

This article was downloaded by:[Crowley, Kevin]
On: 2 November 2007
Access Details: [subscription number 781410616]
Publisher: Routledge
Informa Ltd Registered in England and Wales Registered Number: 1072954
Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Visitor Studies

Publication details, including instructions for authors and subscription information:
<http://www.informaworld.com/smpp/title~content=t773235895>

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Online Publication Date: 01 October 2007

To cite this Article: Sanford, Camellia, Knutson, Karen and Crowley, Kevin (2007)
"'We Always Spend Time Together on Sundays': How Grandparents and Their Grandchildren Think About and Use Informal Learning Spaces', Visitor Studies, 10:2, 136 - 151

To link to this article: DOI: 10.1080/10645570701585129
URL: <http://dx.doi.org/10.1080/10645570701585129>

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“We Always Spend Time Together on Sundays”: How Grandparents and Their Grandchildren Think About and Use Informal Learning Spaces

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ABSTRACT

This study compared grandparent–grandchild groups who experienced an informal science exhibition by visiting a museum or by visiting a website. Although intergenerational learning is often the focus of visitor research, few studies have focused specifically on grandparents as an audience. Do they have unique intergenerational needs that museums and websites are not yet supporting? Do they find museums and websites to be good places to learn alongside their grandchildren? The authors’ findings suggested that grandparents prefer museums as locations for intergenerational learning because the museum environment is more supportive of social engagement in ways that allow grandparents to accomplish their own visiting agendas. In contrast, the web appeared to introduce conflict between grandparent and grandchild agendas.

INTRODUCTION

Grandparents and older adults are becoming an increasingly important audience for informal learning venues such as museums or websites. Yet, compared to what we know about other visitors, older adults have been an under-explored audience segment. Does the informal learning infrastructure meet their needs? Do the assumptions made about designing museum exhibitions and websites hold true for older adults? In this article we focus on these questions with respect to one of the ways older adults use informal learning environments—as places for intergenerational learning between grandparents and grandchildren.

Grandparents, even more so than parents, may choose to engage in informal learning for social and emotional, as opposed to educational, reasons. Prior studies have found that grandparents often view activities with their grandchildren as being first and foremost about spending time together and talking to each other (Robertson, 1977;

Roberto & Stroes, 1992). As they focus on building a relationship with their grandchildren, grandparents report enacting a variety of roles including guides, role models, playmates, caretakers, gift givers, providers of emotional security, historians, and sometimes teachers (Neugarten & Weinstein, 1964; Reynolds, Wright, & Beale, 2003; Stigler-Bales, 2002; Weber & Absher, 2003). These roles are not fixed, and grandparents can have more than one role over the course of their lives. Grandparents are usually very satisfied with their roles, but grandparents who live further away from their grandchildren would prefer to spend more time with them (Reitzes & Multran, 2004). Such research, mostly situated within gerontology, focuses on the grandparent–grandchild relationship in general but does not typically consider what grandparent–grandchild interactions look like in specific activity contexts. Yet it does suggest that participating in informal learning may be one way that grandparents can practice these relationship roles, connect with their grandchildren, and build stronger family ties (Ramirez-Barranti, 1985; Reitzes & Multran, 2004; Roberto & Stroes, 1992).

Much of what we know about the social, emotional, and educational facets of informal family activity has come from studies of parent–child interactions in museums (Crowley & Callanan, 1998; Leinhardt & Knutson, 1996). We know, for example, that parents enter a museum with prior content knowledge, a group agenda, and a set of beliefs that all influence how they will interact with their children in that setting (Ash, 2002; Dierking, 2002; Falk & Dierking, 2000; Borun, Chambers, & Cleghorn, 1996). Parent beliefs include their philosophy about the nature of learning, their expectations for the learning environment, and models for how to best interact with their child. A parent who comes to the museum to have fun with a child may have a very different experience than the parent who comes to the museum to learn content. For example, parents with a learning agenda often act as teachers or guides, explaining concepts and pointing out interesting phenomena as the visit unfolds (Fender & Crowley, in press).

Can we simply generalize what we know about parents to what might be true of grandparents? There have been very few studies of visitors that focused on grandparents. The few studies that have been done have looked for evidence of whether the various roles reported in the gerontology literature played out in museum interactions. One study observed grandparents taking on storyteller, role model, playmate, or historian roles as they visited exhibitions with their grandchildren (Leinhardt & Knutson, 2006). Another study documented how grandparents' personal stories, explanations, and experiences were linked to specific historical objects and exhibits (Beaumont & Sterry, 2005). We still have much to learn about the best way to conceptualize the grandparent audience. Should we focus on what distinguishes grandparents from parents? Or should we focus on similarities between the two groups?

