

Knowledge Visualization and Visual Literacy in Science Education

Part of the Advances in Educational Technologies and Instructional Design Book Series

Anna Ursyn (University of Northern Colorado, USA)

Description:

Effective communication within learning environments is a pivotal aspect to students' success. By enhancing abstract concepts with visual media, students can achieve a higher level of retention and better understand the presented information.

Knowledge Visualization and Visual Literacy in Science Education is an authoritative reference source for the latest scholarly research on the implementation of visual images, aids, and graphics in classroom settings and focuses on how these methods stimulate critical thinking in students. Highlights concepts relating to cognition, communication, and computing.

Readers:

This book is ideally designed for researchers, instructors, academicians, and students.

ISBN: 9781522504801

Release Date: June, 2016

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Pages: 400

Topics Covered:

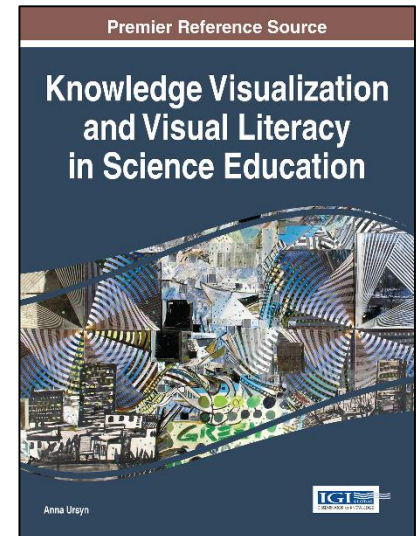
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Acknowledgment

Section 1

Cognition and Visual Literacy

This section discusses essential notions pertaining to cognitive and visual thinking. As cognitive mental activities support us in acquiring knowledge with the use of our senses, thoughts, and exposure to nature, authors of this section's chapters inquire into the sensory and cognitive functions that seem to be necessary in understanding and learning processes.

Chapter 1

Teaching and Learning Science as a Visual Experience

Anna Ursyn, Computer Graphics, University of Northern Colorado, USA

Chapter 2

Exploring Perception, Cognition, and Neural Pathways of Stereo Vision and the Split Brain Human Computer Interface

Greg P. Garvey, Quinnipiac University, USA

Chapter 3

Better Visualization Through Better Vision

Michael Eisenberg, Department of Computer Science and Institute of Cognitive Science, University of Colorado, Boulder, USA

Chapter 4

Visual Approach to the 4th Dimension in Mathematics, Computing and Art

Jean Constant, Hermay.org, Switzerland & Santa Fe, NM, USA

Section 2

Visual Communication and Knowledge Visualization

This section describes instances of knowledge visualization in selected areas: biology, mathematics, digital media, and music. Authors present their conceptions of visualization with the use of implements used in their domains.

Chapter 5

Visualization in Biology: an Aquatic Case Study

Maura C. Flannery, St. John's University, NY, USA

Chapter 6

Visualisation and Communication in Mathematics

Hervé Lehning, AC-HL, France

Chapter 7

Understanding Collage Strategy as a Learning Method and Its Use in Digital Media

Dennis Summers, Strategic Technologies for Art, Globe and Environment, USA

Chapter 8

How We Hear and Experience Music. USA

Robert C. Ehle, School of Music, University of Northern Colorado, USA

Section 3

Computing and Programming

This section delves into selected methods aimed at assisting the learners in acquiring computing and programming skills with the use of video tutorials and metaphorical visualization.

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Using Video Tutorials to Learn Maya 3D for Creative Outcomes: a Case Study in Increasing Student Satisfaction by Reducing Cognitive Load

Theodor Wyeld, Flinders University, Australia

Chapter 10

Metaphors for Dance and Programming: Rules, Restrictions, and Conditions for Learning and Visual Outcomes

Anna Ursyn, Computer Graphics, University of Northern Colorado, USA

Mohammad Majid al-Rifaie, Computer Science, Goldsmiths, University of London, UK

Md Fahimul Islam, Queens College CUNY, NY, USA

Section 4

Educational Applications and Cognitive Learning

The authors of this section provide theoretical and practical materials supporting teaching and learning science.

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Optimizing Students' Information Processing in Science Learning: a Knowledge Visualization Approach

Robert Zheng, University of Utah, USA

Yiqing Wang, Shanghai Normal University, P.R. China

Chapter 12

Integrative Visual Projects for Cognitive Learning

Anna Ursyn, Computer Graphics, University of Northern Colorado, USA

Chapter 13

The Difference between Evaluating and Understanding Students' Visual Representations of Scientists & Engineers

Donna Farland-Smith, The Ohio State University, USA

Kevin D. Finson, Bradley University, USA

Anna Ursyn, PhD, is a professor and Computer Graphics, Area Head at the School of Art and Design, University of Northern Colorado, USA. She combines programming with software and printmaking media, to unify computer generated and painted images, and mixed-media sculptures. Ursyn had over 30 single juried and invitational art shows, participated in over 100 juried and invitational fine art exhibitions, and published articles and artwork in books and journals. Research and pedagogy interests include integrated instruction in art, science, and computer art graphics. Since 1987, she serves as a Liaison, Organizing and Program Committee member of International IEEE Conferences on Information Visualization (iV) London, UK, and Computer Graphics, Imaging and Visualization Conferences (CGIV). From 1997 she serves as Chair of the Symposium and Digital Art Gallery D-ART iV. This is Anna's fifth book published with the IGI-Global. Website: Ursyn.com.