Interactive Learning in Museums of Art and Design
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‘Misconstruing Interactivity’

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Introduction

It is increasingly recognized that social interaction, interaction between visitors, is critical to how we experience museums and galleries (e.g. Falk et al. 2000; Hein 1998). We often visit museums with others – whether friends, family, peers or colleagues – and even when we visit a museum alone we are sensitive to the behaviour of others. Our own research and studies by others reveal the ways in which social interaction has a pervasive influence on what we choose to look at, how we approach exhibits, the ways in which we explore and examine particular objects and artefacts and undoubtedly the conclusions we draw (e.g. Bradburne 2000; Heath et al. unpubl.; Leinhardt et al. 2002; Paris 2002; vom Lehn et al. 2001a; vom Lehn et al. 2001b). Our aesthetic and practical experience of exhibits and exhibitions in museums and galleries emerges in and through our talk and interaction with others, be they people we are with or others who just happen to be in the same space.

This growing recognition of the importance of social interaction in museums and galleries can be seen as part of a broader trend, a trend that is increasingly placing interactivity at the heart of the agenda, not only in science museums and science centres but also increasingly in the arts – and not just the contemporary arts (Dinkla 1995, 2001). This developing commitment to interactivity is being driven by a range of concerns and considerations and it is worthwhile mentioning just one or two. In education, for example, there is a burgeoning body of research in the social and cognitive sciences that demonstrates the importance of social interaction in learning and the ways in which knowledge and skills are gained in practical situations in and through the communication between people whether children or adults (e.g. Cole 1998; Lave 1988; Rogoff 1990). This growing emphasis on the situated, interactional and informal character of learning gives museums and galleries, it is argued, a unique opportunity to contribute to education, and ‘interactives’ provide important resources in engaging people in exhibits and more generally exhibitions in museums and galleries (e.g. Ash 2002; Callanan et al. 2002; Crowley 2000; Crowley et al. 1998; Ellenbogen 2002; Ellenbogen 2002).

The importance of interactivity in museums and galleries, and of the very term interactivity, has been profoundly influenced by the remarkable developments in communication and information technologies that have emerged over the past couple of decades. The widespread and seemingly successful deployment of digital technologies in the workplace, the home and, increasingly, the public arena has encouraged museum managers, curators and educationalists to explore ways in which information technology can enhance our experience of and in exhibitions (e.g. Bradburne 2000; Cheverst et al. 2000; Fleck et al. 2002; Spasojevic et al. 2001; Woodruff et al. 2001). Quite understandably, science museums and science centres, such as the Wellcome Wing in London, Explore @Bristol, the Glasgow Science Centre, the Exploratorium in San Francisco and many others have led the way in creating new forms of interactive experience, but increasingly there is a growing

commitment to exploring how these new technologies can enhance our access to and experience of more traditional objects and collections, not simply through the 'Web', but actually at the exhibit face itself. Indeed, interactivity is seen as an important resource in enhancing interpretation and creating new forms of engagement with museum collections.

These developments, allied to a political agenda that makes museums and galleries increasingly accountable in terms of the visitor numbers and their social background, combine to give interactivity an institutional significance that increasingly pervades the development and redevelopment of exhibits, exhibitions, galleries and museums. Surprisingly, however, the actual interactivity that arises within museums and galleries with and around these new forms of exhibit and exhibition, remains largely unexplored. We know little of the effect of these new 'interactives' on how people behave, let alone about their effect on how people understand and learn. Indeed, our own research suggests that in some cases, while enhancing an individual's experience, 'interactives' – in particular those relying on computing and information technologies – inadvertently impoverish the social interaction that can arise with and around exhibits in museums and galleries. There is a danger that we are confusing interactivity with social interaction and collaboration.

In this brief paper we would like to illustrate and discuss some of these issues with reference to examples drawn from science centres as well as art galleries and museums. In the first part of the paper we will begin by discussing some of the problems that arise when people use computer-based 'interactives' and then go on to discuss a number of more 'low-tech' exhibits and information displays. In particular, we will draw on one or two examples from the new British Galleries at the V&A, which have an impressive range of 'interactives'. The observations are drawn from extensive video-based field studies we have undertaken over the past few years in a range of museums, galleries and science centres, including Explore @Bristol, the Science Museum London, the V&A, the Courtauld Institute, Nottingham Castle Museum and the Musée des Beaux-Arts, Rouen. The approach draws on our wide-ranging studies of technology in organisational environments (Heath and Luff 2000).

