Interaction in the museum: Observing, supporting, learning
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5. Conclusions

5.1 Summary
The last decade has been marked by an explosion of interest in museums, in museum buildings, and in literature about museums. Visitor attendance to museums (in terms of pure numbers) has risen dramatically, and new museums have been built in most major European cities, including Barcelona, Amsterdam, Bilbao, and Lisbon. The critical literature about museums, once comparatively scarce (with the exception of catalogues of collections) has mushroomed, and not a week seems to go by without a new addition to the now vast literature on the role of museums in society, the history of museums, or museum practice.

Most of the current literature about the museum field falls into one of two broad categories critical sociology of the museum as an institution, and museum practice. In the first category we find books with titles such as Museums and the Shaping of Knowledge, The New Museology, Civilizing Rituals, and On the Museum’s Ruins. Much of the literature is papers harvested at conferences and bound together in book form, some of it is new writing, but often derivative of other disciplines, French post-structuralist thought (in particular the works of Michel Foucault) being among the most recent intellectual fashions to shape the museum discourse and the discourse about museums.

In the second category are books such as Exhibit Labels, Museums and their Visitors, and Beyond the Blueprint. This literature often takes the form of ‘how to’ manuals – how to write labels, how to make hands-on exhibits, how to create a new institution. This category is supplemented by the now enormous volume of literature on exhibit evaluation – how to know if the exhibit or exhibition works. But exhibit evaluation (even pre-formative evaluation) is often merely reactive – it tests something that it assumes to already exist – visitor attitudes, visitor behaviour, exhibit holding power. It rarely provides results that aim to generate genuinely new exhibitions or exhibition strategies.

What is startling, as a museum professional, is how little of this immense volume of new material actually helps. In the case of the work on the sociology of museums, it is certainly often interesting, even stimulating, and much of it provides an excellent critical analysis of the museum in the present, and an often biting critique of the role of the museum in the past. But in terms of practice, what is the result? We go through ‘the moves’ (as a sociologist of my acquaintance calls them), finding the silenced
voices, deconstructing the dominant narrative, identifying the presence of absence. And in the end, what kinds of exhibitions result? For the most part, exactly the same kinds of exhibitions that we have been making for decades. To be sure, the content of the exhibitions has changed – often dramatically. There are new voices in evidence, new objects on display, new and critical themes explored – we have replaced our museums of heroes with museums of victims – but is this really enough? Has the way in which we make our exhibitions, and our museums, undergone any fundamental change as a result of the new intellectual trends? Has the relationship of the museum to its user fundamentally changed?

In the case of the second kind of literature – the manuals of museum practice – the same questions can be posed. Do they really help? Most of the manuals indicate norms of presentation – develop a strong storyline, don’t use small type sizes, make sure the lighting is properly positioned, and for heaven’s sake make sure the visitor exits through the shop! Some manuals go into greater detail – how to identify attractive themes, how to test that the words you use are not too complicated, how to measure type legibility – and how to increase sales in the shop. Nevertheless, despite this surfeit of useful information, the quality of exhibitions seems to remain enormously inconsistent.

In spite of all the good advice, good exhibitions and good exhibition labels seem to be the result – not of a theory of exhibition making – but of individuals. Thus on the one hand, museum practice – in particular making exhibitions – remains largely a matter of individual expertise, raw talent, ad hoc approaches, and time-honoured ‘rules of thumb’ – with a little bit of good luck thrown in. On the other hand, the ‘work’ of the visitor is also seen to be a matter of individuals, who are either assumed to have a certain background in order to appreciate the exhibitions created by the museum, or conversely, to lack such a background, in which case the museum can bring to bear the full armament of testing for word length, retention, vocabulary etc., to ensure that the ‘ignorant’ visitor ‘gets the message’ of the exhibition. In either case, the visitor is modelled in advance, and the work of the museum and the work of the visitor are seen as unrelated and profoundly independent.

In a paper given in 1989 in Amsterdam, subtitled Truth telling and the Doing of Science, the author attempted to sketch a provisional history of the science museum as an expression of changes in the history of ideas – notably in the history of science. The author argued that the seventeenth century emphasis on shared observation, an emphasis that largely defined the modern period, had profoundly

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shaped the development of all our institutions of informal learning, as the paradigm of the natural sciences was appropriated in every field of human activity. The author argued further that the resurgence of idealism in the twentieth century, in both philosophy and in the sciences, had prompted a parallel transformation in the science museum – and that we were witnessing the birth of a ‘third generation’ of science museums, based on the active practices of doing science, rather than on the passive receiving of science as a canon of accepted truths. Soon afterwards, in a paper written with Drew Ann Wake in 1990, we identified what we considered to be key failures of the new interactive science centres to deliver on their promise to provide an enriched informal learning environment. Instead of confining our criticism to the realm of conferences on education and policy, we felt compelled to put our ideas into practice, by creating new kinds of exhibitions, as described in Section 3.2 above.

