iBEE
Innovation in Built Environment Education

University of Huddersfield
Yorkshire roots. Global reach.

Innovative Pedagogy for Teaching Collaborative Work in Built Environment

Paul Vasantharaj

Programme Director

Arts and Humanities

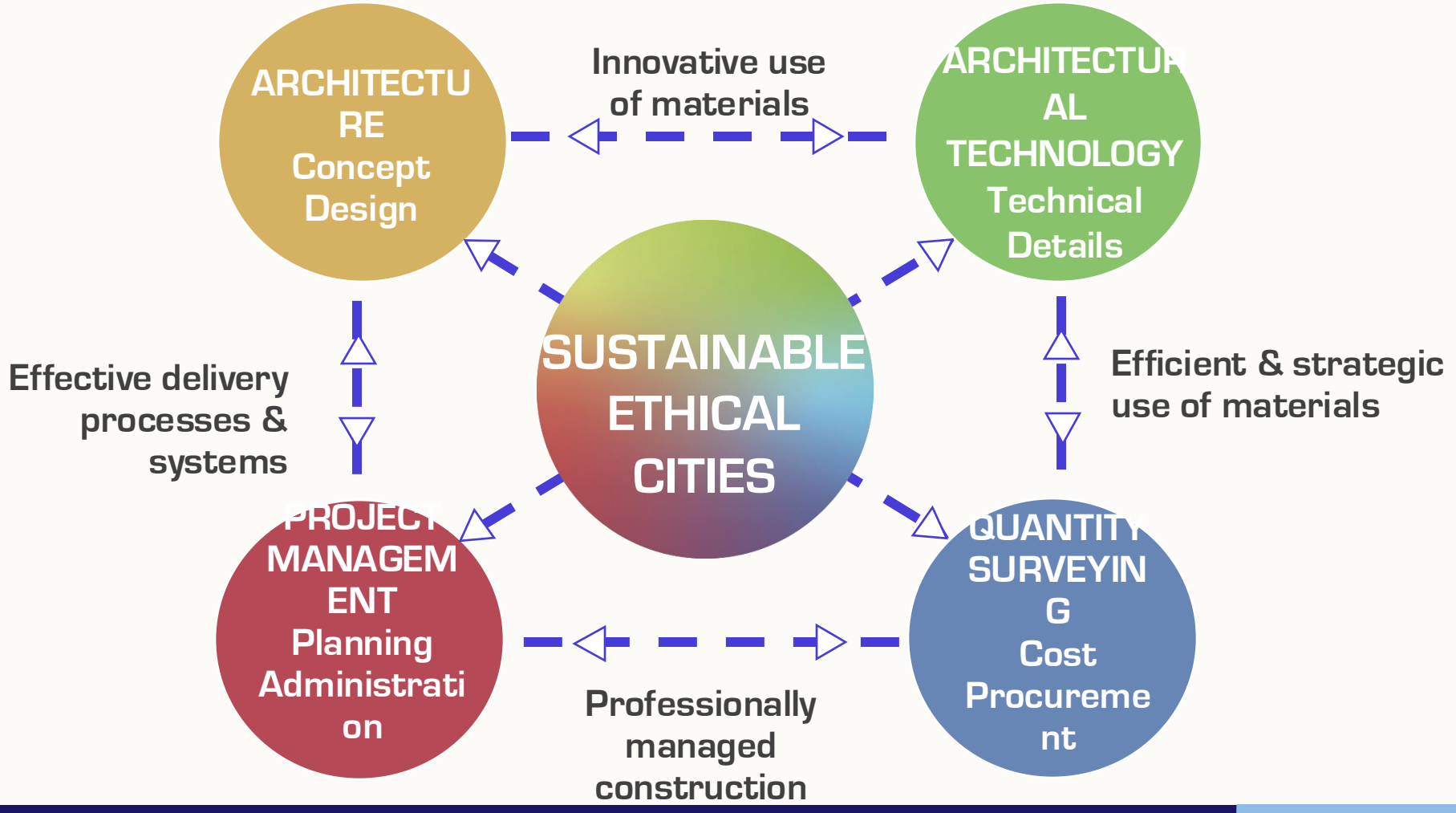
TEF 2023
Overall: Gold
Student experience: Gold
Student outcomes: Gold
Teaching Excellence Framework