Prescribing interaction

One of difficulties with interactivity is that it tends to reflect a particular model of human interaction that is not primarily concerned with interaction between people. The model is implicitly, and sometimes explicitly, drawn from computer science or at least from the ways in which people are thought to interact with computer systems. It is a model that pervades the design of computing technology, ranging from simple work stations through to complex systems, and it is a model with a long history in Artificial Intelligence and Human Computer Interaction (see, for example, Dreyfus 1992/1972; Suchman 1987). This is not the place to discuss the approach in detail, but it is worth mentioning one or two points. The model places the individual and the individual's interaction with the artefact or system at the heart of the agenda. It assumes that activities derive from plans and goals, and that actions are organized in terms of rules that determine patterns or sequences of conduct to allow those goals to be achieved. The execution of action involves complex cognitive processing through which the individual develops representations of the system, for example, and enacts the appropriate sequence of conduct. Many computer-based systems are based implicitly on this approach to human interaction and ironically, perhaps, it was

computer systems and their operation that provided the basis to the model in first instance, not unlike the ways in which the telephone exchange became a model of the mind in the 1930s.

It is perhaps worth briefly considering the use of one or two examples of seemingly successful 'interactives' that embody this model. The exhibits are part of exhibitions in two well-known science centres, Explore @Bristol and the Wellcome Wing of the Science Museum in London.

The Word Skills exhibit at Explore @Bristol

The Word Skills exhibit at Explore @Bristol, for example, is designed to test the word skills of visitors. It consists of a conventional 19" active screen monitor placed in a large free-standing casing, with a seat for visitors directly in front. Interaction with the exhibit takes place through touching the screen. The system presents visitors with a series of tests that become progressively more difficult as they proceed through a series of successive topics and issues. At the end of the exercise each visitor is given a score. Completing the sequence of actions and achieving a score can take up to 10 minutes, and at busy times in the museum this causes some difficulties.

The 'interaction' is primarily designed for a single user who undertakes a series of actions in response to pre-specified questions or puzzles posed by the system. Interaction with the system is structured through a series of two-part 'actions': system action – user response and so on. Each of these sequences of system–user action allows the visitor to progress towards the achievement of the particular goal, which is explicitly presented at the beginning: 'Test Your Word Skills'.

The illustration shows that the individual user is often accompanied both by members of his/her own group and by others visitors waiting their turn. Their physical arrangement and orientation is quite interesting and reflects the limited participation available to others within the surrounding ecology of the exhibit. Those who are waiting their turn, become *partial witnesses* to the actions of the user. They have limited access to the information presented on the screen (through the size of text and position of the user) and cannot necessarily see the actions in which he/she engages. Given that in some cases visitors may have to queue for five minutes or so one can understand why they become a little restless and occasionally agitated.

Even for those visitors accompanying the user there is limited opportunity to co-participate in the activity. First, the progressive sequence of actions and the goal of the overall individual score undermine both the ability and value of a co-participant contributing to the test. Second, the display and input technology restricts a co-participant's access to the system's operation. In many cases, those accompanying a visitor simply wait and watch what he/she is doing. In cases where others do try and collaborate, we find numerous examples of the principal user becoming irritated and in some cases trying to push their eager co-participant away, even of parents removing their children.

It is worthwhile considering a rather different exhibit: the Sex Change exhibit in the 'Who Am I' section of the Wellcome Wing at the Science Museum. The exhibit involves having a photograph taken, which is then digitally transformed to make the visitor appear as if he/she has changed sex.

The Sex Change exhibit at the Science Museum

The exhibit is housed in a large amoeba-like structure, nicknamed a 'bloid', which contains one or two other exhibits positioned at some distance. Once again it consists of a conventional 19" touch-screen monitor. The operation of the system consists of a series of actions specified by the system to enable the user to select the sex in question, to align his/her face correctly to the camera placed above the monitor, and to take the photograph at the right moment. At the beginning of the sequence the system makes clear to the user the purpose of the exhibit.

The system is designed to enable a single user to have his/her photograph taken and transformed. In many cases the user is accompanied by others, again including both members of their own group of visitors and others waiting to use the exhibit. Unlike Word Skills however, the involvement of others does not necessarily undermine the overall goal of the exhibit, and people enjoy seeing pictures of each other after they have 'changed sex'. There is, therefore, some collaboration both in operating the system and in appreciating the results.

