Developing BIM Talent: A Guide to the BIM Body of Knowledge with Metrics, KSAs, and Learning Outcomes

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A Guide to the BIM Body of Knowledge with Metrics, KSAs, and Learning Outcomes

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Table of Contents

- Chapter 1: Call for a BM BOK
- Chapter 2: BIM BOK Development
- Chapter 3: BIM Education and Talent Procurement
- Chapter 4: BOK-Informed BIM Instruction
- Chapter 5: BIM BOK-Informed Workforce Planning and Development
- Chapter 6: Future of BIM BOK
Key Goals

- **Must Provide BIM Education and Training a Common Foundation**
  - A Focal Point For Entire AECOO Life Cycle

- **Current Education and Training Needs To Be Connected**
  - Between Colleges at a University
  - Between Universities
  - Between Disciplines
  - Between Countries

- **We Need A Strong Life Cycle View**
  - Need to develop “T” Shaped Learners and Practitioners

- **Need Coordinated Credentialling Opportunities**
  - Mostly Discipline Focused – unmanaged, the number will grow exponentially!
## Foundation - Bloom’s Taxonomy

<table>
<thead>
<tr>
<th>Level</th>
<th>Factual</th>
<th>Conceptional</th>
<th>Procedural</th>
<th>Metacognitive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creating</td>
<td>Generate, Write, Combine</td>
<td>Gather, Devise, Plan</td>
<td>Design, Develop, Compose</td>
<td>Produce, Create, Actualize</td>
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<tr>
<td>Evaluating</td>
<td>Check, Criticize, Rank</td>
<td>Define, Review, Assess</td>
<td>Judge, Evaluate, Conclude</td>
<td>Reflect, Rate, Prioritize</td>
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<tr>
<td>Analyzing</td>
<td>Choose, Classify, Order</td>
<td>Distinguish, Identify, Explain</td>
<td>Integrate, Compare, Differentiate</td>
<td>Match, Analyze, Achieve</td>
</tr>
<tr>
<td>Applying</td>
<td>Use, Answer, Classify</td>
<td>Give, Set, Experiment</td>
<td>Carry Out, Employ, Calculate</td>
<td>Select, Enhance, Construct</td>
</tr>
<tr>
<td>Understanding</td>
<td>Interpret, Categorize, Summarize</td>
<td>Categorize, Describe, Consider</td>
<td>Paraphrase, Clarify, Predict</td>
<td>Foresee, Explain, Execute</td>
</tr>
<tr>
<td>Remembering</td>
<td>Label, Spell, List</td>
<td>Recognize, Name, Describe</td>
<td>Recall, Recap, Tabulate</td>
<td>Outline, Identify, Omit</td>
</tr>
</tbody>
</table>
Chapter 1

Call for a BIM BOK

Historical context and big picture view

State-of-the-art BIM case studies

How the implementation of BIM is progressing

How AiC arrived at the point of developing the BIM BOK.
Data Information Knowledge Wisdom Hierarchy

The Value Of Data Is Not Realized Until It Is Implemented

Source: Adapted from Frické (2008) and Powell (2020)
Chapter 2

BIM BOK Development

Define BIM BOK

BIM BOK framework and consensus-based development

Educational learning objectives of BIM

Develop Job Tasks and associated KSAs
Develop the BIM BOK

Delphi Panel Selection
- Demographics & Qualification Survey
- Non-Disclosure Agreement

Round 1
- Brainstorming
- Relevance Checking
- Confirmed BIM BOK Line Items

Round 2
- Rating & Consensus Evaluation
- Early Consensus & Early Strong Agreement

Round 3
- Re-rating & Re-evaluation
- Final Levels of Agreement
Candidate list of BIM BOK contents

Plan It (27)
- Organizational mission statement
- BXP: Process mapping
- BXP: Information exchange
- BXP: Goals
- BXP: BIM usage
- BXP: Procurement strategy
- ISO 15686-10: Life cycle functional performance
- Infrastructure planning
- Quality assurance effort
- Business process mapping
- Employer information requirements
- Benchmarking practices
- Security policy
- Risk management
- Facility management needs
- Enterprise architecture
- Life cycle assessment

Coordinate It (6)
- Technical support for interoperability
- Model coordination
- Pre-construction issue resolution
- Software version coordination
- Providing training
- Understand the roles of all phases of the life cycle