Collaboration is Key for Success Built Environment Projects



Image credit:
MIT Sloan Management Review

Integrated Course Structure



Built Environment Suite

BSc(Hons)

- CPM
- QS
- AT

RICS

CIOB

CIAT
ACCREDITED PROGRAMME

cabe
chartered association of building engineers

University of Huddersfield

Course Structure BSc(Hons) CPM

Year 1

- Construction Business and Law (40)
- **Building Technology** and Digital Communication (40)
- Design and Construction Practice (40)

Year 2

- Collaborative Project - Built Environment (40)
- **Building Technology** and Digital Detailing (40)
- **Project Planning and Finance (40)**

Year 3

- Optional Placement (120s)

Year 4

- Procurement and Contract Administration (20)
- Professional Practice (20)
- **Lean and Sustainability (40)**
- Major Project (40)

CPM-specific modules

Common modules across BSc-CPM/QS/AT

Shared with Architecture BA

(number in brackets are credits)

University of Huddersfield

Collaborative Project - Built Environment

- 40 credits | Level 5 | AT/CPM/QS | 72 hrs contact | 7 MLOs | Year-long
- Lecture | Seminar | Tutorial | Studio | 3 Tutors
- Real project-based Activities
- Common & Discipline-specific Tasks
- Formative & Summative Assessments | Industry Partnership
- Group Oral Presentations & Individual Portfolios
- Assessment Criteria

  - The ability to undertake discipline-specific tasks in a Built Environment project.
  - The roles and responsibilities of the built environment professionals and its relationship with related professional bodies, such as CIAT, CABE, RICS and CIOB.
  - The ability to work in a team and deliver the tasks as a team within the required timeframe.
  - The ability to communicate and present information in a professional and appropriate manner is demonstrated.

Activities

- Architectural Design
- Structural Scheme
- Building Services Strategy
- Technical Detailing

Architectural Technologists

- Construction Method Statement & Constructability Analysis
- Project Scope Definition & Schedules
- Logistics & Site Layout plans
- Quality Control & IT plans

Construction Project Managers

- Design economy and value management
- Cost estimating and planning
- Procurement and tendering

Quantity Surveyors

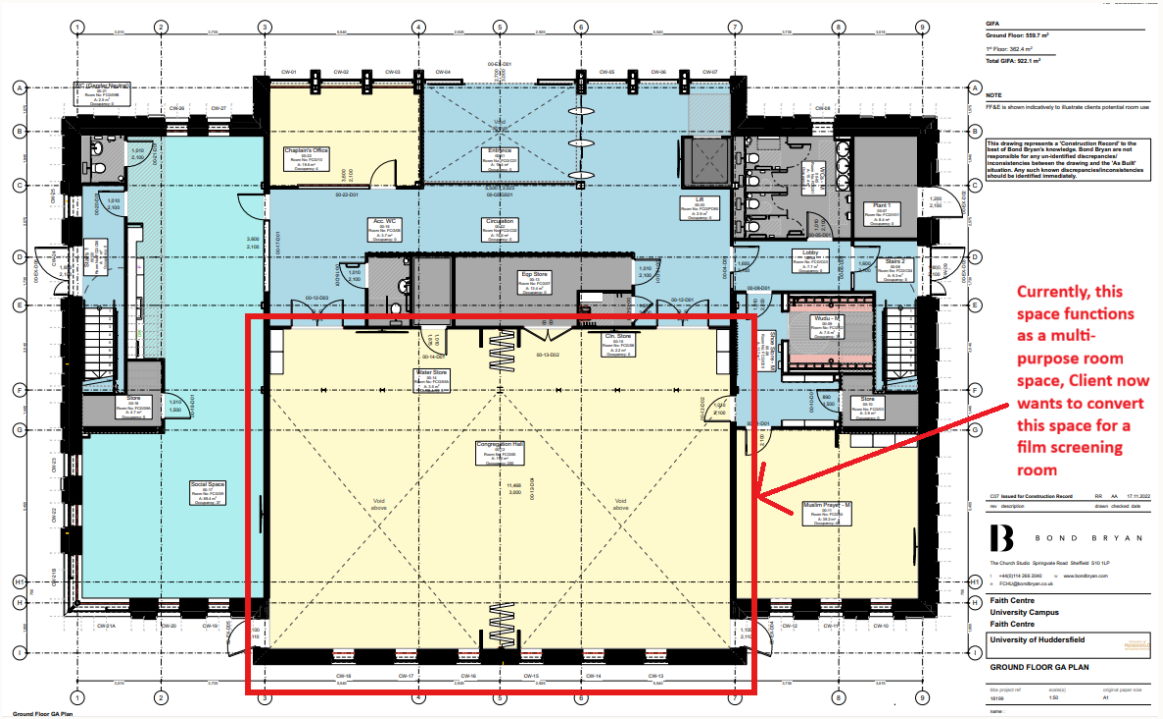
- Overall Project Strategy
- Environment, Health & Safety Plan
- Collaborative Planning Log
- Collaboration Report