The system is rather difficult to use. In particular, users have difficulty in aligning themselves to the camera and it is not unusual to find them making several attempts to produce an appropriate image. The collaboration of others largely consists of a friend or members of the family trying to help the principal user operate the system and

adopt the correct alignment. Sadly, once the picture is taken there may be little time to appreciate the results, since others may be gathering near the exhibit and the results are visible only on the screen. The collaboration of others is limited not only by the organization of the sequence of actions prescribed by the system, but also by the size of the screen and the surrounding casing, so that only one accompanying adult at a time can satisfactorily see what is on screen and help the principal user. Indeed, it is interesting to note that even families with young children often have to split up, with the father and one child, for example, attempting to operate the system while the mother and a second child stand back and wait.

In one sense therefore, the Sex Change exhibit encourages collaboration and in terms of one of the conventional criteria for measuring success in museums and galleries, namely 'dwell time', people do indeed spend extended periods of time at the exhibit, as they do with the Word Skills exhibit at Explore @Bristol. The character of the collaboration, the social interaction prompted by the exhibit, however, raises some serious questions about whether the exhibit is as successful as we might like to believe. It also raises doubts as to the usefulness of conventional measures such as 'dwell time'. When we look at what happens when people use the exhibit, we find that in many cases users spend a substantial proportion of their time attempting to operate the exhibit in the way intended and that collaboration is often limited to one person helping the other to follow the instructions, the prescribed sequence of actions. 'Dwell time' becomes extended further not by virtue of participants discussing the end result, the transformed image and its implications for our perception of sex characteristics and conventions, but rather by participants having to make several attempts to produce an image that is clear enough to be able to see the user in the guise of the opposite sex. The collaboration that the exhibit produces is therefore largely concerned with trying to operate the exhibit rather than discussing, or even appreciating, sex characteristics.

Word Skills and Sex Change are not unusual computer-based exhibits. They both use a basic information system and conventional hardware. They embody many of the features of the conventional computer-based interactive exhibits found in science centres, museums and galleries. The forms of interaction and collaboration they engender are also not unusual. Like many other computer-based interactive exhibits, they are designed for one principal user, who interacts individually with the system to achieve a particular goal. The interaction with the system is scaffolded to elicit successive single actions from the user in response to 'moves' by the system, whether in the form of instructions, questions or some other prompt. The organization of the 'interaction', a series of two-part sequences of action, is designed for, and favours, a single respondent. The organization is not dissimilar to a series of questions and answers in a conversation, such as an interview, which can provide little opportunity for the respondent to initiate action and which biases the interaction towards the same respondent (see for example, Sacks 1974a; Schegloff et al. 1973). The conventional input and display technologies used in these exhibits also undermine the collaboration of others by restricting the ability of people gathered at the exhibit to see the screen, to see the principal user's operation of the system and to select items or moves on the screen itself. Like conventional PCs and work stations, on which these exhibits are based, these types of computer-based exhibit are designed for single users, people on their own interacting with the system to accomplish a particular task. The

collaboration of others is restricted in large part to watching the principal user as he/she 'interacts' with the system and occasionally helping or interjecting comments.

None of this is to suggest that visitors do not use, or do not attempt to use, these exhibits for more complex forms of collaboration; indeed they do, sometimes successfully. Moreover, when the opportunity arises and they have worked out how to use the system, visitors will take turns in using the exhibit and compare and contrast their performance and results. In fact, not unlike some games in amusement arcades, some of these computer-based exhibits are specifically designed to encourage comparison and competition between users. Unfortunately, however, despite their commitment to interactivity in many cases, computer-based exhibits support relatively limited forms of collaboration. In many cases it consists of little more than helping to operate the system or interjecting answers or solutions to a puzzle, often to the frustration of the principal user. The fact that something like 70% of people visit museums and galleries with other people makes this something of a disadvantage.

'Interactives' and social interaction

Unfortunately, perhaps, the term interactive is used to encompass a broad range of exhibits and artefacts, only some of which are based on information and communication technologies. Increasingly, the term is used to include a range of materials and even teaching packages that are designed to enhance interpretation, discussion and learning. Even if we adopt a relatively narrow focus and simply include objects and artefacts that involve an 'interaction', for example by being manipulated, the term still encompasses a rich variety of devices, exhibits and techniques. Even within this more narrow definition, the new British Galleries at the V&A include a variety of 'interactives', ranging from models of the Crystal Palace to gauntlets that may be worn by visitors, from short video programmes describing particular objects through to fragments of porcelain that may be touched and felt. We have undertaken fieldwork and video recording in the British Galleries of people using a number of these 'interactives', and it may be interesting to consider briefly one or two examples.

