Empowering the remote visitor: supporting social museum experiences among local and remote visitors

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ABSTRACT
Museum visits are social events. Social interaction among museum companions influences one's engagement with the exhibition, and shapes the overall experience. This paper draws on observational studies of non-educational groups of collocated visitors, and discusses the role of the friend in one's engagement with displays and the gallery environment. It then investigates the same concept in the case of non-collocated visitors who explore a mixed reality museum environment, and argues that such technology may successfully support social interaction during museum visits. The role of social conduct in mixed reality museum environments is discussed with regard the collaborative production of interpretation and the status of the museum object, the emergence of mutually complementing physical and digital museum designs, and the practicalities of running and maintaining such environments. It concludes with suggestions for future applications within the scope and aims of the museum.

Key words: Museums, Mixed Reality Environments, Co-visiting, Social interaction, Visitor studies.

1. INTRODUCTION

Museums have supported the design and implementation of a range of media, analogue and digital, which enhances the visitor experience for diverse audiences. Audio guides and touch screens have been in use in museums for some time now. Museum websites have also been widely implemented to attract new audiences, and support education and scholarship remotely. Beside museum professionals, sociologists also take the position that the museum's "enclosed nature and the well-defined role" renders it "a fertile ground for studying visitor behaviour and envisioning systems to enhance visitor experience" (vom Lehn et al., 2001) and therefore an "excellent location for testing ubiquitous systems"(Fleck et al., 2002). This concept of the museum as a test bed for technological innovation, or rather as a 'media workshop'—a term coined by Thomas (Thomas, 1998)—has given rise to extended technological experimentation in museum settings in the past few years. Projects such as HIPPIE (Oppermann et al., 1999) and Cooltown (Fleck et al., 2002) progressed from offering location-dependent information to visitors in the Museo Civico in Siena and the Exploratorium respectively, to additionally supporting recording and editing of parts of the experience for later reflection and sharing with friends and family. The Points of Departure project (Exploratorium, 2001) in San Francisco Museum of Modern Art used PDAs and workstations to present videos of artist while creating the artworks on display in the gallery. Furthermore, the Sotto Voce electronic guidebook (Aoki et al., 2002) combined information delivery with sociality by supporting eavesdropping on one's friends' commentaries.

Most of these applications, however, are designed to offer additional diverse and personalised information to individuals who already visit the museum. The choice of single-user technology and the emphasis on personalised information reflect, we believe, an assumption of the primacy of the physical experience and the belief that information is a primary function of a museum visit. In the museum studies literature,

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often the new media discussion focuses on the real–virtual divide (Mintz, 1998) that treats remote visits as secondary or surrogate experiences to the physical ones, prioritising the unmediated experience of the museum object—"the real thing"—over the mediated experience via technology. Museum virtual presence, on the other hand, appears divided as to whether to provide genuine online visitor experiences or instead encourage and support physical visiting (Cunliffe et al., 2001). The result of the former approach is the design of radically distinctive online experiences that are accessible only to remote visitors, and in the opposite end, websites that resemble knowledge repositories more than museum experiences. Local and remote audiences appear segmented, and the connection between local and remote visitors has not been pursued, at least not in the context of a single synchronous visiting event.

Our research rather looks at the relation among local and remote visitors from the point of view of visitors' interaction. Instead of focusing on delivery of information in physical galleries, we investigate social interaction among friends in museums and how social conduct may blur the boundaries among local and remote, and may foster shared experiences for combined on-site and off-site audiences. We do not overlook information —rather, we treat it as a resource for interaction. We are interested in interpretation that is produced in the course of collaborative encounters among participants. In this way we wish to "regard new media, particularly the World Wide Web, as a resource that more closely resembles a museum visit than a museum collection" (Borysewicz, 1998).

The next section elaborates on the notion of the museum visit as a social experience, particularly how social interaction often mediates and shapes the personal experience. That section is inspired by observational studies of non-educational groups of visitors in two cultural institutions in Glasgow, UK. We then discuss an excerpt from a mixed reality system that supported simultaneous visiting among local and remote members of groups of friends. Based on that knowledge, we argue that the categorisation of local and remote participants is not a straightforward cut. Instead, boundaries may be blurred with social conduct. Furthermore, we expand this discussion to issues regarding the status of the museum object in a mixed reality museum environment, the emergence of a mutually complementing physical and digital museum presence, and the practicalities of running and maintaining such environments.