Over the course of the next eight years the questions we posed in 1990 broadened into a far-ranging concern for shifting the centre of gravity in our institutions from the institution itself – from scientists, curators, academics, and designers – to the users of the exhibits. How could we maximise the variety brought to the experience by the user, while at the same time retaining the coherence necessary for effective learning? How could we create informal learning environments that became self-structuring and self-sustaining? How could we support the conditions for what Csikszentmihalyi called the ‘flow’ experience? How could we shift the focus from the exhibit as end-in-itself to the exhibit as a support for human activity – discussion, dialogue, debate? Finally, how could we develop exhibits that genuinely changed as a consequence of the user’s activity and intentions? The answer to many of these questions seemed to lie in the deliberate use of certain user-languages, particularly those of problems, and of games.

As can be seen from the discussion above, the history of museums can also be seen through the lens of user-languages. For over two centuries, the transformation of the museum, and subsequently of the science centre, as public institutions of informal learning, can be described as a consequence of the tendency, present since at least since the late 1800s, to create an informal environment which addresses users and offer them greater autonomy and agency. This tendency can be seen in the first studies of visitor behaviour, and in the mission statements of post-war public institutions, which increasingly recognise the importance of encouraging the participation of a public representative of the entire population. This ambition to serve all citizens from all backgrounds, has been complicated by the tension between a
model in which the specialist predominates, and one in which the user predominates — in other words, between the exhibition and the library — and the user-languages each employs.

The library is a resource, and it puts the accent on use, especially use directed by the user herself, and the organisation of a library is largely a function of its use. The collection, on the other hand, whether it comprises objects, as in the art gallery, or scientific principles, as in the science centre, is meant to be displayed, and its coherence dictated by the curator or designer. The organisation of a collection is a function of the messages its organiser wishes to communicate. The prime consideration of the library is the user — of the collection, the visitor. The library can remain open to the needs of a wide variety of users, and both the coherence and the variety of engagements with the library is potentially very large. The collection, on the other hand, relies upon a model of its visitor — and creates its exhibitions as a function of that model. The library employs the user-language of problem — its collections serve to answer problems defined by its users. The museum, on the other hand, has traditionally defined itself in terms of the user-language of observation (and its extension, the user-language of variables) — the user is meant to see what the museum declares is there to be seen. The library is always open to new use, as users bring new problems to it. The museum, to the extent that it relies on the user-language of observation, is exhausted by the visit. This tension between the two models has also been described as the tension between the ‘top-down’ approach, wherein knowledge is communicated from knowledgeable experts to a presumed ignorant lay public, and the ‘bottom-up’ approach, in which the public is assumed to be competent and able to generate, as well as receive, new knowledge.

What is called for, therefore, is a theory of how museums work — a theory that takes into account the nature of the museum setting and its users — and provides a means to understand it, operate in it, and improve it. The study the results and arguments of which have been described above lays the groundwork for just such a museum theory. This theory hypothesises that the museum is a support system, and that the label, defined as the constraints the museum places on the user, functions as the means by which the museum supports unknown and unknowable users. In the museum, the label confers properties on museum users, and museum users conversely confer properties on the label — the work of the museum and the work of the visitor are inextricably linked.
In its grounded state the theory describes how specific labels confer specific properties, how these labels can be implemented, and how they can create or construct the museum. The latter no longer needs to model the visitor – the label confers properties independent of such a model. Labels operate in many ways, but the key property of the label is its user-language – the constraints placed upon the user of the label to create meaningful activity. The user-languages in museums can be distinguished in terms of the properties they confer. It appears possible, as argued in the study, that a number of such languages developed over time. Each seems to extend previous languages, and to add new properties. The sequence of languages identified in this study ranges from the language of textual authority, being the oldest related to exhibitions, to the languages of observation, variables (an extension of the user-language of observation), problems, and games. It seems reasonable to expect further developments.