At the outset it should be said that the different 'interactives' engender very different forms of interaction with the object and social interaction between people with, through and around the object. They facilitate very different actions and activities and provide very different opportunities for exploration, investigation and discussion. For example, when people assemble the Crystal Palace we find a strict division of labour where each visitor builds sections independently and as they complete different parts attempt to merge them together. Talk between visitors arises mainly during the integration of the different parts and at the beginning and end of the assembly process. In contrast, when trying on the corset, one participant becomes an assistant helping and receiving instructions from the other ('tighter, tighter') until the hiatus where they both appreciate the result. Assembling the model eighteenth-century century chair is different again; it necessitates intense real-time co-ordination and collaboration, where the participants' contributions are tightly synchronized; few succeed in assembling the complete chair, yet it serves to engender much discussion and comment. Very different activities and forms of participation are involved in the completion of these various tasks and one would suspect the implications for learning are very different.

Trying on a corset at the V&A

It is worth mentioning that, despite the apparent success of these interactives, there is no significant evidence to suggest that visitors connect the activities they undertake with the interactives to the original object(s) that they are designed to illuminate. The two interactives described are physically separated from their relevant objects and visitors do not necessarily, for example, go from the interactive to the object or vice versa. In the case of the chair this was not the intention. When the British Galleries opened, there was a real eighteenth-century chair mounted on the wall above the activity, but this had to be removed because it was too vulnerable. It is intended to put an image of the real chair there, as has been done with the corset and crinoline. Physical separation may not necessarily matter, but if the interactives are designed to illuminate particular objects, then we need to explore ways in which we can encourage visitors to make systematic connections.

Most of the interactives in the British Galleries are in fact next to the relevant objects and the relationship between the activity and the object would appear to be obvious. However, even in these cases visitors do not necessarily explore or even discover the connection.

Creating connections

In the seventeenth-century section of the new British Galleries there is a display case containing examples of ceramics, both British and Chinese. Below the case are a series of pieces of pottery and porcelain for visitors to handle, including British and Chinese examples.

The handling activity provides visitors with a puzzle: to feel and distinguish between the pieces and relate them to the examples within the display case itself. When groups visit the exhibit there is once again an interesting division of labour. One person will read the label out loud while their co-participant will touch and feel the ceramic pieces. As he/she touches the pieces the visitor will often say aloud how the different fragments feel, providing comment and criticism, and discussing the relative merits of the different types of ceramic. Remarkably, it is not unusual for only one of the visitors actually to feel the samples, while the co-participant will read out the labels and listen to the spoken response to the

Ceramics handling activity at the V&A

pieces, without necessarily feeling the fragments for him/herself. Even though the two participants are together, their use of the interactive actual experience of the exhibit is thus very different.

The fragments and accompanying labels are designed to provide visitors with a tactile sense of the different types of ceramic displayed in the case above. Despite some stylistic similarities, there is indeed striking contrast between the tactile qualities of the different pieces, in particular the English and Chinese. In some instances, however, if only occasionally, visitors in groups fail to make the connection between the fragments for handling and the relevant objects in the display case above. For example, visitors will touch and feel the pieces and examine the objects in the case but fail to relate the two and sometimes remain puzzled as to the purpose of the fragments. On occasions, not infrequently after the pieces have been touched, one of the visitors will discover the accompanying information and retrospectively establish the connection and, if they are still available, touch the handling pieces again. However, the accompanying information often remains undiscovered, especially by visitors who approach the exhibit from the right rather than the left. This may be because the information introducing the activity is to the left of the fragments, although text about individual pieces is next to the relevant shard. Visitors often leave the display without ever making the connection between the fragments and the objects in the display case.

So even where the interactive is placed in immediate juxtaposition to the objects in question, and accompanying information is provided to enable one to make connections, visitors do not necessarily discover the relationship. The very purpose of the interactive – to enable visitors to look at the objects in the case with a deeper understanding of their physical qualities – passes unnoticed.