2. SOCIAL EXPERIENCE

Museum visits are social events. Whether treated as educational activity or leisure activity, museum visiting is shaped by social contact in terms of both the visitor's intentions and the overall experience. In a pioneering research, Hood (Hood, 1983) identified that 'being with people' was highly valued among occasional visitors and non–visitors, and often a reason for people not to visit museums. Baxandall (Baxandall, 1987) also noted that the bulk of art museum experience is not about "looking at pictures but about talking about looking at pictures", and the labels are a means of constructing the visitors dialogue about art. Falk and Dierking (Falk et al., 1992), following extensive visitor studies, defined social context as one of the three key elements that influence the way visitors experience museums and argued that learning in museums is necessarily socio-culturally mediated (Falk et al., 2000). A series of other visitor studies also looked at how social interaction might affect learning, and how social behaviour is expressed in museums, especially among family members. Although this type or research offers useful insights into the way that interpretation and learning are influenced by social interaction in museums, it offers little knowledge on how social interaction is realised throughout the visit. This is partly due to the research methods employed, for example

interviews, focus groups and so forth, but also due a more historic orientation of traditional museum research towards the cognitive aspects of the museum experience.

Looking at social experience as it unfolds *in* situ is an approach that stems from the ethnographic tradition in social sciences. It has also become increasingly popular among exhibit and technology designers in the recent years. By looking in detail what groups of visitors do in the galleries, we sought to understand the elements that make a museum visit involving a number of individuals into a shared museum experience. A deeper understanding of the social character of the museum visit may then offer useful insights to the design of technology that attempts to fill the space of social synchronous experiences among local and remote visitors. We observed non-educational groups of visitors in two cultural institutions in Glasgow. The first was the Mackintosh Interpretation Centre (Mack Room) in the Lighthouse, a gallery devoted to the life and work of the Glaswegian designer and architect, Charles Rennie Mackintosh. The second was the House for an Art Lover, effectively a historic house built and decorated on Mackintosh's designs. We followed people as they went around the room(s), we recorded overheard discussions and, in some cases, we video-recorded their visit.

Vom Lehn (vom Lehn, 2002) also looked at the interactional aspect of social conduct in museums and identified the richness of interactions that happen in front of the exhibit. That research made obvious that the experience of artefacts is constantly negotiated and re-shaped by social conduct, and that detailed inspection of social interaction with and around museum exhibits may offer insights in the design of displays that encourage or enable social interaction. His research focused on the moments visitors spend in front of objects, although in the analysis of our data we noticed that social interaction does not only happen around and about displays but instead happens throughout the visit. The opening and closing of a visit, the pace of the visit and the way friends connect and combine displays, media, and routes throughout the museum environment are informed and influenced by social conduct. (Pace is discussed in more detail in (Galani et al., 2004)) Verbal and gestural activity informs the time people spend with the exhibits, their orientation and exploration of the exhibition content. Verbal and visual cues facilitate both direct interaction and peripheral awareness of one's friends while one balances personal engagement with the exhibition and social exchanges with his/her friends.

Technology to support social interaction has been explored in other projects too, for example the Sotto Voce guidebook that we have already mentioned. It has also been explored by artistic installations like the Deus Oculi (Heath et al., 2002) and the Ghost Ship (Hindmarsh, 2002) that attempted to stimulate social interaction among friends and strangers alike in an art exhibition. Furthermore, social interaction among remote only museum visitors has been explored in the field of collaborative virtual environments such as the Virtual Leonardo project (Mirapaul, 1999) and the virtual tour in the Van Gogh Museum. The connection between remote and local visitors has not been pursued with the exception of robot applications (Roussou et al., 2001) that offered guided tours to a mixture of local and remote audiences. In the *City* project, we explicitly aimed at studying both technological innovation and visitor experience with focus on social interaction.

3. THE *CITY* SYSTEM

The design of the *City* system was informed by the visitor studies described above, as well as by technical, theoretical and interaction design goals. The prototype explored co-visiting among people who know each other and share an interest in museum visiting, but who may not always be able to visit together due to difficulties such as geographical

separation. The *City* system was designed for a specific gallery: the Mack Room in The Lighthouse. The exhibition combines textual and graphical displays with authentic artefacts, and over 20 screens presenting video and interactive material to visitors.