Even if we could generalize from what we already know of family museum learning, informal learning is not confined to museums. In fact, in sheer number of opportunities, there may be a much greater potential for intergenerational learning on the web. Unlike other informal learning activities families might engage in (i.e., reading together, watching a DVD, etc.), we thought that the web offers a level of interactivity and flexibility that makes it a useful comparison to an experience in a museum setting. However, although the informal world embraces both museums and websites, we should remember that it is possible that they are actually quite different as learning environments.

The web is generally thought of as being a private individual, as opposed to a shared intergenerational experience (e.g., Fox, 2004). When social learning on the web has been considered, it has been in the context of online discussion groups, simulations, or multi-player games rather than side-by-side interactions (O'Donnell, Hmelo-Silver, & Erkens, 2006; Puntam Becker, 2006; van Schaik & Ling, 2006). But, side-by-side interactions are an important kind of social web use, and many informal learning moments may happen when adults and children use a single computer together. Because one person typically has to "drive" when a pair uses a site together, the web as a collaborative learning environment seems to hold more potential for conflict and one-sided interactions than museums. Because the web is often text heavy and didactic, it might also hold more potential than museums for educational interactions where participants are focused primarily on learning goals. Thus, our expectation was that museums may best serve family togetherness and shared experience (Rennie & Johnston, 2004; Borun, 2002), and the web may best serve isolated exploration and goal-directed learning. The study is designed to explore similarities and differences in these two informal learning environments and how grandparents and grandchildren use them to suit their own agendas.

At the core of the current study is the grandparent audience. We are first interested in how grandparents experience informal learning with their grandchildren. What are their goals for and beliefs about the experiences? What roles do they seek to play? How do they interact with their grandchildren? We are secondarily interested in whether the answers to these questions depend on whether grandparents and grandchildren are visiting a museum or a website together.

METHODS

Sixty-one pairs of grandparents and their grandchildren, ranging from 5 to 12 years old ($M = 7$ years), participated in this study either in the museum condition, or in the web condition. In the museum condition, 31 pairs were recruited from the admissions line of the Franklin Institute in Philadelphia, PA or responded to an advertisement. In the web condition, 30 participants were recruited from the admissions line at the Children's Museum of Pittsburgh or responded to an advertisement. Participants who were not already members of the museum in which they were recruited were given free admission to the museum and a small gift in exchange for their participation in this study. Participants who were already museum members received a small gift.

It was important that we chose a museum exhibition that had strong content, that would be appealing to our participants, and that we felt was an example of best practices in exhibit design. We chose *The Giant Heart: A Healthy Interactive Experience* at the Franklin Institute. A longstanding favorite of visitors, the Giant Heart exhibition hall had undergone extensive prototyping and evaluation (Borun, Martin, Thon, Bendzick, & Bose, 2005) and had been redesigned to reopen in 2004 for its 50th anniversary. The new 5,000 sq. ft. exhibition hall included a variety of hands-on interactive components that invite visitors to explore concepts of heart health and anatomy, the circulatory system, blood pressure measurement, high blood pressure prevention, diet, and exercise.

In order to focus on the differences in the two learning environments, we designed an interactive website that covered the same kinds of scientific content as the museum exhibition. This non-public website was created using pre-existing games and activities

from other sources (e.g., American Heart Association, Franklin Institute, Pacific Science Center, BBC). We selected components and organized this website to reflect the main content provided in the museum exhibition. Every effort was made to provide parallel content in both learning environments. If there were two exhibits that contained circulatory system information in the museum, then there were two opportunities to view circulatory system content on the web.

All grandparent–grandchild pairs completed consent forms prior to their participation in this study. Each pair then sat at a table together to complete an activity in which they could write or draw any information that they knew about heart topics. Next, the researcher asked a series of open-ended interview questions regarding heart health, the circulatory system, and blood pressure. After the interview had been completed, families in the museum condition explored the exhibition hall and those in the web condition sat together in front of a computer and explored our website. When each family decided they were done, they returned to the interview table and completed another set of activities and questions about the heart. The grandparents were also interviewed separately about their thoughts on informal learning. All activity was videotaped. All audio was recorded with wireless microphones worn by participants. Length of interactions varied from 7 minutes 54 seconds to 57 minutes 27 seconds in the museum (average time 32 minutes 33 seconds), and from 3 minutes 27 seconds to 37 minutes 31 seconds on the web (average time 17 minutes 4 seconds).

