderson (1993) states referring to Personal Interpretation, thinking switches from analytical intake to synthetically intuitive projection.

Feinstein (1989) focuses on Metaphoric Interpretation suggesting the viewer asks himself 'What else, other than the obvious, can the painting stand for'. He proposes the viewer uses a technique of clustering (Appendix 1)

For Prater (2002) Examine Expressive qualities; concerns the emotions, moods and symbols and ideas conveyed where the viewer notes feelings in response to the artwork and refers back to the artwork to show how that is expressed. For Sandell (2009) this represents the Theme or the 'big picture' based on the subject matter and how it is composed and the process is expanded to making associations/connections to other sources, for example, paintings, artist's contemporaries, literature, music and other subjects etc. with a related theme.

Two of the frameworks (Anderson, 1993; Sandell 2009) claim that contextual information about the artwork; the 'who, what, when, where, why and how' is necessary to provide the added perspective to comprehend the authentic nature of the artwork and leads to refinement of personal interpretations. In contrast to the Sandell model where the strands can be randomly processed, Anderson (1993) defers contextual information to as late as possible, allowing students develop their own personal meanings first.

2.5.2.5. Judgment

Judgment or ranking an artwork in relation to other works is only meaningful if done against a wide range of comparable objects in time and space (Feldman, 1992), based on criteria derived from extensive knowledge about the subject to be evaluated (Feinstein, 1989) who suggests this stage can be omitted for the novice. For Prater (2002), judgment is in terms of the aesthetic theories most relevant to the work and reviewing them in terms of what they think the artist was trying to accomplish, but that judging the success of an artwork should not be done without contextual information.

Judgment for Anderson (1988;1993) refers to synthesizing the descriptive and analytical components and the personal interpretation informed by contextual information to determine the significance of the artwork to the viewer and why that is so.

2.5.2.6. Preference

Feinstein (1989) is the only framework that explicitly uses this step. He recognizes that most students wish to state their preferences but recommends that likes/dislikes are voiced at the end of the process in order to keep an open mind throughout the process. Preferences should also be justified by informed reason from engaging with the artwork and the process.

2.6. Critical skills

2.6.1. Questioning to promote critical thinking and enquiry

By our very nature, not all people are endowed with the same capacity of perception and intellectual engagement. These can be fostered through questioning skills or strategies, (Anderson, 1993; Geahigan, 2002) to be used repetitively and with a purpose and complete understanding of the reason for using these skills (Conn, 2008). Geahigan (1998;1999) emphasizes the need for different types of questions and since there can be multiple different interpretations of an artwork (Charman & Ross, 2006) the learners need to learn to ask questions themselves and to find the answers, otherwise the artwork is meaningless to them.

2.6.2. Critical visual concepts

Visual concepts refer to art elements and design principles. These tools determine what is presented (elements) and *how* the artwork is done (principles). They interact with each other to form the whole. Form and Content are like two sides of a coin (Eisner, 2008); when the content of a form is changed, so, too, is the form altered and vice versa. They are used when conducting a *formal* analysis of an art work, to deepen perception and uncover relationships between form and content as meaning in artwork always lies where significant relationships are found (Anderson, 1993)

Moore (2005) asserts that visual skill is not a subconscious mode of thinking and that these necessary skills for appreciating/understanding the significance of appearance can be taught. Gude (2004) argues for expansion of visual concepts to include concepts appropriate to contemporary artworks today (for example, layering, juxtaposition, recontextualisation etc.).

2.7. Technologies in Art Studies

There is some evidence that incorporating technology in art studies enhances perception of art; using hypermedia of sounds, images, text, instant messaging, and interaction with the art work itself (Carpenter & Taylor, 2006) which purports to support students to construct rich interpretations of works of art by making connections/links to content from various disciplines. Similarly, Carpenter & Taylor (2005) require their graduate students to use hypertext applications (Tinderbox) in their art studies classes. They assert that a hypertextual criticism activity called 'hypertag' is especially successful. Starting with a standard template for art criticism, students conduct research to complete the standard template. The goal however is to provoke students to move beyond this and working in teams they can add and alter content and links, revealing their engagement and understanding of art criticism.

An experimental 3D VLE project Art Café (Lillu Lu,2008) provides an active learning real-time collaborative environment facilitating discourse about images in the galleries and is mediated by an event facilitator (instructor)

Art Thief (Kinkley, 2009) is a game application for teaching and learning art history and students must search the galleries asking questions and finding information in order to locate the correct painting. (Available for download from ARTstor.)

Foundations promoting the Arts in conjunction with academia have also developed comprehensive web applications for research and teaching and learning in art studies. (Table 3)

Technology	Overview	Learning
ARTstor Web application	Digital image library – art, architecture, humanities and social sciences http://www.artstor.org/index.shtml Art Thief – Game based learning model for Art Hisotry	Available to individuals from participating cultural and educational communities e.g. researchers, teachers, students, librarians and museums. Download and upload data and images and allows instructors to give on-line presentations using Image Viewer zooming, panning etc. (Kinkley, 2009)
Getty	Getty Centre for Education in the Arts	Facilitates Research, seminars, lectures, lesson plans etc
Rembrandt Web site	Rembrandt and collections of his art in America Grant aided by NEH (National Endowment for the Humanities) http://eev.liu.edu/nehrembrandt/overview.htm http://eev.liu.edu/nehrembrandt/inquiry/inquiry.htm	This web site explores the art, life, and times of the Dutch artist Rembrandt van Rijn Provides instructional materials, video, musical, and audio to teachers and individuals interested in using the works of Rembrandt as an overall instructional resource. Circle of enquiry, questions to ask Description, Analysis, Interpretation and Conclusion (Conn,2008; Ruby, 2008; Piro, 2008)
Architeacher Web Application	Exploring Architecture As An Art Form, http://www.architeacher.org/aesthetics/archi-main.html	Explains visual concepts of art elements and principles of design. Through text and pictures.

Table 3: Technologies – Foundations promoting the Arts

2.8. Scaffolding Concept

Sharma & Hanafin (2007) recount the early concept of scaffolding as being expert support for novice learning, focusing on task completion and how this was compared to

the ZPD (Zone of Proximal Development), and being the difference in a learner's developmental level as measured by independent and collaborative problem solving.

The fundamental characteristic of a scaffold is that it *fades*; a gradual reduction and eventual elimination of the support. Scaffolding operates by a) supporting learner to complete tasks beyond their individual or unassisted capacity b) when the support is removed learners continue to function and c) removing the support does not reduce functioning at the level which had been achieved.

The concept of scaffolding has expanded beyond the 'expert other' and has been incorporate into technological learning tools. Two important aspects of this are; user actions can be constrained through predefined rules and the ability to store large amounts of data (Sharma & Hannafin, 2007)

Shapiro (2008) discusses the concept of 'embedded scaffolding', in technology, that is, using support features that exist as a natural part of the interface where learner focus can be maintained by suggesting paths through the materials.

2.9. Technology design informed by the literature

2.9.1. The framework

In light of the research questions, the review of the literature and existing tools the initial focus was 'how to go about' conducting art criticism in the artefact. The decision was taken to adapt existing pedagogical frameworks. The design is largely based upon the Form + Theme + Context model (FTC Palette) as this presents a practical and accessible approach to responding to art (Sandell, 2006; 2009) designed to activate thinking by generating an mixing information; internal and external to the artwork and viewer associations. The framework would be extended to include Reaction and Significance from Anderson's (1998) model, reflecting the personal subjective nature of the learning experience.

2.9.2. Scaffolding

The overall approach would be to design the artifact as a scaffold (Sherin Resiser & Edelson, 2004; Shapiro, 2008) and to embed a roadmap that would lead the novice through the different strands of art criticism, with the ability to adapt the software to the experience level of the learner.

The framework would be presented as a graphical interface allowing the learner to visualise the complete process from the outset and provide a structure for learning (Furner, Daigle, 2004).

Multiple studies and viewing would be facilitated, Hubard (2006) study highlights that in a second encounter with the same artwork there was a dramatic change in how students approached it and responded to it with a deepening and expansion perception.

2.9.3. Visual concepts

The way we organize and process visual information, reflects principles of perception (Feinstein, 1989) and many of these principles are reflected in the tools of art criticism; namely the elements of art (line, shape, form, pattern, texture, space, size, colour) and the principles of design (unity, theme, balance, movement, variety, proportion etc.), where the principles are a guide for organizing the elements when creating an artwork.

Strategies to promote the development of the critical visual concepts and skills include on-line documentation (Gibbs, Graves & Bernas, 2001); a glossary explaining the visual concepts and features to explore these conventions such as colour, balance, zooming, questioning and to interactively play with the image. These features would assist in the formal analysis of a painting, assist in unlocking the meanings and mood of the painting along with resolving some of the ambiguities in the visual arts (Mamassian, 2008)

2.10. Summary

This chapter reviewed the literature in relation to Art Criticism. The difficulty for the novice in engaging with art was discussed followed by an outline of the strategies and tools adopted by the galleries to assist the visitor. An analysis of pedagogical art criticism frameworks was presented and an overview of some technologies currently

used in art education was presented. The nature of scaffolding in education was also investigated.

3. Design of the Artefact

3.1. Introduction

This chapter considers the design of the artefact *ArtThinking*; The aim of the artefact is to not only inform the novice of the steps involved in art criticism but to scaffold the learner throughout the processes whilst engendering development of the critical visual concepts and skills and foster enquiry, to effect enhanced perception.

ArtThinking was designed in light of the research questions posed and informed by the literature, technologies, and some recent studies discussed in the previous chapter.

The first section of this chapter presents the concept design describing the application in terms of the strategies, learning concepts and functions provided. The next section presents the artworks and questions for inclusion in the application and the final section outlines the technologies used to create the application.

3.2. Concept Design

3.2.1. Application Overview

Existing pedagogical art criticism frameworks identified in the literature were adapted and embodied in the application to guide and also constrain the learners to the salient processes (Pea, 2004; Shapiro, 2008).

Questioning strategies to foster critical visual skills, thinking and enquiry were incorporated into each strand of the art criticism process and the types of questions varied depending on the strand/skills in question (Anderson, 1998; Geahigan, 1999; Prater, 2002; Conn, 2008).

The questions and sequence of processing can be adapted depending on the experience of the viewer, familiarity with the artwork or artist or the lesson in question (Pea, 2004; Sharma & Hannafin, 2007; Shapiro, 2008)

Tools for exploration and interaction with the artwork and recording/typing findings into the application were incorporated to facilitate deeper engagement and learning (Evans & Gibbons, 2007).

A feature for sharing artifact data among participants would provide viewers with another perspective on the artworks.

ArtThinking was designed as a web based application to ensure wider accessibility by adult learners and that a diverse range of resources would be freely available (Sharma & Hannafin, 2007).

To assist the learner 'Help' is provided via pop-up windows, simple navigation using buttons and arrows always positioned at the top of the window (except for the main menu) and clear concise instructions are always placed at the bottom of the window.

3.2.2. Systematic approach to problem solving

The application design is largely informed by the Form + Theme + Context model (Sandell, 2006;2009) and includes initial reaction/personal response (Venable, 1998; Anderson, 1993; Geahigan, 1999). It provides a systematic approach to learning where the learner focus is on content, process and enquiry (Anderson, 1988, 1993).

Providing a high level graphical representation gives learners a view of the “big picture”, provides perspective on the domain in general and can aid in the creation of global cohesion' (McNamara, Shapiro, 2005) as cited by Shapiro (2008).

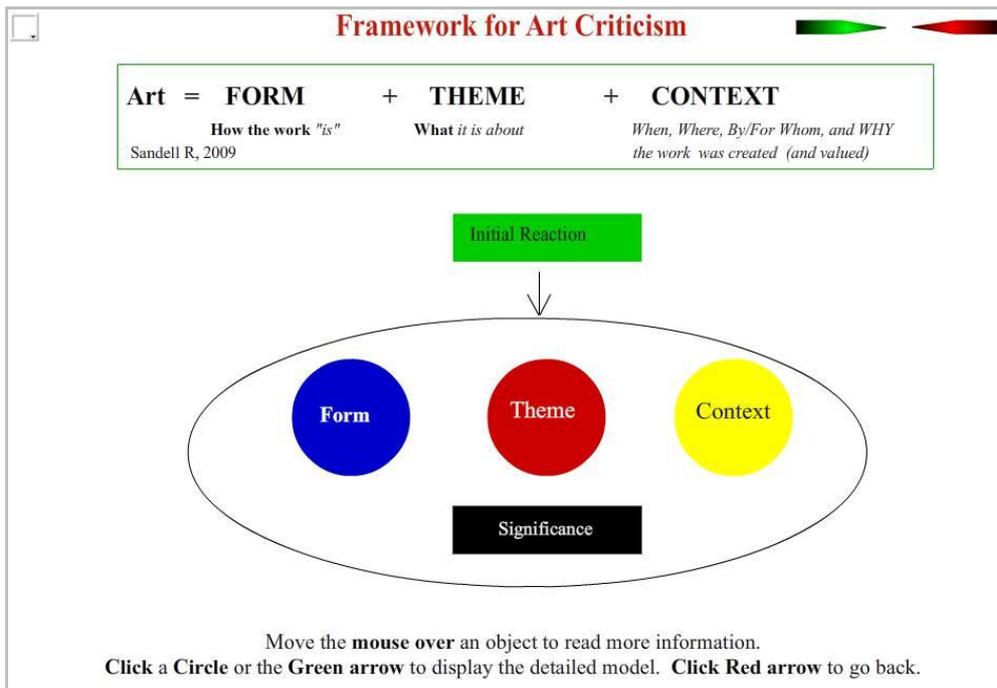


Figure 1: High Level graphical representation of Art Criticism model

The framework depicts the five steps that the learner will complete when examining an artwork. ‘Initial Reaction’ above and outside of the oval shape indicates the viewer response the first time he/she encounters an art work (Anderson, 1993;Geahigan,1998) and cannot be repeated. The three circles represent the main strands of FTC model (Sandell, 2006;2009) and the Significance box represents synthesis of information to determine meaning and personal significance (Anderson, 1993) .

The depiction implies starting with Initial Reaction, then to form, Theme, Context and finishing with the Significance. Apart from ‘Initial Reaction’ the sequence may be altered to suit the experience of the viewer and steps may be revisited many times as the viewer repeatedly explores and researches an artwork or others opinions and refines opinions as new information is found and perception deepens (Hubard, 2008).

Shapiro (2008) suggests using unique and striking colours to identify the important strands in the domain area and a corresponding colour coded pop-up windows is displayed when the mouse hovers over each object on the screen, presenting questions, instructions or an explanation of the element under focus. (Appendix 2)

When you look at a picture for the first time, what do you see?

Does it remind you of anything? What thoughts or words spring to mind?

Do you notice the colour, texture or perhaps the mood of the painting?

Figure 2: Items considered in Initial Reaction

Form:

Here we see the artist's structural decisions.

These are: the selection and use of Art Elements and how these have been combined and organised (principles of design) to portray the subject.

We also note the artwork's 2 & 3 dimensional qualities, size, scale and medium.

Figure 3: Items considered in Form

When the user clicks on an object the detailed framework is displayed.

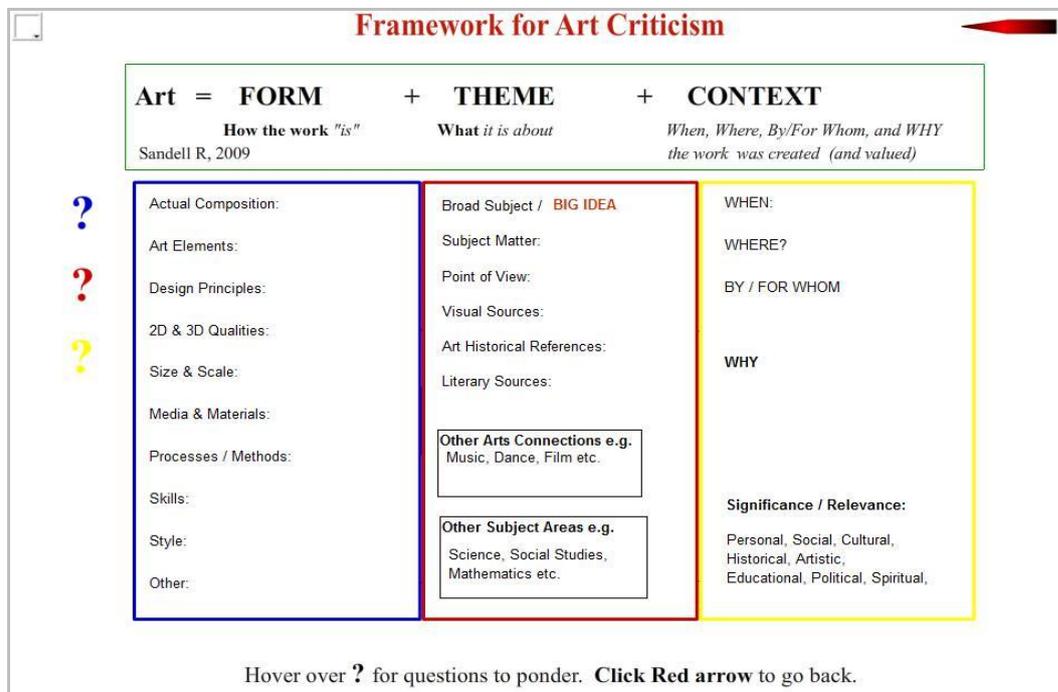


Figure 4: Detailed graphical representation of Art Criticism model

This window (Fig. 4) displays the detailed art criticism model with each of the recommended steps displayed. It enables the learner to visualise the complete process. Hovering over a ? presents a pop-up help window of the details to tend to for that strand (Appendix 3)

3.3. Selecting an artwork for study

The art lesson commences by selecting a picture from the gallery.