There are a number of other interesting issues concerning the use of the interactive at the seventeenth-century ceramics display. The direction from which visitors arrive at the display has an important bearing on whether they touch the fragments and whether they are able to discover what they are for and how they relate to the objects in the case. The arrangement of objects, fragments and accompanying textual information appears to presuppose a particular pattern of navigation from visitors, arriving at the left facing the case and progressing to the right. In fact, the team were well aware that visitors do not follow predetermined routes, but the difficulties of fitting the interactive within a constrained space have militated against this knowledge. Not infrequently visitors arrive from the right and as a consequence not only fail to discover the information that will allow them to make sense of the display but actually progress through the wrong sequence of actions. The problem is how to position text with objects in a confined area in such a way that it is immediately accessible, regardless of the direction of approach.

The difficulties are exacerbated when the section is crowded. Even if visitors approach from the appropriate direction, it is not always possible to progress through the appropriate sequence of actions, because other visitors restrict access to particular objects or to the fragments. Most interesting, perhaps, is the very different experiences that people within groups gain from the exhibit. In such cases there is a wide range of possibilities, for example, as to who actually touches the piece, who reads the labels, the order in which the objects are viewed and the connections made.

This ‘asymmetry’ in the action and interaction that arises around the exhibit is critical to the experience gained, and it is perhaps a mistake to believe, even when people look at an exhibit or display together, that what they learn is equal or ‘shared’. These asymmetries in how people use and experience exhibits when they are with others raises important issues about the design of interactives and in particular about designing interactives to support and enhance collaboration.

Creating audiences

The British Galleries also include digital interactives, which are designed to enhance the visitors’ experience of a particular object or exhibit. One type of digital interactive consists of a screen that plays a short video illustrating the design and function of a particular piece. One example is based in the nineteenth-century galleries. It shows a short film, lasting about two minutes, which demonstrates the operation of a washstand designed by William Burges and illustrates various features of its design. The film consists of a series of interconnected but continuous parts that focus on particular aspects of the piece. Each of these parts includes one or two subtitles summarizing a particular feature: for example, ‘the bowl is emptied into the container underneath’. The monitor is placed on a low stand to the right of the Burges washstand. The film is begun by touching the screen and continues without interruption to the end.

There is, of course, some variation in whether and how people use the interactive, and this can be profoundly influenced by the presence and behaviour of others who happen to be in the same area. For example, it is not unusual when the gallery is relatively crowded for visitors to glance at the Burges piece and, seeing people watching the video, simply to move on rather than wait. Alternatively, if there are one or two people looking at the piece itself, or if they approach from the right rather than the left, visitors will not infrequently watch the video before looking at the object itself. More importantly, however, the video itself can and does become a substitute for the original object, the Burges washstand. It is not unusual for visitors to view the video, occasionally glancing at the exhibit, and then, as the film comes to end, to look at the piece very briefly before moving on. Of course, this may be influenced by the presence of others, but it is also due to the quality of the film, which allows the visitor to see details that are difficult to view on the object itself and gives a sense of how the exhibit operates that is not available in the gallery display. In one sense, therefore, the video undoubtedly extends ‘dwell time’ at this area of the gallery. The fact that visitors spend time watching the film without necessarily examining the object may not be important, but it once again points to the rather delicate, if not tenuous, relationship between interactives and the objects whose interpretation and exploration they are designed to enhance.

The Burges washstand video at the V&A

The short film itself does not necessarily serve to encourage or engender discussion and collaboration between visitors in groups. It is not unusual for visitors when watching a film together to fall silent, to become members of an audience, if only

temporarily. Interestingly, we have found a parallel shift in the character of participation when children doing an exercise together in the classroom turn from looking at a book together to watching a CD on the computer. Visitors will make brief comments and occasionally glance at the exhibit itself, but to a large extent their co-participation is limited to a mutual alignment towards the film.

This may not be surprising. The narrative structure of the film and its uninterrupted flow to completion limits the opportunities for visitors simultaneously to look at the object or converse with each other. If visitors do look up and examine the piece for more than a second or so, then they may well miss the next part of the film, which demonstrates or illustrates some aspect of the exhibit. Similarly, if visitors exchange more than a brief comment, then their talk soon becomes unrelated to the material they are viewing on screen. Moreover, any comments that are made encourage the co-participant to turn and look at some feature of the exhibit itself; yet, if they respond appropriately, they are likely to miss the next part of the film.