Figure 1

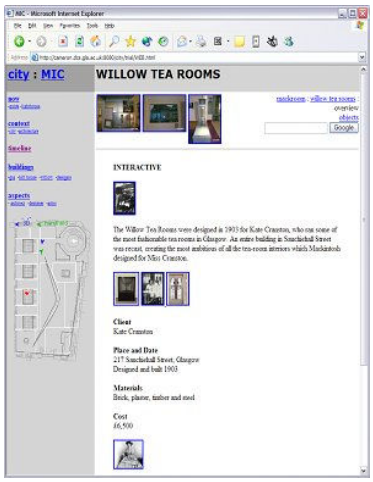


Figure 2

Figure 3

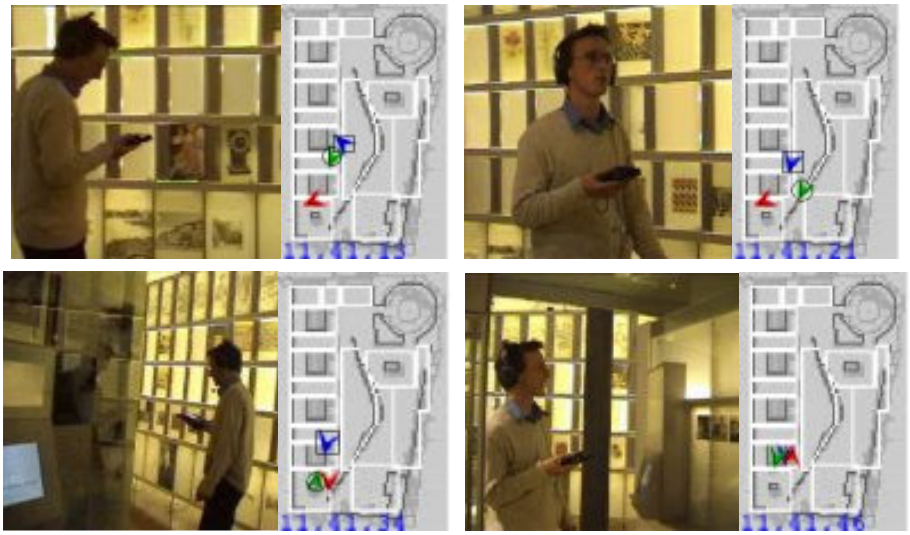
The *City* system combined virtual environments (VE), hypermedia technology, hand-held devices and ultrasound positioning technology. It allowed at least three visitors, one on-site and two remote, to visit the Mack Room simultaneously. An ultrasound positioning system and a wireless communications network was installed in the Mack Room. The on-site visitor carried a PDA that was tracked via the ultrasonics. The handheld displayed the ongoing positions of all three visitors on a map of the gallery (fig. 1). One off-site visitor used a web-only environment that was comprised by a standard web browser which also displayed the gallery map (fig. 2). The other off-site visitor used a first person, 3D display with avatars representing the other visitors (fig. 3). All visitors shared an open audio channel, and wore headphones and microphones. The system also supported multimedia information for the off-site visitors only in the form of web pages that were dynamically presented upon movement in the map or VE. This automatic presentation schematically followed the spatial organisation of the exhibition, so that all three visitors could 'look' at the same display when in the corresponding location. In that respect, the system supported interaction around corresponding exhibits in the Mack Room and in digital form: 'hybrid exhibits' (Brown et al., 2003).

4. THE VISITORS' EXPERIENCE

The user trials of the system took place in The Mack Room. The participants were recruited through poster advertisements as friends and museum-goers. Ten groups of three and two groups of two members participated. Each visiting experience lasted approximately one hour and was comprised of an explorative part and an activity-based part. In the first part, the members of each group were encouraged to familiarise themselves with the technology and explore the gallery according to their own interest. In the second part, they were given a mixture of open-ended and focused questions about Mackintosh's work, and were asked to come up with answers based on evidence from or experience of the exhibition. The group's activity and discussions were recorded, and a semi-structured interview followed each visit. The analytical treatment of the data was based on interaction analysis, which focuses on the moment-to-moment detailed observation of the participants' verbal and gestural activity. It was also informed by ethnomethodology, and particularly the notion of accountability (Garfinkel, 1967). The excerpt presented in this section is taken from the exploratory part of the study.