Grandparent–grandchild interactions and interviews were transcribed and coded by two independent researchers. Our coding scheme was informed by the prior literature on grandparents and on family interactions in museums. We iteratively developed codes through exploring the transcripts of the interviews and interactions while discussing how different pieces of data did or did not directly address our research questions. We finally settled on a coding scheme to detect information about interactions in museum and web settings, grandparents' perceptions of the learning environments, their ideas about grandchildren as learning partners, and the types of roles that grandparents adopt in the museum and web. Inter-rater reliability was at or above 85% for all codes.

RESULTS

We began by wondering whether grandparents were interacting differently with their grandchildren in the museum or on the web overall. We assigned one interaction code to the entire visit. Although we observed some cases where different interaction styles were used within a single visit, we observed no cases where there was not one clear, dominant style that characterized the majority of family activity. Grandparent–grandchild interactions were coded into one of three global categories. In *Grandparent-Directed* interactions, the grandparent led the majority of talk and activity. *Child-Directed* interactions were those in which the child took the lead for the majority of talk and activity. In *Collaborative* interactions, the pair shared most of the talk and activity. These overall estimates of the extent to which one partner dictated the flow of interaction trace their roots back to Matusov and Rogoff's (1995) work on one-way versus collaborative interactions. The assumption was that collaborative interactions would be the best at meeting the goals of each member of a pair.



Figure 1. Percentage of grandparent–grandchild pairs in each interaction category.

Figure 1 shows two findings of interest. First note that, overall, grandparents were very much involved in both the museum and web. If grandparents had been standing back and letting children take the lead, interactions would have been coded as child-directed. Yet only 7% of all interactions fell into that category. The other 93% of interactions had substantial adult involvement, supporting the idea that grandparents saw informal learning experiences as a chance to get involved and interact with their grandchildren. But, second, note that the museum and web conditions produced significantly different profiles for those interactions, $\chi^2(2, N = 61) = 13.00, p < .01$. Grandparents in the museum were most often co-constructing the experience with children, with 70% of families being coded as collaborative. In contrast, grandparents were much more likely to take over the web interactions, with 71% of these being coded as adult-directed.

One reason that grandparents may have acted differently in these settings is because older adults viewed museums and the web differently. We interviewed grandparents at the end of the study to assess their beliefs about the museum and web as learning environments. As part of these interviews we gave grandparents a list of possible advantages and disadvantages and asked them to indicate up to three items that best applied to museums or to the web. They could also fill in their own responses if they did not see options they liked.

Consistent with our observations that museum interactions were more collaborative, grandparents reported to us that they saw museums as places for social learning. The top two advantages of museums were learning something new (67%) and participating in a social experience (67%). The uniqueness and variety of experiences were also important, with 43% reporting that they liked choosing from a range of exhibits to explore and 43% valuing the unique opportunity to view original objects. Museums were also seen as being

fun (30%), trustworthy (20%), and hands-on (20%). In contrast, grandparents saw the web as a solo and customizable learning activity. Grandparents liked the web because they could choose the information that was most interesting to them (70%) and learn something new (50%). At the same time they liked that they could access the information privately (43%) and whenever they wanted to (40%). Some grandparents reported that the web was fun (20%).

Grandparents also told us about the disadvantages they saw within each learning environment. The downsides of museums were that they are difficult to get to (23%), they can be tiring (23%), and that they are expensive (23%). Some grandparents were concerned that they might get lost inside the museum (37%). Some were concerned that they might not view exhibits in the correct order (30%). Some thought the exhibits might be boring (20%) or confusing (23%). The most commonly cited downside of the web was the presence of advertising and spam (47%). Other drawbacks included difficulty in finding information (43%) and the potential non-trustworthiness of information (23%). Grandparents also disliked technical difficulties such as slow web connections (30%) or broken links (33%).

As a direct test of how effective the two environments were for intergenerational learning, we compared the two groups on a composite score that measured the extent to which grandparents felt their own visit agendas were consistent with or in conflict with that of their grandchildren. The variable was constructed by combining the scores of two open-ended interview questions that tapped whether grandparents felt that the presence of their grandchildren supported or detracted from their own learning and engagement. We scored the interviews by assigning one point each time grandparents talked about how their own agenda was supported and subtracted one point each time grandparents talked about how they had supported their grandchildren's agendas at the expense of their own. The scores ranged from -5 to 5, with positive scores indicating a more satisfying visitor experience.