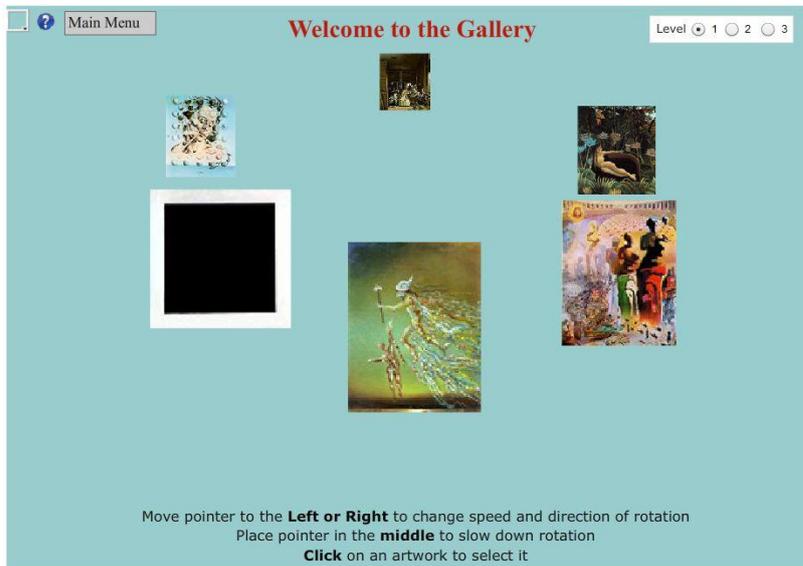


Figure 5 - The Gallery

Colour, rhythm and movement are inbuilt to the gallery presentation in allusion to the principles of design and to simulate the real or physical act of walking around a gallery.

The learner can interact with and control the carousel as described in the instructions at the bottom of the window. This control, choice of artwork and the clear instructions provide an effective beginning to the learning (Furner & Daigle, 2004)

The level number selected determines the questions that will be displayed and whether the user must proceed in a linear/sequential path or randomly through the strands of art criticism (Pea, 2004; Sharma & Hannafin, 2007; Shapiro, 2008)

3.3.1. Initial Reaction

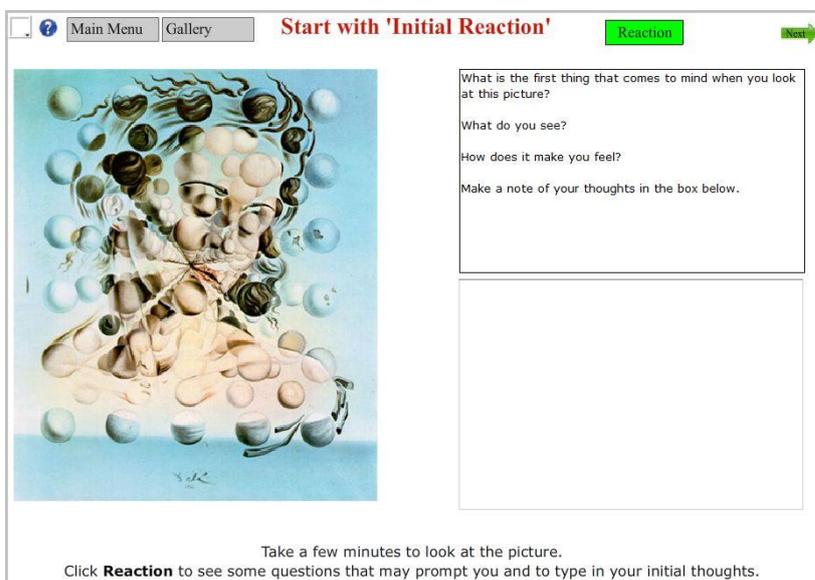


Figure 6 - Initial Reaction

Reaction is the first step in the Art Criticism process and refers to the spontaneous response of the viewer.

It provides an insight to the teacher and viewer into the perceptions and experiences of the viewer and can indicate the level of scaffolding and encouragement required during the process (Anderson,1993; Venable, 1998). This initial response informs the subsequent processes of art criticism (Anderson, 1993) and the viewer may pose a question, form a hypothesis or simply become aware of their difficulty in understanding the artwork as the first step of the critical enquiry that follows (Geahigan, 1998).

Initially the boxes containing questions and user input area are invisible. The user spends a few minutes looking at and thinking about the artwork. If the user is not sure what to do or needs encouragement to focus he/she can click the Reaction button to display the Question box containing some prompts. The user is obliged to type in his personal response before clicking the Next button to proceed.

This function also provides feedback to the user at the end of the process as he can compare shifting perceptions of the artwork at the end with his initial response.

3.3.2. Form

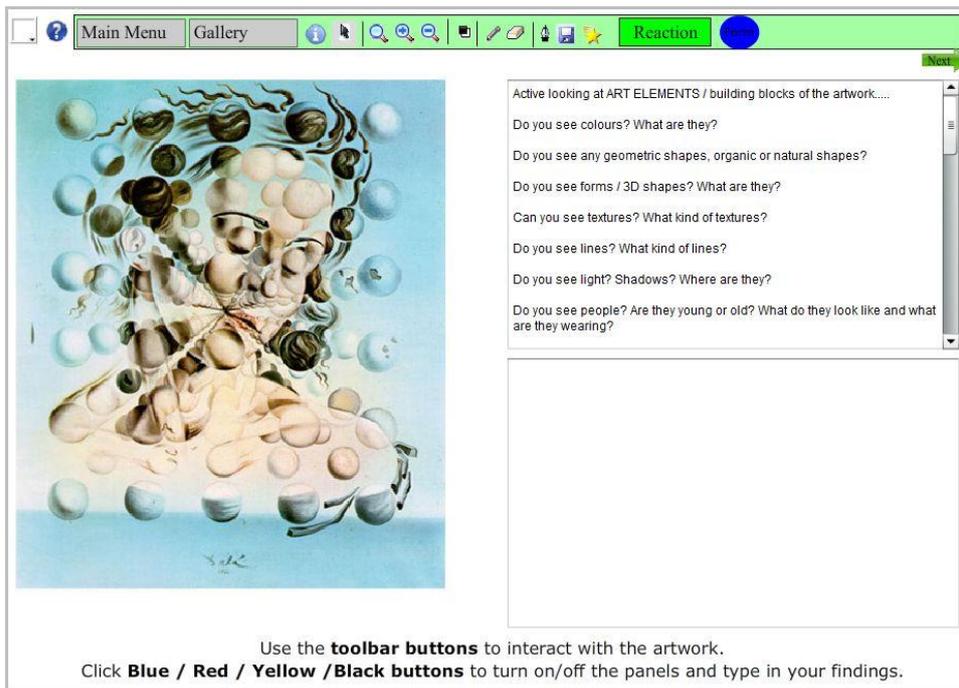


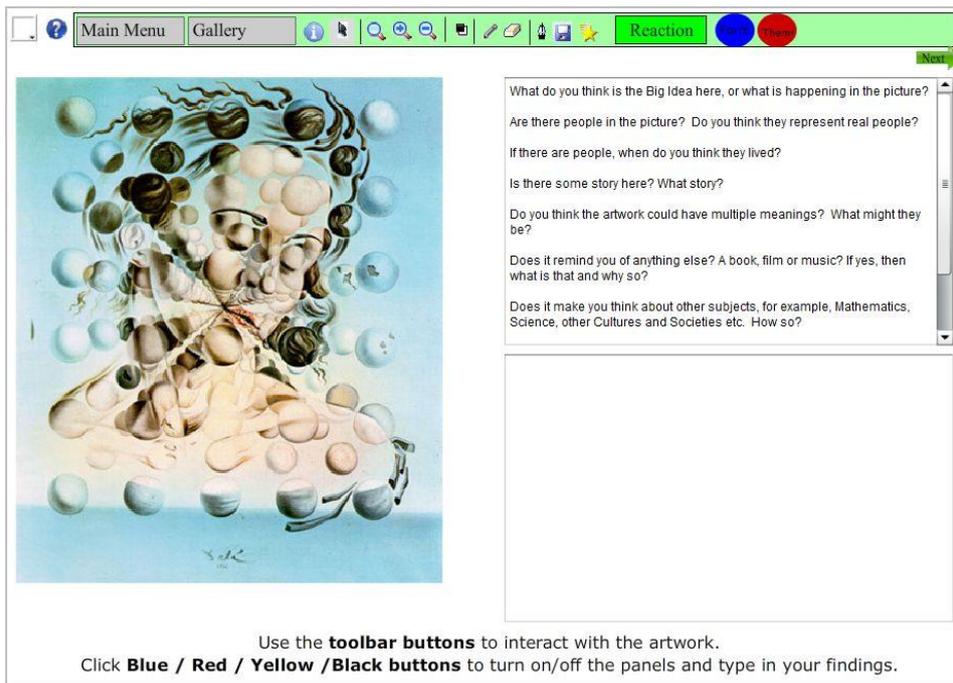
Figure 7 - Formal Analysis

Geahigan (1999) asserts that ‘description’ is not an intrinsic part of art criticism whereas Feldman (1992) encourages the *novice* to ‘slow down’ and examine the artwork in detail and gather data to build a comprehensive description. This model encourages a formal description and analysis where both literal and figurative language is acceptable.

Questions (Anderson, 1993; Conn, 2008) are presented to promote the development of the critical visual concepts and skills by asking the user in turn about each art element for example, ‘Do you see lines? What kind of lines? Different questions follow these relating to the principles of design. Formal analysis deepens perception of an art work and uncovers relationships between form and content (Anderson, 1993) as the meaning in artwork always lies where significant relationships are found. Refer 3.6 also.

The user is obliged to type in some text before clicking the Next button. To assist in building a comprehensive description and analysis the viewer will interact with the artwork using the tools provided on the toolbar.

3.3.3. Theme



The screenshot shows a digital gallery interface. At the top, there is a navigation bar with 'Main Menu' and 'Gallery' tabs, and a 'Reaction' button. Below the navigation bar is a toolbar with various icons for interaction. The main area is divided into two sections. On the left is a large image of a complex, abstract artwork featuring a central figure surrounded by numerous spheres and organic forms. On the right is a text box containing a series of questions for thematic examination: 'What do you think is the Big Idea here, or what is happening in the picture?', 'Are there people in the picture? Do you think they represent real people?', 'If there are people, when do you think they lived?', 'Is there some story here? What story?', 'Do you think the artwork could have multiple meanings? What might they be?', 'Does it remind you of anything else? A book, film or music? If yes, then what is that and why so?', and 'Does it make you think about other subjects, for example, Mathematics, Science, other Cultures and Societies etc. How so?'. Below the text box is a large empty white area for user input. At the bottom of the interface, there is a instruction: 'Use the **toolbar buttons** to interact with the artwork. Click **Blue / Red / Yellow /Black buttons** to turn on/off the panels and type in your findings.'

Figure 8 - Thematic examination

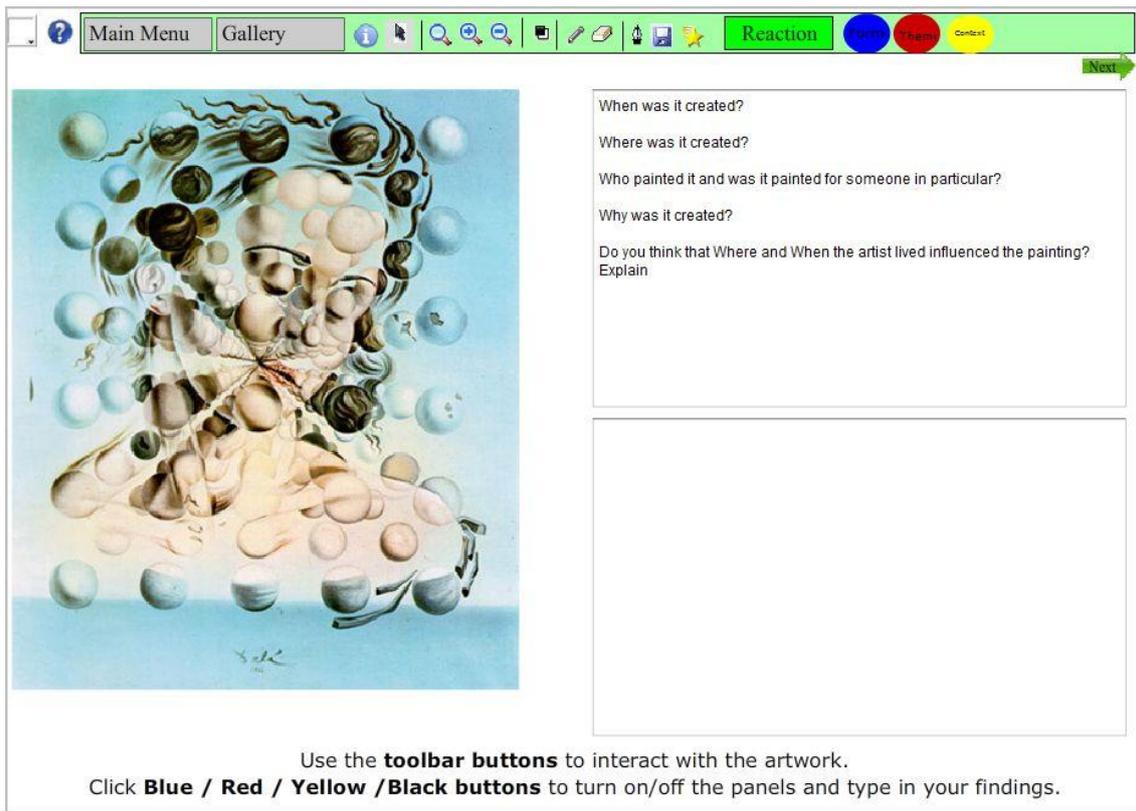
The Theme strand is concerned with constructing a story or determining the ‘big idea’ of what the artwork is about (Sandell, 2009) and is one of the most challenging areas (Feldman, 1992). Building on previous description and analysis and the viewer uses his cognitive skills to construct possible interpretations and to examine how these are supported by the form.

Works of art are essentially problematic as they can be understood in different ways and in order to appreciate an artwork the viewer or critic must ascertain the intentions of the artist, the influences on the artist (Geahigan, 1998) and the representation or ideas portrayed. However, Sandell (2009) moves beyond artist intent and encourages forging connections to other subjects, artworks or previous experiences of the viewer; making these connections external to the artwork helps link art to life.

This strand of the framework encourages higher cognition through the different types of questions posed and as the user explores and reflects on the artwork many ideas or themes may emerge and he will input his findings to the Theme dialogue box.

Providing minimal information about the artwork compels enquiry; facilitated by access to the world-wide-web.