In the excerpt, G (green arrow on the map) is the local visitor, B (blue) is the VE visitor, and R (red) is the web-only visitor. Square [brackets] show overlapping talk, underline shows speaker's emphasis, *italic* indicates text taken from museum labels. For clarity, the green arrow (local visitor) has been circled and the blue arrow (VE visitor) has been squared.

Eric, Jo and Geisa are friends and colleagues. In the study, Eric was on-site, in the Mack Room, while Jo was visiting in the VE and Geisa was in the hypermedia environment. Geisa and Jo had earlier spotted the guest bedroom, designed by Mackintosh for 78 Derngate Street, and they had a chat about it. Eric, who was occupied in the other side of the room, overheard their discussion, checked his map and when he finished looking at the display he was examining, he started moving towards the area his friends were in.



Figures 4-7

G: Doyou know where I am passing? (0.5) Did you see me go by? (Fig. 4)
B: I see I did where are you going? I am gonna follow you again
G: Oh are you? I was going to the bit that you were looking at which was (Fig. 5)
B: I've just walked into oh:: where did you go again?
G: [Well I was looking
B: [Who's the hat?
G: [Where
B: [(Inaudible)
G: Ha (0.3) what was the exhibition you were looking at before? (Fig. 6)
B: It was [the...
R: [The Hunterian Art Gallery
B: =the Hunterian Art Gallery, the *guest bedroom*
R: Yeah:
B: A very stripy bedroom
G: Ok that's where I am now
B: Can you see there's like two two twin beds and and blue and white stripy wall paper
G: Yeah horrible shape (.) terrible (Fig. 7)
B: Oh: I think it's bad from here
G: Well it probably wouldn't go in your room
B: No it wouldn't (.) imagine [waking up
G: [(Inaudible)
B: Imagine waking up with a hang over
G: H:a:h:a:
B: H:a:h:a:

While Eric was moving towards the display, Jo moved away from it, and when they met up, Jo decided to follow him. This decision was verbalised but also acted upon, as shown by the new orientation of the blue arrow on the map. This is not an unusual behaviour in museums. Friends during their visit may attend different displays related to their own interest but remain peripherally aware of their friends' activity due to their proximity in the gallery or by retaining visual contact with them. This awareness is facilitated by visual cues and helps the members of the group to keep track of their friends, develop a shared visiting pace and also inform their own exploration. In the mixed reality environment, visual cues were limited in the display of the participants' position, hence movements of arrows or avatars on the map and the 3D model. This limited cue, however, kept the on-site visitor aware of where his friends were and the rough location of the artefact in question; it was further confirmed verbally. Shared orientation towards the display involved several stages: the on-site visitor approached the area; the remote visitor gave a rough description of the artefact, which included its title, as mentioned on the available webpage, and a reference to group-specific knowledge, the location of the original artefact, in the Hunterian Art Gallery. After the orientation stage, the on-site visitor adopted a relaxed viewing position towards the display and the two visitors started talking—while being overheard by their friend—about the room decoration. Their discussion began with an aesthetic appreciation of the room and concluded with humourous comments about the potential effect of the decoration on one's mood. The latter, appeared to stem from Jo's personal experience but also Eric's knowledge of his friend's lifestyle and taste.

5. DISCUSSION

The richness and topical coherence of visitors' interaction with each other and with the exhibition is the basis of our claim that local and remote museum visitors had a shared visit. In this co-visiting experience, the museum's remote presence was treated not strictly as an information space, used in isolation, but also as a social place to visit, enjoy and relate to others. The latter afforded a set of behaviours that, as we have shown, constitutes a social experience that shares several significant attributes of traditional museum co-visiting. The experience offered plentiful information and afforded rich interaction within a heterogeneous mix of media. This approach moves away from the traditional design focus on a single user's experience, toward multi-user interaction that treats the traditional and new media aspects of a museum as equally important elements of the museum experience (Galani, 2003). Furthermore, it broadens design to address both personal and social aspects of the visit, and does not restrict the visitor to either one of these modes. It supports the individual's interpretation of artefacts and displays, which can be used as a resource for social interaction, and which in turn might inform and influence later individual interpretation.

