Understanding and Evaluating Creativity
Understanding and Evaluating Creativity: A Tutorial

COURSE LEADERS

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1. Overview

In many walks of life, creativity is seen as a desirable ‘something’ that can be beneficial to organizations as well as to individual people and groups. Creativity is highly valued because we believe that it can deliver significant advantages such as gaining a leading edge in business or establishing the basis for a lifetime of satisfaction and even happiness. That creativity is “a good thing” is rarely disputed and yet, when we start to try to be more precise about what we mean by creativity, it soon becomes apparent that there are many different views as to what it is. Many careers and businesses have been founded on the notion that it is possible both to define and to promote creativity as an achievable activity. However, if we make claims that it is possible to enhance creativity, we need first to be clear about what exactly we are aiming for: in other words, what do we mean by creativity? Even more problematic than defining an agreed view of creativity, is the question of whether creativity can be evaluated and, if so, how can that be achieved. Evaluating creativity is a necessary part of determining whether or not we have achieved our goal of enhancing creativity. Thus, we present two interrelated topics: creativity and evaluation. In order to provide participants with tools for exploring creativity and how to evaluate it, the tutorial focuses on methodologies based upon observational studies of creativity in-situ and analysis of behavioural protocols.

Aims and Objectives

The aim of this tutorial is to provide the participants with an understanding of creativity and how to approach its evaluation. It will introduce an approach to evaluating creativity from different viewpoints based on audience, artefact and creator capability. Participants will also be provided with tools for analysing situations in which creative engagement may be taking place. A further aim is to explore the concept of creative engagement and why it is important. The goal is to communicate experiential principles for creative engagement and to discuss the application of these principles to other cases and domains. In addition to the taught part of the course, a secondary aim is to stimulate active participation in evaluation studies and group work.

Tutorial Content

The first part of the tutorial will present the subject of creativity drawing upon creativity research. Knowledge of creativity research is complemented through our approach to the evaluation of creativity. Three points of view for creativity evaluation are introduced: whether evaluation is based on how audiences respond, the features of the artefacts (works) themselves or the capabilities of
the creators to create. The next issue, to explore how audiences respond or behave, is critical to understanding the nature of creative engagement. In order to support and enrich this understanding, different levels of engagement will be introduced and discussed through case studies of audience engagement in-situ.

The second part of the tutorial presents methodologies for discovering the process elements of creativity by conducting and analysing observational studies. Examples of the specific topics discussed are:

- Setting up field studies to observe people/tools/activities in situ
- Coding and analysing audience interactions monitored in videos
- Decomposing creative activity into observable events and actions
- Interpretation of creative processes

To stimulate active participation and explore the experience evaluation methods directly, participants will take part in exercises, which involve reflection on their experiences of an interactive work. This will help them understand both the audience and the researcher perspective in an evaluation study of an interactive artwork prototype. In the audience role, participants will be watching and sometimes engaging with an interactive work that runs from the beginning to the end of the tutorial session.

Participants will be involved in active, short term and sustained engagement with the work at varying levels and styles through the day. In the researcher role, they will be required to write their thoughts and reflections about their own and others’ engagements and experiences at different times of the day. This exercise will help participants become aware of cognitive and emotional processes during engagement with the work, and how their perceptions of interactivity may change over time.

After the discussions and learning about engagement, participants will be presented with video protocols of people’s interactive experiences. The videos were collected in public exhibition spaces where creative engagement occurred. Participants will be asked to assess these video protocols taking on their researcher roles.

The final part of the tutorial will go into more detail about creative engagement and why it is important. The creative engagement model and emerging principles for supporting creative engagement will be introduced. The aim is to communicate experiential principles for supporting creative engagement and to discuss the application of these principles to other cases and domains.
2. Creativity Research

Creativity is a complex human phenomenon that is widely believed to be difficult to analyse and inaccessible to precise measurement. Nevertheless, many researchers have dedicated their professional lives to trying to define the fundamentals of this elusive but richly rewarding aspect of human society. In the realm of practice, people in music, visual arts, dance, design etc., have been making artefacts, giving performances and exhibiting to the world at large the fruits of their creativity. Because the outcomes of their efforts are visible to all, as distinct from the cognitive processes that are necessary to the realization of these outcomes, the public debate as to what is truly creative often centres on artefacts and performances. People of many different levels of knowledge and experience may take a view of whether or not something is truly ‘creative’ based upon their appreciation of a particular artwork. However, whilst the creative artefact is clearly important, it has never been enough to help us fully understand the rich and fascinating dimensions of human creativity.