3.3.4. Context



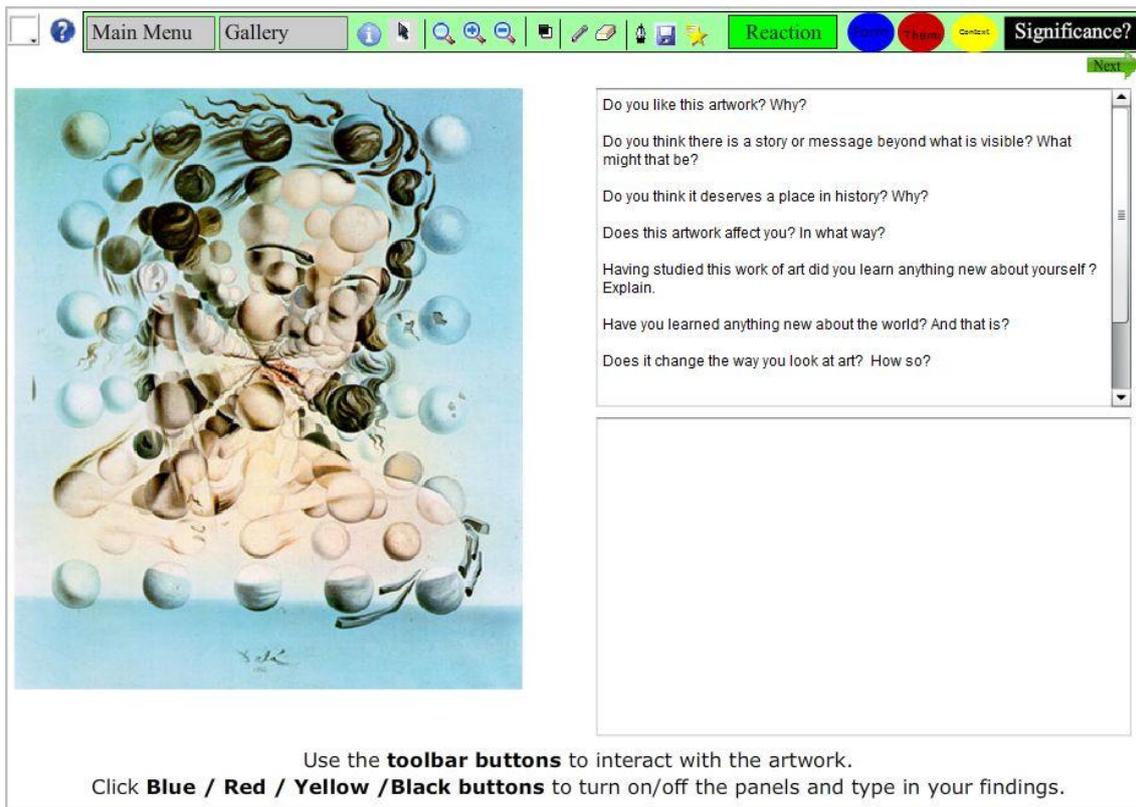
The screenshot shows a software interface for examining an artwork. At the top, there is a navigation bar with 'Main Menu' and 'Gallery' tabs. To the right of these are several icons: a blue circle with a white 'i', a magnifying glass, a red circle with a white 'x', a yellow circle with a white 'y', and a black circle with a white 'b'. A green 'Reaction' button is also present. Below the navigation bar is a toolbar with various icons for zooming, panning, and other interactive functions. The main area is divided into two sections. On the left is a painting of a woman's face, which is a complex, multi-layered composition of various objects, including eggs, shells, and other organic forms. On the right is a text input area with a list of questions: 'When was it created?', 'Where was it created?', 'Who painted it and was it painted for someone in particular?', 'Why was it created?', and 'Do you think that Where and When the artist lived influenced the painting? Explain'. Below the text input area is a large empty box for writing an answer. At the bottom of the interface, there is a green 'Next' button. Below the main area, there is a text box that reads: 'Use the **toolbar buttons** to interact with the artwork. Click **Blue / Red / Yellow / Black buttons** to turn on/off the panels and type in your findings.'

Figure 9 - Contextual examination

The Context strand promotes enquiry as the information sought is external to the artwork itself. Contextual information (Who, what, where, why etc.) is necessary to comprehend the authentic nature of the artwork, to provide the added perspective and leads to refinement of personal interpretations. (Anderson, 1993; Geahigan, 1998; Sandell 2009)

Investigation about these aspects shifts the user perspective from today to the time and society when the artwork was created. Sandell (2009) claims that, 'with contextual information visual learners can perceive the intention and purpose of an artwork by identifying the personal, social, cultural historical artistic and other contexts that influence the creation and understanding of the work'.

3.3.5. Significance



The screenshot shows a web-based interactive gallery interface. At the top, there is a navigation bar with buttons for 'Main Menu', 'Gallery', and 'Significance?'. Below the navigation bar is a toolbar with various icons for zooming, panning, and other interactive functions. The main content area is split into two columns. The left column displays a painting of a woman's face and upper body, surrounded by numerous spheres of various colors and sizes, some of which are connected by thin lines. The right column contains a list of reflection questions, each followed by a text input field. The questions are: 'Do you like this artwork? Why?', 'Do you think there is a story or message beyond what is visible? What might that be?', 'Do you think it deserves a place in history? Why?', 'Does this artwork affect you? In what way?', 'Having studied this work of art did you learn anything new about yourself? Explain.', 'Have you learned anything new about the world? And that is?', and 'Does it change the way you look at art? How so?'. Below the questions is a large empty text box for the user's response. At the bottom of the interface, there is a text box with instructions: 'Use the **toolbar buttons** to interact with the artwork. Click **Blue / Red / Yellow / Black buttons** to turn on/off the panels and type in your findings.'

Figure 10 - Determine significance

As the final activity in the process, the significance of an artwork is understood more clearly when contextual information about the era and social conditions when the work was created are known (Prater, 2002; Sandell, 2009)

“Understanding art leads us back to an understanding of ourselves and is a process of simultaneous hermeneutic interpretation both of the artwork and of oneself” (Venkatachalam, 2004 citing Arnheim and Heidegger).

The questions presented are designed to prompt reflection on the whole process and synthesis of the internal and external knowledge of the artwork and the viewer’s life experiences and response to the artwork. Examples of the questions asked are:

Does this artwork affect you – in what way?
Having studied this artwork did you learn anything new about yourself?
Have you learned anything new about the world?

3.4. Tools for exploration & interaction with an artwork

3.4.1. Information about the art work

Minimal background information is provided to the viewer. This compels enquiry in response to questions posed and the viewer's own questions. Research is facilitated by opening another window and accessing the web using some of the information provided as search criteria. (Links to web sites are also included at the end of the glossary document for those viewers not familiar with web searching).

Artwork Details	
Artist:	Kazimir Melevich (Kazimir Severinovich Melevich)
Artwork:	Black Square
Year:	1929
Size:	Width: 106cm Height: 106cm
Medium:	Oil on canvas
Location:	Russian Museum, St. Petersburg

Figure 11 - Standard information provided for each artwork

Web searching and hyperlinks provides easy access to resources such as other paintings by the same artist, same era etc. and facilitates judgment, comparison, contrast (Feldman, 1972, Feinstein, 1989; Prater, 2002) by the more experienced viewer.

3.4.2. Zoom In/Zoom out

The zoom tool allows the viewer to inspect the finer details or higher spatial frequencies (Mamassian, 2008) of a painting to reveal for example the brush strokes, signature or content better discerned in up-close or optimal conditions for viewing (Ruby, 2008). Zooming in/out alters the viewing perspective and affords enhanced visual perception, assists in resolving ambiguity in an artwork contributing to greater insight to the possible multiple meanings of an artwork.

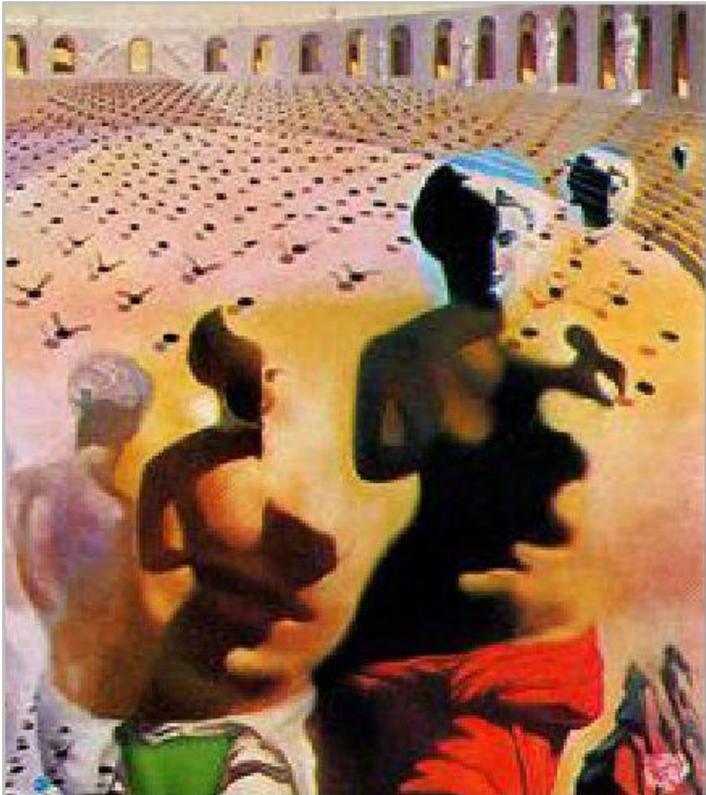


Figure 12 - Zoom In - up-close viewing



Figure 13 - Zoom out - view from a distance

3.4.3. Line tool

The artist controls what we see by applying the principles of design to organize the content and the way in which these are applied affects the overall mood or expressive content (Feldman, 1992; Anderson, 1993). The line tool allows the viewer to interact with the artwork, to inspect balance, pattern, to segment the artwork for further examination and to investigate perspective of how content is organized and where the eye is drawn to.

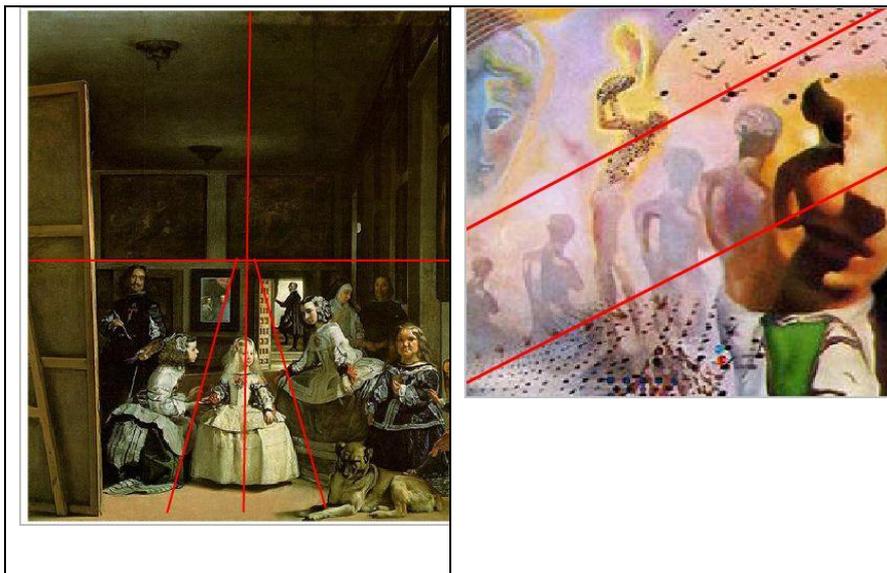


Figure 14: Line Tool

3.4.4. Black / White Tool

There is much science and literature on colour and colour theory which is beyond the scope of this study. This tool brings focus to the art elements of colour, intensity, shadows and textures and design principles of contrast, dominance etc. in the artwork and prompts the viewer to think about affects on content, mood and ideas portrayed.



Figure 15: Black & White Tool

3.4.5. Colour changer

The setting of an artwork can affect the viewer response and perception, thus, depending on the artwork currently under study, the viewer can change the background colour to best portray the artwork.

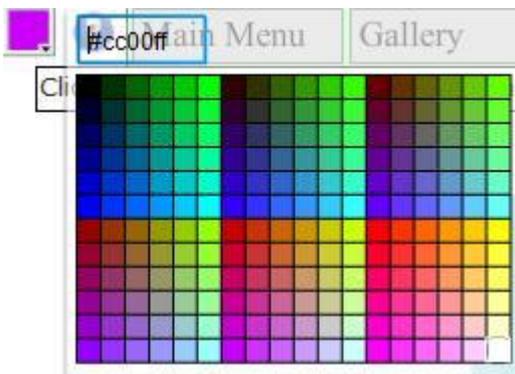


Figure 16: Colour Changer Tool

3.4.6. Animation

This function allows the learner to explore the content and form of an artwork retracing some of the decisions made by the artist when creating it. Rather than asking the learner to ‘think’ about this, the function allows them to ‘do’ and ‘think’ and make choices at the same time facilitating deeper learning (Evans & Gibbons, 2007).

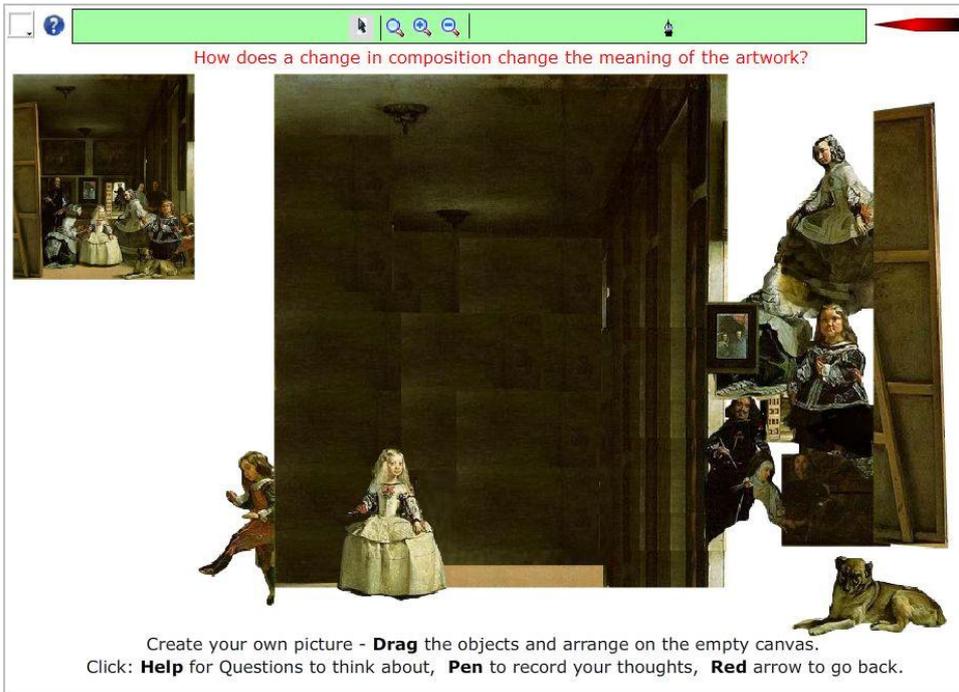


Figure 17 - Las Meninas Animation

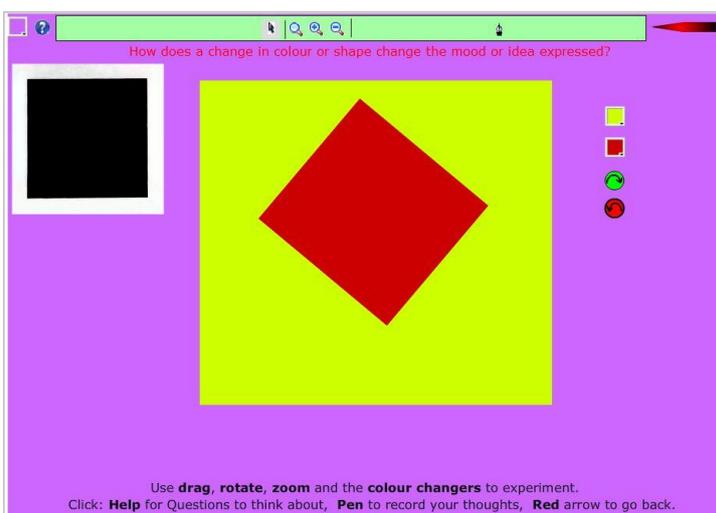


Figure 18 - Black Square Animation

3.5. Questioning and critical enquiry

Standard/default questions are posed for all artworks but when the viewer select the *animate* function, questions specific to the artwork are available to foster critical thinking and prompt enquiry (Geahigan, 1999; Conn, 2008) and the viewer may also input his own questions (Charman & Ross, 2006).

As you interact with the artwork and experiment with the colour and form you might ponder the following:

What is a square?
Can you think of things that it may signify?
Where do we see squares in nature?
Where do we see and use squares in the world?

Does the colour Black have connotations and does it set the mood or tone?

What do you think is represented by the artwork?

What affect does this painting have on you?

Figure 19: Black Square Questions

Think about the formal elements as you recreate the artwork or create your own story and you might also ponder the following:

Do you think the people in the picture are real people? Who are they?
Where is your eye drawn to?
Is there one person or object more dominant than the rest of the content?

Why do you think the artist included himself in the picture?
Are there any symbols in the picture?

What do you think is happening in this picture?
Would you describe the form as harmonious?
Does it support the theme?

Do you think it could be interpreted in different ways? How so?

Do you think the artist spent a lot of time planning and painting this? Why do you say that?

This picture has puzzled the critics for many years. Why do think that might be?

