Open Access

Check for updates

Journal of Transformative Praxis
Vol. 4, No. 1, 2023, pp. 84- 87
https://doi.org/10.51474/jrtp.v4i1.671

Book Review

How to Explain the Rationale of Putting Research into Practice? A Book Review on *Visual-Spatial Ability in STEM Education Transforming Research into Practice*

Prateet Baskota*

Kathmandu University, Nepal

Email: prateet_09@kusoed.edu.np

Abstract

The book is crucial for exposing educational settings to research academics since it is visually appealing. It explains how spatial ability is tested and improved and explores the research procedures and skills utilized in educational settings. It concentrates on the problematic meta-analytic review and addresses two distinct cross-questions, including how large gender disparities in spatial ability are and where gender differences in spatial ability are first observed. The book purposefully covers a wide range of viewpoints, including those from cognitive psychology, educational psychology, science, technology, engineering, mathematics, computer science and information technology. It also addresses human growth. This book gives ideas about the early life span of visuospatial working memory development, along with the impact. As a reader, I found that these abilities have on academic learning with a biological explanation for the observed gender differences that seems to be a contribution to brain development that was shared through the book by the author for readers.

Keywords: Visual-spatial Ability. STEAM Education. Transformation. Research. Spatial Reasoning.

Introduction: What is about the book?

The book, *A Book Review on Visual-Spatial Ability in STEM Education: Transforming Research into Practice,* was printed in 2017 and edited by Myint Swe Khine. Springer International Publishing Switzerland. This book is shared through the Emirates College for Advanced Education Abu Dhabi, United Arab Emirates, and Curtin University, Perth, Australia. The book is split into three sections with a total of twelve chapters. From the introduction to the topics of spatial cognition, this book shares the key to STEM success, about

*Corresponding

ISSN: 2717-5081 (Print); 2738-9529 (Online)
Journal Webpage:
1. http://www.kusoed.edu.np/journal/index.php/jtp

Published by Kathmandu University School of Education, Hattiban, Lalitpur, Nepal.

the validity of spatial ability tests for entry into STEM career fields, with the example of military aviation.

About The Book Author

Myint Swe Khine is a professor at the Science and Mathematics Education Centre at Curtin University in Perth, Australia, as well as the chair of the assessment and evaluation center at Emirates College for Advanced Education in the United Arab Emirates. He earned master's degrees from the University of Southern California in Los Angeles, the United States, and the University of Surrey in Guildford, United Kingdom. He also holds a doctorate in science education from Curtin University in Australia. He was employed by Singapore's Nanyang Technological University's National Institute of Education before joining Emirates College for Advanced Education. Many books on scientific education have been edited and published by him.

Book Contents and Reviews by the Reviewer

In chapter one, the author tries to share about the importance of discovering and developing spatial talent is also shared by good research and practices in spatial ability, which highlight the empowering visuospatial abilities among Italian primary school students that describe from theory to practice. Continuing briefly, chapter two discusses the STEM fields that are relevant to both the civilian and military sectors. It also suggests that spatial skills be considered as a key predictor of field and career success. A FOOT Factor Analysis is defined along with additional specifics, recommendations, and limits. From Chapter 3 to Chapter 7 the writer defines spatial imagery, spatial skills, scales, and a variety of learning aids. The measuring spatial visualization test development study, which gave rise to the current period of opportunities comprising education encompassing all fields of research, is also covered in chapter four. In contrast to chapter seven, Maria Chiara Fastame presents the notion that the early development of visuospatial skills may be related to the empowerment of Italian primary school students.

By categorizing spatial skills tasks with an overview of spatial training studies and using a sample image of a sample water level task item, the author Yi-Ling Cheng indicates the development of spatial ability and its relationship to spatial training (Beilin et al. 1966, p.326). As I continued reading the summary, I saw that Vandenberg and Kuse had modified Shepard and Metzler's (1971) Mental Rotation Test task by generating it with various angles and block lengths (1978). Between the construction of psychological knowledge was shared by Baddeley (1986; 2000), Quinn (2008), and Reuhkala, who established visual-spatial working memory (VSWM) as a subsystem of structure and researched it more thoroughly compared to other spatial skills (2001). Additionally, the subchapter on topics 8.3 and 8.3.1 is debatable, which asks, "What is improved in spatial training?" while reading a book. I am left with the "g factor," which could be covered in greater detail under the discussion of the relationship between academic success and cognitive abilities.

The heading of chapter nine, which provides particular ideas regarding a spatial-semiotic framework in information and communication technologies, is what makes it fascinating. The visualization process, spatial thinking, and mental and dynamic pictures all play important roles but can also be nested. However, the way that people explore spatial tasks by sketching them out reveals something about semiotics, spatial thinking, and mathematics education. I adored Yeh and Nason's (2004) semiotic triad of 3D geometry-image used while reading (p.4). The spatial thinking process images have been presented through the features

and tools of modeling software, which provides information on IFI, VP, and the Emergence of Gestures, Words, and Sketches.

