Amplifying informal science learning: rethinking research, design, and engagement

Reviewed Book DIAMOND, J. AND ROSENFELD, S. (EDS.) (2023). AMPLIFYING INFORMAL SCIENCE LEARNING: RETHINKING RESEARCH, DESIGN, AND ENGAGEMENT. NEW YORK AND LONDON: ROUTLEDGE

Reviewed by **Graham J. Walker**

Abstract An intriguing book on informal science learning in all its cultural and geographic diversity, deftly balancing theory, practice and the wondrous space in-between.

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While some areas of science communication lament the disconnect between theory and practice, this book on informal science learning (ISL) presents the connection as it is: sometimes neatly knotted, occasionally messily tangled, but always in dynamic interplay. As Jamie Bell highlights in his foreword, theory and practice are two sides of the same coin; they interact and inform each other. Editors Judy Diamond and Sherman Rosenfeld go on to note that researchers have been collaborating closely with practitioners in ISL settings over the last half century — arguably more. As the preface hints at, those researchers often start as visitors to such institutions, and then move on to being staff that create exhibits and design programming. At some point, in the quest for more impactful visitor experiences, they think critically, engage with research, and some become researchers.

This book is full of wisdom from the research-practice liminal space, bringing evidence-based ideas and academic research (including grey literature rarities) together with lived experience. Although some of the practice-oriented chapters are more descriptive than analytical, they are nevertheless thought-provoking, and overall theory-practice perspectives are well balanced. It's also accessible for those approaching from different sides — for practitioners, theoretical ideas are digestible and explained in context, while innovative applications of theory and

how practice can refine and challenge it will please curious academics. Whether researcher, practitioner or somewhere in between, you are likely to find inspiration in these wonderous and often untold stories of ISL at its most creative.

Exploring ISL from various angles across over 34 chapters, the book explores typical informal settings such as museums, science centres, zoos, aquariums, planetariums and nature interpretation settings. It also pays attention to emerging, novel or rediscovered settings — escape rooms, maker spaces, kitchens and youth-led gardens, to name but a few.

The book is divided into four sections: (1) exhibits and informal science, (2) engaged with earth stewardship, (3) places and spaces for informal science learning, and (4) rethinking informal science learning. While diverse, the overall narrative runs smoothly from core business to current issues, emerging venues and methods, and finally, challenges and future directions (including provocative chapters on evaluation and deeper goals of the field).

The focus on how ISL can address contemporary societal challenges is particularly welcome. While much ISL content involves centuries-old science, the book contains a fascinating chapter on AIDS exhibitions in the US and a whole section on ISL in the context of environmental concerns, conservation, climate change and sustainability, and the potential of citizen science in these domains. Many chapters highlight the value and unique strengths of informal compared to formal settings, along with models of how the two can come together productively, such as in Singapore's STEM Applied Learning Program and Open Schooling approaches. The value of conceptualising audiences as communities and how they can be part of (co)production of ISL — not just as consumers — is another thread throughout that invites more impactful practice and enlightened research.

Equity and inclusion are cross-cutting themes. The opening chapter discusses how science centres in Western countries are typically the domain of the educated elite and how this can be changed through innovative programming. Other authors explore how ISL can help to overcome social, financial or cultural barriers by fostering long-term youth interest in STEM, with deft comparisons to how sport and music approach similar goals. This issue is then examined from a science capital/identity lens in a subsequent chapter. An intriguing case study of programs for Native American youth shows how Indigenous knowledge, Native American facilitators, tribal elders and impacts of colonisation can be integrated with environmental and earth sciences. It is heartening to see in several chapters that frequently excluded audiences are more than included — in fact, they are invited in to create and facilitate such initiatives. Science communication as a field should take note.

While inclusion is discussed in many contexts, the geographic and cultural diversity of the authors and content gives this additional richness and strengthens the book. Examples of innovative and inspiring ISL programmes in India, Africa and the Middle East are a credit to the editors and authors. A brief history lesson of science-centre-like engagement in the ancient Islamic world is as intriguing as it is humbling. These chapters discuss ISL's cultural and geographic uniqueness — and commonalities — in these regions and contribute significantly by cataloguing the various organisations involved, a trove for networking and new collaboration.

Nevertheless, content predominantly comes from Europe and particularly the United States and how equity, inclusion and other factors are conceptualised are largely the perspectives of the global north. Asia-Pacific countries and authors are sorely underrepresented, which is a shame given that the book has done so well to cover the rest of the globe. Nevertheless, some chapters challenge and reorient the Western perspective. The chapter on Diné (Navajo Native Americans) Indigenous ways of knowing, language and how that relates to Western worldviews, science and ISL is utterly fascinating and a generous sharing of such knowledge with a wider audience. It is clear both authors and editors have made significant efforts to both discuss inclusion in ISL and make an inclusive book — frequently highlighting views of minorities, diverse actors and different ways of approaching the world and learning. Overall, this book will go a long way to making us a more empathetic and connected community of researchers and practitioners who create more diverse and relevant content for audiences.

Author

Graham J. Walker is a science communication teacher, researcher and practitioner based at the National Centre for the Public Awareness of Science (CPAS) at the Australian National University. He works at the interface of science communication and informal STEM learning, focusing on capacity building, emotion and motivation, and communication of social and environmental issues — particularly in informal learning contexts such as science shows and hands-on workshops. He also teaches in these areas.

g.walker@anu.edu.au

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