Common

Case Project 2025-26

- Adaptive reuse of an existing space
- Conversion of an existing multipurpose room into a film-screening room
- Interdisciplinary student teams





University of Huddersfield

Sample Output

Roles + Responsibilities

Collaborations and Reflections as a Team



Figure – 7 Group meeting

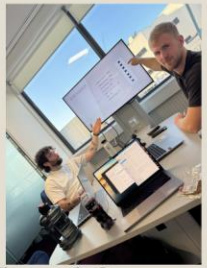


Figure – 8 Group meeting



Figure – 9 Group meeting

AT
George

- Concepts
- Floor plans
- 2D modelling
- 3D modelling

CPM
Cameron
Dominic
Sonny

- Feasibility Study
- Project brief
- Site Analysis
- Site Appraisal
- Project programme
- Project execution plan
- Method statement
- Risk identification
- Workload strategy
- Existing design analysis
- Last planner system
- Site layout and logistics plan
- WBS
- Environmental health and safety plan
- Constructability analysis
- Quality control and IT plan

QS
Felix
Adam
Mo

- Feasibility Study
- Precedent Studies
- Cost Precedents
- Cost Estimate
- Value Management
- Design Value
- Material Selection
- Procurement Routes
- Contract Choices
- Tendering method selection
- PQQ

Collaborative planning

Figure – 91 WhatsApp logo



Figure – 92 Group whatsApp



Figure – 93 Group meeting

Figure – 94 Email logo

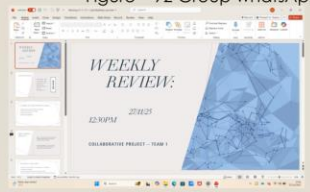


Figure – 95 Weekly review template



Figure – 96 Global email

AUTODESK CONSTRUCTION CLOUD

Figure – 97 Autodesk logo

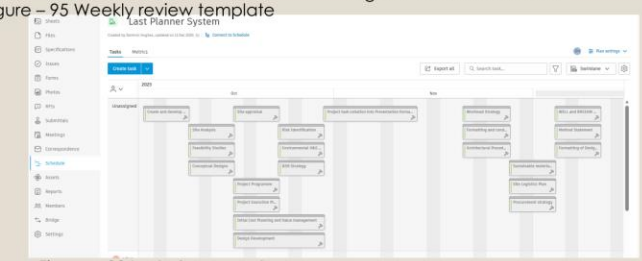


Figure – 98 Last planner system

University of Huddersfield

Sample Output

Facade

The facade was made by using the building plans to get the exact dimensions of the layout of the windows. By using the same measurements as the real building I was able to ensure that my design was a exact replica of the real thing.

I also made sure to use the same roof height for the back and front of the building, ensuring that my design kept the same roof layout.

