Building Information Modelling in Quantity Surveying Education
What is BIM?

“An integrated digital process providing coordinated, reliable information about a project throughout all phases, from design through construction and into operation”
What is BIM?
BIM benefits

Clients
Designers
Contractors
Suppliers
Operators

By allowing

Better informed decisions
Quicker decision making
Improved quality
Improved safety
Reduced waste
Greater cost certainty
Increased profitability

BIM benefits

What BIM is not

BIM is not 3D CAD

BIM is not a single building model

BIM is not a single software technology

BIM is not a replacement for good communication, team working and due diligence

THEREFORE critical that QS students and graduates are aware of and can use BIM comfortably and effectively and can act as “champions” to promote and spread
Why adopt BIM?

The UK Construction industry in 2011:

- Fewer projects
- ‘More for less’
- Low carbon agenda
- Increased competition
- Disjointed procurement
- Technology ‘generation gap’
- Lower fees
- Staff reductions
Why adopt BIM?

30% of projects do not meet original programme or budget

92% of clients said that designers drawings are typically not sufficient for construction

37% of materials used in construction become waste

10% of the cost of a project is typically due to change orders

38% of carbon emissions are from buildings not cars

Why adopt BIM?
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Why adopt BIM?

“BIM is seen as having the greatest potential to transform the habits, and eventually the structure, of the industry”

Innovation and Growth Team Report, Autumn 2010
“Government will require fully collaborative BIM (with all project and asset information, documentation and data being electronic) as a minimum by 2016. A staged plan will be published with mandated milestones showing measurable progress at the end of each year”
10% of QSs are using BIM regularly.

4% of QSs invest regularly in BIM training.

A further 10% of QSs are actively assessing BIM tools.

Surveyors who work on BIM projects generally felt using it would be appropriate on 2.5 times as many projects.

Respondents felt the RICS should provide BIM guidance and training.

QSs felt the barriers to BIM adoption were lack of client demand, lack of training, lack of application interfaces and lack of standards.
## BIM technologies

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**Briefing**

**Design**

**Analyse**

**Manage & Review**
From Theodolites to Total Stations to Laser Scanning

Point Cloud output of laser scanning

Use of high definition scanning equipment

Captures millions of survey points (3D)

Provides accurate as-built information

Interoperable with BIM tools

Used as basis for design development

Validates accuracy of existing model
Building performance analysis
Visualisation
Design Coordination

Architectural

Structural

MEP

Multi-Discipline Model
Design Coordination

Windows require realignment (Drop 115mm)
Model-based programming (4D)
Model-based cost management (5D)

5D = 3D Model + Time + Cost

Quantities, Labour, Schedules, Equipment...

Comparative analysis

Interoperability with 3D modelling technologies
6D (model-based facilities management)

ArtrA: Asset and Plant Lifecycle

FM Systems

ArchiBus

SPACE MANAGEMENT
- Improve occupancy rates and space utilization with automated space management tools.
- Align and enforce design and building lifecycle information with visual and automatic tracking of floor plans.
- Track departmental allocations and easily produce chargeback reports.
- Link facility information to the organizational chart to provide specialized information to each department.
- Manage and maintain real-time facility data on your ideal plans.

STRATEGIC PLANNING
- Align real estate and facility plans with business operations by analyzing space utilization, cost, and lifecycle performance.
- Create multiple “what-if” scenarios and analyze data to ensure opportunities for portfolio savings.

REAL ESTATE PORTFOLIO MANAGEMENT
- Track real estate assets with FM Systems’ Real Estate Portfolio Management to improve real estate performance and key performance indicators and benchmarks.
- Track tenant information and assign new events such as expiration and renewal dates.

OPEN MANAGEMENT
- Reduce move costs and change cycles by achieving room guarantees, work orders, and facility assignments.
- Capture, analyze, and act on valuable insights to achieve better results.
- Monitor real-time and historical data.

FACILITY MAINTENANCE
- Provide a comprehensive view of facility management and maintenance functions.
- Manage inventory, labor, and parts information.
- Improve facilities planning and design with real-time information.

PROJECT MANAGEMENT
- Model facility projects in sustainable and green design.
- Reduce waste and improve the quality of construction.
- Manage project timelines and costs.

SUSTAINABILITY
- Plan and analyze sustainable projects and building performance across real-world projects.
- Align with sustainability goals and requirements for facility management.
6D (model-based facilities management)

Northumbria University – Ellison Building – linking asbestos records with BIM and visualising in a wire frame model
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<th>Relevance of BIM Workstreams</th>
<th>Quantity Surveyor</th>
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<td>Space Programming</td>
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<td>Pedestrian Simulation</td>
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<td>3D Modelling</td>
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<td>Room Loading</td>
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<td>Standardisation</td>
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<td>Information</td>
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<td>Visualisations</td>
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<td>Building Performance Analysis</td>
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<td>Design Coordination</td>
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<tr>
<td>Systems building / Offsite manufacture</td>
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<tr>
<td>4D Planning (time)</td>
<td>✓</td>
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<tr>
<td>5D Planning (cost)</td>
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<tr>
<td>6D Planning (operations)</td>
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BIM – Learning & Teaching

Currently:
BE0890 – Measurement & Technology 2 (Year 2)
  • Visualisation

BE0778 – Construction Economics (Year 2)
  • 3d models (revit software)/Data scheduling/ quantification/ pricing
  • Coursework

Future:
BIM technology & collaboration techniques will be incorporated into QS modules for:
  • Enhance the learning experience
  • Up to date industry methods & techniques
  • Development of QS specific skills
    1. Visualisation – 3d viewing
    2. Quantification
    3. Data Scheduling & pricing
    4. Multi disciplinary work based projects
BIM – BE0890 Visualisation
The BIM Academy

Aims

Promote collaborative working
Support the supply chain through facilitation, training and resource
Innovation in partnership with industry
Independence and impartiality
Evidence based design, delivery and operation

Services

Research and Development, Education, Consultancy
Why teach BIM?
New MSc Building Design Management and Building Information Modelling

Commences September 2012 - 1 year FT, 3 years PT

Aims of the programme
• To provide a better understanding of the future of construction and how the industry will develop in a BIM enabled future
• To provide an understanding of the complexity of working in interdisciplinary teams and managing collaborative design and production
• To allow students to develop new skills which will enhance their ability to plan and execute design for construction, producing more efficient, sustainable and buildable projects
• To allow construction industry professionals to enhance their existing skills in order to improve project delivery through the use of Building Information Modelling and Management.
• To foster leadership, decision making, strategic thinking and communication

http://www.northumbria.ac.uk/?view=CourseDetail&code=DTFBBBD6