Figure 20 - Las Meninas Questions

3.6. Development of Visual concepts and skills

A glossary of Visual Art terms

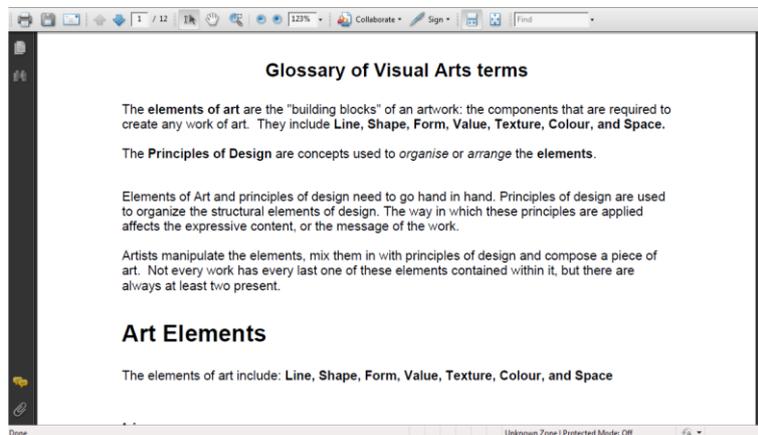


Figure 21: Glossary / help on Art Terminology

The way we organize and process visual information, reflects principles of perception (Feinstein, 1989) and many of these principles are reflected in the tools of art criticism.

Knowing and utilizing these tools assists the viewer in the description and formal analysis (Feinstein, 1989; Feldman, 1992; Anderson, 1993) and to construct and communicate his thoughts and findings using a common language.

A glossary of art terms is included in the application as a quick reference for the learners (Gibbs, Graves & Bernas, 2001) to inform and assist in focusing on the artwork. This help document can be opened in another window and available at all times throughout the process. (Fig. 21)

3.7. Sharing data / refining opinions

The learner can select to view data and opinions of other learners at any time.

View data from other learners

Iasmeninas

examining paintings that grab my attention.

USER: Picasso ARTWORK: Iasmeninas

INITIAL REACTION:
Artist painting a family portrait, including dog - presence of an animal suggests rural setting Eye is drawn to the light coming in through the door at the back of the painting - room is very dark. Figure in the doorway reminds us of the cover of a Fleetwood Mac album - 1960s approx. Ceiling featured in the painting is unusual Wondering what the paintings on the wall are - did these influence the style of the artist in the picture?

FORMAL DESCRIPTION AND ANALYSIS:
Room is very dark except for a shaft of light at the back in the doorway, Another shaft of light in the foreground which seems to be focussing on the artists canvas. Also light on the girl in the middle - she is wearing white and she is fair-haired. Light is coming from the right, hitting the panels of the door - sun is to the right of the room.
Window shutters are closed in the room, except for the one at the front. Perhaps the setting is a very warm country and shutters are closed to keep out the heat?
Colours appear dull, not very colourful painting overall.
There is a definite depth to the painting - characters in the background appear smaller.
Texture - feel like we could reach out and rub the dog, the coat fur seems very real. Different texture between the dogs coat and the clothing on the children.
Children and dog at the foreground, artist and two females in the middle - these are an older age-group. Old man in the background.

Processing data - 8 from the database

Select an **artwork from the list**, click **Submit** to retrieve the details.
Click the **Red arrow** to go to the Main Menu.

Each individual's intellectual capacity, life context and values are different; in fact Venable (1998) declares that an encounter with art is not only influenced (if not mediated) by the entirety of past visual experiences but the totality of the personal human experience as well. Prater (2001) citing Vygotsky (1986) asserts that perception is by no means a constant and that by interacting with others, learners incorporate different perspectives into their understanding and meanings can be revised and refined in light of this.

3.8. Content Selection

3.8.1. Selection of Artworks

Permission was sought and granted from the Design and Artists Copyright Society (DACS) for the three Salvador Dali artworks selected for inclusion in the application. The other three artworks for study in were selected from those freely available under Fair Dealing Act from Wikimedia Commons.

Six very different artworks were selected for inclusion in the learning artifact, from Baroque, Expressionist, Suprematism and Surrealist styles. Part of the rationale for this was to promote the critical visual concepts and skills and as some of the artworks focus

to a more or lesser degree on two or more art elements, for example, form and colour, space, line, texture, shape and value/colour intensity and design principles, for example, contrast, balance, unity etc.

The content of the artworks was also very different, some contain historical representations of people and the learner may construct a story. The Dali artworks have underlying mythological influences. Some concentrate on texture, pattern, rhythm, concept, symbols etc. However, all of the artworks selected are deemed to provide ample scope for analysis and multiple interpretations by the novice.

‘Black Square’ was intentionally selected to disrupt and challenge the viewer. Geahigan (1998) claims that selecting provocative works for study challenges beliefs about art, elicits interest and the unsettling situation prompts further reflection.

Due to time constraints animations are provided for only two of the artworks. This however will allow the researcher and the participant to evaluate the effectiveness of animations in enhancing perception of the artworks.

A list of the selected artworks is included in Appendix 4

3.8.2. Selection of Questions

Different types of questions were devised for each strand of the framework (Geahigan, 1998; Conn, 2008) and varied for scaffold level 1 or level 2.

Much of the standard/ default questions were based on the Circle of Enquiry web site (NEH, 2009) and the FTC model (Sandell, 2009) and the researcher devised specific questions for two of the artworks.

3.9. Technologies

Technology	Description	Usage
Adobe Flash CS4	A platform for creating rich (internet) applications. A multimedia authoring program affording animation, interactivity, vector and raster graphics manipulation and audio streaming.	Used to build the application & facilitated provision of a content rich and interactive learning experience.
ActionScript 3.0	Programming language of the Adobe Flash platform. Enables animation, interactivity, data and event handling.	Input, update, delete, retrieve learner dialogue & share/view others data & to retrieve questions and information about the artists and artworks.
Adobe Photoshop CS4	Digital image editor	Manipulate artwork images before importation to Flash, to generate:- <ul style="list-style-type: none"> • small images for the Gallery • larger images for individual study • black & white images of artworks • Isolate sections of artworks which the user could manipulate during the learning experience.
PHP 5.2.11	PHP “PHP Hypertext Preprocessor” is a free open-source server-side scripting language which can be embedded into HTML to create dynamic Web pages.	Facilitates integration between Flash and the database. Control log in to the application, insert, update, delete and retrieve user dialogue, sharing of user dialogue and retrieve artist, artwork & questions from the database
Apache HTTP Server V 2.2	Free open-source Web server.	Facilitates local development and testing of the web application, negating the need for continual internet access and uploading to the web server.
MySQL 5.1	Community version of MySQL “My Structured Query Language” - an open-source relational database management system (RDBMS). Freely available under GNU General Public License.	Multi-user access for the storage and retrieval of all data:- Artist, Artwork, Artist-Artwork links, Std Questions on artworks, User generated data. Scripts were designed to: <ul style="list-style-type: none"> • create the database, • create the table structures • grant privileges to the databases • Populate the database with the art questions, artist and artwork details. Scripting facilitates quick changes to the database and eases deployment to the server.

Table 4: Technology employed to create ArtThinking

4. Methodology

4.1. Introduction

The previous chapter described the design of the artifact '*ArtThinking*' a scaffold to enhance perception of artworks by the novice when engaging in art criticism.

This chapter describes the research methodology and the methods implemented for this study. The first section of this chapter provides an outline of three major research types and identifies the guiding principles and methods of same. The next section describes the purpose of this study and presents an overview of categories of qualitative enquiry. Following this ethical considerations and sampling are discussed. The conditions of the study are described including a profile of the participants and the researcher and the data collection instruments employed. Implementation of the intervention is described and the chapter concludes with a summary of the data collection and analysis methods used.

4.2. Research Types

The first consideration for any research project is the selection of the most appropriate type of research. The type of research depends on the 'worldview' of the researcher, the purpose of the research and the research variables or attributes under study (Grix, 2004) and it determines the guiding principles and procedures of the study; such as the sample size, criteria and methods of selection, ethical procedures, implementation and methods of data collection and analysis (Creswell, 2009).

Grix (2004) identifies two major categories of research; Quantitative and Qualitative, while Creswell (2009) expands on this to include a third category, being Mixed Methods.

Quantitative research is a means for testing objective theories by examining the relationship among variables (Creswell, 2009) and is concerned with selecting, testing and measuring randomly selected sample variables to generalize from the sample to the population (Creswell, 2008). It seeks measurement and analysis that are easily replicable by other researchers (King and Verba, 1994) as cited by Grix (2004 p. 117). Typical methods include surveys of large populations from which trends, attitudes or

opinions are deduced (Creswell, 2009) and controlled experiments to test the impact of the intervention on an outcome (Creswell, 2009, p. 145, 146).

On the other hand, qualitative research is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2009) and the researcher intentionally selects individuals or sites that can best help to understand the phenomenon ‘purposeful sampling’. The intent is not to generalise to a population but to develop and in-depth exploration of a central phenomenon (Creswell, 2008, p. 213). Typical methods of qualitative research include observation in the field, interviews and document review, where the researcher is the key instrument for collection, analysis and interpretation of data from multiple sources, in order to understand the meaning that the participants hold (Creswell, 2009, p. 175).

In practice, these research approaches may use some quantitative and qualitative methods.

Finally, Creswell (2009) defines a Mixed Method research type as one where both qualitative and quantitative approaches are used in tandem (to broaden understanding of the problem or better explain the results of one type) and declares that the overall strength of a Mixed Method approach is greater because of this.

4.3. Qualitative Research

4.3.1. Purpose of this research

The artifact *Art thinking* was designed to assess if technology could assist the novice to enhance their perception of artworks. To determine how this might happen required an in-depth exploration and investigation of the phenomenon; of the learner using the technology and the meaningfulness of the experience for the learner.

This study was confined to a small sample and did not seek to generalise finding to a larger population. Therefore a quantitative approach was ruled out and the remainder of this chapter focuses on a qualitative design.

4.3.2. Qualitative Approach

Given the overview of the main research types as set out in the previous section and the purpose of this study as described above, a qualitative approach was selected.

Within a qualitative enquiry a number of different research categories exist, for example, Ethnographic, Action Research, Grounded Theory & Case Study. These are outlined below and for each one a determination of fitness for this study was made.

An *Ethnographic* enquiry is one in which the researcher becomes submerged in the culture of the society or group under study for long periods of time. Grix (2004 p.121) states that the purpose of such research is to find patterns of the area under study, for example, power, identity etc. through close observation and interaction in the day-to-day lives of the community. The process is flexible and evolves in response to the lived realities encountered (Creswell, 2009). This study does seek to explore and understand a social phenomenon; the meaningfulness of the individual's experience, but within very limited time period.

Action Research seeks to change or improve practice or solve problems (Cohen, Manion & Morrison, 2000) and is characterized by iteration or spiraling cycles of problem identification, systematic data collection, reflection, analysis, data-driven action taken and finally problem redefinition (Freebody, 2003). This is beyond the boundary of this study as it assumes knowledge and understanding of current practice or problems and is more solution-oriented than purely exploratory or descriptive. (Freebody, 2003, p.86)

Grounded Theory is concerned with empirical research out of which a theory is formed. It does not set out to answer pre-defined questions or prove some hypotheses. Researchers start with an area of interest, collect the data and then seek relationships between concepts as ideas emerge and develop from the data (Grix, 2004, p. 111). This study does seek to answer the specific research questions through in-depth exploration, a grounded theory approach is deemed inappropriate.

A *Case Study* approach involves empirical investigation of a particular phenomenon used to shed light on the object of study (Grix, 2004) and is the preferred approach for examining contemporary events where the behaviours cannot be manipulated (Yin, 2009, p.11). Yin (2009) asserts that Case Study is an appropriate design to answer questions such as *how, what, why* and defines the scope as: ‘an empirical enquiry that investigates a contemporary phenomenon in depth and within its real-life context especially when the boundaries between phenomenon and context are not clearly evident’. Freebody (2003) highlights the suitability of the case study approach in education as the teacher, student, subject, conditions and practices all shape the teaching-learning event and can be fully explored in this type of research. He claims that it ‘shows a strong sense of time and place and represents a commitment to the overwhelming significance of localised experience’

Given the purpose of this study and an outline of the various qualitative approaches above, a Case Study enquiry was selected.

4.4. Case Study

This Case Study comprises an in-depth exploration of the novice using the designed artifact and seeks to provide a rich and vivid description of events relevant to the case; (Cohen et al, 2000) to understand the novices experience with the application and the meaningfulness of the experience to the participant. The methods employed in this study are observation, interview and artefacts created by the participants during the intervention.

The locations for implementing the intervention were identified, participant criteria were established and the instruments and methods of data collection and analysis were drawn up. The guiding principles and processes for these decisions and the conditions of the study are fully described in the following sections.

4.5. Ethics

Researchers need to protect their research participants; develop a trust with them; promote the integrity of research and guard against misconduct and impropriety that might reflect on their institutions (Creswell, 2009, p. 87). Silverman (2006) stresses the need to be open, honest and fair to the participants so that the true purpose of the

research is explained with no attempt to conceal, deceive or exploit the participants and to protect them from harm. Where anonymity is guaranteed then there must be no means by which to trace comments or behaviours back to the source. Where confidentiality has been promised then the researcher must not make public the source of information. (Cohen et al, 2000).

Silverman (2006) proposes that ethical goals can be achieved by using Ethical Guidelines and thoughtful and ethically responsible research practice. The table below describes the forms submitted to the Research Ethical Committee for approval.

Instrument	Purpose	Appendix
Informed Consent form	Conditions of participation in the study signed by participant and researcher before the study commenced.	5
Participant Information sheet	Pre-study information about purpose and conditions of the study read to participants	6
Project Proposal Sheet	Description of the study for Ethics committee as Audio instruments were being used	7
Pre-Study Questionnaire	Completed by participants to establish base line of art and technology experience.	8
Interview protocol	Guide to researcher when conducting semi-structured interviews with participants	9
Ethical Approval form	Outline required by Ethics committee before approval for the study was granted	10

Figure 22 Table of documents submitted for Ethics Approval prior to study

4.6. Case study conditions

4.6.1. Sampling

Multiple-case design leads to more successful studies than single case designs (Yin, 2009) and even if you can do a ‘two-case’ case study you have the possibility of direct replication and that the conclusions arising from two cases as with two experiments will be more powerful than those coming from a single case. However, Creswell (2008) asserts that it is typical in qualitative research to study a few individuals or a few cases

to provide an in-depth picture of the complexity of the case because the overall ability of the researcher diminishes with the addition of each new individual or site and a large number of cases can become unwieldy and result in superficial perspectives (Creswell (2008, p. 217).

Two different small groups of participants were purposefully selected to best help to understand the phenomenon (Creswell, 2008) and the intent was not to generalise to a population, but to develop an in-depth exploration of the phenomenon (Creswell 2008, p. 217). To purposefully or intentionally select the individuals (Creswell 2008, p. 213) a pre-study screening questionnaire was used to ascertain participant interest in the subject, previous use of technology for the subject and level of education in the subject (Appendix 8). While the two groups selected may be seen as opportunistic sampling in that the researcher had relatively easy access to them, the criteria to differentiate each group sought to include a 'typical sample' and use 'maximal variation sampling' in order to present multiple perspectives to represent the complexity of our world (Creswell, 2008 p. 214)

The limiting factors of this study are the numbers and types of cases which were dictated by access to site, access to participants, the short time available and there being only one researcher.

4.6.2. Participants and location of study

Group 1 consisted of 3 males and 2 females in the age range 18+ to 35 and all could be classed as intermediate to expert users of technology. All of the participants were in employment and acted as mentors to 15 and 16 year olds using technology in novel ways. The researcher was acquainted with this group on a professional basis as a volunteer mentor, once a week during school term, over 15 months. This group participated in the study in a central location which was fully equipped with a personal computer for each participant and access to the web. This facility was made available freely to the researcher for a full day on Mondays and from 3pm on Tuesdays to Fridays inclusive.

Group 2 consisted of 1 male and 1 female, both in the 50+ age range, with limited computer expertise; email, simple web searches and some word processing. These participants were older with possibly more and richer life-experiences than the younger

participants in the first group and they both work on a part-time basis only. These people participated in the study in the privacy of their own homes and were not directly observed by the researcher. The participants were personally known to the researcher.

4.6.3. Consent and pre-study questionnaire

Before implementation participants were emailed a softcopy of the Informed Consent form for examination. The researcher provided a hard copy of the pre-study questionnaire and the informed consent form to both groups and these were completed before the first day of implementation.

4.6.4. Researcher Profile

The researcher has worked in the computer industry for more than fifteen years developing and managing projects delivering custom software solution to business. She provides computer training in common applications to small groups and individuals in business. She studied art at Intermediate and Leaving Certificate level in secondary school.

4.6.5. Data Collection Instruments

Multiple sources of evidence enables triangulation and corroboration or otherwise and enhances validity of the study and its findings (Yin, 2009) where data can be cross-checked to limit the chances of bias in the methods or sources employed (Grix, 2004).

