

# Supportive Methodology and Technology for Creating Interactive Art

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## Statement of Sources

I, Greg Turner, declare that the work presented in this thesis is, to the best of my knowledge and belief, original, except as acknowledged in the text, and that the material has not been submitted, either in whole or in part, for a degree at this or any other university.

Signed:

# Acknowledgements

This is the one part of the thesis I can be sure the examiners won't read, so I think it is safe to relax the rules of scholarship for two pages, because the justification for thanking these very special people need not be very rigorous. It's been a big journey, and my thanks are literally the size of the world: I shall begin with the far hemisphere and perform several circumnavigations.

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*Simple things should be simple.  
Complex things should be possible*

Alan Kay's law of simplicity.

*...and there should be a smooth curve  
between them.*

Greg Turner's corollary.

# Abstract

Computation, as a medium for programming, supports scientists, mathematicians and “algorithmically-creative” (Amabile, 1996) workers very well. ‘Deep’ programming environments, with few, or flexible constraints, are designed for these kinds of computation. However, most artists, designers and other “heuristically-creative” (Amabile, 1996) workers must make do with more ‘gentle’ programming environments, such as Max/MSP or Processing, which support particular conceptual spaces well. Yet once the constraints of those spaces are come up against, they are found to be rigid.

The new media world is, by now, used to seeing interdisciplinary work that involves artists and technologists in collaboration, sometimes in response to this difficulty. These collaborations combine the power of artistic modalities of thinking with the full capabilities of computational media, but still the computing medium must be mediated for the artist by the technologist. Such mediation is at risk of reinforcing boundaries between artists and technologists, and denies artists ‘hands-on’ creativity in the medium, which is not only frustrating but also can destroy artistic meaning (Candy & Hori, 2003).

How can we make computational media better support creative workers, in and out of collaborations? My answer stems from the roles of constraints which surround conceptual spaces, but which can support creativity only as far as they can be changed in response to a change in conceptual spaces (Boden, 2004). Computation is an attractive medium because potentially supports highly changeable constraints. However, this potential is not realised—there are plenty of constraints within computing today which are neither inherent nor useful for creativity, but imposed as a result of industrial practices which are decreasingly relevant in today’s techno-society. An example is the constraint around every compiled program preventing any modification of that program. Since these constraints cannot be changed in response to changing conceptual spaces, creativity is limited.

To remedy this technological disjunction between conceptual spaces and supportive media, I have made recommendations for future computing systems in which imposed constraints are not rigid. For example, if someone wishes to explore or change a particular constraint in such a computing system, they can ‘lift the hood’ and discover what’s happening and change it, recursing if necessary to the level of computing fundamentals, but using a similar interface paradigm to that which they have already been using. Such a computing system allows people to change a computing medium to fit with their changing conceptual spaces.

To illuminate the accompanying social issues of supporting interdisciplinary collaboration, I carried out a grounded theory inquiry into the roles of collaborating experts—predominantly artist and programmer—working in interactive art collaborations. By studying first-hand reports and conducting interviews, I was able to build a rich theory of technology’s role in the collaborative process. Most importantly, I found that non-programming artists prefer to use shared language and boundary objects (Fischer & Ostwald, 2003) that are also meaningful in computing terms. An example is when a programmer constructs ‘computational toys’, which sit between conceptual spaces and thus can be manipulated to create technical, aesthetic and computational meaning simultaneously.

To evaluate these findings, I synthesised the computing recommendations and the toy-making methodology, and examined prototypical examples of them in the light of a real-world art collaboration called *Cardiomorphologies v. 2*. The collaboration involved the development of several computational toys in the Max/MSP computing system, and also a technology for quickly creating toys.

# Contents

<b>1. Introduction</b>	<b>1</b>
Chapter Overview	1
Thesis Statement	2
Overview of My Approach	2
Why Creativity?	3
Why Study Artists?	5
Why Study Interactive Art?	6
The Research Question	7
constructing an environmental framework	8
Core Argument	9
Goals	9
Wider Aims	9
Research Outcomes of Each Chapter	9
Summary	9
<b>2. Literature Review</b>	<b>20</b>
Introduction	20
Creativity	21
<b>Creativity Support Qualities</b>	<b>28</b>
creativity support qualities of ethnic and institutional culture	28
creativity support qualities of motivation	31
creativity support qualities of human minds	32
creativity support qualities of activities	35
creativity support qualities of collaboration	44
creativity support qualities of artefacts	46
creativity support in balance	53
<b>Interactive Art</b>	<b>53</b>
Processes for Creating Interactive Art	69



<b>End-User Programming</b>	<b>72</b>
editor style	73
intuitional eup vs. expository eup	74
developing a programming culture	77
metadesign: designer–consumer and expert–novice transitions	79
buttons	81
aspect-oriented and table-oriented programming	82
visual programming environments (vpes)	83
code typography and literate programming	84
debugging/dynamic visualisation	84
<b>Summary</b>	<b>88</b>

## **3. Methodology** **91**

<b>Introduction</b>	<b>91</b>
<b>Relativism, Realism and Constructionism</b>	<b>94</b>
<b>Characterising Creative Situations and People in This Research</b>	<b>100</b>
<b>Strategic Approach</b>	<b>102</b>
A Note About Preliminary Studies	106
Exploring Tools	107
<b>Exploring Art-Methodology</b>	<b>108</b>
introduction to grounded theory	110
grounded theory process	111
influence of preconceived ideas	112
<b>COSTART Data Analysis</b>	<b>113</b>
interview analysis	114
<b>Evaluation through Collaboration</b>	<b>117</b>
software development	118
interactive art evaluation	120
collaboration process evaluation	120
<b>Summary</b>	<b>122</b>

