Design in Three Dimensions: Building Information Modeling and Design Visualization

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Presentation Agenda

• What is BIM?
• What software is available?
• Who is using BIM/design visualization?
• How can interior designers, specifically, leverage the technology?
• How does usage of these technologies change the design process and fee structure?
• How is MSU teaching BIM and visualization?
• What are the pitfalls of implementing to BIM?
• How can I get more information about BIM?
Audience Poll...

• How many of you use AutoCAD or other 2D drafting software to produce documents?

• How many of you would like to spend more time on design and less on document coordination?

• How many of you have trouble getting your clients to fully understand the design before moving to construction documents?

• How many of you have seen things in the field that are a result of a bad design decision or coordination issue in the documents?

• How many of you have a whole arsenal of software programs (and perhaps army of specialists) to produce all of your required drawings and documents?
What if I told you that….

- Removing a wall on the floor plan would
  - Automatically (and immediately) update all plans and elevations and sections containing that wall
  - Update the door schedule and hardware schedule
  - Remove any finish information associated with that wall
  - Alert you to possible problems that are encountered
  - Update the area analysis
  - Update the client presentation renderings of the area
  - AND Make you french toast for breakfast…
BIM is almost that good...

- The use of BIM and the new design visualization tools are a paradigm shift
  ... not just an incremental technology step
- BIM offers
  - Better quality design, detailing, and coordination
  - Greater productivity
  - Control of project information
  - Better client integration
- Use of the tools requires
  - Education and change management
  - Rethinking of traditional design firm roles
  - Process change
What is BIM?
What is BIM?

- **Parametric Modeling**
  - Object modified in one view is updated in all views

- **Goal**
  - Eliminate repetition and mundane tasks to allow more time for design and visualization

- **Single file contains entire building project**
  - Worksets can be created for multiple team members roles and responsibilities

- **Models are created using families of design elements**
  - A door knows in can only be placed in a wall
What software is available?
What software is available?

- **Conceptual Design**
  - Alias Sketchbook, Arch. Studio, Photoshop, SketchUp
- **Free-Form**
  - Rhino, Form-Z, AutoCAD 3D, etc.
- **3D Object Oriented**
  - Revit, ArchiCAD, MicroStation, Architectural Desktop, Bentley Architecture, VectorWorks ARCHITECT
- **VIZ-Presentation**
  - 3D Studio Max / VIZ, Maya, SoftImage, etc.
- **Simulation**
  - 3D Studio Max, Catia, Unigraphics, etc.
- **CADCAM**
  - Rhino, Catia, Unigraphics, SolidWorks, Pro-E, Inventor
Who is using BIM?
Who is using BIM?

• As of May 2007, there are 200,000 licensed seats of REVIT (up from 100,000 in 2006)

• 2006 AIA Firm Survey
  – 46% of large firms +$5M, 15% of firms under $5M
  – 86% schematic design, 91% design development, 81% construction documentation
  – 35% of firms with international practice
  – GSA: all projects receiving funding in 2007 must use BIM
  – Perceptions of adopters:
    • Biggest Benefit: Enhancing project quality
    • Biggest Risk: higher proportion of project costs incurred earlier

Adapted from the Article “Which Architecture Firms are Using BIM. Why?”, AIA Architects this Week. April 27, 2007
Who is using BIM?

- ASID 2007 Environmental Scanning Report quotes Design Intelligence about BIM as one of the trends affecting the Profession and Practice of Interior Design
  - “BIM technology will transform the language of design from drawings to models”

- Design Firms (From AutoDesk Customer Stories)
  - Hillier Architecture, RTKL Associates Inc., Skidmore, Owings & Merrill LLP, Johnson Bailey Henderson McNee (JBHM)

- Universities and Community Colleges
  - Pennsylvania State University, Brigham Young University, Savannah College of Art and Design, University of California Berkley, Mississippi State University,

- High Schools
  - The Green Bay School District’s Preble High School
How are Interior Designers using BIM?
How are Interior Designers are using BIM?

• Interior Designers cite several key advantages of BIM
  – Speed and ease of creating an interior design model, and the ability to visualize the design
  – Ability to capture and manage multiple design options
  – “Richness and reliability” of data
  – Ability to help clients visualize the solution
  – Ability to help designers make better decisions

Adapted from the Article “1-2-3 REVIT: BIM for Interior Design”, December 15, 2005, Rick Rundell, AIA, aec.cadalyst.com
Concept to Visualization

Adapted from the Article “1-2-3 REVIT: BIM and Visualization, Part 2”, August 1, 2007, Rick Rundell, AIA, aec.cadalyst.com
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Concept to Visualization

3D Studio Max Image

Adapted from the Article “1-2-3 REVIT: BIM and Visualization, Part 2”, August 1, 2007, Rick Rundell, AIA, aec.cadalyst.com
Concept to Visualization

Adapted from the Article "1-2-3 REVIT: BIM and Visualization, Part 1", July 1, 2007, Rick Rundell, AIA, aec.cadalyst.com
Interior Design – BIM for Information

- Tremendous amounts of data are stored in the model
- BIM offers a way to manage, compile and distribute this
  - Door, window, fixture finish schedules
  - Furniture schedules and budgets
  - Calculation of materials quantities and costs
  - Keep track of design options
  - Work on existing and new condition changes
  - Develop phasing plans
  - Area analysis and charge-backs (offer new services)

Adapted from the Article “1-2-3 REVIT: BIM for Interior Design Information”, February 13, 2006, Rick Rundell, AIA, aec.cadalyst.com
How does RTKL Interiors leverage BIM?

Adapted from the Article “1-2-3 REVIT: BIM for Interior Design Information”, February 13, 2006, Rick Rundell, AIA, aec.cadavalyst.com
How does BIM change the design process?
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• Current Process
  – Majority of the time (and fee) spent on the project is in the construction document phase
  – However, the majority of design decisions affecting the general appearance and cost are made before the project gets to that stage

• The use of BIM changes the process
  – Moves project man hours from construction document phase to design phases (bill fees accordingly!)
  – People who know the program make (all) the design decisions
What are the pitfalls of implementing BIM?
What are the pitfalls of implementing BIM?

• Realize the significant effort required for change management
  – design tool first and foremost
  – not simply a drafting tool
  – you’re on your own
  – software not yet complete
  – difficult to hire trained staff
  – professional trainers are novices
  – transition period
How are we educating about BIM?
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- MSU has three technology related courses
  - Traditional CAD: AutoCAD 2008
  - Digital Design: Photoshop, Web Design
  - 3D CAD Modeling: Sketchup, Revit, Viz
- Recently have decided to move these up earlier in the curriculum to enable more proficient use – especially of the 3D tools.
- Students then use the technology for 5 of the 6 studio classes (in addition to hand sketching and designing)
Student Work Examples - Sketchup

Lauren Sullivan
Michelle Clearman
Tiffany Durr
Mallory Stipe
Student Work – REVIT Visualization
REVIT Commercial Medical Office

Angela Latham
Student Work – REVIT to VIZ

REVIT/VIZ Living Area

Tiffany Durr
How can I get more information?
How can I get more information?

- Websites:
  - www.autodesk.com,
  - www.cadalyst.com,
  - www.revitcity.com
  - www.sketchup.google.com
  - www.sketchup.google.com/3dwarehouse

- Books/Tutorials

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