In the user-language of authority, effectively the label has only one dimension – that of the voice of authority. In the user-language of observation, the user is conferred the property of being an observer. The user-language of variables, an extension of the user-language of observation, marks the emergence of the modern museum, as it confers the ability to see, not only the visible, but also invisible relationships among things. The user-language of problems confers actorship on the user, while the user-language of games makes this actorship an indispensable condition of the experience, and confers the additional property of being able to deal and interact with other players – even if these players are virtual.

Thus the user-language of textual authority always constrains the amount of variety a visitor can generate. As witnessed in Robert Bakker’s frustration with the Smithsonian, even a specialist is confronted by the incontestable authority of the text. The constraints of the user-language of textual authority privilege the authority cited, and make acceptance of the authority of the authority a ‘take it or leave it’ affair. The user-language of observation, which exploded like a bomb under the foundations of centuries of intellectual discourse based on the exfoliation of texts, grants an important role to the observer, but is obliged to constrain both the observations and the conditions of observing. The user-language of variables, which is, in effect, a prolongation of the user-language of observation, confers the property of control on the visitor. The visitor can experiment, test, compare, and classify observations. Nevertheless, both the observing and the conditions of observation remain constrained.
The user-language of problems supports the visitor to define, analyse, and solve, and to compare the merits of different formulations. The solution to one problem may in fact lie in redefining it as another. Here the property of agency is conferred on the visitor, and acceptance encouraged by identifying problems relates to and derived from human experience. Finally, the user-language of games creates the conditions for enormous variety, by conferring the property of other players, with other, competing interests. Some games come to an end after an agreed upon point (the expiration of time, the reaching of a certain score, the accomplishment of an action), others (what Carse calls infinite games), only end when the players decide to stop. The goal of an infinite game is to keep playing. Infinite games remain open to new rules and new information to achieve this end. It is important to note that only the latter two user-languages, that is those of problems and games, confer the property of actorship on the user. That is to say, they allow user’s to structure their experience in terms of time rather than in terms of some kind of infinite timelessness – as for example happens in the case of the language of textual authority.

This last conclusion has striking consequences for the future of museum. User-languages that do not confer the property of actorship are, in a sense, ‘exhausted’ by their use. They support the user while they are being used, but the properties they confer disappear when the user stops. However, if one of the goals of a museum can be said to support repeat use, and perhaps more ambitiously, to support the acquisition of new skills, it can no longer rely on user-languages that do not confer the property of actorship. It cannot rely on user-languages that are limited to conferring certain properties to the user only while she is using the support – in order to support acquiring new competence, the properties conferred must be sustained over time. This possibility of support over time is only possible with user-languages which confer the properties of actorship and other players – the user-languages of problems and games, and presumably languages that still have to be designed.

5.2. What has been achieved?

The notion of a theory is not an easy one, but it proves to be especially difficult outside the natural sciences. Still it allows one to summarise a number of findings in a short label. Earlier I identified a number of criteria a museum theory has to satisfy. It should summarise what is relevant in the relation between the museum and the user or visitor, and indicate why. It should show how to create museum-like environments, and allow one to recognise when they have been achieved (or in other words, when the environment under scrutiny has become a member of the
class of museums). As a consequence, it should help identify how individual designers, conservators, directors and visitors are to be addressed so they can maximise their competence (that is, they can increase their skills, given that ‘individualised’ qualifications have been bestowed in the process of addressing). This kind of theory is not identical to a theory of certain phenomena. It is a theory for the construction of what a posteriori can be modelled as a desirable or ‘good’ museum.

As argued above, each such museum should serve as a support system. If the class of these systems is seen to function as a ‘scientific object’, it also should serve as a support system itself – in particular the theory that describes the properties of the class. This implies that any user of the theory should be able to understand exhibitions better, make better exhibitions, and thereby perhaps contribute to making better museums. A proper means to evaluate whether or not this study has achieved this goal would therefore be to identify what the theory claims to provide, and what has been demonstrated that it can provide.

What is claimed is that to make an effective exhibition (or museum), one should determine first how to ‘address’ the visitor, and what general properties to confer or to make possible. Subsequently one should choose a user-language, on the basis of existing information about which user-languages allow which properties to be conferred. Such information may be produced outside the museum, for instance in the academic setting, but can also be produced as part of an actual implementation (the latter has been the case historically, of course further development requires a more systematic approach than is usually possible in practice). After a user-language has been chosen, labels may be created and implemented, and exhibits or exhibitions developed. In the actual implementation, the means must be identified to lower the threshold of acceptance, and to encourage full engagement on the part of the visitor. This implies a process of (local) experimentation, including prototyping with presumed potential users. The opening exhibition should be treated as a completely implemented prototype, open to change. At this level there is no ‘right’ answer, predetermined a priori – in contrast to the level where the user-language was chosen. According to the theory developed in these pages, on this level it should be possible to ‘predict’ what constraints to prefer, after the first step is taken.

