Parallel Pathways

The Relationship between
the Formal and Informal Pathways
to Learning Science and Technology

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Informal Learning

- Learning during the 92% of our lives which we spend *outside* the formal education system
- Also called “free choice learning,” because learners set their own agenda
- Pathways include museums, zoos, botanic gardens, parks, visitor centers, television, magazines, books, libraries, the Internet, and hobbies.

Example: Science Museums, the Fastest Growing Sector of the Museum World

- Several new “hands-on” science museums open each year
- 350 now in USA alone
- $1+ billion per year total budgets
- 177 million visits per year in USA
- about 60 million visitors on school field trips

Science Museums Share Resources Intensively, On a World Wide Scale (e.g., **TryScience.org**)

Assessments of Informal Learning

- **Visitor Studies Association** annual conferences and publications include hundreds of evaluations of affective and cognitive domain learning
- **Critical literature surveys** (e.g., Valerie Crane, 1994)
- **Extended Analyses** (e.g., Falk & Dierking, 1992, 2002; Hein 1998)

Typical Results from Evaluations

- Visitor demographics are highly diverse, and men and women are approximately equally represented
- Many popular evaluation instruments used in formal education (such as multiple choice tests) are rarely useful in informal learning situations
- Despite brief visits and often noisy, crowded, busy environments, visitors do learn in museums
- Cognitive and in particular affective gains happen for a wide variety of visitors

27,500 Inservice Teachers Take In-Depth Training in Science Museums Each Year

- Museum staff know *both* content and pedagogy
- They are used to paying attention to learners
- Museums have a culture of ongoing iterative improvement

Apprenticeships for Students and Pre-Service Teachers Are Increasingly Popular

- Exposure to real phenomena, scientists, technologies
- Culture of inquiry, love of science and technology
- Good balance of intensity, evaluation, and enjoyment, well suited to most youth

Some Connection with Formal Education Has Always Been a Feature of Museums, But Should We Expect Much More?

- For schools the use of science museums is typically an optional “enrichment” rather than an essential piece of the core curriculum or strategy
- For most museums, school field trips are an expensive secondary priority

How Should The Relationships Between Formal and Informal Education Change?

- Should schools incorporate informal learning pathways in a more serious, structured, integral manner?
- Should museums redesign their programs to serve formal education more directly?
- Should museums become more like schools?
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