The concept of gender differences in spatial ability and approaches to reducing the gender gap for parents and educators in a contentious area is discussed in Chapter 10 by David Reilly, David L. Neumann, and Glenda Andrews. On the other hand, a wealth of research demonstrates that spatial competence can be enhanced through relatively quick interventions. Similarly, it discusses spatial ability in 10.1.2, which suggests that "psychologists and cognitive researchers apply the term spatial ability to tasks meant to measure individual cognitive processes in isolation" (p.196). As you read The book by editor Khine, it discusses "spatial perception" (p.196) in the Piagetian Water Level Task (see fig. 10.1) and other tests in addition to gender differences.

Jorge Martin-Gutierrez and M. Montserrat Acosta Gonzalez's addition to Chapter 11's ranking and predicting results for various training activities to develop spatial abilities shows that SA (spatial ability) contributes in a special way that later transforms into creative and scholarly outcomes, especially in STEM domains. The final chapter 12, begins with the query, "How does space interact with numbers?" It is tied to academic endeavors and demonstrates the apparent relationship between visuospatial skills. The little chapter seems difficult to comprehend, but it positively affected me and piqued my curiosity in theoretical information regarding the evolution of numerical notions.

As a visual learner, I feel that the ability to comprehend visual content spatially is a strong predictor of personal qualities and individual distinctions. The book is ideal for enthusiastic STEM students as well as for other academic disciplines such as education, neuroscience, psychology, and techno-centric world researchers who may believe in knowledge growth and advancing current thinking regarding spatial intelligence, reasoning, and cognition. I adore the book since it is visually appealing, describes how spatial ability is measured and developed, and discusses the research techniques and skills used in educational settings; the book is essential for introducing settings to research academics.

Evaluations from Reviewer

The phrase that really appeals to me is "We desired flying vehicles. Rather, we received 140 characters" by Peter Theil, which describes innovation as what leads to change in the direction of the future. In contrast to the intellectually based "liberal arts of rhetoric, logic, and grammar," spatial reasoning is also linked to physical, mechanical, and practical duties of success in "illiberal" Hellenic Greece and Medieval Europe. The chapter also discusses photos of long-term SMPY project data that show gender inequalities in educational practice as well as talent. Finally, it questions the innovation of lost NASA engineers and Elon Musk's firm intervention. JLAP, the Vandenberg Mental Rotation Task, embedded figures tasks, paper folding tasks (French et al. 1963), and the example of dynamic spatial ability tasks put forth by Hunt et al. are a few examples of tasks that use visuals to characterize them (1988). When I look at the pictures of the various tasks, the spatial orientation dynamic test-revised catches my attention (SODT-R; Contreras et al. 2007). "How large are gender disparities in spatial ability" and "Where are gender differences in spatial ability first observed" are two distinct cross-questions that were addressed by the problematic meta-analytic review look puzzling to readers in terms of spatial ability and numeric reasoning, but a biological explanation for the observed gender differences seems to be a contribution to brain development.

Developing spatial skills and understanding how they relate to spatial training provides the concepts, as they have been discussed in the context of information and communication technologies using a spatial semiotic framework. The consequences of STEM education of

gender disparities in spatial ability as well as strategies for parents and educators to close the gender gap, have been defined.

In contrast, the question "How does space interact with numbers?" and the ranking and predicting results for various training activities to enhance spatial abilities have been added. I discovered that Nazan Sezen Yüksel, the author, supports spatial labeling ability by supporting the addition of the term "visual-spatial ability, skill, orientation, and thinking." I also believe with the writer *Khine* that the proper information regarding the pilot application of the created test with confirmatory factor analysis, in which one sample Kolmogorov-Smirnov analysis has been analyzed, is provided by several fields/disciplines. A good example of spatial ability in relation to small-scale vs. large-scale spatial skills that are concerned with human intelligence and created as multi-dimensional in spatial perception, mental rotation, and spatial visualization is Lu Wang, whose title poses a question. The author *Khine* discusses the causes of gender disparities in spatial abilities along with other specifics.

As a researcher of Visual Spatial Intelligence Research and Education, I have a question about spatial cognition i.e. how can we boost visuospatial abilities at school that decides an educational proposal? On page 227, I also discovered that the two distinct components of "spatial relations" and "spatial visualization" are connected in their shared ability to "rotate 2D and 3D objects as a whole-body" and "parts in three spatial dimensions by folding and unfolding" and the "visuospatial coding account," or "SNARC effect," is a term used to describe evidence of the linkages between number and space in healthy participation.

ORCID

Prateet Baskota https://orcid.org/0000-0001-7577-8202

List of References

Khine, M. S. (2016). *Visual-spatial ability in STEM education*. Springer International Pu.

Suggested Citation:

Baskota, P. (2023). How to explain the rationale of putting research into practice? A book review on *Visual-Spatial Ability in STEM Education Transforming Research into Practice*. *Journal of Transformative Praxis, 4*(1), 84-87. https://doi.org/10.51474/jrtp.v4i1.671