Exploring “the Open Work” and Creative Cognition to create an Interactive Experience

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Abstract
This paper elaborates on the collaborative creative process of an interactive experience in form of a new media artwork. “Sim-Suite” is an installation-game which engages three members of the public in embodied interaction. The creative process for this artwork was informed by Umberto Eco’s concept of “the open work” as well as the Geneplore model from creative cognition research.

Keywords
Guidelines, Creative Process, Interactive Experience, Embodied Interaction, Artistic Process, Installation

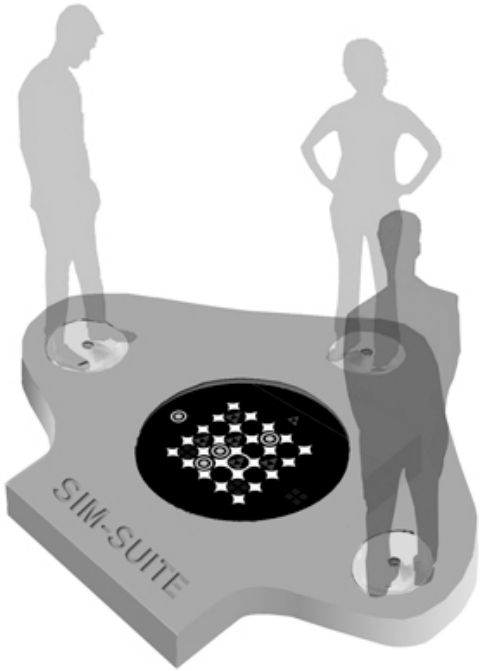
ACM Classification Keywords
H.5 Information Interfaces and Presentation; H.5.2 User Interfaces (D.2.2, H.1.2, I.3.6); J.5 Arts & Humanities.

Background
Digital technology has permeated the cultural dimension of global society while new media has formed the material basis for digitally derived communication tools. These new tools have affected how we engage creatively and how we evolve our

cognitive capabilities as part of our creative intelligence. Our media rich environments, characterised by pervasive and ubiquitous computing, are now addressing a much wider social and cultural context. Specifically, artistic new media work has blurred the boundaries between established forms of art, and integrated multidisciplinary skill-sets in the production of these works. As a result, new strategies for creative engagement emerge on both sides of the artwork: in the construction of new media works via collaborative interdisciplinary team efforts, and in their use via interactive experiences when participants engage with the artwork. Interactive new media works are often open-ended, where the engagement by the public completes the work, providing a coherent embodied, cognitive and social experience to the participants as well as the creators.

Recently creative cognition research has begun to investigate creative problem solving with the aim to understand the process behind the generation of creative solutions when given a set of parameters. This addresses the traditional understanding of the creative process from the view of the creator only. From the position stated above, the contemporary expression of real-world creativity in form of media artworks which also encompasses the creative interpretation assumed in the engagement by the participant is still in need to be addressed and included as part of the creative process. One aspect of my research is the creation of an interactive installation in collaboration with two other people. For this position paper I shall discuss an experimental approach to the creative process that was informed by Umberto Eco's concept "the open work" and understandings in creativity research to develop a set of guidelines that are oriented on the participant as co-creator in the completion of the artwork.

The installation Sim-Suite



To explain my approach, let me first introduce you to "Sim-Suite", an interactive installation-game played by three participants. Imagine a four-piece platform constructed from timber, which is arranged on the ground to be a single platform participants step onto to engage in the interaction. Three pieces of the platform

contain, embedded, a wooden wobble-board. The fourth piece of the timber construct is located in the centre of the platform arrangement; it covers a large 40 inch screen display that faces upward in horizontal position on the ground. The screen display is disguised inside the platform only part of it is visible via a square shape cut out from the timber. The participants position themselves on the wobble-boards around the visible part of the screen display, while facing each other and forming a triangle in space. The interaction takes place by moving on the wobble-board, using stepping and balancing motion in response to what is displayed on the screen.