Our work does not attempt to substitute or reproduce a visit to a traditional museum. It supports, however, a mixed reality museum visit that may cover needs and expectations that are not easily addressed by the traditional museum. Remote visitors, disenfranchised by geographical or other barriers, may interact with the layout and content of an exhibition and become immersed in exploration of and discussions about artefacts. Local visitors may also access information on-line, with the difference that they can use the contributions, experience and understanding of their remote friends.

This approach to remote access to museum environments creates new opportunities for museum experiences and exhibition design. It is not however unproblematic both in terms of technological implementation and museum practice. We would like to explore

further the issues that arise from supporting socially interactive visits among local and remote participants, such as the collaborative production of interpretation through social interaction and how it is linked to the artefact as well as the empowerment of the remote visitor and the emergence of a mutually complementing physical and digital museum design. Additionally, we discuss some practical consideration regarding mixed reality environments and how they might fit with a museum's practices and priorities.

5.1 "Imagine…waking up with a hang over!"

Studies of technology in museums, and especially of use of personal mobile devices, had shown that interaction with technology might inhibit social interaction (Walter, 1996) as well as redirect the attention of the visitor from the museum artefacts to the information that is delivered on his/her device (vom Lehn et al., 2003). Among the most reported disadvantages of such technologies is the decline of talk among visitors. On the contrary, in the mixed reality environment we observed a radical increase in talk among participants. For some of the off-site participants the experience was liberating: "I think it is fun though. I quite enjoyed the social engagement in that way, being able to talk about everything more and not feeling that you are disturbing…not thinking about other users in the gallery. You know it's kind of liberating", and for others it was a good laugh: "I thought it was actually fun, and I thought it was a laugh; an easy pleasure".

In the relaxed manner of the visit we attribute the increased production of funny, unexpected and imaginative comments and reactions by the participants and the affective rather than scholarly approach to the available content. Co-visitors used and appropriated the available information to suit their shared knowledge and experiences. Although part of the conversation involved giving directions and instructions to one's friends regarding one's whereabouts, well reported museum behaviours were regularly observed: participants read aloud phrases from the exhibition text, communicated their own knowledge, made connections to their own everyday lives, expressed opinions and verbalised imaginative thoughts, like the phrase at the title of this section.

Furthermore, unlike the displacement of the object that is reported with mobile devices, in the mixed reality environment the constant focus of the attention was the displays and the environment. The hybrid character of the displays, which meant that the participants interacted with different presentations of the display according to their media, provoked extended discussions around the displays, initially in order to develop a shared understanding of what was available to each participant, to "translate" and "compare" it with each other, as one of the participants said, a process that "*gives a different kind of perspective*"; then to discuss the content. Asymmetries in the presentation and the amount of content, afforded by the variety of the media, as well as the participants' eagerness to share, often sparked further investigation and exploration of content that was not accessible at the first glance. Furthermore, the attractiveness of displays in the different media was also variable resulting with people being prompted by their friends to see objects that they would have skipped otherwise. How asymmetries in the visiting environment functioned in interactional level is the topic of the next section.

5.2 "Oh I think it's bad from here!"

This phrase from the excerpt presented earlier in the paper is at the heart of the discussion on new media and museums; one could argue that it verbalises the difference between 'here' and 'there': in the gallery and away from it, for the on-site visitor, and vice versa for off-site visitors. Mintz argued for this distinction by claiming that "a virtual visit to a museum is fundamentally a media experience, not a museum

experience" (Mintz, 1998). In our opinion, however, this distinction appears to stem from focusing on the individual media and their affordances instead of their use in context. We approach the sentence of this section's title by taking more account of the overall interaction between the two companions. We notice that the difference between the media and distinctions of 'here' and 'there' did not seem to impose problems in discussing the display and participating in the shared joke. On the contrary, and again using the given dialogue as an example, the two friends used the displays at hand to initiate their discussion, and complemented it with their knowledge of each other's habits and tastes. The distance, the diversity of the environments and media did not inhibit their shared appreciation of the display. We suggest that a more fruitful way of looking at mixed reality environments in museums is to treat all media—new and old—as potentially equal resources in the course of interaction.