Findings suggested that grandparents found the museum ($M = 0.4$, $SD = 1.7$) to be a better environment for intergenerational learning than the web ($M = -1.5$; $SD = 2.16$), $t(59) = 3.65$, $p < .001$. This finding provides a final piece of converging evidence that is consistent with the idea that grandparents saw museums as more social learning experiences than the web. In their justifications for their interview responses, grandparents told us that the need to share the experience with grandchildren opened up new opportunities that they may not have pursued if they had been visiting the museum on their own:

"I probably wouldn't have gone through the heart exhibit, the entire exhibit. But it's fun to see the exhibit and see the museum through the eyes of a grandchild."

"I probably wouldn't have spent as much time at all the exhibits as we did today, and you tend to hurry things when you don't do it with children. Because [I had to] explain it to her and through that you learn more."

"Oh, I pointed out to him different things. Like when we came to the pacemaker, I said there's what I got here [points to chest]. And he pointed out different things to me; you know, he called me and said to look at this. And then I called. We did things together."

In contrast, grandparents on the web often reported that the need to share the experience distracted them from their own learning goals:

"I probably would have studied it in more detail. Her attention span is not what mine would be. There is a lot of heart disease in our family, so I think I probably would have gone into more detail to see some of the problems and so forth, more. I would have learned more because I would have studied it more intensely and I would have read it more precisely. I was actually skimming over it with her."

"Well I probably would have gone a little faster. I might have searched out different topics that were more specific to what my interest was about hearts, in general. I probably would have learned differently. Not as much how it works, but looking at things that I would feel relate to me specifically."

"You know it's like when they do cattle. They kind of just direct them. I'm really just sort of like steering her."

When comparing these two sets of quotes, it is important to remember that the content of the website had been designed to be roughly equivalent in coverage and depth to the museum exhibition. So the grandparents' feeling that they wanted to go deeper or that they wanted to engage their own interests was not based on the fact that the website had more detailed information aimed at a much older audience. Instead, it was probably the nature of the web experience—more text and graphics, less interactivity, and sitting at a desk with one mouse and keyboard controlling a two-dimensional display—that contributed most to the grandparents' perceptions.

Finally, we asked our participants direct questions about the primary role they played in the museum or web interactions we had just observed. Grandparents were provided a list of roles to choose from. They could choose more than one role. Grandparents were asked to justify their answers and describe an activity that they felt exemplified their role. The list of roles and descriptions provided to participants was

- *Teacher*: You explained some of the topics to the child during the activity;
- *Coach*: You encouraged, supported, and offered suggestions to the child during the activity;
- *Playmate*: You shared the fun, enjoyable aspects of the activity with the child;
- *Storyteller*: You related some of your own personal stories to the child during the activity;
- *Novice*: You were taught by the child during the activity;
- *Role Model*: You ensured that the child stayed on-task, and you modeled respectful behavior during the activity; and
- *Other*: You played another role during the activity.

The self-reported roles of grandparents in the museum and on the web were quite similar to those that are often taken up by parents in museums (e.g., Swartz & Crowley, 2004). In both the museum and web, almost all reported roles were teacher, playmate, and coach (Figure 2). This contrasts with accounts that position grandparents mainly in storyteller or historian roles both in (Leinhardt & Knutson, 2006) and out of museums (Weber & Absher, 2003; Neugarten & Weinstein, 1964). The figure also shows that, although teaching roles were equally common in the museum and on the web, the