Instrument	Data Set	When used	Appendix
Questionnaire	Base-line data	Pre-study screening	8
Observation protocol	Researcher observation & reflection	During & after implementation	11
Audio	Researcher -participant dialogue	During implementation	12
Interview Protocol	Interview Data	End of session & end of study	13
Database	Participant generated artefacts	During implementation when examining an artwork and during data analysis	14

Table 5: Data Collection instruments and Data Sets

Observation allowed the researcher to record brief objective facts about events witnessed in context and in real-time (Yin, 2009). Observation in the field enables researchers to see things that might be unconsciously missed and to discover things that participants might not talk freely about in interview situations (Cohen et al, 2000). The observation protocol used in this study may be considered as ‘unstructured’ as apart from the date, location and research question typed at the top of the blank and allowed the researcher to remain open to all observations and to postpone decisions on the significance of these until they emerge during data analysis (Cohen et al, 2000, p. 306)

The Interview protocol was used as a guide for conducting semi-structured interviews with participants. An interview provided the opportunity for the participant to describe their experience and for the researcher to probe deeper if necessary. Open ended questions provide access to interviewee’s views, interpretation of events, understandings, experiences and opinions (Byrne, 2004 as cited by Silverman, 2006 p.114) and allowed the researcher to explore ideas as they emerged.

4.7. Implementation

4.7.1. Pre-Implementation testing

Implementation was deferred for a week after Christmas for Group 1 due to the severe weather conditions and closure of the centre. Two of Group 1 participants ran the application from home computers and verified that all worked fine in Google Chrome and Microsoft Internet Explorer. The following week the researcher carried out multi-user testing at the centre to ensure accurate data storage of participants work in the database and the researcher also tested the range of the audio equipment in situ to ensure no loss or distortion of audio data which would be required for participant observer data and interview data.

4.7.2. Pre-Implementation introduction to participants

The researcher met with Group 1 in early January 2010 and Group 2 individual separately for a brief session to collect the consent forms, pre-study questionnaires and to describe the purpose of the study, how it would proceed, how the audio recorder would be used, what the participants would be doing. This was followed by a brief demonstration and instruction in using the application *ArtThinking*.

Each participant was assigned a unique username (the name of an Artist) and a unique password and they logged in to the system to try it out. The researcher gave a brief overview of western art conventions (art elements and design principles). A Glossary document was requested and the researcher posted this to the web for retrieval by all participants.

4.7.3. Implementation

Implementation took place during January and February 2010. For Group 1 participants each session lasted one hour and each participant completed four hours.

The instruction given at the first session was to select the dark picture with the people in it (Las Meninas) for study and to complete the Initial Reaction and to continue on to the Formal step in the art criticism process. Participants were told to work at their own pace and all thoughts and interpretations are valid and not to be concerned about right and wrong views about an artwork.

At the second session the participants were instructed to carry on with the first artwork and to finish the Formal step and proceed to on to the rest of the steps in the process as best they could. They were told that the next artwork to study was the Black Square and to move on to it when they were ready. Participants worked at their own pace and so some were working on different artworks than others. The researcher informed the participants that if there was time that they should select an artwork of their choice from the gallery for further study.

At session three participants were instructed to continue working on their second artwork and the researcher opened the link on participant's computers to allow them to view notes on artworks recorded by other participants in the study. One participant finished the study after session 2 and a semi-structured interview was recorded with him.

Group 2: The researcher instructed the participants to study Las Meninas first, Black Square second and then to select an artwork of their choice from the gallery if there was time. The participants worked alone for a minimum of six hours and the researcher was available by phone and email if necessary. The researcher met with each participant

mid-way through the study to check progress and at the end of the study conducted a semi-structured interview with each participant.

4.7.4. Observation

The researcher observed all sessions at the centre for Group 1. Initially the researcher adopted a non-participant observational role to objectively view the behavior, actions and sequence of actions taken by the participants as they interacted with the application. As the study was underway the researcher adopted a participant observer role to gain insight from the subjective perspective of the participants (Creswell, 2008, p. 223) and rotated between the subjective and objective observer roles enabled the researcher to make field notes about what happened (Creswell, 2008, p.225) and to log thoughts and hunches as they occurred to the researcher.

4.7.5. Audio of Interaction between researcher and participant

The researcher interacted with individual participants to check progress, if help was needed and to remind them to save their data periodically. These interactions were recorded on the audio recorder.

4.7.6. Interviews

At the end of each session the researcher conducted an informal interview with one or two different participants to get their reactions and thoughts about the intervention. The participants talked about their feelings about the painting, the notes they typed in the database, what features of the application they had used and why they used them and their general feelings about the experience.

4.8. Data Analysis

4.8.1. Preparation of data and preliminary analysis

The first step in data analysis was to organize and prepare the data for analysis and this involves transcribing interviews, typing up field notes, reviewing artifacts produced in the field or sorting and arranging the data into different types depending on the sources (Creswell, 2009). To establish the construct validity and reliability of the case study evidence the researcher created a case study database (Yin 2009) in the form of a series of Excel worksheets. Initially the database contained all the raw data gathered from the

multiple data instruments (Table 5) except for the database records generated by the participants, as these were extracted into PDF/Portable Data Format documents. To obtain a general sense of the information the researcher read through and reflected upon all of the prepared data before beginning a detailed analysis (Creswell, 2009 p. 185).

4.8.2. Data Set Preparation

Following each session the researcher reviewed the observation protocol and made reflective notes about the intervention and uploaded the audio recordings to a laptop after each session. Listening to the recordings after each intervention afforded the opportunity to reflect on the session and to note ideas that arose. Initial listening to the recording elicited a general sense of the experience from the participants perspective and while indications of answers to some of the of the research questions were evident further listening and deeper analysis would be required to gain an in-depth understanding of the learners experience before interpretations could be formalized. The interviews were transcribed and stored in the database.

4.8.3. Coding and Themes

The basic coding process in content analysis is to organize large quantities of text into much fewer content categories (Weber, 1990). Categories are patterns or themes that are directly expressed in the text or are derived from them through analysis. (Heish, Shannon, 2005) The salient characteristics and processes to support both the participants and the research questions were embedded into *ArtThinking*. This enabled the researcher to adopt a ‘directed content analysis’ approach whereby an initial list of codes and categories was devised using existing theory or prior research to develop the initial coding scheme prior to beginning to analyze the data (Kyngas & Vanhanen, 1999) as cited by Heish and Shannon (2005)

Analysis commenced with the researcher highlighting data and the appropriate keywords or codes were input to the adjacent column in the spreadsheet. As the analysis proceeded the researcher tried to remain open to new ideas and the initial code and theme list was revised and refined as codes and themes emerged from the data (Heish, Shannon, 2005 p. 1286) therefore a rich understanding of the phenomenon akin to that yielded by conventional content analysis was not precluded.

While computer tools assist in the initial analysis, in-depth post-computer analysis and interpretation was required to understand and interpret the data and to make inferences from the data (Geisler, 2004; Yin, 2009) Using the database eased cross-checking and data triangulation as all of the data was easily accessible in one place and it also enabled the researcher to maintain a chain of evidence to increase the reliability of the information presented in the case study (Yin, 2009)

Data samples are included in Appendix 12-15

4.9. Summary

This chapter outlined various approaches to research, identified the rationale for the case study approach and described the research design and implementation conditions. It concluded with an outline of the data analysis procedures.

The following chapter presents the findings from the data analysis processes.

5. Findings & Discussion

5.1. Introduction

The purpose of the study is to explore and evaluate how technology can be used to enhance perception of art works by the novice when engaging in art criticism.

The previous chapter described the research methodology employed and the data methods (Table 5) used for the study.

This chapter presents the findings from an in-depth analysis of the data collected from multiple sources; observation, participant-researcher dialogue, participant interviews and participant generated artefacts. All participant constructed artefacts are available for review (Appendix 15)

Analysis is carried out in light of the themes emerging during observation, reflection and analysis of the data sources and research questions posed. For each theme the findings are presented followed directly by discussion. The principal themes analysed are:

- Questioning
- Guidance through the enquiry process afforded by the embodied framework
- Development of visual concepts and skills
- Enquiry
- Critical Thinking
- Interaction
 - With the application
 - With the facilitator/researcher
- Participant subjective / personal feelings about the experience

5.2. Questioning

5.2.1. Findings

Analysis of **interviews** with participants revealed that the questioning strategy was a key factor in engaging participants in the experience. Transcript from a **semi-structured small focus group** of participants **2** and **6** highlights this:-

P6: I would have written almost nothing without the questions. I wouldn't have known where to start, without the help of the question, so.....

R: Ok

P2: Yeah, the questions are good. I think even the way you start off with like really basic things like Colour, Line, and you know Shapes... you're not.... you don't have to really interpret those to any depth and that you get you.... sort of get into it.

R: Yes, it's about looking first. So then if you had to do that first, does that get you into the process?

P2: Yeah, and also the questions, they're not asking for like..truth, they're just asking for your opinion of what you see at a very broad level, so you don't feel like your obligated to be right about anything

P6: Yes just the basic starting bit about the colour... from the very beginning and having invested that bit of time, by the time it got to the historical background stuff I was actually interested

Similarly, data from an **interview** with Participant 7 reveals that he also found the Questions helped him to engage:-

P7: The prompts help me to look more closely and appreciate more... maybe if it's a painting you didn't like (I mean love the one I was doing) but if you were looking at something that you didn't like then you do need ... you do need to know how to approach looking at it.

I got on very well and I did find it a great experience and definitely having the questions there, which I read first and then looked at the painting. And definitely help to find things in the painting that I probably would never have eh probably noticed.

Similarly data analysis of an **interview** with participant **5** found the questioning good - but that sometimes they *repeated* themselves. He states:

P5: I found that sometimes the questions repeated themselves

R: yes

P5: and as a result I was answering a question too early and when I went further down in the list I saw that I answered that question earlier so how am I going to

R: so did you answer is differently

P5: but then I was going back , See, sometimes you'd answer the question differently because you had seen something different.... I think that's fair

R: good, yes

Researcher reflection notes P5 engagement and changing perceptions over time.

Similarly data analysis of an **interview** with participant **3** (art history and appreciation at leaving certificate level over ten years ago) also found the questioning helped, but found the questions *specific to an artwork were better*. He states:

P3: I thought the prompts were good

R: these are the questions?

P3: yes, cos when I studied it you were told more or less,... told the meaning, the good things and bad things about the painting

R: Whereas you weren't told a lot here were you?

P3: no. basically.. basically you were forming your own opinion

later he states that:

P3: the Questions in the animate were better though cos they were about the picture I was looking at [referring to Las Meninas]

5.2.2. Discussion

Analysis of the evidence presented from the interviews shows that the questioning strategy employed in the *ArtThinking* played a major role in engagement with the artworks.

Participants 2 and 6 commented on the different types of questions, the easier or more basic ones at the start had helped them to initially engage and Geahigan (1998;1999) emphasizes the need for different types of questions.

Participant 3 commented on her own learning experience, or how she was taught art history and appreciation at school and a search of the literature reveals:

The traditional approach in education to understanding art is the transmission of meaning from the teacher to the pupil (Atkinson, 2006) and that scant attention is paid to interpretation as a fundamental component within pupil's visual arts education (Charman & Ross, 2009). This leaves little room for students to learn *how* to go about interpreting a work of art.

Making sense of art is not a trivial task and Hubbard (2006) asserts that exploration of an artwork is a complex phenomenon grounded in human experience. Feinstein (1989) claims it's the knowing *how* to see that is fundamental to art criticism. In light of varying degrees of perceptual and intellectual capacity, incorporating questioning strategies and emphasising the need for contextual information (Anderson, 1993; Geahigan, 2002; Conn, 2008; Sandell, 2009) fosters these skills, promotes enquiry, leading to enhanced understanding. Geahigan (1999;2002) stresses that the types of questions should be varied and Conn (2008) states that the questions can be used repetitively and with a purpose and complete understanding of the reason for using these skills.

Corroboratory evidence that participants answered the/some questions can be found in the artefacts created by participants.

5.3. Framework / guidance through the process

5.3.1. Findings

Analysis of the artifacts produced and interviews with participants highlights immersion in the process with the focus on content and deepening perceptions as participants are lead through the different strands of the process. **Interview with Participant 4** he stated:

P4: and that's where I think the structure helps as well, because an you didn't realize how.. ..not that the length of time mattered... but, just how much you were looking and thinking , you know , because of the structure was there it really helped you to stay focused on the painting instead of just wandering off it.....

especially for the 'black square' . I think I wrote in it in my thing I would probably just look at it and walk away in a gallery whereas the structure really forced me and by the end of it I thought, mmm Yeah, it's still probably not something I would really like but it definitely got me interested. I would look at other paintings from that style, the Suprematism, or whatever it was called em...

Similarly, in **interview with participant 7** she stated she had visited the Hermitage and had probably walked by Black Square but now states:

P7: I know if I saw it in a gallery I wouldn't pass it by or any painting just because it doesn't appeal to me initially. And that if I look at it from the various prompts let say in this, I certainly would've looked at it from a different perspective and got more out of it.

Interview with Participant 5 agrees:

P5: its essential. you know it's like when you're going on holidays you create a list of things to do ...

Interview with Participant 1 concurs and emphasis the value of structure for the novice:

P1: I felt that breaking it down into Form, Theme, Context that ... I felt that was very helpful to me. Especially for somebody who wants to learn about art,.... not everything thrown at you at the one time,.... you know, that its structured, its categorised , and it just gives you enough space.....I liked the linear structure.

Analysis of the **artefacts** for participants 4,7,5 demonstrates engagement with the process and P5 obviously researched contextual information and ran out of space! – and while Significance is not filled in, opinions can be found in various places and the context section below:

First painted in 1915. Moscow, Russia Kazimir Malevich. He was the first born of 14 children and lived a very simple and peasant lifestyle for the first 15 years of his life. Baptised a Roman Catholic by his Polish parents. This painting was created when he was 35 years old and was the beginning of Suprematism which was an Art movement based on fundamental geometric shapes, in particular the square and the circle, in 1915. He was not particularly liked by critics and stalinists alike. This did not bother him one little bit. He probably painted it for himself. Most likely because it was the first of its kind. It would definitely have caused huge controversy and because he wanted to paint it. This artist would have become a genius no matter where or when he was born. It just so happened that he was born in Russia. He could easily have been born in Poland. I think this painting owes more to him been a radical than anything else. One of his paintings of geometric shapes entitled Suprematist Composition and created in 1916 was sold at Sothebys for 60 million dollars in November 2008. Not bad for a simple russian pea

5.3.2. Discussion

The embodied art criticism framework in *ArtThinking* is underpinned by the pedagogical models in the literature (Anderson, 1999; Sandell, 2009) which essentially provided a learning roadmap for the learners. Anderson (1993) claims that providing a methodologically consistent exploratory model of art criticism develops student's knowledge of art and the critical thinking skills for the development of meaning.

Observation by the researcher noted that participants did not seek guidance on what to do or, where to start, where to go next as they were guided seamlessly through the art criticism process.

Researcher **reflection** also notes P7 insightful statement – Whatever about an artwork you do like, it's certainly not easy to engage with a painting you don't particularly like and a framework (combined with a questioning strategy) assists with this.

With reference to **P4 comment** on 'Black Square'; this was intentionally selected to disrupt and challenge the participant's belief about art (Geahigan, 1998) and elicited interest, feelings of annoyance and frustration. But it did cause participants to look critically and examine the painting and to think critically. As Hmelo-Silver et al (2007) would attest, it 'rocked the boat' and forced engagement with the framework.

5.4. Development of Visual concepts and skills

5.4.1. Findings

Analysis of the data shows that participant's awareness of some of the visual concepts was heightened, evidenced by the artifacts constructed and in this particular **interview with Participant 4**, she describes how perception of the artwork changed as she became aware of the art elements colour, light and shade and this occurred through using the *Black and White tool* /image beside the original picture.

P4: Well when I first looked at Las Meninas eh, I think I described it as dull and sort of not very bright . To me the colours weren't very bright . But once I looked at the black and white and compared them then it kinda made me realize ok no, there's actually a lot more color here than on my first impression, so it made me look closer at the colour and the contrast between the light and shade and that.

Similarly, other participants explored the art elements and how the principles of design are applied. For example, **dialogue Researcher - Participant 3** explores the artwork using the *Line tool* to see how content is organized and where the eye is being drawn to:

P3: em.. I was trying to see where the focal point would be. And trying to see any kind of shapes he has created within the picture and where he is trying to get the viewer's eye to go to

R: good, and is that helping you to focus on something ?

P3: it's helping me because I'm kinda dissecting the painting and I'm seeing more by looking at sections of it instead of the whole thing
I'm noticing moreand how the characters are positioned in relation to each other as well

Observation of participant 1 shows that he is using the *Zoom* tool for closer inspection of finer details combined with the *Line tool* to discern repetition and pattern drawing the eye up and across the painting and **researcher-participant1 dialogue** shows:-

R: what were you saying there? You wish that...

P1: I almost wish that I could save the image of the picture that I've put the lines on because it would help me to try and describe what I'm trying to say here

R: ok, I see you have dissected the picture

P1: ... well I've drawn the lines in the directions that the objects are... and you see the figure there... is getting gradually bigger and bigger

Researcher **observation of Participant 6** using the glossary provided and **dialogue with participant 6** he demonstrates growing awareness of the visual concept Line and awareness of movement through the artist's use of diagonal lines. In this instance he is simply looking at the artwork and not using any of the interactive tools.