Manage It (21)
- Model quality control
- Manage BXP
- Refine BXP
- Performance measurement
- Model validation
- Standards compliance checking
- Buy-in from stakeholders throughout the organization
- Contract language
- Manage workforce
- Project controls - budgeting/cost
- Project controls - scheduling/time
- Project lifecycle data collection - feedback loop
- Leadership - team building
- Contract administration
- Change management
- Project administration
- Manage information exchange
- Pre-construction issue resolution
- Evaluate metrics
- Protecting IP of digital assets
- Professional ethics

Do It (13)
- Rendering for marketing
- Individual effort
- Understands just your own model
- Ability to build a model
- Aggregate a model
- Software usage
- Solving problems and gaining knowledge
- Estimating
- Site logistics
- List of BIM uses
- Knowledge of scripting
- Knowledge of programming
- Technical writing

List of Abbreviation
BIM: Building Information Modeling
BXP: BIM Execution Planning
IP: Intellectual Property
ISO: International Organization for Standardization
VDC: Virtual Design and Construction
Heat map on median values of importance rating of BIM BOK line items

Perceived importance ratings of BIM BOK line items tend to increase with the LOPs dimension, i.e., from Entry to Middle and then to Full Performance.

Designers tended to give the lowest importance ratings while Consultants/Specialists tended to give the highest.
Chapter 3

BIM Education and Talent Procurement

Historical context and existing practices of BIM education and talent procurement

Trends, gaps, and opportunities to improve the status quo with the application of the BIM BOK.

How the implementation of BIM and BIM talent recruitment is progressing

Unified framework for BIM education, training and talent acquisition
BIM Talent Acquisition Process

Identify the demand
- Frequency of BIM projects
- Revenue from BIM projects

Job profiles & qualifications
- BIM-prefixed vs. generic job titles
- BIM-relevant vs. BIM-dedicated competency

Identify talent sources
- In-house training
- Emerging professionals
- College graduates

Recruiting, retention and management
- College recruiting is rising up
- BIM career paths are emerging and gaining establishment
- Dedicated business units such as BIM/VDC department help build a BIM career path
Chapter 4

BOK-Informed BIM Instruction

Abbreviated literature of BIM curriculum development & instructional design

BOK for curriculum development

BIM pedagogy & learning activity design

BOK-informed learning/training module design
Module Design Part 1: Context for Instruction

1.1 Course Type
1.2 Total Time for Instruction
1.3 Instructional Strategy
1.4 Learners’ Role/Discipline
1.5 Discipline Specific Existing KSAs
1.6 Existing BIM KSAs
1.7 Category of Learning Outcome
Module Design Part 2: Module-Specific Information

- 2.1 LOP
- 2.2 BIM Use
- 2.3 BIM Job Task
- 2.4 LOI
- 2.5 Learning Goal
- 2.6 Learning Objective
- 2.7 Learning Outcome - BIM Knowledge
- 2.8 Learning Outcome - BIM Skills
- 2.9 Learning Outcome – BIM Abilities
- 2.10 Instructional Materials
- 2.11 BIM Technology
- 2.12 Practice Activities
- 2.13 Assessment Format
Chapter 5

BIM BOK-Informed Workforce Planning and Development

Historical context of workforce planning in AECO industry

Develop a BIM Workforce Planning/Succession Model

BIM workforce planning case study

BIM BOK-informed workforce planning: knowledge, skills and abilities for job tasks
BOK for BIM Workforce Planning and Development

1. Focus on the Job Tasks and associated Knowledge, Skills and Abilities (KSAs)

2. Look at varied levels of performance (LOPs)
   - Entry
   - Middle
   - Full Performance

3. Look at different roles of users (ROUs) played in the AECO industry
   - Designer
   - Contractor
   - Facility Manager/Operator
   - Consultant
Job task and KSAs are validated by industry leaders and experts.

Information captured in these sections were meant to be used by both educators and corporate trainers.

The Job Tasks and KSAs serve as the measures for evaluation of individual’s BIM competencies.

For convenience of use, pocket guides are also developed for quick reference.
Chapter 6

Future of BIM BOK

What are the next steps?

Using the BIM BOK

BIM BOK evolution amid the digital transformation
The Next Steps For BM Talent Development: A Road Map

Roadmap to Developing Quality BIM Talent
BIM BOK Evolution Amid The Digital Transformation

BIM market continues to boom globally

Central leadership is needed in the US to stay competitive in the global market

Emerging technology expands the scope and role of the BIM BOK

Standardization by adopting the BIM BOK helps AECO companies and educators navigate through the digital transformation
Thank you!

Discount Code: BIM20

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Q&A