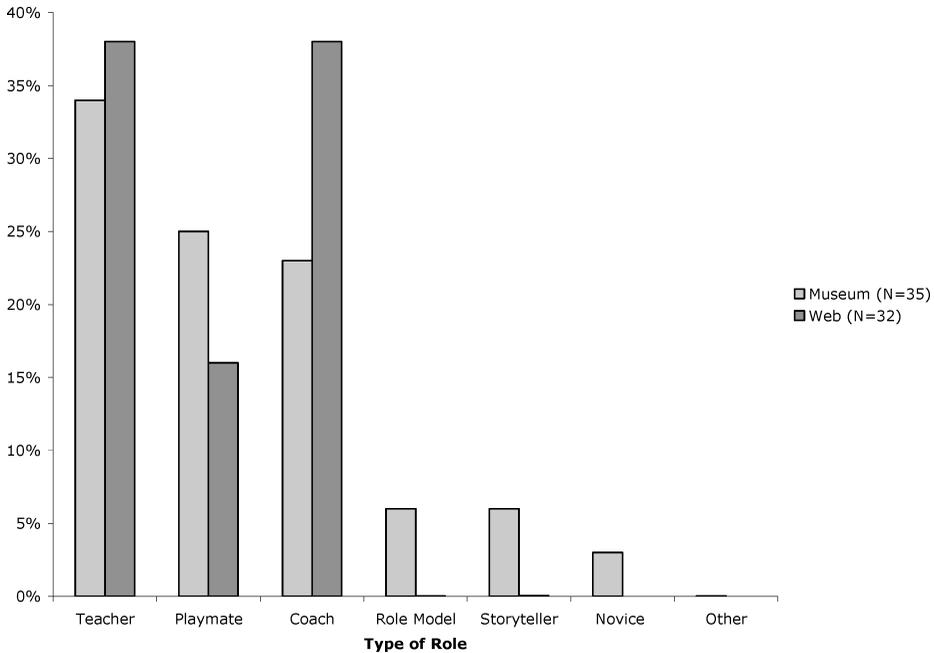


Figure 2. Percentage of grandparents selecting each role.

museum appeared to support more playmate roles than the web, whereas the web supported more coaching roles than the museum.

EXAMPLE INTERACTIONS

In order to ground the quantitative findings and to provide snapshots of how beliefs, learning preferences, interaction type, and role come together during grandparent–grandchild interactions, we next provide examples from grandparents enacting the most frequent roles—teacher, playmate, and coach.

A Teacher in the Museum

Henry¹ and his eight year-old grandson Isaac came to the museum because Isaac’s grandmother had to work and Henry and Isaac “always spend time together on Sundays”. Henry thinks of museums as places to learn and reported that he visits them several times a year in order to observe the “accomplishments of mankind”. Henry felt that it was his job to “educate” Isaac and reported that his main role in museums was that of a teacher. When we asked Henry to identify an interaction where he played the teacher role, he chose the Giant Walk-Through Heart. This exhibit is a large-scale human heart model in which museum visitors are able to follow the path of blood as it travels through different parts of the heart and lungs. Henry said that while he was in the Giant Heart with Isaac, he “was trying to explain to him. . . what part we were in and what the function was”. The transcript of this part of their interaction begins with Henry drawing Isaac’s attention to a specific part of the heart:

¹All names used in this article are pseudonyms.

Henry: Isaac, come here. See this? Look. This is a valve, that's where one of the valves is.
Isaac: Oh.
Henry: Isaac, come here! See? Here's the artery, the pulmonary artery. This is the one. And this is the aorta. This is the one that takes the blood from the lungs.
Isaac: Oh. Inside the lungs. . . Swallow, swallow, come on.
Henry: Now see here? Here's the blood. That's the blood moving through with the heart's pumping.
Isaac: This is weird. Please watch your step.
Henry: Look. See? It says leaving the lungs. You're leaving the lungs now. You just walked through the lungs. Now we're going where the, where. . .
Isaac: Watch your step, Grandpa.
Henry: yeah. Where the artery is. See these? Look. These are connections where the arteries are.
Isaac: Oh. This is cool!
Henry: Do you see this? Look, you're in this, you're in up here, you're in the small. . .
Isaac: Left [atrium].
Henry: You're in the small atrium now.

The interaction continues for several more minutes along the same lines. Throughout, Henry used the activity to draw attention to, name, and describe salient features of the heart to Isaac. Most of Henry's conversational moves involve mini-lessons that quickly identify the parts of the heart that Isaac is approaching. Henry's teaching is quick and to the point, and Isaac is a receptive student who appears to appreciate the interaction. He expresses interest in the experience, helps fill in blanks in the lessons, and, somewhat endearingly, turns several times to make sure his grandfather is fine with the somewhat tricky footing inside the heart.

Our coding of their interaction style was collaborative—and they were more consistently collaborative across their visit than many of the other families we observed. Both appeared to be comfortable with their roles and both appeared to be engaged with the learning environment. It is interesting to note that Henry reported that he would have learned less if Isaac had not been with him that day. The need to be a teacher had Henry seeking out information that he might have otherwise ignored, and he found himself in places that he might have otherwise avoided—such as walking through the potentially confusing, confined, and dark Giant Heart.

A Playmate in the Museum

Colleen and her 12-year old granddaughter Greta came to the museum with Greta's younger brother Paul because it gave them "something to do," and because of *Moneyville*, a new traveling exhibit at the museum. Colleen was not a frequent museum visitor, attending about once a year. When Colleen did visit museums, she mentioned that she liked having the option of exploring a variety of exhibits, having a place to pass the time, and having fun. Colleen reported sometimes finding it difficult to navigate within a museum, to find staff members to answer her questions, or to get the appropriate amount of information about an exhibit topic. Because of these potential difficulties, Colleen preferred to visit the museum with her granddaughter, Greta. Colleen said that she would have learned less and would have "felt lost" without Greta.