The movement generated by the wobble-boards is captured by concealed Infrared analogue sensors. The signal is digitised and translated by a proprietary computer programme which drives the graphics and the virtual interaction. Three participants interact competitively in game-play. Each participant is represented virtually with a particular, graphical token which can be moved in four directions on a virtual grid. The virtual grid is equally legible to all participants. Participants play together against time in successive rounds with the goal to accrue tokens so that these compose a previously specified pattern. These efforts can be undermined by competing participants who are able to block an unfinished pattern. A multifunctional graphic overlays each active token to obtain feedback on where the participant is stepping on the wobble-board and in what direction they are moving on the virtual grid. Before entering into game-play, participants are introduced on how to move on the wobble-boards via virtual instructions. There are hidden aspects to the game-play that are left for the participants to discover rather than being revealed in the introductory tutorial. When these aspects are encountered, they are accompanied by sound effects.

Figure 1. Three participants from the public engaged in playing Sim-Suite at a digital arts festival.

"The Open work" and Creative Cognition as Influences on the Artistic Process

The creation of Sim-Suite was approached as an artistic process. The manner in which the collaborators on this project worked was exploratory and open-ended. The project evolved through discussions and ad hoc decision-making on the basis of the guidelines which I shall describe in this section. To establish some background on the influences that were used as guidelines in the creative process, I shall briefly outline Umberto Eco's concept of "the open work", followed by a short introduction to the relevant concepts from creative cognition research. I shall then demonstrate

how these concepts influenced and informed the creative process of the recently completed installation-game “Sim-Suite”.

Umberto Eco’s [1] view of artistic creativity encompasses the participant as a co-creator of the artwork. The participant engages with the artwork based on subjective interpretation and experiences in the interaction that are underpinned by the participants freedom to engage with full emotional and imaginative capacity. On the part of the creator there is a deliberation in intending diverse interpretations, and at the same time neglecting to create spatial and temporal resolution in the artwork. Nevertheless, the creator also has an awareness of his or her own perspective in how the work can be interpreted. Eco exemplifies this point by stating that a painter suggests proportion of a figure in a painting not from an “objective canon” but rather from “judging them in relation to the angle from which they are seen by the observer”. Eco further differentiates the concept of “the open work” from the “work of movement”. Inside the organisational structure of a “work of movement” is the possibility of movement by “unplanned or incomplete structural units”. These “units” are concluded when participants interact with the artwork. There is no optimal interpretation of the “work of movement”, only a series of inexhaustible interpretations all of which create the artwork. The challenge for the producer of a “work of movement” is to balance “openness” with “structural vitality” so that the artwork maintains a coherent whole in what it aims to communicate.

These concepts informed the construction of guidelines for Sim-Suite’s creative process. The guidelines constitute three perspectives in the creation of interactive experiences:
1. Ambiguity: extend previously generated and selected artefacts, properties, and actions away from cultural convention.

2. System: organise the selected and extended artefacts, properties, and actions so that the organisation maintains a dichotomy of order and freedom.

3.Integration: define what constitutes a boundary of a unit in the system and how the participant improvises with the system.

Let me now turn to a brief description of how creative cognition research approaches creativity. The creative cognition approach has put forth a heuristic model of creative functioning, called the Geneplore model [2]. The model constitutes a two-fold cyclic dynamic with an initial generative phase the “Generation of Preinventive Structures”, which is interpreted in a second exploratory phase the “Preinventive Exploration and Interpretation”. The insights gained from this process are then focused or conceptually expanded to a final product. Constraints on the final product can also be imposed at any time during this process. For the purpose of the position paper, I shall focus on the components of the first phase. In their model, Finke et al [2] suggest the following examples of cognitive processes that are generative in nature: retrieval of existing structures from memory; the formation of simple associations among those structures, or combinations of them; the mental synthesis of new structures; the mental transformation of existing structures into new forms; analogical transfer of information from one domain to another; and

categorical reduction in which existing structure are conceptually reduced to more primitive constituents. These are considered mental processes which are part of the early cycle in developing creative work.

