

But nevertheless, the UK lags behind countries such as Canada and The Netherlands due to its lack of permanent spaces purposefully designed to accommodate interactive artworks. Yet the UK is a hotbed of interactive artwork design.

It is clear from this research that the emergence of interactive digital art requires convergence between the worlds of art and marketing at a deeper level than is currently the practice. Many interactive digital artworks, after all, incorporate commercial products made by well-known (and not so well-known) companies, or can become commercial products in their own right.

FUTURE DIRECTIVES FOR CREATIVE USE

Experience gained from the Future Physical programme and through observations on the aesthetic, technical and social directions in which interactive artworks are heading enables the identification of a number of future trends in creative use.

Development

>>> **Creation of public-access development spaces:** permanent or temporary spaces in which users can experience a range of interactive processes would advance public understanding and acceptance of creative use. Such spaces could manifest themselves as open-house residencies or development centres set up for artistic projects to install and run systems to be tested by users of all skill levels. Preferably with zones accommodating different interfaces such as Observational, Responsive and Kinaesthetic. For artists, these would be used to experiment with and prototype artistic technological systems, layering existing analogue performance technologies with the new breed of intelligent responsive environments (as developed through the Intelligent Stage concept). This can only currently be possible by designing this functionality into new build schemes.

>>> **Episodic staging of interactive works:** is desirable as user adaptation and learning takes place through processes of repetition. Users who were able to revisit Future Physical works spoke of deriving more enjoyment and a greater understanding from them on repeat visits. Creation of public access spaces would facilitate this, and would allow developed versions of works, whose user experience would have been refined, to be exhibited.

>>> **Developing new models of collaboration, co-authoring and shared funding:** open-sourcing allows for the development of back-end component and system technology that can form the basis of widely differing types of interactive works. By combining such components with open source-based co-authoring and co-production models, plus conceiving new models of shared funding, a new and much-needed measure of coherence could be brought to the area. The Future Physical programme provided a blueprint for such collaboration and sharing; the challenge is for the regional, national and international funding agencies to work with artists and pick up the ball.

>>> **Extending the product life-cycle:** the life-cycles of products in the field need to be extended in order to stabilise and advance system functionality and user learning processes. Performative-based digital work is often released to the market before it has been completely tried and tested.

Design

>>> **Beyond user testing:** Interactive artworks demand that the role of the user is configured into the design process from its conception - preferably while works are still at the concept stage. Creative users benefit from being involved all the way through the design process, from concept to field testing development and evolution. A model for this is provided by the videogames industry: gamers are often involved in the process of games development from concept to completion.

>>> **Applying educational models for looking and making:** the use of models such as those developed by Mosston and Ashford (learning styles), Honey and Mumford (learning cycles) and Rudolph Laban (effort analysis) to design elements of interactive work or information requirements pre and post experience could support the physical, emotional, social and cognitive development of users within interactive environments. Performance simulation may also have a role. This is a process that trains participants to react, not freeze, in an intense situation. This is accomplished by familiarising the participants within the context of the event and then having them practise sequences which will aid their survival. Simulation trains people to cope with alterations in detail and to respond to those changes with appropriate behaviour during a real event.

>>> **Creating adaptable systems:** we have seen, for example, videogames that intelligently adapt their difficulty levels to accommodate their users' range of abilities; the same principles could be applied to creative users, adjusting interaction according to users' creativity levels.

>>> **Adding physical feedback:** once again, the videogames industry leads the way in terms of the commercial exploitation of sophisticated physical feedback (generally known as force-feedback or haptics). Interfaces providing cyclical feedback with developers looking at both physics and biological sensor technology are starting to find their way into interactive artworks such as a number of the designs created for the Future Physical programme.