Contents

Part I  Eco-design, Sustainable Manufacturing,
Design for Sustainability

Supporting Environmentally-Benign Design: Environmental Impact Estimation and Uncertainty Categories with Respect to Life Cycle Assessment in Conceptual Design ........................................ 3
Shakuntala Acharya and Amaresh Chakrabarti

Supporting Sustainable Service-System Design: A Case Study on Green-Roof Design with InDeaTe Template and Tool at Syracuse, New York ................................................................. 19
Shakuntala Acharya, Kiran Ghadge, Praveen Uchil, Carli Denyse Flynn, Alexander James Johnson, Mallory Nicole Squier, Yige Yang, Xiaoliang Yang, Cliff Ian Davidson, Gaurav Ameta, Sudarsan Rachuri and Amaresh Chakrabarti

‘What Ideality Tool’ (WIT) for Product Design Briefs ............... 35
Alon Weiss, Iko avital, A.K. Das, Mazor Gedalya and Pratul Ch. Kalita

Holistic Socio-environmental Design: Practices Through Making, Craft, and Historicity ....................................................... 47
Saurabh Tewari and Aurgho Jyoti

Design for Innovation: Toys for Sustainable Play .................. 59

A Story of Languishing Doll: Revival of Cloth Dolls of India .... 71
Satyendra Kumar Mishra and Satyaki Roy

Smart-Cities for India: Why not Open-Source Villages? .......... 79
Paul Varghese
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Intervention for Livelihood and Hygiene for Street Vending</td>
<td>91</td>
</tr>
<tr>
<td>of Panipuri</td>
<td>Pratul Ch. Kalita, Supradip Das and Amarendra Kumar Das</td>
</tr>
<tr>
<td>Life Cycle Assessment (LCA) to Assess Energy Neutrality in Occupancy</td>
<td>105</td>
</tr>
<tr>
<td>Sensors</td>
<td>Tarun Kumar and Monto Mani</td>
</tr>
<tr>
<td>Sustainable Development for Rural North East India</td>
<td>Brajesh Dhiman, Mrinal Krishna Chaudhury, Sudip Kumar Deb and Debkumar Chakrabarti</td>
</tr>
<tr>
<td>Design for Communities: An Entrepreneurial Approach to Solve the</td>
<td>127</td>
</tr>
<tr>
<td>Problems of Society and Environment Fuelled by Product Design</td>
<td>Eshan Sadasivan, Mainak Das and Shantanu Bhattacharya</td>
</tr>
<tr>
<td>Supporting Social Innovation: Application of InDeate Tool for</td>
<td>139</td>
</tr>
<tr>
<td>Sustainable Service Design—Case Study of Community Workshops</td>
<td>Suman Devadula, Kiran Ghadge, Saritha Vishwanathan, Shuk Han Chan, Quinn Langfitt, David Dornfeld, Anil Gupta, Sudarshan Rachuri, Gaurav Ameta and Amaresh Chakrabarti</td>
</tr>
<tr>
<td>Reduction of Environmental Impact of Products Through Hotspot Analysis in LCA</td>
<td>153</td>
</tr>
<tr>
<td>Koti Banal Architecture of Uttarakhand: Indigenous Realities and</td>
<td>165</td>
</tr>
<tr>
<td>Community Involvement</td>
<td>Smriti Saraswat and Gautam Mayuresh</td>
</tr>
<tr>
<td>Assessment of GRIHA and LEED on the Parameters of Sustainable Design</td>
<td>179</td>
</tr>
<tr>
<td>and Development of Buildings</td>
<td>Shiva Ji, Sharmistha Banerjee and Ravi Mokashi Punekar</td>
</tr>
<tr>
<td>A Concept for Assessing Sustainability—The Sustainability Diamond</td>
<td>189</td>
</tr>
<tr>
<td>Understanding the Hope Harbingers—ASHA, the Women Foot Soldiers of</td>
<td>199</td>
</tr>
<tr>
<td>India’s National Rural Health Mission</td>
<td>Needa Jamil, A.S. Vysak, Aditya Parihar and Sharmistha Banerjee</td>
</tr>
<tr>
<td>Supporting Sustainable Product Design: A Case Study with InDeaTe Tool</td>
<td>209</td>
</tr>
<tr>
<td>and Template at Washington State University, Pullman, WA</td>
<td>Shakuntala Acharya, Kiran Ghadge, Quinn Michael Langfitt, Charles Pezeshki, Gaurav Ameta, Sudarsan Rachuri and Amaresh Chakrabarti</td>
</tr>
</tbody>
</table>
Design’s Role in Transitioning to Futures of Cultures of Repair
Tristan Schultz
225