This concept is further supported by another point in the excerpt: the moment where the two friends decided to follow each other. Participants in the trials often followed each others in the course of their visit. Remote participants followed their local friends around; they also invited them to displays or suggested points of interest to them. Local participants invited their friends to come to where they were in the gallery, and shared recommendations on where to go next. Social conduct supported their interaction in and through physical and digital environments, and facilitated the blending of media and environments in one common activity. The participants appeared willing to follow their friends regardless of the media they were using, passing the 'leading role' among them. Although one might expect the on-site exhibition to have primary impact on people's choices, we believe that participants often treated all environments as equal resources for interaction as long as they supported the activity at hand.

Furthermore, the support of social cues in the mixed reality environment created a sense of togetherness and engagement throughout the visit, which was highly valued by the participants in the debriefing interviews: "It would actually be nice to share opinions as you were looking rather than sat down and have a coffee afterwards to talk about what you've seen. A bit more engaged…". We however feel that, in many cases, social interaction was favoured above individual engagement with the museum displays. In our initial studies of collocated visitors we had established that collaborative exploration of displays is based both on strong personal engagement and social interaction. We believe that mixed reality environments, like the one presented in this paper, would benefit from focusing equally on attracting and sustaining personal engagement with the exhibition along with the support of group collaboration. One way of achieving this is by further exploring and exploiting the individual characteristics and affordances of each environment, for example by introducing complementary asymmetries in the quantity and type of information, e.g. having historical information about a painting presented to one person while another contributes technical information about its production. We believe that a design approach towards a diverse but mutually complementing physical and digital museum design would also fit with visitors' expectations as an off-site visitor said: "that would be really good. That's what I expected. I expected that I would have more text so I could look up and tell you more things than you would be able to get.

5.3 Practical considerations

We have discussed the social interaction among local and remote friends in a museum exhibition, and presented examples of both navigation around the exhibition and lively discussion around displays. In this section, our attention shifts to practical considerations regarding the application and maintenance of mixed reality technology in museum

settings. Mixed reality environments may enhance visitor's experience but they also introduce practical challenges. This section explores two aspects of the challenge: the ecology of the museum environment and issues of maintenance and updating.

The remote participants, free of constraints usually imposed by the museum's sheer materiality as well as the corresponding social etiquette, were able to explore the displays and the environment in highly individual manner. Technology enabled them to do things impossible by human standards, for instance passing through walls, as well as things incongruous with museum customs, such as racing each other. In the interviews, most of the remote participants mentioned this kind of freedom as one of the advantages of the experience. They were however aware of the fact that the person in the gallery was accountable for her behaviour not only among the members of the group but also other visitors. The unexpected navigation choices e.g. radical changes of direction, *impromptu* disruption of other visitors' field of view and so forth, was the most noticeable change in the visiting manner of the on-site participants. In the interviews, local visitors confirmed that did not feel intimidated by this freedom in the course of the trial, they expressed however concerns that it might be proved impractical in crowded exhibitions. Based on our experience with technology, we anticipate that subtler behaviours are usually developed as users become familiar with systems over longer or more regular periods of use. Nevertheless, the impact social interaction among on-site and off-site visitors might have on the navigational ecology of the gallery is worth revisiting.

Furthermore, hybrid exhibits that enable social interaction around and about displays also impose maintenance challenges to museums. Although asymmetries in the content appeared fruitful and often sparked further exploration, the hybrid character of the exhibits effectively means that changes in one environment should be reflected in the others so people can orientate themselves towards the same display. In our studies we found out that asymmetries in content were tolerated better by participants unlike asymmetries in the spatial representation, which almost unmistakably lead to confusion, disorientation and distrust of the technology. We emphasise that such asymmetries have to be carefully designed, just as any other exhibition feature would be. The cost and effort of creating and maintaining multiple media, and correspondences and asymmetries between them, suggest that mixed reality technologies may be especially suited to permanent exhibitions that do not change often or where changes are controlled and can be easily reflected in all modes of experience.

6. CONCLUSION

Technology in museums is not only about presenting information but also about supporting social interaction. The advent of wireless communications makes remote communication possible, but in this paper we have argued that it may also be desirable since it can support social interaction that enriches exploration, appreciation and interpretation of collections. While there are undoubted costs of design and maintenance of new technologies and associated materials for display, we suggest that trends in computing and telephone technology will make such interaction possible among local and remote visitors. Such technology may, therefore, offer practical means to enhance the accessibility of collections and the educational activities of an institution.

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