Colleen said that the main role she took on in the museum was playmate. Colleen reported that she and Greta have a lot of fun and generally “get along very well together.” Colleen felt that she had embodied the playmate role the most when she and Greta had been at the Exercise Opera exhibit. At this exhibit, visitors operated one of four recumbent bicycles in front of a large video screen. As visitors pedaled, cartoon characters appeared on-screen and sang an opera song about the importance of exercise for a healthy lifestyle. In the excerpt below, Colleen, Paul, and Greta get on bicycles that are next to one another. Colleen initially had problems pedaling because the pedals were too far away. Greta’s brother, Paul, was on a shorter bicycle, so they had to negotiate until he agreed to let Colleen move onto his bicycle. Colleen and Greta begin to pedal, and Colleen sings along to the song until Greta decides that they are done and should move on to a new exhibit:

Colleen: Want to ride the bicycle?

Greta: Do you? Here, want to go? Oh, look at Paul getting on. Want to go? Do you want to get on the bike? Grandma, is it too far away?

Colleen: Yeah.

Greta: Here, hold on! I don’t know how to make it go forward for you.

Colleen: Too far away!

Greta: Here. Maybe. Do you want to see if another one will fit?

Colleen: Okay, I have to fit one that’s closer.

Greta: Paul, do you think Grandma can try this one so she can reach? Here, Grandma. I think this one you could reach. Okay, Paul will get off.

Colleen: Paul, get off! I’ll get on it.

Greta: Grandma’s going to get on.

Colleen: I’m getting on. You’ve got to go. [Colleen gets on the new bike; The Exercise Opera song begins]

Greta: [Laughs].

Grandma: Yam pam pam.

Greta: [Laughs]. Here, Grandma. Hold onto that!

Colleen: What do I do with this? Doo doo dooo.

Greta: Right there.

Colleen: Pam pam pam. Bam bam.

Greta: All right. Are you all done? We’re going to go look at another exhibit.

Colleen and Greta are playmates in the sense that they make mutual decisions together in order to enjoy the different exhibit experiences. First, they make sure that they both want to go to the Exercise Opera exhibit. When their play is interrupted because one bike is not working, Colleen and Greta work as a team to find another bicycle—albeit at the expense of young Paul. Colleen could have let Greta pedal on one bicycle and become an observer, but instead she continued to try to participate in the activity with Greta by negotiating for Paul’s bicycle. When Colleen and Greta finally did get to use the bicycles together, Colleen did not encourage Greta to keep pedaling as a coach might, or to recite exercise facts to Greta like a teacher. Instead, Colleen sang along with the song causing Greta to laugh. Here, Colleen was most interested in having fun and enjoying her granddaughter’s company, two important aspects of the playmate role.

A Coach on the Web

Sylvia is a grandmother who feels that engaging in activities with her 8-year-old granddaughter Jackie makes them “closer, tighter.” Sylvia has been using the web for over four years. She spends more than 11 hours per week online researching health, medical, and consumer topics, sending e-mail, and doing personal finances. Sylvia likes that she can access personally relevant information in the privacy of her own home. She gets annoyed when she cannot find what she is looking for, when downloads take too long, and when she encounters broken links. Although Sylvia spends a lot of time on the web, she seldom, if ever, goes on the web with her granddaughter Jackie. This turned out to be common among our sample: Only 8 of the 31 grandparents in the web condition had used the web with their grandchildren. However, unlike other grandparents in the web setting, Sylvia did report that she learned more because Jackie was present.

Sylvia felt that she played a coaching role in Jackie’s web experience, using as an example their interaction around the Heart Puzzle. In this activity, visitors could click on different unmarked pieces of the heart and drag them into a whole heart outline. Once visitors had completed the activity, textboxes with relevant information became visible. In the following excerpt, Sylvia is trying to get Jackie interested in the activity:

Sylvia: Assemble the heart. Do you want to put the heart together?

Jackie: I don’t know.

Sylvia: Hmm?

Jackie: I don’t know. Maybe. Let me see, let me see. Can I try? I know [Points to screen] what goes next.

Sylvia: Ok, go ahead.

Jackie: [Reaches for mouse] I can’t reach. Wait. Did I get it?

Sylvia: That’s it. You just drop it and it will go right into place.