The procedure described above allows the museum, in effect, to turn conventional museum practice ‘on its head’. Instead of good style creating good labels, style being
something ‘extra’ added to the content the museum wants to convey, style once again begins to serve the ends of the exhibition. What are to be considered good labels now is pre-determined by the user-language that is chosen, and by its ability to address and engage the visitor.

Let me illustrate the above with some examples drawn from the foregoing study. In each case, a decision was made very early about the way in which the exhibition would ‘address’ the visitor – in effect, the user-language was chosen – and a second decision was made about how best to encourage the visitor to engage with the exhibition’s content, based on local context. It has been argued in this study that these two decisions correspond to answering the questions ‘what properties does the label confer on the user’ and ‘what properties does the user confer on the label.’

Although the user-languages of textual authority, observation, and variables may not always be most desirable in terms of current museum thinking, they are certainly not to be rejected in general. They do appear to help when certain properties are to be enabled, as confirmed by the experience of the author and others. Their effectiveness supports the notion of a user-language, as part of the theory explored above. The Gates of Mystery provides a useful example. It used a magisterial approach to convey the solemnity of the world of the Russian icon. The intent of the exhibition was to allow the visitor to understand the icon as part of the liturgy – not solely as a de-contextualised work of art. The user-language was that of textual authority, and visitors clearly became more knowledgeable by means of the exhibition. Conversely, visitors were encouraged to engage with the admittedly difficult material by means of a striking audiovisual, and a coherent scenography that expressed the organisation of the exhibition visually. The exhibition was the most successful in the history of the host museum, the Walters Art Gallery in Baltimore, in terms of attendance, and in terms of press coverage. Similarly, the exhibitions Merchants of Light (about the art and science of Rudolphine Prague), and Theatre of Reason/Theatre of Desire (about the art of Leon Bakst and Alexandre Benois), drew critical acclaim.126 They too relied largely on the user-language of textual authority, and were implemented in such a way as to encourage the visitor to immerse themselves in the subject matter of the exhibition by means of dramatic lighting, coherent scenography, and compelling texts.

Nevertheless, however successful these exhibition in the eyes of the public and the international press, it was clear that they were still profoundly limited by their use of the ‘traditional’ museum user-language of textual authority. Their labels confer
little active role to the visitor, and the visitor rarely returned to the exhibition a
second time. In order to develop exhibitions that unlocked and sustained visitor
activity, it was necessary to explore the use of other user-languages, languages ra-
rely used in the museum setting.

To develop the exhibition *The Body in the Library*, Drew Ann Wake and the author
had decided from the outset to use the user-language of problems – in fact, the
‘murder mystery’ approach that shaped the exhibition was considered even before
we were offered the opportunity to develop the exhibition! In this case, the both
the user-language of the exhibition, and the high level of engagement with the visi-
tor, derived from the choice of structuring the exhibition as a murder mystery. On
the one hand, the user-language of problems that characterises a murder mystery
(and characterised the exhibition) conferred actorship on the user – the visitor had
to, in effect, become the detective. On the other hand, reading murder mysteries is
part of a deeply ingrained Western cultural practice – certainly murder mysteries are
the genre most in demand at nearly all of Alberta’s public libraries – and as a con-
sequence, increased the level of acceptance of the exhibition by its users.

The change in visit behaviour from a ‘traditional’ exhibition was striking. Visitors
stayed longer, undertook new investigations on their own, and returned to the ex-
hibition time and again. Never before had the researchers seen such commitment
to an exhibition, from visitors both young and old.