P6:some of the phrases like what does line, texture and form mean, I don't know, so I just checked the glossary to check on them so it's making me think about things I wouldn't have thought about otherwise definitely, em....

P6: apparently he can fly [referring to the artwork Hermes]

R: but I saw that you had mentioned that in your Reaction

P6: yeah

R: without thinking about it you had talked about flying

P6: it looks like flying

R: and what makes you think that? What is the artist doing?

P6: the directions things are coming off - things are coming down as well as up

R: yes, exactly

P6: I mean going in that direction [moving hand up from right to left across picture]

R: yes, so that direction you're pointing... sort of diagonally

And Participant 6 goes on to demonstrate growing awareness of balance and placement of content:-

P6: and I used the line tool as well, just to...all of the action seems to be in the bottom half - just I wouldn't have seen that before [artwork Las Meninas]

Interview with participant P7 also demonstrates awareness of principles of design (balance/symmetry)

P7: Enlarging the painting and dividing it and seeing.. although it did look symmetrical to me in the beginning and that everything was happening on the lower part, when I zoomed in and looked at it more closely I saw that there was a lot more happening than I had notice before.

Observation and researcher-participant dialogue with participant P2 also demonstrates awareness of Space using the Animate tool for Las Meninas)

R: Did you use the animate?

P2: I had a bit of go. Actually it's interesting to see the space, the use of space. Cos obviously you're starting off with it blank.

5.4.1. Discussion

Analysis of the findings reveal that there is some engagement with the visual concepts. That's encouraging as these skills take practice and are build over time and with experience looking at artworks..

Form or the 'shaping of materials and ideas into a coherent meaningful pattern' (Richmond, 2009) shows the minds ability to create order, order is the basis of making sense of or understanding the world (p.96).

There is much debate in education on the value of the visual concepts. Moore (2005) asserts that visual skills are necessary skills for appreciating or understanding the significance of the way things look and can be taught. Even Sandell (2009) retains what she terms the 'infamous' visual concepts because it represents the artist's many

structural decisions embedded in the creative process and along with Theme and Context provides a more balanced approach.

Yet formal analysis is not a given in secondary schools today; a recent *small* study (de Sousa Vianna, 2009) cites a lack of appreciation and application of visual concepts and skills by teachers in secondary schools in the UK and Brazil, in Critical Studies education.

A glossary document with short descriptions of the visual concepts was provided to participants. Both of the remote participants reported reading and using the glossary but only 1 of the observed group said they did.

Yet, there is corroborating evidence of observations and researcher-participant discussions in the artefacts generated by the participants.

5.5. Enquiry

5.5.1. Findings

Internal enquiry was facilitated by looking at the artwork and using the toolset to explore it, along with personal thoughts and past experiences of the participants. Minimal information was provided in the application *about* the artworks. Participants were compelled to carry out their own research for external/contextual information to make more sense of the paintings.

Researcher observation of Group 1 confirms that participants conducted research on the internet and **Interviews** with the **remote participants** reveals this also. Analysis of artefacts constructed corroborates this as contextual details are recorded in the Context area but also referred to in other areas.

Analysis of **Interview** with P5 highlights research / web searching

P5: textures, so it's hard, there's a huge amount of things now.... So and then of course you go into the net and read a little bit more about this person Malevich or whatever his name is. That guy was incredible , eldest of fourteen children born in Russia somewhere parents were polish he's Roman catholic you know and of course it all starts to mean a little bit more to me....

Similarly, an **interview** with participant 4 highlights research was done:

P4: oh yeah , I didn't go out on to the Internet until the last, like the context and the significance
R :good
P4: so I would have worked through most of the others first of all on my own
R : did you find then that that made it sort of a richer or more
P4: yes, yes
R: it made more sense to you , the fact that you went out
P4:yes . In some ways I was reluctant because I really wanted to figure it out for myself but at the same time I wanted to know what eh...
R: others?
P4: what others thought and other opinions were of it and also because I'm an art novice how this specific artwork fitted into the grand scheme of things and how the artist had influenced others are what kind of timeframe they were working in and that sort of thing

Researcher observation noted that all participants in group one conducted searches on the internet. Analysis of the generated artifact and interviews with the two remote participants reveals that searches were carried out.

5.5.2. Discussion

Participant 5 noted that as he learned more contextual details, for example, about the artist's life that it all started to mean a little bit more to him. The literature shows that contextual information can help us to understand the artwork clearly Sandell (2009). Feldman (1972) is not concerned with external information for interpretation art, but other models in the literature acknowledge external/contextual information (when, who, what, why, for whom etc.) adds perspective and helps in understanding the artwork.

Interestingly, Participant 4 talks about deferring research until the Context step, which is as Anderson (1999) advises as it allows the viewer to develop their own views first.

It is difficult to say exactly how much time and the level of research that took place as participants were not compelled to type in everything they found and in fact were limited to 2000 characters in each step, but all participants felt the need to, to engage with the artworks. Enquiry was not limited to just the painting under study and review of the artefacts reveals that some participants viewed other paintings from the same artist or the same era, again concurring with the Sandell model.

5.6. Critical thinking

5.6.1. Findings

Analysis of constructed artifacts revealed evidence of critical thinking. 3 samples refer to Las Meninas and the last 3 to Black Square. The extracts below are from the Significance section, however the researcher notes that opinions appear in context and theme sections also.

P4: Didn't like it at first but the more I look at it and think about the theme and the context the more it grows on me. Yes I think it deserves a place in history because of the influence his style seems to have had on other artists eg. Van Eyck and Picasso

P3: I do like this painting because there is a lot going on in the scene, and every time I look at the painting I spot something different. It fascinates me. There is probably a hidden message but I am yet to figure out what.

P7: The artwork appeals to me because of the depth and delicacy of the colour. Comparing to our era i could not imagine so many people looking so content with one another. without a doubt it should be recognised for its quality and beauty

P1: Initial Reaction: A black square with a white border. Makes me feel like I could do this myself without too much difficulty.

P1: Significance: (having complete the process and his research)
I like it because it is more than just a black square. After thinking about it and following the questions I realise that it is highly significant of the time it was painted. I think if I have learned anything is that a painting needs to be analysed in its context and in particular the time or era of its creation.

P6: I don't really like this. I wouldn't want to look at it. I hope there is a story beyond what is visible. If not, its just a square. If i saw this in a gallery, id think Black Square and id keep walkin

P3: I still don't like this artwork.

5.6.2. Discussion

There are many definition of critical thinking, Conn (2008) cites the following:

Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.

The extracts above are from the Significance section of the artifact where the participant reflects on the process and the significance of it to them, the significance of the artwork. They evaluated the painting differently, using different criteria; artistic influence, recognizes multiple meanings still to be uncovered, aesthetic qualities, shifting perception.

The extracts do demonstrate critical thinking at varying levels, for example participant 3 acknowledges that she knows she doesn't know... Participant 1 perceptions altered and deepened and participant 4 has moved beyond the painting itself to the wider influences of the artist / artwork on other artists.

Participant 6 and 3 had difficulty engaging with the artwork, largely due to the fact that they didn't like it in the first place, but reading their completed artefacts revealed that they had formed opinions about possibly that time in history in Russia.

An insightful comment below from **participant 2** during interview demonstrates the difficulty sometimes in articulation of thoughts about art, as Eisner (2008) reminds us that 'the limits of language are not the limits of cognition. We know more than we can tell.'

P2: Like, but even at the end the question is like "How does it make you feel"... I still find even after all the analysis I still find it very very difficult to actually explain why I like it. Even after having studied it and gone into detail...

This is the first time that many of the participants have seen the artwork and it takes time to engage and studies show (Hubard, 2006) that understanding deepens with a second encounter.

5.7. Interaction

5.7.1. Findings

Researcher observation noted that participant's interaction with the application was largely driven by the framework approach which stepped them through the processes of art criticism, but it was chiefly the questioning strategy that dictated what the participants actually did next. While all were striving to achieve the same goal a variety of responses were observed as participants responded to the questions posed:

- sitting quietly, looking and thinking
- interacting with the artwork using the tools provided
- reading the glossary (to help answering question in the Form strand)
- typing in responses
- conducting web searches and reading.

Researcher reflection is in the form of a question. How can the traditional classroom education cater for the variety of approaches, learning styles and activities that people engage in and allow the time and level of research required to make sense of a painting?

5.7.2. Interaction with the facilitator

In the main the facilitator adopted an observational role and interjected in certain situations:

- to assist with technicalities of the application
- to check if help was needed and guide through questioning or offer assurance

5.7.2.1. Assisting with Technical details

Training in the use of the application was a brief demonstration at pre-implementation stage and therefore participants were unsure of how and when to save data. Interaction was brief and samples are as follows:

<p>P4: So, I'm wondering how to save my initial reaction R: ok, are you happy that you've put in all that you want to say? [Initial Reaction cannot be changed once saved] P4: Yeah R: ok, click the Next arrow and then click the Save button on the toolbar</p>

Responding to Participant Question: “Yes that saves all of your data, for all strands”
“Yes, you can leave the document (Glossary) open and switch back and forth between it and the artwork by selecting option in the taskbar”

5.7.2.1. Checking if help needed

The facilitator/researcher intermittently asked participants if they needed help and if the participant responded by talking about the painting the researcher engaged with them mainly through questioning and making suggestions.

Analysis of **researcher-participant dialogue** demonstrates evidence of change in *participant behavior in response to researcher questions and suggestions.*

Participant 1 pauses to actually look for content in response to researcher question:

R: and can you see the matador or the bullfighter?
P1: yeah, there he is down there
R: Is he?
P1: I think so
R: mm. [silence] Can I suggest you move closer - there's a lot going on in this.
R: Do you know what sort of a hat a matador/bullfighter wears?
P1: Sort of... eh black, spanish... maybe a wide rim... eh..
R: ok, so take a close look at this area ...[pointing in general area of Venus de Milo
[Participant uses the Zoom and then long pause while participant looks]
P1: Does that look like a nose, ... face..... I can definitely see a green tie now....
R: good
P1: So..... that's the matador then.....[looking, thinking.....]
R: Yes, keep looking around that area - maybe zoom in might help.....
P1: I can see it now.... And what's the red?..... A jacket, a cape
R: so you are starting to see him now...
P1: I didn't spot that till now.... [sits thinking]
R: don't forget to type in your findings

Figure 23: Researcher-participant P1 dialogue

Researcher-participant dialogue with participant 2

P2: Is that too much written for initial reaction?
R: Well it's your initial reaction is I think yeahHow long would you normally spend thinking about something ..as an initial reaction ?
P2: [thinking.....] Well I suppose you see this is getting me to focus on it a bit more than perhaps I would em... on this particular type of painting
R: ok. Well if you feel you've given is enough then click next
P2: yeah I think I've given it enough

Researcher-participant dialogue with participant 6 reveals lack of confidence and researcher assists by providing assurance.

R: how is it going ?
P6: grand . I'm not sure if my eh opinions or reactions are , em , in any way relevant but this is quite new to me
R: but yeah, they are
P6: I'm putting down what ever pops into my head and seeing if it makes any sense at the end
R: ok, and the things that pop into your head ...Is it because you are looking at that picture ?
P6: em.. I'm certainly looking at it more ...normally if I look at the picture I just look at it and decide straightaway whether I like it or don't and I would never give it any thought so
R: ok
P6 :so I'm just going through the questions and trying to follow them and they're kind of making me think of things that I would just never have thought about
R: good, good

5.7.3. Discussion

ArtThinking is a learner-centred application promoting enquiry, as opposed to the traditional teacher-student classroom identified by Atkinson (2006). That being the case, there was minimal talking by the facilitator/researcher except to check progress, or help out or encourage and participants were busy researching and typing in / formulating their thoughts.

Does less teacher talk and more learner enquiry provides for a real learning experience? Selden Barnes (2009) considers an alternative approach to art education where students write down their thoughts and interpretations and this forces reflection and justification of findings and deeper insight to the artwork.

5.1. Participant subjective / feelings

During observation of group one participants and reflections while listening and transcribing audio footage of all participants, certain themes emerged in relation to participant's feelings about the experience and at the final interview if participants had not expressed it already they were asked 'if you could think of three words to describe the experience what might they be'?

General themes emerging from these data sources covered many areas, such as apprehension, challenge, education, new, learning, interesting, enjoyment, engagement, how time flies, lack of confidence, growing confidence and enjoyment, frustration, annoyance.

A small sample is shown below to reflect the diversity of participant's reactions to the experience.

Dialogue, P1: grand, I really like it. (in response to researcher asking how is he getting on)

Dialogue P2: [thinking.....] Well I suppose you see this is getting me to focus on it a bit more than perhaps I would em... on this particular type of painting

Dialogue, P3: I'm noticing moreand how the characters are positioned in relation to each other as well (growing engagement)

Interview, P4: Interesting, educational, different

Interview, P5: Feelings : brilliant, initially apprehensive, unsure, definitely was , a bit, I was a bit apprehensive if you like to call it that, in the beginning

Dialogue P6: grand . I'm not sure if my eh opinions or reactions are , em , in any way relevant but this is quite new to me
And on another occasion (looking at Black Square) –

Yes [tone of the yes was very definite]. [both laugh]. I'm finding it very frustrating..

Interview, P7: I got on very well and I did find it a great experience

P6: Yes just the basic starting bit about the colour... from the very beginning and having invested that bit of time, by the time it got to the historical background stuff I was actually interested

The researcher interpretation is that the feelings can be attributed in some part to the fact that thinking and learning was taking place. The literature shows that interpreting art is the most challenge task for the viewer (Feldman, 1972) and Hubbard (2006) describes the exploration of art as complex phenomenon grounded in human experience.

Learning is influenced and mediated by many factors, personal experiences and values, interactions and interrelations (Freebody, 2003; Change, 2006) and some people find it more or less difficult than others. It is noted that the application did encourage engagement and confidence grew, for example, refer to participant's 6 comment above (the last one listed above)

5.2. General Discussion

Researcher interpretation of the study is that engagement in the process was afforded mainly by the questioning strategy and the structured framework approach. Adopting a Socratic approach is laudable to inspire learning by enquiry but it is important that the novice has access to sufficient resources for research, time to carry out the enquiry and assimilate the information and to know why they are doing it, or feel that it is a worthwhile activity to engage in.

The framework approach broke the problem down into 'manageable chunks' and categories, for example, Form, Theme, Context and the participants knew what they were supposed to be looking for and the reason why, or what problem they were trying to solve, for each category. For example, in Theme the questions relate to what the artwork means and they were prompted to think if it reminded them of anything, other paintings, music, any subjects etc. in order to forge some links between their own life experiences to the artwork. It must be noted that there is little evidence in the artefacts generated by the participants during the study that this was the case. Whereas in the Context category, the questions are *about* the painting and they relate to discovering facts, for example, who painted it, when, for whom etc.

Complementing the questioning strategy, the toolset provided a means for intrinsic exploration of the artwork and interactive engagement with the artwork. The most valued tools seemed to be the Zoom and Line tools.

The simple Line tool was used in a variety of ways, for example to explore pattern, symmetry, dissect to explore specific part of the artwork etc. Zooming allowed close inspection of finer details. These tools are generic, in that they can be applied/used to examine any artwork

The Animation tools were specifically designed for individual artworks and while they were used by some to examine content placement and space the researcher must now question whether the time and skills required to design specific animations yields any benefit above and beyond the generic tools.

The pen tool was used by only two participants, to record the fact that they could not organise the content any differently or better than it already was in the artwork. Also, the scaffolding levels were not used.

A fundamental aspect to the experience was internet access and availability of resources on the web, without which research could not have taken place.

Two participants used *ArtThinking* remotely and both related that they spent at least six hours using it and that they used it sporadically, as they had free time. This facilitated integrating the experience/learning into the normal everyday life of the participants just as is with watching television or reading a book.

5.3. Summary

This chapter presented and discussed the main findings in relation to participant's engagement with the artworks, when using the technology.

The next chapter concludes the study and highlights limitations of the study and recommendations for further research.

6. Conclusion

This purpose of this study was to examine how technology could be used to enhance perception of artworks by the novice when engaging in art criticism.

Results of the study suggest that engaging with *ArtThinking* can foster development of the critical skills to effect enhanced perception. The embodied framework guided the learner seamlessly through the process, from Initial Reaction, through Form, Theme, Context and finally Significance. Adopting a questioning strategy throughout and varying the type of questions for each strand elicited interest and engagement and helped to guide and focus participants. Questioning combined with the toolset for exploratory interaction with the artworks (the zoom, line, black & white image, and animation, background colour changer) engendered development of the critical visual concepts and skills and enquiry. Minimal information about the artworks was provided in the application and this compelled external enquiry and this research was facilitated by accessing rich and varied content on the internet.