Jackie: I don’t know. Wait. I think I know where this goes. It fits. Hmm. Oh, I know where this goes.

Sylvia: Okay.

Jackie: Right here.

Sylvia: Okay.

Jackie: See? Oh.

Sylvia: The right ventricle?

Jackie: Mm-hmm. Right here somewhere.

Sylvia: Looks like it.

Jackie: Yeah and then this. He’s going to put a puzzle. . .

Sylvia: So now you can tell your mom you put a puzzle together!

Sylvia invited Jackie to do the Heart Puzzle activity. Jackie was initially unsure about whether she wanted to do the activity, but Sylvia persuaded her to continue with words of encouragement. Unlike Henry and Isaac’s interaction in which Henry used content and facts about heart anatomy to frame the activity, Sylvia was more focused on helping Jackie feel confident about completing the activity itself. Notice also how the constraints of using a computer encouraged Sylvia and Jackie to adopt less collaborative roles. Unlike walking through the heart or using bicycles together, the puzzle provided no easy way for Sylvia to directly interact with the web alongside Jackie.

A Teacher on the Web

Laura is a regular web user who spends up to 20 hours per week reading news, doing research, and shopping on-line. Like Sylvia, she likes the privacy of the web and the variety of information, but she does not like spam, broken links, or dubious sources of information. Unlike Sylvia, Laura often goes on the web with her 7-year-old grandson, Derek. She usually searches for activities that they can both enjoy. The web is one of many activities they do together—they also play board games and card games, go to the library, read, go fishing, and attend summer campfires.

During their web experience, Laura felt that she had played a teacher role, explaining that, “some of the words and concepts were difficult. Tricuspid valve, and things like that. I didn’t know that he actually needed to know what the tricuspid valve was. However, it was important that he know what the heart did, and so I tried to push him to some of that.” She felt she had embodied the teacher role the most when she was talking to Derek about the function of the heart during the Heart Movie. This was a webpage that contained text, audio, and animated illustrations about the heart’s anatomy and its various functions. In the excerpt below, Laura and Derek are looking at the text and image that accompany the Heart Movie. Laura and Derek begin their conversation with a fact-checking game in which Laura tells Derek a particular fact and Derek replies that he knows it. After listening to the movie, Derek makes a statement about the shape of the heart, and Laura expands upon it.

Laura: How would you like to learn about how your heart works?

Derek: Sure.

Laura: That sounds like a good place to start. It’s really a muscle.

Derek: Knew that.

Laura: It’s in the middle of the chest.

Derek: Knew that.

Laura: It’s about the size of your fist.

Derek: Knew that.

Laura: We’re still doing okay. Lots of muscles. We’re discussing what it does. It sends blood all around your body, provides your body with oxygen and nutrients it needs. It also carries away the waste that your body has to get rid of. Your heart is like a pump. Two pumps in one. The right side receives the blood and pumps it to the lungs, and the left side does exactly the opposite. Receives it from the lungs and pumps it to the body. That’s pretty good. Shall we play this and see?

Derek: Uh-huh.

Laura: What’s it going to tell us? [Both watch movie]

Derek: Here’s the shape of the heart. [Derek draws shape with his finger on to the table]

Laura: It’s not exactly like a valentine.

Derek: Why did they do that?

Laura: I think they were making it that shape before anybody actually looked inside somebody else and saw one.

Derek: Oh. What’s it really shaped like?

Laura: [Pointing to image on-screen.] Like that.

Given her teaching role, it is perhaps not surprising that Laura reported that she would have learned more from the web page if she had been alone. Surfing solo, she thought

she would have looked at the web content more quickly, avoided the games, and spent a greater amount of time with the didactic content. However, Laura stated that she still preferred to look at the web with Derek: “His need of the information and his ability to incorporate it as he grows up is more important. I have more leisure time, and I can go back at it on my own pace later on, which I don’t think he can.”

DISCUSSION

This study focused on grandparents as an audience for intergenerational informal learning experiences. We wanted to explore whether the grandparent audience has unique characteristics or whether they act similarly to other adults in informal settings. Previous work in the gerontology literature has focused on different roles that grandparents play in their grandchildren’s lives—roles that may be different from those that parents or other adults play (e.g., Reitzes & Multran, 2004; Ramirez-Barranti, 1985). Prior literature has most often examined these roles in general ways as opposed to whether they are actually enacted in a specific experience or environment. In both museums and on the web, our findings suggest that the commonly enacted roles were teacher, coach, and playmate. Historian, storyteller, and role model were less commonly mentioned as having been enacted in these environments.