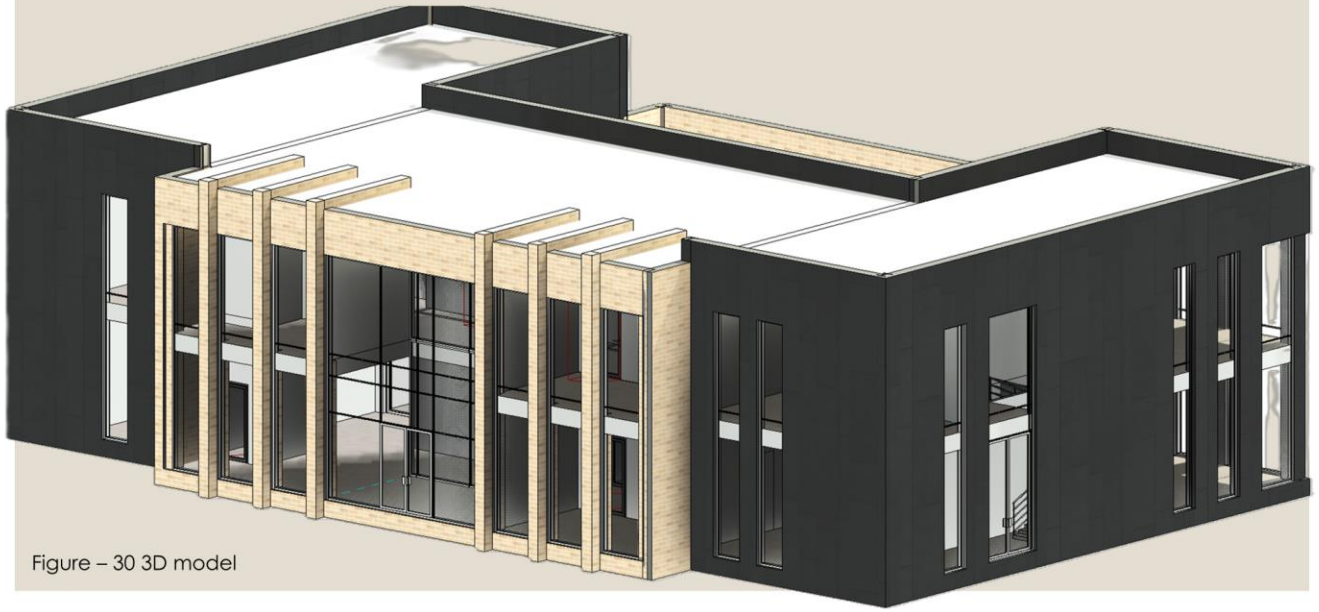


Figure – 30 3D model

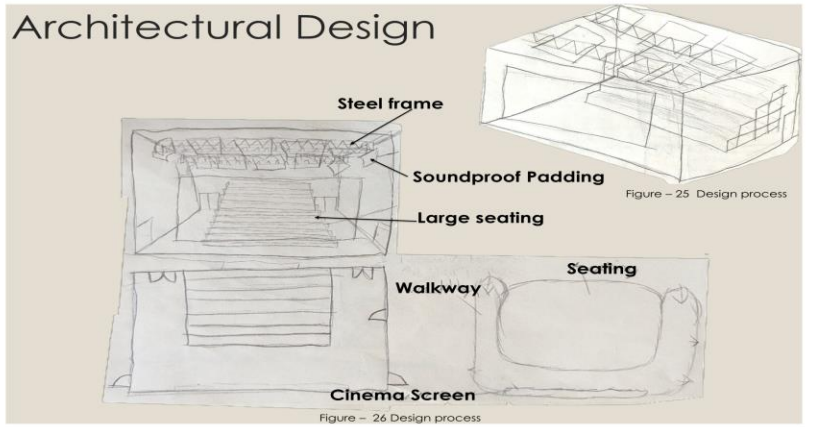


Figure – 25 Design process

Figure – 26 Design process

Design Information



Figure – 82 Bill of Quantities for Film Screening Room

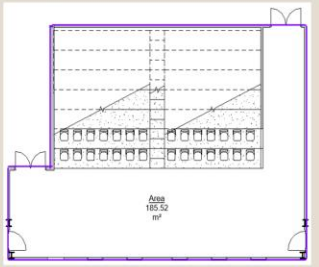


Figure – 83 Gross Internal Floor Area of Film Screenin Room

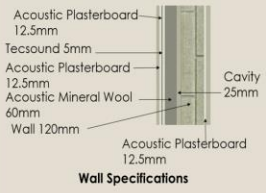


Figure – 84 Technical Detail of Wall

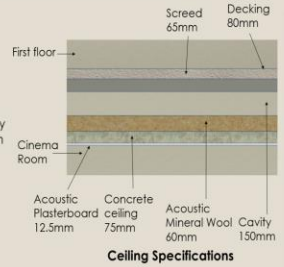