Visitors go to some lengths in an attempt to co-participate in simultaneously watching the video and looking at the exhibit. Once again we find examples of a division of labour emerging, where one visitor will watch the video and speak the subtitles as they appear, while his/her partner inspects the actual piece. Rather sadly, however, these forms of collaboration often lead to difficulties since the visitor viewing the piece will demand his/her partner's attention in examining some feature of the washstand, while the partner attempts to continue to watch the film. Unfortunately perhaps, the structure and pace of the film provides limited opportunities for simultaneous participation in examining the exhibit, watching the video and discussing the object in question. When visitors do attempt to use the film to create a more collaborative examination of the exhibit, for example by selectively speaking the subtitles to a partner, tensions arise between the interaction of the visitors and the structure and demands of the film. As in the case discussed here, there is a delicate process of negotiation through which the visitors attempt to establish and maintain a common focus of involvement that interleaves the film with the exhibit, but within moments a fragmentation generally arises or the second person simply joins his/her partner and watches the video.

None of this is to suggest that the accompanying films are not interesting and informative. In the case of the Burges exhibit the film dramatically illustrates aesthetic and functional aspects of the washstand that would be difficult, if not impossible, to describe in a label or even in accompanying pictures. However, the location, length and structure of the film have a significant impact on the ways in which visitors inspect and experience the original washstand and, more broadly, the ecology of participation and interaction that arises within the area of the exhibit itself. The film engenders particular forms of participation and can temporarily transform visitors into an audience, undermining their ability to explore and discuss the piece collaboratively. The relationship between viewing the film and inspecting the object is highly dependent on the presence and actions of others within the same space and even on the direction from which the visitor approaches this particular area of the displays. However, unlike a conventional label, which provides resources for comment and discussion and the collaborative inspection of the exhibit, the film does not necessarily remain subservient to the object it is illustrating and, rather than

engendering discussion, it can transform the visitor into a more passive participant while removing the necessity to examine the object.

Rethinking interaction

The term interactive is misleading. It encompasses an extraordinary range of tools, technologies and techniques, objects and artefacts that are designed to create interactivity in museums and galleries. It includes sophisticated information systems that prescribe complex forms of interaction between the user and the exhibit through to 'low-tech' artefacts designed to enhance visitors' understanding of particular objects. Different 'interactives' engender very different forms of interaction and provide highly variable opportunities for co-participation and collaboration. As yet we know little of the conduct and collaboration that different 'interactives' afford, still less of the ways in which they might contribute to learning.

The problem arises with the term interactivity. It suggests active participation, human action creatively articulated not only with regard to an object, artefact or system but in response to an active, potentially intelligent and intentional agent. Unfortunately interactivity is conflated with human social interaction. However, 'interactives' are rarely designed to support or enhance social interaction; rather, in most cases they are principally concerned to provide individual users with the ability to operate or manipulate a system or object. In the case of exhibits based on information and communication systems these operations can be relatively complex and engage the user in a lengthy series of structured action and activity prescribed by the particular interactive. The design and development of interactive and new exhibitions, including a number of major projects over the past few years, continue to prioritize the individual user, often at the expense of co-participation and collaboration. The fact that visitors are seldom on their own and that the object, artefact or system may well be used in interaction with others is not infrequently disregarded. There are important exceptions, and it is interesting to note that these often involve 'low-tech' objects and artefacts and are designed to necessitate co-operation and collaboration. With the development of more technically sophisticated 'interactives', when the presence of others is taken into account, their participation is often limited to the role of spectator or witness, an accompanying visitor(s) who, it is believed, will watch their friends or partners and then engage in the particular activity itself. The 'myth of the individual user', as Jo Graham suggests, continues to pervade the design and development of 'interactives' in museums and galleries – a general reflection perhaps not only of the provenance of the term, but more worryingly, of the prevailing curatorial and educational concept of the visitor.

It is hardly surprising that 'interactives' meet with varying success when deployed in museums and galleries. Their actual use rarely appears to reflect the ideas and assumptions that informed their original purpose and design. In prioritizing the individual visitor rather than the social and interactional circumstances in which the interactive will be used and seen, a complex array of issues and factors come into play that profoundly affect the visitor's encounter with and discovery of the exhibit(s) or artefact. These are largely disregarded in the design and deployment of the interactive and yet have a critical affect on its ability to function and engage. Visitors do whatever they can with many 'interactives' and show remarkable ingenuity in using them to support forms of social interaction and collaboration that they were never intended to support. More disturbing, perhaps, is that, despite their apparent success in

terms of conventional measures such as ‘dwell time’, the forms and quality of interaction and collaboration that arise with and around the exhibit would do little to please the objects’ original designers or the curatorial staff.