In the case of *Beyond the Naked Eye*, an exhibition of medical imaging technology,
the exhibition was originally planned to appeal to women, research having shown
that women were more at ease with art than science. The first prototype exhibition
displayed the stunning images generated by modern medical technology as if they
were works of art, and used the user-language of observation to describe them. The
prototype revealed that many visitors were more interested in the outcome of the
patient’s condition, than the representation of its pathology, however beautiful.
Confronted with the image of a brain tumour – however strikingly rendered by CAT,
PET, or NMR, the visitor’s question was consistently, ‘did she die?’ As a consequen-
ce, the user-language of problems was chosen to structure the exhibition, and a se-
ries of case studies developed, grouped according to which imaging technology was
used to diagnose the condition. The challenge of the exhibition was for the visitor
to put herself in the shoes of the doctor – to analyse the material available, and come
up with a diagnosis.
In this case, as in the case of *The Body in the Library*, the user-language chosen for the exhibition and the context chosen to encourage the user's engagement complemented each other. Once again, the change in visitor behaviour was striking. In fact, the case study/problems were so compelling that often visitors ignored studying the underlying scientific principles of the imaging technology, prior to plunging into the hard work of making sense of the actual images. Once again, visitors returned often to the exhibition to continue working on a case study, or to review their initial conclusions.

In *Mine Games*, the challenge was to create a forum for discussion about the future of resource management in the province of British Columbia, Canada – a daunting task! Given our experience with the two exhibitions described in the paragraphs above, Drew Ann Wake and the author opted for the user-language of games, which held out the promise of both conferring actorship on visitors to the exhibition, but also conferred the property of interacting with other players – indispensible if the exhibition were to fulfil its mandate to become a real forum for debate and discussion. As in the cases described above, the choice of games as both user-language and context served a dual function – conferring the properties we desired on the user, and, and because of its importance to the culture of its intended audience – Canadian teenagers.

In every key respect, *Mine Games* met its ambitious objectives. The user-language of games was implemented at every level of the exhibition. The entire exhibition was presented as a game, the objective of which was to advise a community on its best future. Each cluster with the exhibition was also a game, providing new information to fuel the discussion about the broader question. Within each cluster were hands-on exhibits, which allowed the visitor to discover critical information with which to play the cluster's computer game.

The visitors to the exhibition quickly understood the excitement of the game, and used the clipboards provided at the entrance to record their progress. A comparatively large percentage of visitors stayed in the exhibition for extended periods of time, and many returned regularly to test new ideas and debate different options. A high level of discussion was seen, and a high level of involvement. The computer games were highly successful in attracting and engaging teenage users, while the hands-on exhibits and demonstrations kept other user groups involved. The Hotseat! theatre gave visitors a real say in the issues surrounding resource development in the province, and continues to be a forum for debate about the issue, over
fou rr  year  s  afte r  th e  exhibitio n  opened , and two years after the exhibition was
scheduled originally to close.

It is not unusual to judge results in terms of two types of validity. It seems useful to
identify the first, internal validity, as the level of internal coherence of the intended
development of the theory and of data collection, and the actual one. In other words,
did we meet with any obstacles when implementing our research model? The
discussion in this section would suggest that there were no serious difficulties,
indicating a high level of internal validity of the research undertaken. In the next
section the notion of external validity will be considered, that is, the possibility that
the research method makes more visible than simply the experiences reported,
or in other words, that it was possible to identify the class of 'better' museums, not
only merely specific examples. This would tend to imply that results could be
generalised over whatever can be recognised as an element of the class.

5.3. newMetropolis

Being given the opportunity to contribute to the building and the design of a new
museum allowed for a further test of the theory, as already exemplified in isolated
exhibitions. Could the lessons learned about new user-languages be applied on
a broader scale and in a single institution? Would the same kinds of properties be
conferred? Would we be able to observe new kinds of museum behaviour?

After over one year of operation of newMetropolis, the new science museum in
Amsterdam, the answer to all of the questions posed above appears to be yes. On
any day of the week, under widely varying circumstances and with widely varying
publics, the exhibitions consistently give rise to the same kinds of behaviour –
behaviour marked by relatively long periods of engagement, visitor-initiated activity,
and visitor-directed enquiry. newMetropolis is remarkable for the degree of
collaborative activity its exhibitions support, and the amount of contact and discus-
sion among visitors.

It is especially instructive to note that the least successful exhibits (notably the
exhibits about the physics of light in the area called 'The Debate') are those which
still employ the user-language of variables – exactly as might have been predicted
by using the theory presented above. Alternatively, the most successful exhibits
(including Get Connected, Superbankers, and the Tankergame) – all employing the
user-language of games and conferring actorship in a collective of other players –
are rarely quiet. Moreover, after only a month of operation, there appeared to be so many repeat users, that they became a problem to hosting staff-users would return every morning of the holidays at opening time to play a particular game. Given the limited number of playing positions such staff became worried about possible new players becoming irritated and disgruntled.