## **4. Preliminary Studies** **124**

<b>Introduction</b>	<b>124</b>
<b>cubeLife</b>	<b>125</b>
<b>Séa.nce</b>	<b>129</b>
the perpetual emotions project	131
the origins of séa.nce	131
engendering networked e.motion	133
perceiving networked e.motion	136
networked creative collaboration—inside and outside of séa.nce	139
conclusions	140
séa.nce in the context of this thesis	141

Summary	142
<b>5. Study 1—The Role of Computing Media in Interactive Art</b>	<b>144</b>
Introduction	144
Terminology	145
Computing as a Creative Medium	146
Examples of Constraining Sub-Media	149
Some Counterexamples	159
Hardware	167
Open Source Software	167
So why do we compile software?	168
Summary	171
<b>6. Study 2, Part A—Technologists’ Roles in Interactive Art Collaborations: Analysis of Previous Data</b>	<b>172</b>
Introduction	172
COSTART Reports	173
COSTART 2 Reports	187
Summary	198
<b>7. Study 2, Part B—Technologists’ Roles in Interactive Art Collaborations: Interviews</b>	<b>200</b>
Introduction	200
Interview Design Rationale	201
general questions	202
motivation (macro and micro)	202
the collaboration process	202
artists’ and technologists’ relationships to computing	203
Interview Analysis	204
Demographics	206
attuning	206

relating to the project	207
collaboration patterns	211
developing problems into shared structures	215
artists exploring technological structures: naïve interactive art, and human computational interfaces	221
technologists exploring artistic structures: intimate iteration and computational toy-making	226
Summary	231

## 8. Design Recommendations 234

Introduction and General Comments	234
A Computing Medium for Creative Engagement	237
Methodologies to Collaboratively Engage with Computing	242
Technologies to Support Creative Collaboration and Engagement with Computing	249
Summary	257

## 9. Study 3—Implementing and Evaluating the Recommendations 259

Introduction	259
Description of the Artwork	260
Metadesign	261
use of leading current technology	261
additions to current technology	263
Evaluation and Discussion	270
evaluation of the artwork	271
evaluation of the collaboration process	274
Summary	277

## 10. Conclusions 279

Summary of Argument	279
Situating the Research	286
kautz et al.'s grounded theory study of programming	286
heuristic evaluation of design recommendations	287
Future Work	291
methodological implications	291
end-user programming and creativity support	291
teaching programming	291

implementing my recommendations further	292
artists who program	293
sketching reconsidered?	293
curatorial importance of art development	294
towards future technology	294

## Appendix 1 (on CD): Publications 298

Complete List of Publications	298
Towards a Supportive Technological Environment for Digital Art	300
Uncanny Interaction: A Digital Medium for Networked E.motion.	308
A Grounded Theory Study of Programming in Artist-Programmer Collaborations	333
Creating Affective Visualisations for a Physiologically Interactive Artwork	347

## Appendix 2 (on CD): Heuristic Evaluations of Max/MSP and Squeak Smalltalk 354

Max/MSP	354
Squeak Smalltalk	357
“good graphic design and colour choice”	358
“less is more (keep it simple)”	359
speak the user’s language	360
use appropriate mappings and metaphors	360
minimise user memory load	360
be consistent	360
provide appropriate feedback	361
clearly marked exits (to functions)	361
prevent errors	361
good error messages	361
provide shortcuts	361
minimize modes	361
help the user get started with the system	361

## Appendix 3 (on CD): COSTART Coding 362

COSTART Project Case Report No. 2 (Candy & Kelly, 2000b):	363
COSTART Project Case Report No. 3 (Candy & Kelly, 2000c):	364
COSTART Project Case Report No. 4 (Candy & Kelly, 2000d):	365

COSTART Project Case Report No. 5 (Candy & Kelly, 2000e):	366
COSTART Project Case Report No. 6 (Candy & Kelly, 2000f):	369
COSTART Project Case Report No. 7 (Candy & Kelly, 2000g):	371
Categories Resulting from open coding	371

## Appendix 4 (on CD): COSTART 2 Coding 374

Introduction	374
Document Coding Report	376
Node Coding Report	394
Categories resulting from COSTART 2 coding	406

## Appendix 5: Interview Questions 408

Questions for Artists	408
Questions for Programmers	409

## Appendix 6 (on CD): Interview Transcripts 412

Interview with [IT1]	413
Interview with [IT2]	424
Interview with [IT3]	434
Interview with [IT4]	449
Interview with [IA1]	461
Interview with [IA2]	469

## Appendix 7: Interview Coding Table 474

Initial Coding Table	474
Coding Table Restructuring Stage 1: Removing/Renaming categories.	477
technologists' categories	477
artists' categories	479
Coding Table Restructuring Stage 1: Rearranging the hierarchy—the emergence of 'Attuning'	482
The Final Coding Table	484

Appendix 8 (on CD): Transcript of Interview with George Khut	497
Appendix 9 (on CD): Excerpt From George Khut's Exegesis	514
Appendix 10 (on CD): Artist Biographies	520
Dave Everitt	520
Norie Neumark and Maria Miranda	521
out-of-sync	522
George Khut	523
References	524