One of the more interesting issues that arises when one considers the incongruity between the design of the interactive and the conduct and interaction that arise when it is actually deployed has a bearing on the growing concern with learning and education in museums and galleries. Many interactives have been driven in part by the learning agenda in museums and galleries and yet, if the interaction that they give rise to is somewhat at odds with the original design then it perhaps raises problems concerning the motivation and validity of the concept behind the interactive. Learning may well take place, but not necessarily in the way predicted and as yet, given how little we know of the interaction that interactives produce, we are hardly in a position to make an informed judgement.

Surprisingly, perhaps, curators and museum managers have long been aware of their inability to prescribe how visitors explore and experience objects and exhibitions. In his introduction to *A Grand Design* Malcolm Baker suggests, for example:

> While guidebooks may suggest what a visitor should look at, and even the route that he or she should follow – and the meanings that the single individual might read into the objects encountered along the way – will only rarely coincide with the strategic thinking of the Museum’s planners. How a visitor interacts with artworks and their settings is determined by personal needs, associations, biases, and fantasies rather than by institutional recommendations. In considering this history – that of response to, and reception of, the collections – the issue is not with the Museum defined by its official aims and aspirations, but with how it is reconstituted in the individual imagination.
> (Baker 1998, pp. 18–19)

In the case of many ‘interactives’ these difficulties become exacerbated. The interactive is designed to facilitate particular forms of conduct and experience and relies on visitors using the exhibit or artefact in particular ways. The interactive may even necessitate the visitor interrelating objects and making connections between exhibits that are not necessarily located together. Unfortunately, however, visitors do not necessarily respond in the ways we imagine or hope, and circumstances may arise that make it difficult if not impossible for them to undertake the pattern of action required by the interactive. Even if we reflect on one of the more seemingly straightforward assumption entailed in many ‘interactives’ and exhibitions – that visitors will normally follow particular navigation paths and thereby be in a position to undertake the relevant actions in the appropriate sequential order – we can see how easily such an assumption may be undermined simply by virtue of the number of visitors or different pace or direction in which they pass through the galleries. These and many more considerations besides are important factors in designing exhibitions and need to be placed high on the agenda when we are developing ‘interactives’.

In designing and developing for museum and galleries we have to reshape the ways in which we think of and conceptualize the visitor, to break away from the individualistic model that continues to pervade ‘interactives’ and the very idea of interactivity. Unless we place the social and interactional at the heart of agenda we

will continue to be frustrated by the unanticipated ways in which people use our 'interactives' and disappointed when we examine their conduct and experience, let alone learning. The lone visitor wandering through galleries and achieving a pure aesthetic or scientific encounter with objects is largely a myth, despite the wishes of certain curators in more contemporary spaces. The presence and conduct of others have a profound impact on what we see and do, and on the opportunities that arise for exploration, investigation and learning. 'Interactives' are encountered and used with regard to the conduct and interaction of others, just as 'interactives' have a profound affect on the opportunities and organization of conduct that arises within the domain, the perceptual range, of the exhibit and its surrounding context. Social interaction in museums and galleries is highly contingent and reveals complex and variable forms of participation and collaboration. Our discovery and experience of the museum arises in and through this interaction and, if they are to meet with success, our 'interactives' have to be sensitive to, and designed with respect for, the social interaction that will inevitably inform their use.

One final point: despite the substantial body of research concerned with visitor behaviour and the growing interest in interactivity in museums and galleries, we still know relatively little about how people respond to exhibits in museums and galleries and interact with and around the objects and artefacts they contain. Save for a few important exceptions, conduct and social interaction at the exhibit face remain unexplored territory and yet provide the foundation, the very basis, for people's experience of, and learning in, museums and galleries. It seems critical therefore that in developing new forms of exhibit and exhibition that are designed to enhance learning and interaction we need a more thorough understanding of how visitors behave in museums and galleries and of the ways in which their behaviour is prompted and affected by social interaction with others. Without this understanding it is unlikely that the hopes, principles and ideas that underlie the development of new forms of interactivity will be reflected in the actual response and conduct of visitors.

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