How do Icelandic families learn at science centres?

SERA 2006 Annual Conference
23 November – 25 November 2006, Royal George Hotel, Perth

Kristján Ketill Stefánsson
Researcher
Dr Allyson Macdonald
Professor
• Science in the Centre (Vísindi á vettvangi)
• Gather information that might become useful for the establishment of a Science Centre in Iceland.
• Three graduate students: Elín Bergmann Kristinsdóttir, Marín Rós Tumadóttir and Kristján Ketill Stefánsson worked on the project in July and August the summer of 2006
• Presentation
  – Defining the research questions
  – Pilot research
  – From the literature
First steps

• The term *science centre* has no exact equivalent in an Icelandic context.

• This moulded our first research question which led to the subsequent ones:
  – What is a science centre?
    • What are interactive exhibitions?
  – What do we have to build on?
    • Who are using the options available?
    • How do Icelandic families value learning at interactive exhibitions?
    • How do families learn at science centres?
A museum where the main emphasis is on science and scientific phenomena.

Built around interactive exhibitions.

Aimed at being fun.

Has an educational role and it is often closely related to schools or marketed as an educating entertainment for children and families.

Main purpose is for children and adults to learn about and get inspired by science.
Interactive exhibitions

• “A hands-on or interactive museum exhibit has clear educational objectives which encourage individuals or groups of people working together to understand real objects or real phenomena through physical exploration which involves choice and initiative” (Caulton, 1998).
What do we have to build on?

- Three Icelandic institutions were compared to Science Centres in Oslo and Stockholm.
  - The Science World (A summer activity in the Reykjavik Family Amusement Park)
  - Electroworld (A part of the Electric museum belonging to Reykjavik Energy)
  - The Natural Museum at Hellnar (A part of the national park Snæfellsjökull)
  - Vitensenteret (A part of the Technic museum in Oslo)
  - Teknorama (A part of the Technic museum in Sweden)
Museum roles

Science World

The Natural museum at Hellnar

Teknorama in Stockholm

Electroworld

Entertainment

Vitensenteret in Oslo

Conservation

Education
Pilot research

= Interactive exhibitions
= Tent pole
= Aquariums
= Visitors’ route
= Table and chairs

300 m²

Entrance/Exit
Who are using the options available?

How do guests value learning at interactive exhibitions?

Different roles

How guests at the Science World perceive the role of science centres

- Science World
- Teknorama in Stockholm
- The Natural museum at Hellnar
- Electroworld
- Vitensenteret in Oslo

Roles:
- Entertainment
- Conservation
- Education
How do guests value learning at interactive exhibitions?

How high should the admittance fee be (for adults)?

- No admittance fee: [chart data]
- 500 ISK (£3.6 GBP): [chart data]
- 1000 ISK (£7.5 GBP): [chart data]
- 1500 ISK (£11.3 GBP): [chart data]

How feasible is the establishment of the intended Science Centre?

- Not feasible: [chart data]
- Not very feasible: [chart data]
- Neutral: [chart data]
- Feasible: [chart data]
- Very feasible: [chart data]
Results

• Despite methodological weaknesses the results suggest five things:
  – The main users of Science World are children with their families (mothers) or in organised daycare
  – The adults emphasise equally education and entertainment in science centres
  – There is a strong demand for more opportunities for science learning as entertainment in Reykjavik
  – The adults find 4 GBP a suitable amount for an admittance fee
  – Focus needs to be on how families learn in science centres
From the literature 1

• Family Behaviour and Learning in Informal Science Settings: A review of the Research (Dierking & Falk, 1994)
  – family groups constitute approximately 60% of all visitors in informal science settings
  – becoming the single most popular out-of-the-home family activity in America
• Review of the research:
  – Studies of family group interactions, Time allocation and agendas in informal science settings.
  – Studies investigating family learning in informal science settings
    • “Families utilise informal science settings to facilitate learning, but historically the effort to “structure” and “measure” the family museum experience in a narrow quantitative fashion has prevented researchers from truly understanding the nature of this learning” (p. 67)
• Generalisations about family learning
  – families pay attention to exhibits, discussing content within exhibits, and interacting with exhibits in ways that strongly suggest learning has occurred
  – the visitor’s prior knowledge and experience on the museum visit is of importance
  – learning is influenced by a number of variables including the visitors prior knowledge and experience, the type of the exhibit, the sex and age of the parents and children interacting, and at what point during the visit families encounter a particular exhibit.
  – It involves both cognitive and affective domains and appears to be socially mediated.
  – curiosity and attention play key roles
  – preactivity instruction for parents may be useful
  – when more naturalistic methodologies are utilised there is good evidence that learning does occur.
Family Learning in Museums: An emerging Disciplinary Matrix? (Ellenbogen et al., 2004)

- Signals of an emerging disciplinary matrix
  - New shared language, beliefs, and values about family learning
  - Realigning methodologies
  - Understanding of the family as a learning institution
Ellenbogen et al. (2004)

- Shared language, beliefs, and values about family learning
  - The popularity of sociocultural theory in learning research has turned the focus to shared meanings, processes, artifacts, symbols, and identities that families construct as they participate within a specific community.
  - This has emphasized the role of the museum in a larger social and cultural context.
  - This also harmonises with constructivist ideas on the importance of prior knowledge and how that knowledge evolves during and after the museum visit.
• Realigning methodologies
  – A decade ago prevalent studies were time and tracking studies
  – The last decade and until now diverse methodologies including:
    • Discourse analysis
    • Video and audio recording of moment-by-moment interactions
    • Pre-, post, and post-post interviewing,
    • Journaling
    • Talk-aloud cued visits
    • Providing family members with cameras for documentation and meaning making tools
  – The seemingly insignificant nature of the family discourse has proven to be significant to learning if the museum visit is seen in the home life or other real world context.
• The family as a learning institution
  – Its own disciplinary matrix
    • Examines learning beyond the museum walls
  – Family centric perspective
    • The position of the museum is dependent on the culture of the family.
      • Identity building becomes significant
  – Museums become a place for building and affirming identity.
  – The museum is context not content.
From the literature 3

• Research on Students and Museums: Looking More Closely at the Students in School Groups (Griffin, 2004)
  – Research on family visitor learning can provide insights into ways to enhance student learning in museums
  – For example the ability to choose (valued highly in family learning) is often restricted by worksheets (which are given out with good intentions)
A deeper understanding on the nature of learning in school groups can be reached by shifting attention to:

– students’ views about field trips
– their socially negotiated learning behaviour
– the interaction between learning in the classroom and in the museum
Implications

• Implications for new centres
  – The science centre has to become a place for building and affirming the identity of the individual through a positive science experience.
  – Family and schoolgroup considerations can go hand in hand although the family will probably be the biggest visiting group.

• Implications for research
  – Research on how families learn at science centres will have to be implemented in parallel with the opening of the intended science centre.
  – The research has to encompass the larger social and cultural context of the museum.
  – The research has to include a family/learning group central perspective
References