Before the collaborative creation of Sim-Suite began, the themes for the installation were established by my interest in full-body human motion and group interaction. The theme "full-body human motion" was focused on naturalistic movement rather than, for example, dance movements. To better conceptualise "full-body human motion" I changed the representation of the theme [3] to "standing on a moving ground", which evidently causes full-body motion in most humans. At this stage, analogical transfer, a generative cognitive process evolved the theme to the selection of an actual artefact. Finke et al [2] define analogical transfer as analogical reasoning that "involves the transfer or mapping of knowledge from one domain, called the source to another domain, called the target [4]". Furthermore analogical transfer is a generative process resulting in the creation of new Preinventive Structures. Finke at al describe the process as searching for unanticipated attributes, structural relations, and conceptual interpretations. In other words, these concepts brought forth by Geneplore model served the purpose to ignite my creative process similar the use of creative techniques in meta cognition.

Informing Sim-Suite's creative process

In this section I shall describe how the principles from Eco's "open work" and processes from the creative cognition model guided the creative process of Sim-Suite.

The initial theme "full-body human motion" was first explored by changing the representation of the theme to "standing on a moving ground" and then mentally processed via analogical transfer. In the beginning stages of the collaboration, we selected the wobble-board as an artefact to develop an interface that enables engagement via full-body human motion. The wobble-board is analogous in its function to "standing on moving ground". Further analogies in form of selected artefacts, properties and actions, and how they were extended to fulfil the first guideline is illustrated in the table below.

artefact & analogy	extended
wobble-board (analogous to "standing on a moving ground")	extended translation of axis: Y-axis (up, down) extended to X and Z-axis (left, right, forward and backward) when moving on the wobble-board in virtual space
virtual grid (analogous to gameboard)	extended from moving on the grid in two dimensions to moving in a third dimension by wrapping around the grid
a unique graphic shape represents each participant (analogous to tokens)	extended to simultaneous turn-taking by all participants
graphical shape as timer (analogous to time limit)	extended via random placement of a new token for each participant after each time limit has come to an end

Figure 2. Table demonstrating the application of the developed guidelines in Sim-Suite's creative process

The next step was to organise these artefacts, properties and actions into a simple system:

S1= movement generated by the participant on wobble-board navigates token

S2= token is able to move in four directions on virtual gameboard

S3= n number of tokens in pattern formation creates winning configuration of the game

S4= build up tokens by cycling through activity; after x amount of time, activity on virtual gameboard freezes and resumes with additional tokens placed into the game

The third guideline aims at integrating the elements of the system into a coherent whole. This is an embodied endeavour requiring direct interaction with the elements by the creators. Lastly, Figure 3 illustrates what we defined as the boundary of one unit in the system: One movement of a token on the virtual gameboard in each possible direction constitutes one unit in the system. The participants improvise this movement via embodied strategies. The strategies have to cover:

- moving the token on the virtual gameboard effectively so that the token moves into the desired direction

- holding a token in stationary position on a constantly moving wobble-board when placing the token onto target field

- exploring the limits of the gameboard for optimal game-play, e.g wrapping around and moving on top of another token

This concludes my brief introduction to the Sim-Suite's creative process. The loosely devised guidelines were an essential foundation in the discussions between the collaborators, as they provided the necessary structure for our exploration. The project is considered successful but further experimentation is needed to solidify this approach to the creative process and to test it on a broader variety of interactive experience.

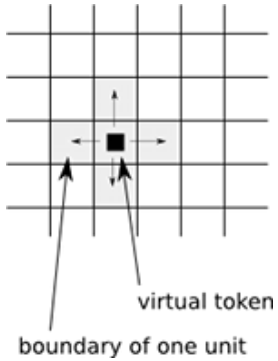


Figure 3. One movement of the token in all possible directions defined the boundary of one unit in the system

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References

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