**What do we mean by “creativity”?**

How we characterize creativity engages a wide range of people. Proffering interpretations and appreciation of creative works is, at a professional level, the province of critics, cultural commentators and academic researchers. In the research communities, the approaches differ in three main respects: 1) the type of research design, whether experimental, psychometric, observational etc. 2) the focus of the research, whether on human attributes cognitive processes or features of creative outcomes, and 3) the type of information that is used for the basis of evidence, by which is meant whether the time frame is present (real-time observation) or past (historical data) and whether the situation is artificial (laboratory) or natural (real world settings). There are significant differences in the way that the subject has been studied. In recent times there have been advances in our understanding of the nature of creativity and a growing consensus that features can be identified that distinguish creative thinking from everyday routine thinking. Weisberg [36] is a notable dissenter from the more commonly held view that creative cognition has characteristics such as divergent thinking, problem finding and incubation [13, 18] that distinguish it from routine structuring, planning and problem solving.

The creative process can be studied in its "small acts" such as identifying how incubation takes place by way of laboratory experiments. Partridge and Rowe provide a useful review [36]. Alternatively, creativity may be seen in the larger scale, where all issues, including the creative outcome itself, are considered. A variant on this approach is to examine creative work (as defined by the creative
outcomes) in terms of the totality of the person's activities. Creativity looked at this way can be considered to be characteristics (e.g. mental operations such as memory, recognition, intelligence etc.) that are combined in an exceptional way so as to maximise their effectiveness (Perkins, 1981). The traits might be extended to include basic cognitive capabilities, values, motivations and strategies. Studies of the personalities and attributes of people, indicates that there are certain traits that seem to be indicators of greater creative potential. Creative attributes that have been investigated include independent attitudes, a diverse range of interests, a rejection of external controls, high confidence levels, intrinsic or extrinsic motivation and risk taking inclinations. Conversely, low confidence, risk avoidance and fear of criticism imply poor potential for breaking barriers and moving beyond conventional thinking [3, 11, 23].

Another approach is to build computational models of individual creative thinking processes and to postulate that these models provide explanations of creativity [Boden, 37].

In addition to studies of individuals, the social and cultural dimensions to creativity potential have been recognized. Lubart has explored the relative values of Eastern and Western cultures in relation to the recognition give to outstanding individual work over collective endeavour [23]. Socially defined influences such as access to physical and intellectual resources, including rewards and incentives and culturally-defined value systems including organizational constraints have received less attention but are increasingly recognized to be defining factors [23, 26, 29]. A relatively new approach to measuring creativity is that arising from Neuroscience. Evidence about brain activity can be generated using increasingly powerful scanning techniques. This has stimulated a growth in interest in the biological bases of creativity [30] and provided a new challenge to the more familiar traditional psychological and cognitive approaches. Nickerson’s recommendations for fostering creativity are based upon a survey of findings from a range of studies [25]. Amabile uses results from motivational and organizational research to support the development of models and instruments for assessing incentives and obstacles to creativity in the workplace [4].

There is no simple pathway to understanding the essence of creativity. It is necessary to take account of many factors including personal attributes, cognitive style, social influences, environmental constraints and cultural values. By bringing together three dimensions of the creativity spectrum: creative attributes, creative process and creative context, we can start to scope the ways in which those factors promote or hinder the manifestation of creative behaviour and outcomes.
3. Evaluating Creativity

Evaluating creativity implies being able to place a value on the particular phenomena we define as ‘creativity’. How we characterise creativity is the first step towards deciding how to evaluate it. We can judge creativity by the way the audience responds or behave, by the features of the works themselves or by the abilities of the maker to create. The creative artefact is likely to be at the heart of all three points of view. Many people are asking whether we can establish measures for evaluating creativity that can be agreed and applied in many situations? A first step is to decide which perspective is to be adopted in determining the criteria for measurement. Three perspectives are included in our matrix: audience creativity, artefact creativity and creator capability.