Teachers may be interested to note that learners in this limited study appreciated working alone, having enough time to construct and refine opinions and that typing their findings into the application helped them to formulate and clarify thinking. Engaging and connecting with artworks was not a trivial task but rather than being given widely held views and interpretations about artworks, the participants only showed interested in sharing their thoughts and viewing what other participants had to say after their own personal study. Some felt that a facilitator may be helpful for interpretation of web-researched information and mediation of post-study discourse.

Designed as web application not only afforded access to volumes of data but also facilitated learning in context, where the two remote participants reported using the application for longer periods (sometimes looking at other artworks outside the study) and as time was available.

6.1. Limitations

This short study did not provide enough time to use and assess the different scaffolding levels whereby questions and sequencing of the process were altered.

Group discussions about an artwork did not take place. In hindsight, this would have provided insight into participants real understanding of the process itself and the artworks and would have provided the opportunity for refinements of opinion and a shared understanding.

Due to time constraints the researcher devised specific questions for only three of the artworks and standard/default questions applied to the rest. Likewise, specific animations were only developed for two of the artworks. The evidence suggests that only some of the participants used the glossary document and possibly missed some useful help and links contained therein to enhance their study of the artworks.

6.2. Recommendations for Further Research

Further study is necessary to address the limitations discussed above.

Designed for use outside of formal education, perhaps a study of usage by groups, for example, an Art/book club, in the library or in the gallery may be worthwhile.

Investigate the affect of including multimedia - audio, video, hyperlinks, participant upload/download etc.

The application could easily be adapted for other subjects, for example, photography, music etc. as the data (artist, artwork, questions and participant generated artefacts) resides in a database.

It could also be adapted for mobile technology (as suggested by one of the participants) for example, used while in the gallery.

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Appendices

Appendix 1: Feinstein -AC

Feinstein (1989) Metaphoric Interpretation

Feinstein suggests the viewer asks himself ‘What else, other than the obvious, can the painting stand for’. He proposes the viewer notes his dominant impressions and then use a somewhat complex technique of clustering (an associative search strategy) (pp. 46-48) to reveal connotative threads:

where the viewer builds a map (circles and connected lines) with the circles containing each of the main components of the artwork, descriptors of all art elements are noted (in circles) around each component (e.g. warm-colour, curved-lines) and viewer thoughts/feelings aroused around these (e.g. happy, anxious). The viewer then constructs a metaphor or statement based on findings in the map.

Appendix 2: High level FTC model details

A clear and minimalist homepage (Riley-Huff, 2009) establishes appeal and the theme, behind which an economy of words on the main menu explains site usage to the viewer.

When you look at a picture for the first time, what do you see?

Does it remind you of anything? What thoughts or words spring to mind?

Do you notice the colour, texture or perhaps the mood of the painting?

Figure 24: Items considered in Initial Reaction

Form:

Here we see the artist's structural decisions.

These are: the selection and use of Art Elements and how these have been combined and organised (principles of design) to portray the subject.

We also note the artwork's 2 & 3 dimensional qualities, size, scale and medium.

Figure 25: Items considered in Form

Theme: what the work is about:

"the Big idea," is revealed by the content and form of the artwork and we may find connections to other ideas in other sources, for example: Art historical references, literature and similar topics explored in music, theatre, dance and film.

Thematic associations with multiple intelligences may be revealed through the subject areas of math, language, science etc.

These connections help link art to life.

Figure 26: Items considered in Theme

Context: when, where, by and for whom, why

We view art from our own perspective today but we can better understand the artwork by investigating external information also, such as the conditions and context in which the art was created.

Our ability to interpret and evaluate the art is enriched by identifying personal, social, cultural, historical and other contexts that influence the creation and understanding of the work.

Form & Theme within the Context can reveal the function and significance for the artist, which can lead to greater understanding and appreciation when we view it today.

Figure 27: Items considered in Context

Appendix 3: FTC model details

Significance:

Having taken the time to analyse the painting and external information what are your thoughts about it?

Are your thoughts now very different from your initial reaction?

What does it mean to you? Perhaps it means many different things?

Have you shared your thoughts and ideas with others or listened to what others have to say about it?

Figure 28: Items considered in Significance

Things to ponder when doing a Formal Analysis of a painting.

Identify what if any of the following art elements do you see:
COLOUR, SHAPE, FORM, TEXTURE, LINE, VALUE /COLOUR INTENSITY SPACE

THINGS, PEOPLE, RECOGNISABLE OBJECTS?

Is it flat? Any 3D effects?

Where is your eye drawn to?

Art elements are combined to make formal compositions - creating PATTERN, RYTHM, SYMMETRY, BALANCE, CONTRAST, PROPORTION, THEME, UNITY.

Take a closer look at the painting and see what if any of these Design theories are apparent.

What medium was used to create it?

Figure 29: Detailed items considered in Theme

What the overall THEME of the artwork?

How is this apparent?

Does it convey or express values, feelings, mood, metaphor and dynamic states.

Are there any symbols?
What do they mean?

Does the content represent anything?

What does it remind you of?

Are there connections to other subjects or sources, for example, other art works, books, film, other subjects?

Figure 30: Detailed items considered in Theme

What other external information do you know about the artwork?

When was it created? Where? By whom? Why?

How does any of this affect the message of the artwork?

What does it say to you?

Based on details of when and who created the work:

What does it tell you about then?

What is its significance today?

Are there multiple meanings?

Figure 31: Detailed items considered in Context

Appendix 4: Selected artworks

Artwork 1:

Las Meninas (The Maids of honour) by Spanish artist Diego Velázquez, born in Seville, June 6, 1599 and (1599-06-06) died August 6, 1660 (aged 61)

1656, Oil on canvas 276cm x 318cm

Artwork 2:

Black Square, 1915 by Russian artist Kasimir Malevich, born February 23, 1879 and died May 15, 1935 (aged 57)

1915, Oil on canvas 106cm x 106cm

Artwork 3:

The Dream, 1910 by French artist Henri (Julien Félix) Rousseau (post-impressionist painter) born May 21, 1844 and died September 2, 1910 (aged 66)

1910, Oil on canvas, 6' 8 1/2" x 9' 9 1/2" (204.5 x 298.5 cm).

Artwork 4:

Galatea of the Spheres, by Spanish artist Salvador Dali, born May 11, 1904 and died January 23, 1989 (aged 85)

1952, Oil on canvas, 54 X 65 cm

Artwork 5:

Hermes, by Spanish artist Salvador Dali,
1970, Oil on canvas 299.7cm x 398.8cm

Artwork 6:

The Hallucinogenic Toreador by Spanish artist Salvador Dali
1970, Oil on canvas 299.7cm x 398.8cm

Appendix 5: Informed Consent Form

TRINITY COLLEGE DUBLIN INFORMED CONSENT FORM

LEAD RESEARCHER: Marian Reeves

BACKGROUND OF RESEARCH: Engaging with and understanding a painting can be problematic for the gallery visitor and the novice art student. The aim of this research is to investigate the effectiveness of using a software model and interactive technology as a guide and support to enhance understanding when engaging in the process of art criticism.

PROCEDURES OF THIS STUDY: As part of this study, you will be asked to participate in a number of sessions using the technology and if time permits to conclude with a visit to an art gallery. The Procedures and Data gathered are described in the *Information Sheet for Participants*.

All of the data gathered will be analysed and used to determine the effectiveness of the technology in enhancing your understanding of the paintings, the features that were useful (or otherwise) in assisting you throughout the process and the role of the teacher/facilitator. None of the recordings will be identifiable or made public unless prior written permission has been given to do so.

PUBLICATION: The results of this research are required to be submitted for the Master course at Trinity College and may be submitted for publication in conferences and journals on technology-enhanced learning. Individual results will be aggregated anonymously and research reported on aggregate results.

DECLARATION:

- I am 18 years or older and am competent to provide consent.
- I have read, or had read to me, this *Informed Consent Form* and the *Participant Information Sheet*. I have had the opportunity to ask questions and all my questions have been answered to my satisfaction and understand the description of the research that is being provided to me.
- I agree that my data is used for scientific purposes and I have no objection that my data is published in scientific publications in a way that does not reveal my identity.
- I freely and voluntarily agree to be part of this research study, though without prejudice to my legal and ethical rights.
- I understand that I may refuse to answer any question and that I may withdraw at any time.
- I understand that my participation is fully anonymous and that no personal details about me will be recorded.
- I understand that if I or anyone in my family has a history of epilepsy then I am proceeding at my own risk.
- I have received a signed copy of this agreement.
- I allow recordings to be made of interviews conducted during this study.
- I understand that this means that I may request the recorder to be turned off at any point and that any request I make to withdraw the recordings will be respected.
- I understand that the recordings will be replayed solely by the researchers and not in any public forum.

**PARTICIPANT'S NAME:
DETAILS:**

PARTICIPANT'S SIGNATURE:

DATE: _____

RESEARCHERS CONTACT

reevesm@tcd.ie

RESEARCHERS SIGNATURE

DATE:

Statement of investigator's responsibility: I have explained the nature and purpose of this research study, the procedures to be undertaken and any risks that may be involved. I have offered to answer any questions and fully answered such questions. I believe that the participant understands my explanation and has freely given informed consent.

Appendix 6: Participant Information sheet

TRINITY COLLEGE DUBLIN

INFORMATION SHEET FOR PARTICIPANTS

I am in the final year of a Masters course at Trinity College Dublin and I am conducting a study which seeks to establish if information technology (IT) can be used effectively to guide and support a novice in the appreciation of the visual arts, specifically paintings.

This stage in the study calls for volunteers for a number of hours between mid December 2009 and mid-February 2010. Your participation in the study would be greatly appreciated.

You do not have to be an expert using a computer; all you need is to have some interest in exploring and learning about paintings! If you are interested please see below for more details.

Background

A work of art/painting is one of the most creative expressions by man and it represents the artist's interpretation and vision of the subject matter at the time that the painting was made. But, engaging with and understanding a painting can be problematic for the gallery visitor and the novice art student. Have you ever left the gallery or put down the art book feeling disappointed and that surely you have missed something?

The Study

The study investigates the use of software (an interactive website) for engaging in art criticism. The software consists of a model to guide and support you throughout the processes of studying a painting, for example; looking and describing, enquiring, analysing, interpreting, seeking answers to your own questions, imagining, thinking, making notes and searching for information about the art work or the artist.

In this study the researcher will act as a facilitator only and is not there to impart information or provide direct instruction but where present, will prompt and guide by asking questions to stimulate recall and critical thinking, where participants are having difficulties proceeding.

The study seeks to determine if the software is an effective scaffold/support for participants, to identify the features that are most helpful in engaging with the art work and any problem areas that detract from the learning experience.

It is hoped that the result of this research will lead to a greater understanding of how the software can be used for teaching and learning in art criticism and also to determine what the role of a teacher/ facilitator is during the learning experience.

Participation

As part of this study, you will be asked to participate as follows:

- One tutorial session to demonstrate and discuss the model in order to gain an understanding of the processes and how to use it (approximately 50 minutes)
- Two sessions where you will explore two different paintings (max of 60 minutes each) and make notes e.g. first impressions, description, questions, interpretations etc.
- Due to time constraints some participants may work alone by accessing the web site at more convenient times to themselves.
- A small and random selection (your alias/number is drawn from a hat) will be invited for an informal interview to discuss the experience.
- Participants may be invited to visit a gallery and explore a painting (approx. 60 minutes)

You will be requested to complete a questionnaire before and possibly after the study. The purpose of the first questionnaire is to identify any relevant prior knowledge, experience, feelings and / or interest in paintings. The final questionnaire seeks to identify learning and any changes in your interest, experience and approach to paintings and how the technology assisted in this.

We are all different and multiple interpretations and opinions can be made. Participants will be required to input their work/thoughts/finding/interpretations/opinions to the website and to justify their reasons or opinions by referring back to the artwork. Participants can choose to share this information with other participants or not. Sharing the information can help to expand or refine your interpretations and opinions about the artwork.

For attended sessions, audio recordings will be made & the researcher will also observe and make notes.

At the end of the study you will be requested to make a private/individual audio recording reflecting on the learning experience. The purpose of this is to reflect on the learning experience and to ascertain your evaluation of the software tool and the teaching and learning methods used.

It is anticipated that during the course of this study you will augment your understanding of the art criticism processes and that it should lead to your enhanced perception of paintings.

Agreement

- Participation in the study is entirely voluntary. You have the right to opt in and subsequently to withdraw at any time for any reason without penalty.
- All participants must sign a Consent Form before participation in the study. See the *Informed Consent Form*.
- You have the option of omitting questions you do not wish to answer on questionnaires.
- Your identity will not be revealed in any way. You will be assigned an alias prior to the study and this will be used to identify you on all data: questionnaires, discussions, notes and audio recording. You will remain anonymous in the analysis, publication and presentation of the resulting data and findings.
- There are no anticipated risks to your involvement in this study.
- On completion of the research, findings will be presented back to the participants and debriefing sessions will be available for any participant who wishes to avail of them.
- At all stages during this study you will be expected to use the technology solely for the study, not to download or install any software or images and not to engage in any illegal activity. In the extremely unlikely event that illicit activity is reported to me during the study I will be obliged to report it to appropriate authorities.

Appendix 7: Project Proposal

TRINITY COLLEGE DUBLIN

Title of project:	A scaffold for enhancing perception in the area of Art Criticism
Purpose of project including academic rationale:	
Background A work of art/painting is one of the most creative expressions by man and it represents the artist's interpretation and vision of the subject matter at the time that the painting was made. But, engaging with and understanding a painting can be problematic for the general gallery visitor and the novice art student.	
The Study The study investigates the use of information technology (an interactive website) for engaging in art criticism. The software consists of a model to scaffold learner throughout the processes of art criticism: Description, Analysis, Interpretation and providing opinions on meaning.	
Pedagogy: Inherent to the learner-centered model are learning strategies for <i>looking, enquiry, research</i> and <i>dialogue</i> so that learners will actively engage in the process and use critical thinking skills rather than being passive receptors of information about the artwork. In this study the researcher participant will first do a tutorial and then where present will act as a facilitator only and is not there to impart information or provide direct instruction and will prompt and guide by asking questions or making suggestions to stimulate recall and encourage critical thinking, where participants are having difficulties proceeding.	
Aim: To gain an understanding of how the technology can be used for teaching and learning in art criticism and to understanding the role of the teacher/facilitator.	
Objectives: To identify specific features and the use/contribution to the learning experience. The role of the teacher/facilitator will also be clarified.	
Brief description of methods and measurements to be used:	
This is a Qualitative Case study of the learners experience engaging in the process of Art Criticism, with a researcher participant observing the phenomena throughout, for a small group of the participants only. Some participants will engage alone / via web at a suitable time to themselves. A diverse range of data will be collected to provide rich insight to the learning experience. These are:	
Questionnaires: A Pre –intervention questionnaire will be used to establish participant interest and previous experience with art works e.g. gallery visits, formal education etc. Post -intervention questionnaire will be used to determine how they experienced the use of the intervention and if/how they felt it explained the processes and scaffolded it them during the intervention and changes in the way they approach art and their understanding of art.	

<p>Dialogue: Participants interact with the art work and record their feelings and findings about the art work e.g. descriptions, interpretations and understanding and opinions by input directly to the web site/database. They can choose to make these available to other learners or not; sharing with others allows for expansion and refinement of interpretation and opinions.</p> <p>Individual feedback and reflection: (Audio) on the experience. Participants will be asked to reflect on the experience and what they have learned, how their feelings and / or approach to engaging with art works have changed and include areas such as: degree of difficulty understanding the model, ease of use throughout the process, worthwhile features, how it helped them engage with the Art work.</p> <p>For those sessions attended by the researcher: throughout all of the processes (except individual feedback and reflection) the researcher participant will record (audio) and observe the participants and make notes.</p> <p>A small number of participants will be requested to attend informal interview – by random selection (alias/number pulled out of a hat). Interview focus will be on what /how / why of using the scaffold and to determine learning and change in learners approach to art.</p>
<p>Participants - recruitment methods, number, age, gender, exclusion/inclusion criteria, including statistical justification for numbers of participants</p>
<p>Participation is completely voluntary. Notification of the study being undertaken will be posted on the notice board, by email (where email address is known) and by oral invitation directly to potential participants. Participants will be adults (18+) It is anticipated that between 4 and 8 candidates will partake in the researcher attended study. Other participants can work alone/unattended at times convenient to them.</p>
<p>Debriefing arrangements:</p> <p>Participants will be invited to a debriefing session after participation at which the data collected during the study will be presented, along with a summary of its analysis. Participants can examine how their contributions to the study have been used and interpreted, and confirm that their contributions have been used accurately and not taken out of context.</p>
<p>Ethical Considerations: (A clear concise statement of the ethical considerations raised by the project and how you intend to deal with them)</p>
<p>Copyright of source materials: Paintings older than 70 years after the artists death and 100 years after the artists death are download from Wikimedia Commons: http://commons.wikimedia.org For other paintings the researcher has contacted the Education Curator at the gallery requesting permission and awaiting response: http://www.dalimuseum.com/ (ptush@dali.org) and is currently being referred on to various contacts.... Where permission is not granted then the works of art will not be used.</p>
<p>Cite any relevant legislation relevant to the project with the method of compliance e.g. Data Protection Act etc.</p>
<p>Data Protection Act. E.g. Data is gathered for this study and will not be used for any other purposes. Participants (and their data) will remain anonymous throughout. Participants may review their own data/contributions and correct or delete.</p>

Appendix 8: Pre-Study Questionnaire

All information provided will be used for this research only and will be used in accordance with the procedures as described in the Participant Consent form.