Figure – 85 Technical Detail of Ceiling

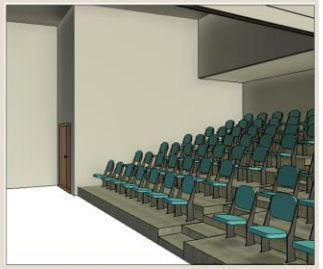


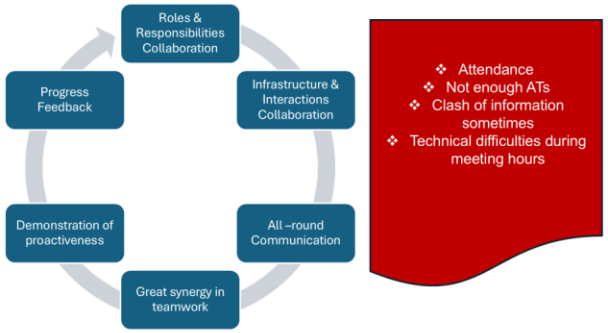
Figure – 86 Camera View of Film Screening Room from Revit

University of Huddersfield

Sample Output

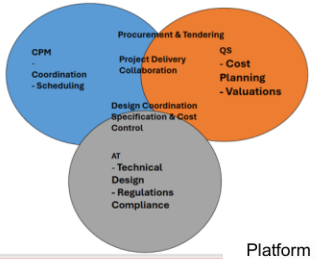
Collaborative Reflection

Collaboration Challenges



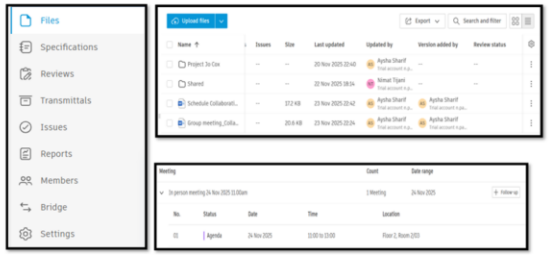
- Attendance
- Not enough ATs
- Clash of information sometimes
- Technical difficulties during meeting hours