**Audience Creativity**

We can start by evaluating how an artefact, such as an artwork, affects creativity in human beings. Artworks with which an audience can interact are particularly helpful in that, not only do people exhibit different kinds of behaviour faced with different examples of works, but the works themselves change in response to audience presence. For example, we can measure the degree and quality of engagement that an audience has with a creative work. If an interactive work excites immediate attention and appears to elicit playful behaviour, we can say that the work has the quality of immediate engagement. If, having obtained the audience’s attention, people continue to interact with the work for a given length of time we can say there is sustained engagement. If, as the audience attention declines with familiarity and the passing of time, the work changes unexpectedly leading to renewed interest, then a transformation may take place. This also depends on how the audience interprets the change. If the unexpected change in the system is seen as frustrating, there might be no further engagement. On the other hand, the audience may welcome the unexpected change as a positive challenge and embrace this as a new way to look at the same work. At this point there is a high possibility that audience experience will be transformed. We call this transformation in the experiential paradigm creative engagement. Creative engagement is sustainable and rewarding for the audience. It often makes the experience a 'memorable' one, rather than a 'pretty' one.

Any assessment of creative engagement is complex and requires an understanding of audience psychology and behaviour, as people move through different levels of experience. There are two indicators for assessment: behavioural change and conceptual change. Participants often demonstrate an
observable different behaviour before and after an unexpected change in the system. In this situation they often describe how they tactically changed their behaviour to interact with the unexpectedness. This behaviour change observed in real time must be confirmed with participant’s retrospective reports or with in-depth post-experience interviews.

Participants may demonstrate a conceptual change in time. This is a shift in how they understand and interact with the system, from the beginning of their experience to the now. It is possible to track this change by comparing how participants describe the work in the beginning and at the end of their experience. These two descriptions must be distinctive. Another assessment metric to track conceptual change is the point where participants describe the system’s feedback as a human’s e.g. participant thinking that the system consciously makes choices and/or talks to her/him.

**Artefact Creativity**

Evaluation according to the result or outcome of creativity such as works of art can be divided into two main categories: those that are perceived to be creative to the individual concerned and those which have been recognized as historically significant over the passage of time. Such artefacts may be judged according to features such as: Composition, Aesthetic, Affect, Content, and Technique. Each feature can be measured according to specific qualities and expressed as criteria; for example:

- Composition: must be coherent, exhibit shape and balance between order and complexity
- Aesthetic: visual, sound qualities: colour, line and form
- Affect: pleasing, challenging
- Content: appropriate and effective for subject matter
- Technique: well executed and fitting form.

This is an area of evaluation that falls mainly within aesthetics and related subjects. We will comment on its role but note that it does not form a significant focus within the taught elements of this tutorial. Participants carrying out their own evaluations may, nevertheless, choose to include this form of evaluation. Judging the artefact is frequently used to evaluate creativity in common usage.

**Creator Capability**

Evaluation according to whether or not the person who creates works demonstrates particular skills, knowledge and creative sensibilities is a necessary part of assessment for the distribution of funds to support creative work. The type of creator may be differentiated according to whether he or she
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is an amateur or a professional in the domain. The creator should be able to demonstrate an ability to create an artistic outcome where subject matter, artistic ideas and technique are combined well to produce a coherent outcome. He or she should be able to demonstrate an ability to make work that is exploratory, creative and imaginative. Interesting ideas are presented in intelligent and surprising ways. Key features of creator capability are being proficient/expert/competent in the following: Composition and Interpretation, Content selection, Ideas and techniques, Artistic expression and Individual responsiveness. These are some of the attributes used by arts councils to evaluate applications for funding.

