BIMSTORM: A PLATFORM FACILITATING INTEGRATED DESIGN AND CONSTRUCTION PROCESSES

Tammy McCuen – Associate Professor
Elizabeth Pober – Assistant Professor
University of Oklahoma
Background

• *Collaborate...Create...Construct*
  
  – University of Oklahoma College of Architecture

  • Architecture
  • Interior Design
  • Construction Science
  • Landscape Architecture
  • Regional & City Planning
BIMStorm OKC

- Concept: Use the BIMStorm platform to support the real-world project context in Oklahoma City (OKC)
- Faculty partnered with the OKC Planning Department to identify an area that was planned for redevelopment
- The Core to Shore River District area was selected
- **Primary goal:** Support collaboration in an interdisciplinary team environment
Background

- BIMStorm OKC
  - Four areas for redevelopment in the River District:

  - Project programme provided by the Planning Department
Course Design

• Team assignments
  – Senior Construction Science and 4\textsuperscript{th} year Architecture students
    • Also included was a subset of Construction Science graduate students teamed together
  
  – First activities were dedicated to teaming
    • Becoming familiar with team member(s)
      – Contact information
      – Personal interests and goals
Course Design

• Student Teams
  – First activities were dedicated to teaming
  • Becoming familiar with team member(s)
    – Contact information
    – Personal interests and goals
Course Design

• Student Teams
  – Next activities were dedicated to working together and creating a team plan
    – Individual goals for the project (course)
    – Communication – tools and techniques
    – Strategy for managing alternative ideas
      » Understanding perspective
      » Understanding individual goals
      » Resolving conflict
Course Design

- 12 learning objectives defined for the BIMStorm OKC student teams
  1. Programming
  2. Site analysis
  3. Design authoring
Course Design

• 12 learning objectives defined for the BIMStorm OKC student teams

  4. Design reviews
  5. Space management and tracking
  6. Sustainability evaluation
Course Design

- Learning objectives established by faculty for the BIMStorm OKC project teams
  7. Site utilization planning
  8. Construction sequence
  9. Building systems’ analysis
Course Design

• Learning objectives established by faculty for the BIMStorm OKC project teams
  10. Value engineering analysis
  11. Construction plan and schedule
  12. Cost estimate

Value Engineering:
Although the design is great, there are a few things that could be changed to reduce the cost of the project. The Waffle Slab system is very expensive in OKC in comparison to the typical beam, girder, joist system. Changing the slab system to the more typical system would reduce costs.
• Micro BIM
  – Tools and process for detailed information
    • Provide students with the cognitive tools necessary to support discipline specific input on the project
    • Typical strategy in learning environments where students are presented with complex, novel and authentic tasks
    • Students brought their discipline specific skills to the table for collaboration and sharing expertise
Micro BIM

Students from both the design and construction disciplines came together with varying technological skillsets in BIM related software applicable to their specific discipline.
BIM Instruction and Learning

- Micro BIM
  - The design students focused on applications specific for design conceptualization, design development, site analysis, structural analysis, energy analysis, mechanical simulation, lighting analysis and simulation, and acoustic analysis.
Micro BIM

The construction students focus on developing their skills with applications specific for design analysis, constructability analysis, structural analysis, cost analysis, phasing, and schedule development.
BIM Instruction and Learning

- Micro BIM
- Additional advanced instruction related to BIM specific technologies utilized in the college, as well as industry, were included in the schedule prior to the actual BIMStorm charrette.
BIM Instruction and Learning

- Macro BIM
  - Focuses on higher order critical thinking and judgment about creating and proposing a project solution
BIM Instruction and Learning

- Macro BIM
  - BIM is used for decision making based on the feasibility of a proposal and project improvement
BIM Instruction and Learning

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You've got BIM Mail (TM)

To me

Brandon Meland has sent you a message regarding the following project:
Project: Mitch Wilson River District
Scheme: (148-775) Riverside Development

"I think this is a really interesting design particularly the series of gardens within the opening. I do think opportunity exists to further develop the facades, especially at the street level along Walker and the east facade. The windows seem very small and out of scale in relationship to the concrete beams and columns visible in your facade."

The BIM Mail was sent from the following page:
BIM Instruction and Learning

• Macro BIM
  – Increases productivity in the early project stages
  – Curriculum was designed to introduce ways students might improve schematic design proposals and preconstruction activities
BIM Instruction and Learning

• Industry Participation
  – Local and regional architectural firms and construction companies participated
    • Presented best practices and experiences for working in an interdisciplinary team
    • Presented current practices for working in BIM
    • Provided feedback about student project progression
A wide range of collaboration between team members was demonstrated throughout the semester.
Observations

- The teams that demonstrated the highest level of collaboration were:
  - Teams with the highest frequency of interaction outside of the designated team meetings
  - Teams with the most proactive members that initiated communication
Outcomes

- Micro level and macro level BIM instruction
  - Provided the technical skills necessary
  - Facilitated the interdisciplinary team experience
  - Enhanced project communication
Outcomes

- BIMStorm OKC
  - Supported the real-world project context
  - Energized teams
  - Facilitated feedback from outside participants
THANK YOU!
FROM THE OU BIMSTORM OKC TEAM!

tammymccuen@ou.edu
epober@ou.edu