Collaboration Infrastructure Between CPMs, QSs, and ATs



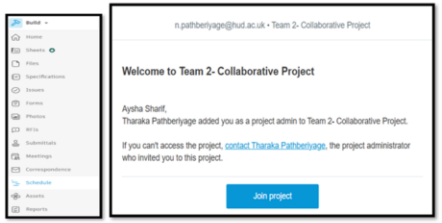
Collaboration Tool

Autodesk Construction Cloud



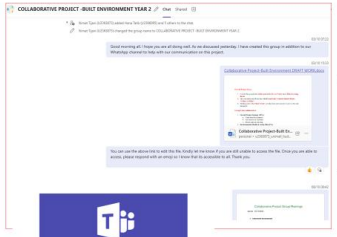


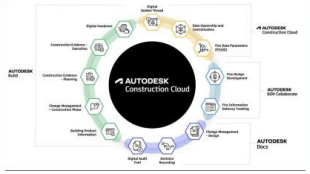


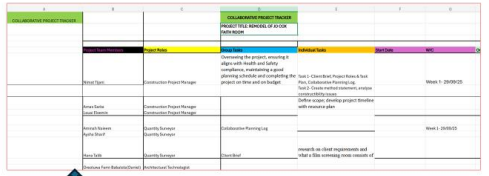


Collaborative Planning Tools

Platform used for communication and sharing files

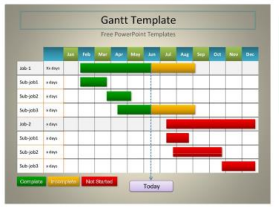








To assist with project progress



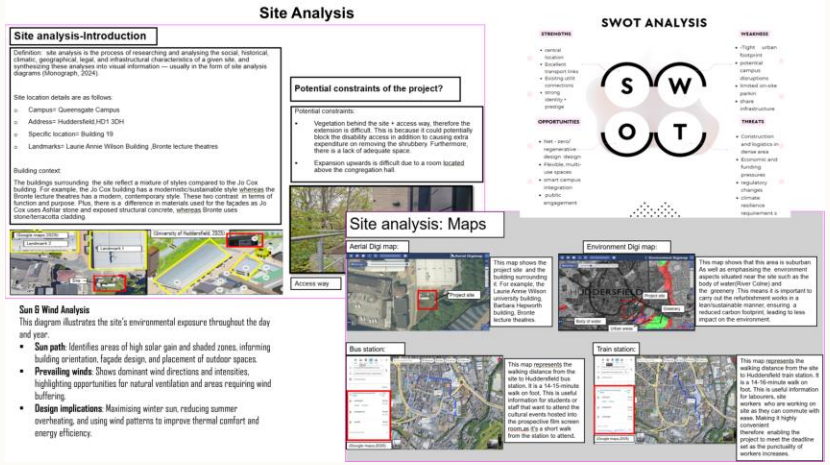


Allowed for a build-up of overall project roles/responsibilities/team members, tracking and project status

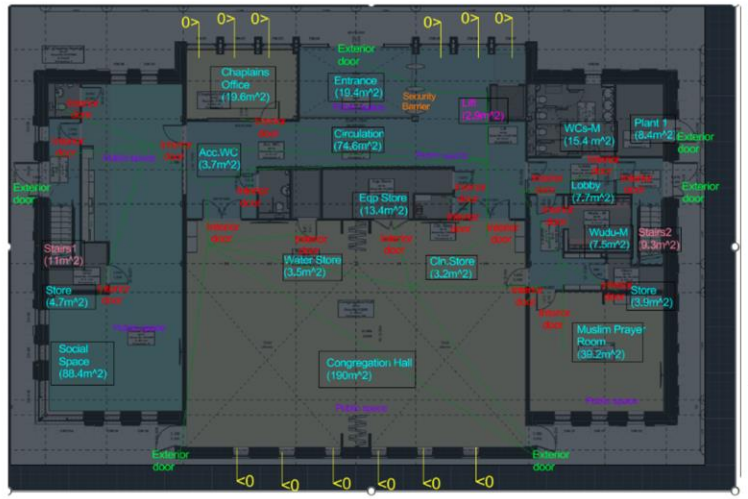
Served as the most convenient tool of communication for the group.

University of Huddersfield

Sample Output



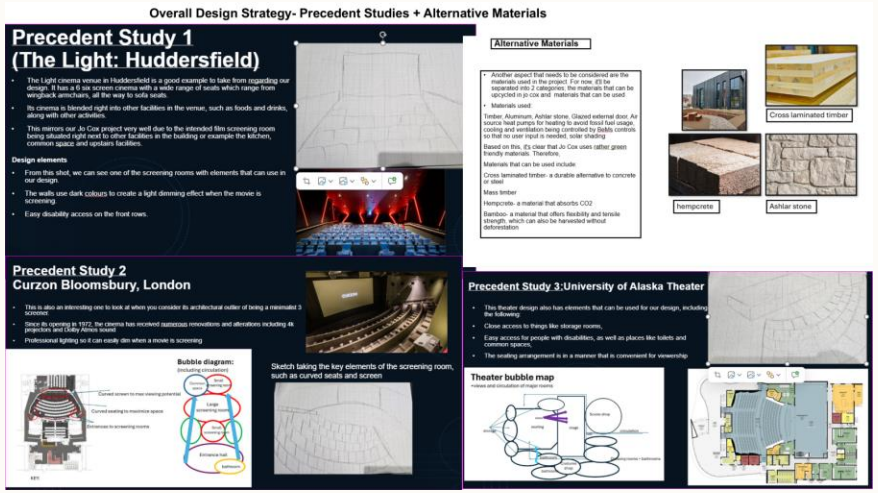
Annotated First floor plan: Using AutoCAD