Measuring Creativity Support

The notion of ‘measuring’ support usually connotes deriving numerical values that can be used to test or compare something according to a set of agreed standards. Galileo’s famous advice to “Count what is countable, measure the measurable and what is not measurable, make measurable” is at the heart of scientific research methodology. This immediately raises the question as to whether or not creativity, looked at in a holistic human centred sense, is potentially a measurable phenomenon. In turn, this requires an approach to measurement that recognizes the limitations of standard reductionist approaches [34]. If we are to be able to demystify creativity and, in doing so, contribute to new knowledge about the nature of creativity, we need to apply strategies for generating clear and unambiguous data that can be turned into meaningful information. From meaningful information, we can then derive understandings related to the context of use, the outcome of which might take the form of a coherent model. Applying appropriate measures of creativity can be seen as a necessary basis for generating reliable understandings about creativity and therefore, providing a stronger basis for evaluating its worth. Measurement is, therefore, fundamental to evaluation, where evaluation implies comparing different phenomena with claims to creativity.

One strategy for deriving meaningful information about creativity is based on collecting observable data about human behaviour where creative products are involved or the process itself is identified as creative. We may derive measures of creative activities by undertaking a longitudinal involvement in the process of creation and in the situations where creative engagements occur. The data collection methods include first hand, direct observation of events, generating reports of behaviour, making informed judgments, referring to histories of events and participants, comparing the current situations and outcomes with historical records as well as the current trends, movements. The aim is to arrive at a rich set of ‘observable’ data which can be used to derive a “ranking” of the originality of the person, process, and the product.
The analysis of the data is carried out using criteria derived from previous research outcomes. For example, one criterion, as Csikszentmihalyi [14] defines it, is the moment where the person is fully immersed in what he or she is doing. This is a feeling everyone has at times, characterized by a feeling of great absorption, engagement, fulfilment, and skill, and during which temporal concerns (time, food, ego-self, etc.) are typically ignored. So how can we measure such a personal process? It is important not to underestimate the task but there are some steps we can take: for example, we can observe it in live situations if we are able to capture those moments, or we can configure such situations to take place where we can observe each different and personal creative characteristics and artefacts.

Observation as a method for data collection raises issues as to its reliability in creativity evaluation. Data from observing creativity depends upon the interpretation of what the individual observer sees. Hence the advantage of multiple observers and video data that can be analysed by different researchers. Overall, it is fair to say that this form of creativity research is a description of either the end product or the process shaped by a collective knowledge and interpretation.

Some researchers in the creativity domain study examples of human creative process and products using case studies. Being involved in creative practices, observing creative processes and engagements in different places at different times, understanding the creative process better and improving judgments over time can provide “stories” of creativity measurement. We refer to it as a ‘story’ because each measurement is a case in itself with the people, processes, its creative context and artefact(s). Because each case is unique, one measurement method may not apply to the other story/case. Given this is so, if measurements may not apply across cases, in what sense can we call this a measurement?

In traditional scientific method, measurements must provide consistent results across different cases at different times and that is why they are taken over and over to verify the previous measurements or to reach an average value (with an acceptable standard deviation) for a series of measurements. Meanwhile, the factors which affect the measurement have to be controlled rigorously so that researchers can explain why variations (in measurements) occur. However, in order to ‘measure’ creativity, we have to conduct research outside of controlled laboratory conditions, and cannot rely on fixed criteria which can be applied to all cases. The shifting ground and the ever-changing contexts often render consistency out of reach.

If the term “measurement” does not match what we are doing within the creativity domain, then why do we still use this word? The reason is that we consider that creativity is, nevertheless, accessible to systematic study, albeit not in the standard scientific reductionist sense. The contrary point of view is to
view it as a mysterious activity that humans are engaged in and which can never be subject to scrutiny using scientific methods whether from traditional or ‘soft systems’ methodologies. From our research, we have some evidence that there are factors, conditions and other phenomena that occur every time we observe creativity. Many of these factors and possibilities have led to the emergence of computational creativity and development of creativity support tools [8, 19, 20, 27, 28]. Although this kind of repeatable conditions and factors are not as easy to demonstrate as those in scientific measurements of non-human systems, still we see enough evidence to start a discussion about criteria for creativity measurement. From this starting point, we aim to stimulate a discussion and, in time, further research about whether creativity can be made measurable. Here are some criteria we have developed and verified in design, art and collaboration domains, which we are using to analyse creativity in real contexts of use:

1. Creativity may increase when people are easily and intensely engaged in activity and enjoy it at the same time.

2. Creativity may increase when people achieve a controlled state in their activity and then snap out of this state with an unexpected condition.