This ‘problem’ was further compounded with another – visitors were staying too long at the exhibits, thus creating long waits and lowering the overall capacity of the museum. While these issues cannot be ignored on an operational level, the issues of users monopolising games and of lower capacity due to sustained engagement with the exhibits must be addressed. Both point to the effectiveness of the use of proper user-languages when sensitively implemented in particular exhibits to confer specific desirable properties on the user. Perhaps even more importantly, the successes of the user-languages of problems and games suggest exciting possibilities for future development.

However far-reaching its ambitions, this study did not even begin to exhaust the subject, or the possibilities for further research. On the contrary, due to the relative scarcity of sufficiently strong and high shoulders on which to stand, this study has been by nature provisional, tentative, exploratory, and fraught with risks. In nearly every respect it appears to provide only the merest beginning. Many questions remain to be asked, many approaches remain to be tested, much research remains to be done. Like all early work in a field, the study above cannot expect to answer in full the questions it asked, nor ask all the questions it gives rise to. The field is open to others to fill in – to refine the questions, test the hypotheses, tighten the arguments. Research has already begun on several of the questions raised by this study. What further user-languages can be identified? Can the advantages they provide be studied, made more visible or even measured? Do certain user-languages support certain kinds of debates? Which ones? In terms of these questions this study can be said to lay the groundwork for future research, and for improving museums.

This study began with the troubling observation (given the enormous investment of time, energy, and money in interactive science centres) that despite the appeal of ‘interactive’ exhibits, physical interaction alone did not seem to be enough to support prolonged, sustained, intellectual engagement. While useful as a means of soliciting activity, ‘hands-on’ interaction by itself did not appear sufficient to support the user to discover that ‘the life of the mind is a pleasure.’

127 Jonathan Miller, private communication
seemed to be needed. It is my conviction that this extra support can be provided by means of well-designed user-languages, used to address the user in ever richer ways, eventually by means of the labels offered to the user. This conviction has been largely confirmed in the course of my study. Interaction, when supported by the deliberate use of labels that confer actorship, is able to create and sustain concentrated, engaged activity – to support users to ‘touch with the mind, not the hands’ – or put differently, it allows for ‘minds-on’ and ‘hearts-on’ activity even without the need for physical contact. 128 Given that a large majority of museums are endowed with objects that cannot be touched (for reasons of conservation), this must be considered an important finding.

Even more importantly perhaps, it also can be concluded that user-languages do indeed provide the referent needed to identify the range of generalisation of the theory. According to the study above, museums can flourish wherever it becomes possible to offer labels to the user, given the proper user-language. The challenge this poses is to design user-languages that give users the most support. It is important to realise, however, that the theory above also allows the design of what could be seen as ‘bad’ museums, depending on which properties are defined as desirable – and which user-language chosen to implement them – at any given time in history. In this sense we may say that the study above shows external validity: it has well-grounded implications that are wider than the specific instances reported.

This study should not be understood to say that only research holds the key to the development of the museum environment. What I have done only extends and supports work that has been developed by dedicated directors, designers and hosting staff for several decades. In this development many challenges have been identified and met. The science centre movement for example developed as a reaction to the perceived failure of what were seen to be dusty, detached, and elitist museums. In the 60s, new times called out for new techniques. The past three decades have shown that science centres too have had to confront the failure of their approaches, in particular to sustain prolonged engagement. This study has its roots in a close examination of some of those failures as well as of what was done to deal with them. But it is not enough if we only use what we have learned. Something more is needed. Can an object-based museum, its collection protected behind vitrines, benefit from the same labelling approaches as a ‘hands-on’ setting? Does the effectiveness of the user-languages translate to settings where the actorship a user-language can confer is limited by the scope of the action possible to the visitor? Can the ‘hands-off’ museum of vitrines, guards, and infra-red alarm systems

128 Physical interaction is still often a desirable – and sometimes necessary – prerequisite for understanding, as Richard Gregory demonstrated in several psychological studies, see Gregory, R. How hands-on exploration may turn minds on to science, unpublished paper: Bristol; 1989.
be transformed into a vital, engaging informal learning environment – a support system in the fullest sense of the term?

These questions refer to new challenges that have still to be met, although now with a new tool. Recently I have been given the opportunity to do so as of 01 January, 1999, as the new Director of the Museum für Kunsthandwerk (Applied Arts) in Frankfurt am Main. It is to be hoped that the coming years will demonstrate in full the utility, scope, and effectiveness of the theory described in these pages.