1. Have you ever studied Art? Please state Yes or No: _____

If your answer is Yes then please indicate the subject e.g. Art History etc and at what level?

2. Which of the following statements best describes your interest in art? _____

- a. Very interested
- b. Interested
- c. Somewhat Interested
- d. Don't think about it
- e. Not interested

Please give a short comment about your interest in Art

3. Which of the following statements best describes how often you look at art or visit the gallery? _____

- a. Twice or more in a year
- b. Once a year
- c. Only when on holidays
- d. Seldom: a couple of times in your lifetime
- e. Never

Any short comment you would like to make about this?

4. Before this study had you ever used technology to learn about an artwork? E.g. audio device at a gallery, other? Please state either Yes or No: _____

If you answered Yes, then please provide a brief description of where and how you used it.

5. Do you think art is important? Please choose one option from below: _____

- a. Yes
- b. Maybe
- c. No

Please comment on why you think that:

6. Do you enjoy looking at paintings? Please choose one option from below: _____

- a. Yes
- b. Some paintings
- c. No

Any short comment you would like to make about this?

Would you like to make a brief comment that you feel is relevant? Please do so below.

What is your name? _____

Please indicate your gender Male or Female: _____

In which age category do you belong? Please circle the appropriate category:

18 – 25 26 to 35 36 – 49 50+

Signature: _____

Date: _____

Researcher Signature: _____

Date: _____

Thank you for completing this questionnaire.

Appendix 9: Interview Protocol

Researcher: _____

Date: _____ Location: _____ Participant: _____

Thank participant for coming to interview	
1. How did you get on? How would you describe the experience? If you had to think of three words to describe or sum up the experience, what might they be	
2. Overall- how did you find using the computer for the study?	
3. How or did the application help you to engage in the process? How so? <i>For me.....</i> <i>Wondering would they find the stepped process restricting?</i> What options did you use? Do you feel you learned anything?	
4. What did you think of the Questioning?	
5. How did you feel about having to type in your thoughts? Helpful to be able to store and retrieve them? Did you read over them or change them at any time?	
6. What options/features did you feel were the most important to help you with learning? How and why?	
7. Animate function and specific artwork questions? How and why did it / did it not help?	
8. Was there anything missing/lacking in the experience? Working with peers? Teacher/facilitator to ask questions? Wondering would participant mention wanted more hyperlinks, audio, other	
9. Did you use the glossary?	
10. Did you read other participants opinions? Why / why not?	
11. Any general comments you would like to make?	
THANK YOU FOR YOUR PARTICIPATION IN THE STUDY	

Appendix 10: Ethics Approval form

UNIVERSITY OF DUBLIN, TRINITY COLLEGE

Faculty of Engineering, Mathematics and Science

School of Computer Science and Statistics

When is Ethical Approval Needed?

Ethical approval is required before any studies involving human subjects can commence. This requirement applies to studies to be undertaken by staff, postgraduate and undergraduate students. In the case of collaborative projects involving researchers from outside the School, ethical approval obtained from an external research ethics body may suffice – evidence of same must be submitted to the SCSS Research Ethics Committee prior to the commencement of the study (see procedures below). In the absence of such external approval, approval must be obtained as per this document.

Additional ethical approval may be required if the project involves or is funded by an external body, for example, studies under FP7 automatically require such approval.

For the purpose of this document a “study” may be understood to involve a potentially staged series of different experiments to be conducted over a period of time. If substantive changes are made to a study following receipt of ethical approval, this will constitute a new study for which further ethical approval must be obtained.

Procedure

To apply for ethical approval from the SCSS Research Ethics Committee, completed application forms together with supporting documentation should be submitted in hardcopy to the School’s Research Unit and an electronic copy e-mailed to research-unit@scss.tcd.ie.

The Committee will consider each application and normally provide a response within two weeks but not more than one month later. Applications that are considered not to have significant ethical implications may be evaluated by the Committee Chair without reference to the full Committee. Applications will otherwise be considered at a meeting of the SCSS Research Ethics Committee.

When approval has been obtained from an external research ethics committee, and School approval is not required, a copy of the external ethical approval must be submitted to the School’s Research Unit, prior to commencement of study, for noting by the SCSS Research Ethics Committee.

Note: These procedures may be amended from time-to-time following recommendation by the SCSS Research Ethics Committee and with the approval of the SCSS Research Committee.

Before seeking ethical approval researchers should:

- identify actual and potential ethical issues that might arise;
- reflect on how these will be addressed; and
- formulate procedures to deal with all such issues.

During the research project researchers should:

- implement the ethical procedures;
- obtain continuous feedback from participants about ethical issues;
- periodically review the ethical strategy in the light of feedback received; and
- if required, update their ethical procedures.

Composition of the SCSS Research Ethics Committee

The Committee will consist of a Chairperson/Convenor appointed by the Director of Research and two other experts – a member of the School’s academic staff and an external representative. The internal and

external members will be selected from a panel approved by the Director of Research from time to time. Members will be selected on a case by case basis by the Chairperson subject to their availability. Researchers will be precluded from the Committee considering ethical approval for their study.

Part A

Project Title: A scaffold for enhancing perception in the area of Art Criticism

Name of Lead Researcher (student in case of project work): Marian Reeves

TCD E-mail: [XXXXXXXXXX](#)

Contact Tel No.: NNNNNNN

Course Name and Code (if applicable): MSc Technology and Learning

Estimated start date: 14/12/2009

Estimated end date: 14/02/2010

Office Use Only

SCSS Ref No.:

Date Received:

I confirm that I will (where relevant):

- Familiarize myself with the Data Protection Act and guidelines
http://www.tcd.ie/info_compliance/dp/legislation.php;
- Tell participants that any recordings, e.g. audio/video/photographs, will not be identifiable unless prior written permission has been given. I will obtain permission for specific reuse (in papers, talks, etc.)
- Provide participants with an information sheet (or web-page for web-based experiments) that describes the main procedures (a copy of the information sheet must be included with this application)
- Obtain informed consent for participation (a copy of the informed consent form must be included with this application)
- Should the research be observational, ask participants for their consent to be observed
- Tell participants that their participation is voluntary
- Tell participants that they may withdraw at any time and for any reason without penalty
- Give participants the option of omitting questions they do not wish to answer if a questionnaire is used
- Tell participants that their data will be treated with full confidentiality and that, if published, it will not be identified as theirs
- On request, debrief participants at the end of their participation (i.e. give them a brief explanation of the study)
- Verify that participants are 18 years or older and competent to supply consent.
- If the study involves participants viewing video displays then I will verify that they understand that if they or anyone in their family has a history of epilepsy then the participant is proceeding at their own risk
- Declare any potential conflict of interest to participants.
- Inform participants that in the extremely unlikely event that illicit activity is reported to me during the study I will be obliged to report it to appropriate authorities.

Signed:

Date:

Lead Researcher/student in case of project work

Part B		
<i>Please answer the following questions.</i>		<i>Yes/No</i>
Has this research application or any application of a similar nature connected to this research project been refused ethical approval by another review committee of the College (or at the institutions of any collaborators)?		No
Will your project involve photographing participants or electronic audio or video recordings?		Yes
Will your project deliberately involve misleading participants in any way?		No
Is there a risk of participants experiencing either physical or psychological distress or discomfort? If yes, give details on a separate sheet and state what you will tell them to do if they should experience any such problems (e.g. who they can contact for help).		No
Does your study involve any of the following?	Children (under 18 years of age)	No
	People with intellectual or communication difficulties	No
	Patients	No

Details of the Research Project Proposal must be submitted as a separate document to include the following information:

1. Title of project
2. Purpose of project including academic rationale
3. Brief description of methods and measurements to be used
4. Participants - recruitment methods, number, age, gender, exclusion/inclusion criteria, including statistical justification for numbers of participants
5. Debriefing arrangements
6. A clear concise statement of the ethical considerations raised by the project and how you intend to deal with them
7. Cite any relevant legislation relevant to the project with the method of compliance e.g. Data Protection Act etc.

Part C

I confirm that the materials I have submitted provided an complete and accurate account of the research I propose to conduct in this context, including my assessment of the ethical ramifications.

Signed: Date:
 Lead Researcher/student in case of project work

There is an obligation on the lead researcher to bring to the attention of the SCSS Research Ethics Committee any issues with ethical implications not clearly covered above.

Part D

If external ethical approval has been received, please complete below.

External ethical approval has been received and no further ethical approval is required from the School's Research Ethical Committee. I have attached a copy of the external ethical approval for the School's Research Unit.	
Signed:	Date:
Lead Researcher/student in case of project work	

Completed application forms together with supporting documentation should be submitted in hardcopy to the School's Research Unit, Room F37, O'Reilly Institute, and an electronic copy e-mailed to research-unit@scss.tcd.ie Please use TCD e-mail addresses only.

Application Check List

- The following documents are required with each application:
 1. SCSS Ethical Approval Form
 2. Participants Information Sheet
 3. Participants Consent Form
 4. Research Project Proposal
 5. Intended questionnaire/survey/interview protocol/screen shots/representative materials (as appropriate)

Appendix 11: Observation Protocol

Researcher: _____

Date: _____ Location: _____

Research Question:

Participant	Description	Reflection

Appendix 12: Audio extract

P6	grand . I'm not sure if my eh opinions or reactions are , em , in any way relevant but this is quite new to me [sheepish laugh]
R	but yeah, they are
P6	I'm putting down what ever pops into my head and seeing if it makes any sense at the end

Lack of confidence in his opinions

R	Are you finding it difficult, very different from the last one?
P6	Yes [tone of the yes was very definite]. [both laugh]. I'm finding it very frustrating..
R	do you?
P6	It's a square , it doesn't mean anything to me.
R	Right
P6	It doesn't make me feel anything. I don't know. Is there a story?
R	Where have you ever ... do you think theres a story?
P6	Well I just said here, if theres a story its taking place in a coal mine,
R	[both laugh] right, or do you think the artist is expressing some thought or opinion?
P6	I don't know, if hes expressing an opinion then maybe it's a lack of creativity, or frustration or something, I don't know
R	ok, did you try the animate
P6	yep - I liked it better in blue and red
R	ok, maybe think about the colour then?

Difficulty engaging with the artwork, does not like the painting

R	and in the context section did you fill out about two of the characters might be
P	yeah
R	oh, yes I see that
P	yeah but I don't want to get bombarded with by information so I'm literally just getting facts because I don't want anything to influence me but I did read , no, learn that the artist did have a very good relationship with the royal family at the time and was kind of given free reign so I did think it affected this painting as instead of having a portrait of the girl he was trying to paint it was something different and he was allowed to do something like this , a snapshot , more like a photograph of the time
R	yeah, isnt it?
R	yeah, [reads participants notes] and do you think it would be unusual that an artist would be in, if that was a portrait of her, is it unusual that the artist is there or is that because of the relationship
P	I'd say it's because of the relationship. I think he had ... my impression is that he quiet an influence in the court , in the palace, so ... like for himself to be in the painting as well.

Appendix 13: Interview

	Participant 6 at end of the study
R	OK here we go, Picasso. Thanks a million
P	No problem
R	I know you got in and worked away on your own on the web For the last picture
P	Yeah, I did
R	ok so you know roughly what I want to talk about here anyway, but I will ask you straight up,.... if you had to think of some words,just single words to describe the experience. What comes in to your head ?
P	Eh..... interesting
R	Ok
P	Educational
R	Good
P	and em.....different
R	different ...OK . And I just want to ask you then did you find it difficult ?
P	Em..in terms of the use of the application or the task , the learning task?
R	Both
P	OK , so in terms of the use of the application , no , very easy to use , em in terms of the , em I think it's challenged me a lot more in the way I was thinking about the paintings than I would have without the tool
R	Ok
P	if you know what I mean . So in that sense it was a more difficult engagement but more rewarding
R	I was just going to ask you there , when you say challenging - is that good or bad but you've said it was rewardin
P	Eh, in at good way, yeah, yeah, yeah
R	OK, how so ?
P	I felt I got more out of the pieces of art than I than I would have, had I just glanced at them on the Internet or seen them in the gallery even, em... and it allowed me to create my own ideas or impressions or come up with the my own ideas about the painting as opposed to just listening to an audio device and being told
R	good
P	now having said that I know the Internet was there and I used it to find out information about the paintings
R	That's fine . That's your own research
P	yeah , but but I felt like I could, I had the chance to think of my own ideas first
R	did you spend time yourself first before you went off and looked at the Internet
P	oh yeah , I didn't go out on to the Internet until the last, like the context and the significance
R	Good
P	so I would have worked through most of the others first of all on my own

	Participant 1 interview at end of the study
R	OK XXXX, thank you very much, you know we are going to go down through some questions
P1	Yes
R	and I told you why we were going to go down through these - So eh this is just a guide
P1	Alright
R	So, first thing, what was your overall impression of the experience
P1	brilliant absolutely brilliant
	Feelings : brilliant, initially apprehensive, unsure
R	OK
P1	definitely was , a bit, I was a bit apprehensive if you like to call it that, in the beginning
R	ok
P1	I didn't really know what I was letting myself in for, but once I got started it was a very hard to stop me
R	OK because looking at your form I see you hadn't studied art at all before
P1	No
R	is that what you were apprehensive about or was it the technology ?
P1	well a little bit of both eh the technology is something you can get used to but if you have no experience really of art you can't manufacture it in five minutes
R	Both laugh. OK did you spend a long time using this throughout the course of the study like how many hours roughly would you say
P1	oh, lots of hours
R	more than 5
P1	absolutely I'd say ten
R	ten hours

Appendix 14: Sample participant constructed artefact

ARTWORK: Black Square

INITIAL REACTION:

eh...a black square on a white background...I suppose i could be looking into a hole or dark spac

FORMAL DESCRIPTION AND ANALYSIS:

its black and whitesquare within square. no natural shapes, definitely man made.The black in the middle adds depth to it, as i said it could be hole or tunnel. This is an intersting yet basic use of space, despite my initial scepticis

THEME:

It like looking into another space. After playing with the animate tool I realised that the use of black on white really gives the impression of another space, I did try other colours, this made it look sillier than it is. Another colour doesnt give the sense of the unknown that the black does. It makes me feel almost curious as to what is in the darkness, a certain level of intrigue. Although I wouldnt exactly want to explore the darkness.

CONTEXT:

it was created in 1929 by Kazimir Melevich, in Russia.For its time it seems quite unusual, although my knowledge of art is limited.I guess it was created to explore the extent to which art can be interpreted by the audience, or even the artist themselve

MEMO PAD:

SIGNIFICANCE:

At first I was scpetical, but the more I looked at it the more I began to be interested by it.I think the message is up for interpretation, therefore there is no right answer.It has opened me up a little to this type of simplistic ar

ARTWORK: Black Square

INITIAL REACTION:

A black square with a white border. Makes me feel like I could do this myself without too much difficulty.

FORMAL DESCRIPTION AND ANALYSIS:

black. white. Geometric shape. Black square. unnatural. The white frame looks like it has a bit of texture - slightly rough. It looks higher than it is wide. I think it could represent a dark passageway

THEME:

I think the theme is bleakness or despair. There is no hope or joy in this painting. It could have many meanings. I think it could be representative of a rigid culture like communism as the artist painted it in 1929.

CONTEXT:

Painted during Stalin's rule. Represents rigidity of communism. Both colours are direct contrasts of each other. Black and white represent rigidity as does the shape. I initially thought the square was higher than it was wide but now see that it is a perfect square. The fact that it is a geometric square shows that it is unnatural. The painting was created for the ordinary person in society. The blackness represents despair. I think it is mocking Red Square which is hugely symbolic of communism. The blackness represents despair as opposed to red which is vibrant. I think it was created to make people think about the society they lived in.

MEMO PAD:

SIGNIFICANCE:

I like it because it is more than just a black square. After thinking about it and following the questions I realise that it is highly significant of the time it was painted. I think if I have learned anything is that a painting needs to be analysed in its context and in particular the time or era of its creation.

Appendix 15: Access to the Application & Data

Participant constructed artefacts are available to view in a document

ArtmscDBContents.doc

and also via the website. <http://www.bvl.ie/artmsc/artmsc.html>

Username: guestab, Password: passwordab