3. Creativity may increase with expertise or naivety – i.e. in simple terms when people know “a lot” or “very little” about the activity they are engaged in. For example sketching studies showed that expert architects explore less number of alternative design solutions than the novice designers. Experts excel in predicting outcomes of certain design solutions over the time of dealing with many similar problems in their profession – so they would not go certain pathways. However novice designers have little knowledge of what might work in a design/therefore little skill of predicting outcomes. They are often more excited about exploring larger number solutions than an expert – and sometimes they end up with an unexpected outcome – “unexpected” in the realm of expert’s expected outcomes. If novice had the skill of carrying this unexpected finding with confidence to a professional level, maybe this would have been the creative solution. Whether each unexpected finding/outcome can be referred to as creativity is another question.

4. Creativity may increase when a person adapts him/herself to an unexpected situation during a “creative activity” i.e. s/he re-frames the activity s/he is engaged in. People often are attached to their initial intentions when they start an activity, and because they have expectations from these activities, they may get stressed with unexpected situations. Moving out of their comfort zone thinking they lost the initial state of control might cause possible anxiety/stress. However people also manage to be flexible; they adapt and they have
ability to re-frame the situation and start believing in it along with new expectations. Through this re-framing the anxiety could be transformed into relaxation, control and to ‘flow’. We see this movement in emotions and the ability to re-frame conditions an important criterion for creativity measurement.

We believe that similar criteria, used to analyse existing situations, can be applied to designing for creativity support.

4. Studying Audience Experience

This part of the tutorial is concerned with methodologies for understanding the process elements of creativity based upon observational studies of creativity in-situ and an analysis of behavioural protocols.

Understanding and evaluating “interactive experience” is of interest to HCI researchers and interaction designers. In the history of HCI, “interaction” was primarily studied through effectiveness and efficiency of a system and has been measured by focusing on usability, user’s understanding, the number of errors users’ make, and the amount of time required to complete a task. However, goal/task-oriented evaluation techniques do not always satisfy interactive art experience evaluation objectives. Recent trends in HCI research have begun to focus on fun, pleasure, goodness and beauty [21, 22, 35] as experiential goals. For example, Hassenzahl argued that evaluation should take the role of affect and emotions into account to better understand people’s experience of technology [21]. Similarly, the evaluation of audiences’ experience of interactive artworks goes beyond usability and often involves measurement of aesthetic appreciation and the various engagement qualities which are dependent on personal traits, motivations, expectations, emotions and cognitive states of the audience.

Audience/user experience evaluation is conducted using several methods such as direct and lateral observations in the context of experience, contextual enquiries (interviews with the audience during their experience of an interactive system) and/or expert workshops (where experts are invited to experience and discuss an interactive system). These methods can help the interaction designer to understand to what extent user/viewer expectations are met and how to further develop the interaction design.

There are several cases where we performed observation and analysis of creativity and interaction with different tools including digital technology. Examples will be taken from fields as diverse as: collaborative design and audience experience of interactive art.
Methods to study creative processes and interactions

The context analysis gave us a perspective on activities in the design practice at a higher level. While context analysis continued over the research timeline, the protocol data collection occurred during intensive periods of collaborative designing where video recording was also needed and employed.

Protocol analysis has been accepted as a prevailing research technique allowing elucidation of design processes in designing [13]. While earlier studies dealt mainly with protocols’ verbal aspects [1], later studies acknowledge the importance of design drawing [2], associating it with design thinking which can be interpreted through verbal descriptions [33] [32] [31]. By gathering information on how designers talk about and represent their design ideas during collaborative design while using different environments, we were able to understand how the characteristics of the different environments influenced their behaviour during the design sessions.

The method of data collection employed in audience experience studies was video-cued recall, a technique which involved collecting participants’ reports of their thoughts about their primary experience of the interactive artwork. The video-recording of each participant’s behaviour in the interactive artwork environment was shown to them immediately after their experience as visual cues for recalling their experience. This method has been used and proved to be useful for understanding situated experience of interactive art and how meaning is generated in situated experience [12] [24] [6].