Can Interactive Installations Bring About Behaviour Change?
Using Interactive Installation to Change Food Waste Behaviours
Jayati Bandyopadhyay and Girish Dalvi
235

Review on Sustainable Lighting Design in Art Galleries
to Balance Between Visibility and Conservation
of Light Sensitive Art Exhibits
Amrita Bhattacharjee and Swati Pal
247

Meghalaya Tourism: Inculcating Cultural Image in Developing
Enroute Mini Halts
Wanrisa Bok Kharkongor, Arunita Paul, Shilpi Bora
and Debkumar Chakrabarti
255

Challenges to Sustainable Growth of the Micro-scale Kuhila Craft
Industry of India
Prarthana Majumdar and Sharmistha Banerjee
267

InDeaTe—A Computer-Based Platform with a Systematic Design
Template and a Database of Methods and Tools
Amaresh Chakrabarti, Shakuntala Acharya, B.S.C. Ranjan,
Suman Devadula, Kiran Ghadge, N. Madhusudanan, Praveen Uchil,
V. Srinivasan, Gaurav Ameta and Sudarsan Rachuri
277

Application of InDeaTe Design Tool for Designing Sustainable
Products—Case Study of a Natural Water Cooler
Kiran Ghadge, Saritha Vishwanathan, Suman Devadula, Quinn Langfitt,
Shuk Han Chan, Arvindbhai Patel, Gaurav Ameta, Anil Gupta,
Sudarsan Rachuri and Amaresh Chakrabarti
291

A Methodological Basis to Assess and Compare Manufacturing
Processes for Design Decisions
Manish Kumar and Monto Mani
301

Application of InDeaTe Design Tool for Designing Sustainable
Manufacturing Systems—Case Study of a Micro-hydel Turbine
Kiran Ghadge, Saritha Vishwanathan, Suman Devadula, Quinn Langfitt,
Shuk Han Chan, G.K. Ratnakar, Gaurav Ameta, Anil Gupta,
Sudarsan Rachuri and Amaresh Chakrabarti
313

Supporting Manufacturing System Design: A Case Study
on Application of InDeaTe Design Tool for a Smart Manufacturing
System Design
Praveen Uchil, Kiran Ghadge, Shakuntala Acharya, Raunak Bhinge,
Stefanie Robinson, David Dornfeld, Sudarsan Rachuri, Gaurav Ameta
and Amaresh Chakrabarti
325
A Gandhian Framework for Social Design: The Work of Laurie Baker and Hunnarshala .......................................................... 337
Saurabh Tewari, Nipun Prabhakar and Saurabh Popli

Closing the Loop: ‘Systems Perspective’ for the Design of Food Packaging to Facilitate Material Recovery .......................... 349
Amaltas Khan and Puneet Tandon

Sustainability Definitions—An Analysis ............................... 361
Nikhat Waseem and Srinivas Kota

French Education System Organization from Secondary School to University to Prepare Future Engineers to Sustainable Development and Eco-design ............................................. 373
Catherine Perpignan, Vincent Robin and Philippe Girard

Disassembly for Redesign ................................................. 385
Serge Rohmer and Paulina Rodriguez

A Sustainable, Eco-friendly Charge Storage Device from Bio-charred Jute: An Innovative Strategy to Empower the Jute Farmers of India ................................................................. 397
Amarish Dubey, Deepu Philip and Mainak Das

Connotations of Ecodesign: A Commentary on the State of Discourse ................................................................. 409
Ramani Krishnaswamy and Kumari Moothedath Chandran

Part II  Design Creativity, Synthesis, Evaluation and Optimisation

A Tool for Generating New and Appropriate Methods for Supporting Various Design Processes ........................................ 423
Bijendra Kumar and Prabir Sarkar

Learning Aid in Braille and Typography ............................. 433
Siddhesh Sushil Shirsekar

