Computation, Visualisation and Critical Reflection

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We are interested in creating novel representations of computation, so that people who are often excluded by traditional software development tools can access the power of computing. For example we work with artists who wish to use computational behaviours as an inspiration for dancers, or for sculpture, but lack the time or interest to engage with traditional programming languages. We also engage with social concerns such as online political activism, economic divides, cultural heritage, the 'e-sciences/e-humanities' and gendered conceptions of technology.

Rather than using our technical expertise to craft solutions one at a time for these audiences, we use particular engagements to inform the creation of tools that our collaborators can take forward and use by themselves, creating new products for their own audiences. In this way we reach a much wider constituency than would otherwise be possible.

The dominant discourse in computer science as to how to achieve this, is the advocacy and implantation of 'computational thinking' [Wing 2006], training others to think like computer scientists. We have chosen to reject this route [Blackwell et al 2008], starting instead from a critical reflection on metaphysics of computation [Smith 1996] and the politics of information structures [Bower and Star 1999], further developed through our own action research.
This research has taken the form of extended technical engagements with several major global corporations. In each case, we have been involved in core aspects of the technical infrastructure strategy, contributing as specialist design consultants (unfortunately the sensitivity of these projects means that we will not be able to discuss them in any detail, or to name the companies involved).

We juxtapose our commercial activities with a programme of engagement in contemporary arts research and practice, studying and extending the varying design processes and requirements of leading artists such as choreographer Wayne McGregor and sculptor Bruce Gernand.

The outcome of this programme of technical engagement and critical reflection has been a series of interactive visual representations, seeking to explore different aspects of the experience of computation. Our aim is to allow users to explore the possibilities of computational behaviour in flexible ways, rather than limiting them to a series of predefined options constrained by the trivial 'metaphor' of direct manipulation interfaces, as is common in software design practice [Blackwell 2006a]. This goal might be expressed as the creation of a graphical 'programming language', rather than simply a graphical 'user interface', although the representations that we are creating are sometimes not recognisable to computer scientists as belonging to either class.

We are concerned that in rejecting much of the standard discourse from computer science, we run the risk of working without the rigour of a critical community. We are closely engaged (including as founders and convenors) in fields that take a cognitive stance with regard to visual representation use, such as the international conference on theory and application of diagrams, conferences on visual languages, and on psychology of programming. However, we would like to seek new feedback from other communities as to the philosophical and methodological foundations of our research.

We are very aware of the challenges involved in facilitating interdisciplinary encounters [Blackwell 2006b, et al 2009], and of the need for shared experiences, values or boundary objects in establishing new conversations. We therefore propose - if the conference programme and technical facilities allow - to offer participants the opportunities to experiment with some of the novel tools we have created in a 'hands-on' session. We think this could provide a stimulating basis for the discussion on the ways that visual representations can become notational tools for use in supporting a wide range of intellectual enquiry.

References

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