Computer Aided Video Analysis

Studying complex kinds of behaviour such as social interactions, stress/aggression, collaborative designing, and problem solving activities make audio and video documentation a must in most cases. Only the repeated playback of these recordings allows for analysis and understanding of the triggers and correlations of the shown activities in detail. Given the well-known problem associated with collating, indexing and structuring large amounts of qualitative data, software applications are an obvious source of support to the analysis process. However, not all applications provide sufficient support to all requirements of a given set of research objectives and data. Data transferring requirements (such as heterogeneity, compatibility) and data analysis requirements (such as level of details in the video, need for one or more video streams, issues related to coding process etc.) determine the software application needed for the study.

In a previous paper, we described a study of the use of a software system for coding and analysing audio video data in the context of research studies undertaken in a live commercial environment [9]. The analysis of video
recordings without the support of professional tools is extremely time consuming. For example analysing the protocols in design research involves investigation of video recordings together with transcribed audio files. The transcribed verbalizations are usually time-stamped and segmented manually, which is a lengthy process. Additionally, video recordings require particular care in order to capture a complete picture of the actual drawing process. For the purpose of analysis, scene shots have to be captured from the video each time the researcher wants to refer to the related verbalization. In that way, the design protocol document has the associating image/drawing with the verbalization.

Computer aided video analysis offers a solution to bring together and synchronize these resources/streams of data in one interface (Figure 1). There are several software solutions in the market and the appropriate application should be selected after a survey of several available systems based on a set of requirements established for the particular research situation. We established that the software system INTERACT (Figure 1) performed well and was a clear enhancement to the task of the research analyst [9].

![Figure 1 Coding with Interact, video analysis software](image)

**Audience Experience and Engagement**

Interactive art is, by its very nature, concerned with audience experience. The participant goes beyond looking or listening and we cannot describe what happens just in terms of what the see or hear. We can only describe it in terms of what they experience. The interaction is the essence the meaning of the work to the participant. Audience experience is a key issue in all art, but in the case of interactive art it becomes the overriding issue.
Beta_space is an exhibition space for interactive art situated within a large science and technology museum in Australia. The space is curated by members of the Creativity and Cognition Studios (CCS), a multi-disciplinary practice-led research group in digital media and the arts. Beta_space provides a public context for artists and researchers to conduct research into artworks that may be at various stages of completion, from early draft to fully functioning work.

The aim of research in Beta Space is to study the audience experience of interactive artworks in a public exhibition context. The objectives are two-fold;

- To support artists in the development of their art-works as part of an iterative creative process. Research into audience experience thus forms part of a process of formative evaluation for each artwork.
- To contribute to a general understanding of the experience of interactive art that can support theorists, artists, curators and producers.

We have developed an analysis framework for the evaluation of interactive art experience [6]. Interactive art experience data from three different artworks (cases) have been coded and analysed. Comparison of the three cases/artworks showed that the nature of interactive experience is mostly determined by the affordances of the artwork in context. Analysis of commonalities and differences between participants’ experiences across cases enabled us to characterize each artwork in terms of feedback, use of bodily interactions and cognitive indicators [5].

The results from the same study also showed that each participant’s interactive experience of the same artwork could be very different from each other; i.e. each individual creates a unique situation of his/her interaction. Understanding and characterizing these unique ways of interactions is the focus of this research which is relevant to the tutorial subject.

**Creative Engagement**

Experiencing art is driven by perception, where perception is an active and constructive process. Experiencing interactive artworks involves the same condition in addition to the active engagement with the work, which involves being in the space of the work, interacting with it and constructing a meaning through this interaction. Therefore, within an interactive art system, the audience as well as the artist, is engaged in a creative pursuit.

Edmonds et al discuss creative engagement with interactive art works in terms of three categories: attractors, sustainers and relaters [16]. The first is concerned with gaining attention, the second with maintaining that attention and the third with ensuring a long-term interest. In this paper we are particularly concerned with the first two of these. We consider the initiation of interaction (concerns about attractors) and sustaining that interaction (concerns about sustainers). Our
interest here is in modelling the processes and work in this kind of engagement in interactive art.