Designing Learning Experiences for Problem-Solving, About Mindblower .................................................. 443
Karla Paniagua

Improvised Concept Development Process in Design Through Product Ingredients ........................................... 453
Prabhat Kumar and Puneet Tandon

Influence of Creative Thinking and Playfulness on Creative Styles of the Individuals .................................................. 465
Mritunjay Kumar, Satyaki Roy and Ahmed Sameer
Contents

Idea Inspire 3.0—A Tool for Analogical Design .......................... 475
Amaresh Chakrabarti, L. Siddharth, Madhuri Dinakar, Megha Panda,
Neha Palegar and Sonal Keshwani

A Matrix Framework Proposal for Evaluating Innovation Criteria
of a Design Process Output During Product Conceptualization .... 487
Ravi Lingannavar, Sai Prasad Ojha and Pradeep Yammiyavar

Design Fixation and Creativity Blocks in Architecture
Design Studies ..................................................... 499
Purva Mange and Vinayak Adane

A Framework for Component Selection Based on Multi-attribute
Evaluations .......................................................... 509
Stueti Gupta

Conceiving and Applying Relationship Models for Design Strategy . 517
Terence Fenn and Jason Hobbs

Empower the Future: The Inside Story of Building Creative Space
for Sub-urban Kampong’s Children .................................. 529
Martin Katoppo and Phebe Valencia

Representing the Effects of Product Architecture for Decision-Making
in Conceptual Design ................................................ 543
Timo Richter, David Inkermann and Thomas Vietor

Evolution of Design Briefs: Expressions from Professional Design
Practice ................................................................. 555
Mamata N. Rao, Prasad S. Onkar and Deepak John Mathew

The Effect of Idea Representation Techniques on Design Decisions
During Idea Exploration Phase: An Exploratory Study of New
Product Design .......................................................... 567
Purba Joshi and Sharmila Sinha

A Design Evaluation Framework for Developing Communities ...... 577
Euan Coutts, Joey Ho and Alex Duffy

Development and Validation of a Method for Assessment of Novelty
and Requirement Satisfaction in Designing .......................... 589
B.S.C. Ranjan and A. Chakrabarti

Vastu-Purusha Mandala and Web Page Design: Comparison
of Tradition and Modernity ......................................... 603
Anshuman Sharma
Part III  Design Lexicon, Taxonomy, Ontology

Review and Classification of Knowledge in Engineering Design ........ 617
Cristina Carro Saavedra, Teresa Serrano Villodres and Udo Lindemann

Approaches to Parameterization in Architectural Design ............... 629
K. Anil Kumar and P.S. Chani

Towards Automatic Classification of Description of Analogies into SAPPhIRE Constructs .............................................. 643
Sonal Keshwani and Amaresh Chakrabarti

Part IV  Design Aesthetics, Semiotics, Semantics

What the Statistics Tell Us—How to Use Empiric Data in Design for Emotional Impressions .................................................. 659
Susan Gretchen Kett, Benedikt Schmitt and Sandro Wartzack

Hedonic Design. Contributing Factors in Generating Emotional Ties. The Shape as a Contributing Factor in Generating a Hedonic Design ................................................................. 671
Jorge Gil Tejeda and Lorena Olmos Pineda

Visual Design Considerations for Evoking an Emotional Response Towards Non-personalized Information to Encourage Object Loyalty Amongst Users ................................................................. 685
Priyanka Bharti

Preferences in Recall of Pleasant and Unpleasant Images ............... 695
Mritunjay Kumar, Rajesh Ranjan, Braj Bhushan and Ahmed Sameer

Attributes and Emotions in Product Form Design: A Survey of Professional Industrial Designers ........................................... 705
Santosh Jagtap

Inspiration in Product Form Design: A Survey of Professional Industrial Designers .............................................................. 715
Santosh Jagtap

Modeling Design Strategies for Package Graphics:
A Study of Hair Care Products Among Young Indian Users ........... 727
Toney Sebastian, Pradeep Yammiyavar and Stevan Jones

Syncretism 5.0: Could Design Become a Meta-religion for Global Communion? ................................................................. 739
Chitra Chandrashekhar