Teacher, coach, and playmate are the most common roles observed in parent–child interactions in informal learning environments (Swartz & Crowley, 2004). Thus, one way to interpret these findings is to conclude that grandparents are not a substantially different audience than parents. In some ways, this should not be surprising. After all, museums, especially science museums, are often designed to communicate the message that the most important role for adults is to act as interpreters and facilitators of a child’s experience. This message is in part a result of what museums think the public wants. It is rare to find a new science exhibition these days that does not have families with children as the primary audience. One often finds exhibition content designed to dovetail with school standards and curricula. Choices of how to interpret content are often guided by a perception that children learn best when they are involved in inquiry and hands-on discovery. In such a child-centric educational environment, adults may be seen as mediation tools rather than as learners in their own right. If this is, indeed, the goal of an informal learning environment, our findings suggest that informal learning environments are already responding to the needs of grandparents in intergenerational interactions. We observed them being effective facilitators of their grandchildren’s experiences.

However, one might argue that it is a missed opportunity to view grandparents and other adults only in terms of what they can do for children’s learning. The other way to interpret our findings is to conclude that informal learning environments may not be doing enough to support the roles that grandparents want to play in their grandchildren’s lives. Grandparents are looking for places where they can spend time socially, bonding with their grandchildren and playing a storyteller or playmate role. When grandparents participate in activities such as visiting museums or going on the web, their main goal is to strengthen their social relationships with their grandchildren through talk. When we asked grandparents why they felt that it was important to participate in activities with their grandchildren, they said things such as: “So we can have bonding and be close

to each other; just form a relationship.” Another grandmother told us: “To increase our relationship and our love we have already going right now, you know? I just enjoy being with her. And I think they enjoy being with us and to create some memories, you know, for them when we’re not around.”

These social goals seem to come into conflict with the agenda of the learning environment, and grandparents reported less frequently that they played roles of playmate and storyteller. The question remains of how we might develop informal learning experiences that more effectively support the agenda of grandparents. In a study of grandparents in a natural history museum, a museum type with a less strongly elaborated educational exhibit schema, Leinhardt and Knutson (2006) found that grandparents enacted playmate and storyteller roles by using artifacts as a means to relay information about prior joint experiences. In fact, the presence of real objects in museums has been shown to elicit powerful conversations from visitors, in general (Paris & Hapgood, 2002). Perhaps then, the nature of the specific informal experience, including the type of museum and range of activities provided, might support the enacting of more socially oriented roles for grandparents and other visitors.

Whether or not visitors choose to engage with an educational or a social agenda for their visit, museums are designed, in all their permutations, to afford the opportunity for dialogue and interaction. On the other hand, in our study of grandparents and the web, we did not find the same support. In this sample, web experiences did not elicit the same level of collaboration and social exchange. Although both the museum and the web can cover the same educational objectives and provide similar levels of content, the web in its typical state cannot yet support a collaborative experience in the same way that a museum can. Grandparents may currently socialize with their grandchildren on the web, but they do so remotely through e-mail or instant messaging, whereas grandparents in museums engage in face-to-face interactions with their grandchildren around similar objects of interest. As innovative communication technologies evolve, we may find that face-to-face interactions within virtual communities like Second Life become increasingly “life-like” ways for grandparents to interact with their grandchildren around computer representations of artifacts. Yet we suspect that the difference between interactions in a virtual space and those that the museum can provide center around something that is fundamental and unique to the museum environment: access to real, authentic objects as scaffolds that seed higher-level learning conversations (Eberbach & Crowley, 2005). We should also note that, although the web may allow grandparents and grandchildren to one day have complex exchanges from a distance, we suspect that grandparents would still prefer to see the children face-to-face when they can. Informal learning experiences will still need to be designed so that people can learn with those they want to spend time with. Perhaps the clearest implication of our findings is that museums and other physical settings will continue to have a unique role to play in the informal learning infrastructure; a role that brings groups of people together and allows them to create social experiences that include rich disciplinary content.

ACKNOWLEDGEMENTS

This research was funded by grants from the National Science Foundation to UPCLOSE and to Setting Priorities for the Retirement Years. We thank Russell Morgan and the staff at SPRY for inviting us to be part of their work on the informal learning of older adults. This project was a small part of that larger effort. Thanks

to our museum sites arranged by Minda Borun at the Franklin Institute and to Jane Werner at the Children's Museum of Pittsburgh, and to Debra Bernstein, Andrea Patterson, Meryl Zwanger, and Sasha Palmquist for their feedback on this article.

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