Candy and Edmonds categorized interaction types in art as static, dynamic-passive, dynamic-interactive and dynamic–interactive varying (also called generative) [10]. Most interactive artworks we refer to in this paper are in the dynamic-interactive category, where the human “viewer” has an active role in influencing the changes in the art system. Motion and sound capture techniques are often used to incorporate human activity into the way visual images and sound are presented. The work performs differently according to what the person does or says.

An example of a dynamic-interactive art system is ‘Iamascope’ [17], a work which includes a camera capturing viewer images and movement and which is connected to a controlling computer. The work reacts to human movement in front of it by changing kaleidoscope-like images and making music at the same time in direct response to viewer’s movements (Figure 2).

Figure 2 Iamascope in Beta Space

An example of the generative type interactive art system (dynamic-interactive-varying) is ‘Absolute 4.5’ (Edmonds, 2006)[15]. In this system, there is an additional agent (a software program) that changes the original specification of the art object. Because of this, the performance of the artwork cannot be predictable.

Absolute 4.5 (Figure 3) is comprised of a large screen with a changing grid of colours accompanied by a complex sound track and controlled by a generative set of rules carried out by a computer. As the audience approaches the screen Absolute 4.5 detects their presence through sensors in the floor. Aspects of the system’s behaviour, such as its rate of change, are influenced by audience behaviour in the space.
A Creative Engagement Model

The Creative engagement model [7] is a model that represents active engagement with interactive systems, based on defining interactive experience as a transformative dialogue between the audience and the interactive (art) system. Through studying different art systems and audience experiences we identified interaction modes, phases and states of audience engagement and used these as basic elements of the engagement model.

The model was developed through long-term analysis of direct and lateral audience observations and qualitative analyses of audience verbal reports and interviews. Observational and qualitative data was collected from audience experience of ten different artwork installations in Beta Space over a three-year period between November 2004 and November 2007.

The engagement model represents the perspective, expectations and interaction behaviours of the participant who walks into the exhibition space, interacts with the work, stays engaged and goes through phases during her experience. Therefore, the active engagement model is human-centred, rather than system centred, i.e. it does not represent the system architecture of the artworks.

The engagement model [7] represents “interaction modes” and “interaction phases” related to the participant’s experience of an interactive art system. While interaction modes define dialogues between the participant and the art system, interaction phases define participant’s longer-term cognitive processes. We propose that the model contributes to our understanding of audience engagement and offers a realistic and viable framework the problem of designing for creative audience engagement with interactive art systems.
Supporting Creative Engagement

Below is a summary of principles for supporting for creative engagement that emerged from the creative engagement model. During the tutorial, each design principle will be discussed in detail in relation to example audience experiences:

1. Create situations where the audience may initiate an interaction unintentionally, and may be surprised about the outcome.
2. Provide visible and noticeable outcomes from the unintended initiation and just enough for the participant to realise the interactivity.
3. Set expectations of the audience before they start to interact: in a way that is clear and encouraging enough to motivate them to interact but not prescriptive of what is going to happen.
4. Stimulate the initial interaction in an inviting manner and strive to make initial interaction style easy to understand and achieve.
5. Provide intuitive ways of learning the interactivity and the environment if interaction cannot be simple and inviting.
6. Provide sufficient ‘adaptation’ time for the audience to practice and test interactivity and the feedback from the system.
7. Maintain audience attention and engagement during the ‘adaptation period’ by allowing the system-audience interactions be consistent.
8. Research audience intentions within the context of interactions to be designed and design for the most common and intriguing intentions.
9. Make design decisions where necessary whether to align (or not to align) system feedback with audience intentions.
10. Reward audience with a sense of achievement or control at some level to move them into the ‘anticipation phase’.
11. Provide audience with stimulus to reflect on their previous intentions and question their current interactions.
12. Create an ambivalent experience, switching between a ‘sense of uncertainty’ and ‘control’.
13. Introduce ‘unexpected’ changes to the audience experience, where audience might be challenged.
15. Continue creating ‘unexpected’ changes in audience experience when they seek closure.
5. Readings

References

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**Additional Reading**