An Exploration of Design: Based on Pan-Asian Semiotics and Semantics ................................................................. 751
Tanima Bhattacharya and Joy Sen
Cultural Construction: Design Aesthetics, Semiotics and Semantics
Associated with Masks in Namghar—The Study of Its Design Aspects in the Island of Majuli, India .......................... 763
Charu Monga and Amarendra Kumar Das

Bollywood on Television: A Backbone for Creating Social Connect with Indian Audience ......................... 779
Paritosh Singh and Saptarshi Kolay

Semiotic Analysis of Digital Medium of Education ......................... 789
Priyanka Bharti and Jivtesh Singh Aulakh

Domestic and Global Designs in Hair Care: A Study of Aesthetic Preferences of Indian Users ....................... 799
Toney Sebastian, Pradeep Yammiyavar and Stevan Jones

Transmutative Visual Culture of Folk Festivals in a Semi-urban Scenario: A Study and Exploration of ‘Magh Bihu’ in Assam .... 811
Anusmita Das, Umme Hani and Sri Harsha Andukuri

Look at that Sound!—Visual Representation of Sound in Indian Comics ............................................. 821
Subir Dey and Prasad Bokil

Legibility: Same for All Scripts! ................................. 833
Subhajit Chandra, Prasad Bokil and D. Udaya Kumar

Venkateshwarlu Varala and Pradeep Yammiyavar

Applying Product Semantics to Benchmark Physical Properties of Product Characters Through Design Teaching: Strategies for Shape Coding ................................... 855
Shujoy Chakraborty

Nature Inspired Design—A Review from an Industrial Design Perspective .............................. 869
Shiv Kumar Verma and Ravi Mokashi Punekar

Design as Culture: Understanding Vernacular Architecture of Indigenous Tribal Community of India ............... 879
Harshitha G. Raju

Form and Colour—Two Basic Elements of Design ......................... 893
S. Saleem Ahmed and B. Gurumoorthy

Spokes Characters of Mascot and Young Consumers’ Perspective Particular Understanding .................. 903
Preeti Yadav, Dandeswar Bisoyi and Debkumar Chakrabarti
The Making Affect: A Co-created Community Methodology .......... 913
Fiona Hackney

Part V  Design Training and Education

Design Week: A Challenge for Designers and Medical Students ...... 929
Juan Carlos Briede Westermeyer and Cristhian Pérez Villalobos

Using Senior Design Project to Teach Design for Use of a Mechatronic Device ..................................................... 941
Vukica M. Jovanović, Otilia Popescu, Alok K. Verma, Daniel Hynst, Laura Livanec and Jason Cash

Design Thinking and Creative Problem Solving for Undergraduate Engineering Education in India: The Need and Relevance ........ 953
Tigmanshu Bhatnagar and Petra Badke-Schaub

Design Considerations for Personalized Learning ...................... 969
Vimal Anand

A Conceptual Model for Introducing Design Thinking in Management Schools ............................................................. 987
Cedric Serpes and Gayatri Menon

Design Research and the Academy: Research Driven Community Facing Work ............................................................... 999
Diana Nicholas, Debra Ruben, Kathleen Martin and Alphonso Mclendon

Systems Design is Needed for Smart Manufacturing Curriculum to India ................................................................. 1007
N. Vijayarangan, A. Senthil Kumar, G.D. Sivakumar and R. Muralikannan

Infusing Design Thinking Mindset in Engineering Education—A Pioneering Step Towards Excellence and Sustainability .......... 1017
Gagandip Singh Khanduja, Karmjitsinh Bihola and Jaimin Dave

Rigid Frames and Flexi-Frames—Matchstick Cellular Space-Frames Hands-On Self Realised Learning Approach ..................... 1027
Ranjan De

A Novel Frame Work of Design Realization Course at IIITDM Kancheepuram: Critical Evaluation ................................... 1039
Deepak Ranjan Padhi, R. Adeline Mellita and M. Sreekumar

Students’ Feedback into Enriching Learning Experiences for Design of Smart Devices and Applications ............... 1051
Anmol Srivastava and Pradeep Yammiyavar
Erratum to: Connotations of Ecodesign: A Commentary on the State of Discourse

Ramani Krishnaswamy and Kumari Mooathedath Chandran

Author Index