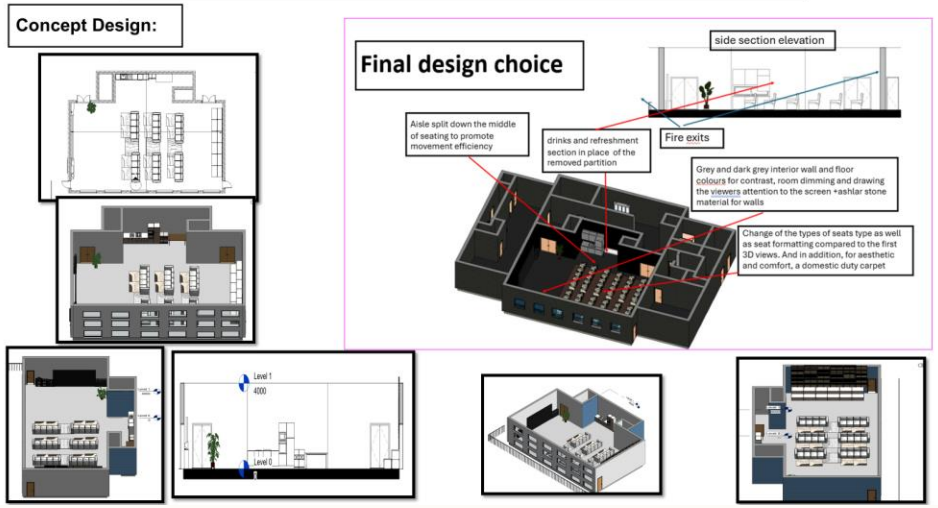
Key for annotations on drawing:

- Yellow(<0)=Views
- Green=Exterior doors
- Blue=Room name/area
- Red=Interior doors
- Dark purple=Public space
- Light pink=stairs
- Magenta=Lift
- Orange=Security Barrier
- Dark green=Circulation

Overall Design Strategy- Precedent Studies + Alternative Materials



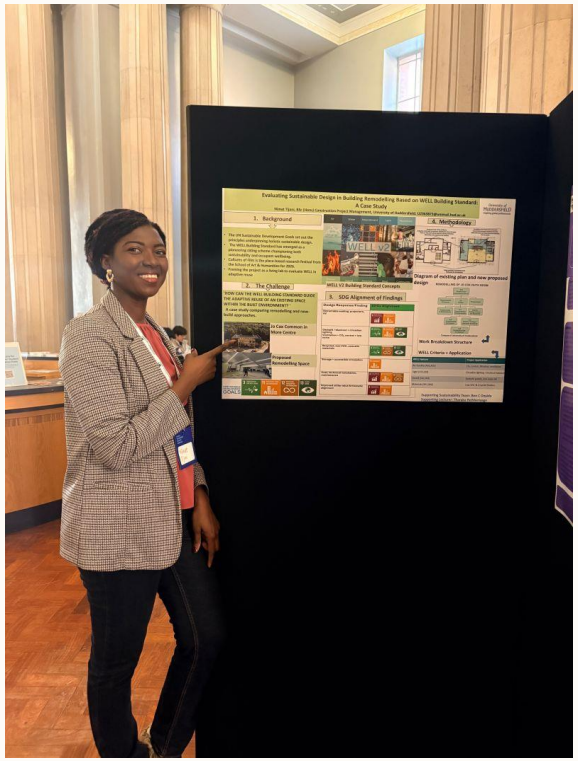
3D Views, Elevations of concept design and final outcome of the overall design strategy



University of Huddersfield

Best Practices

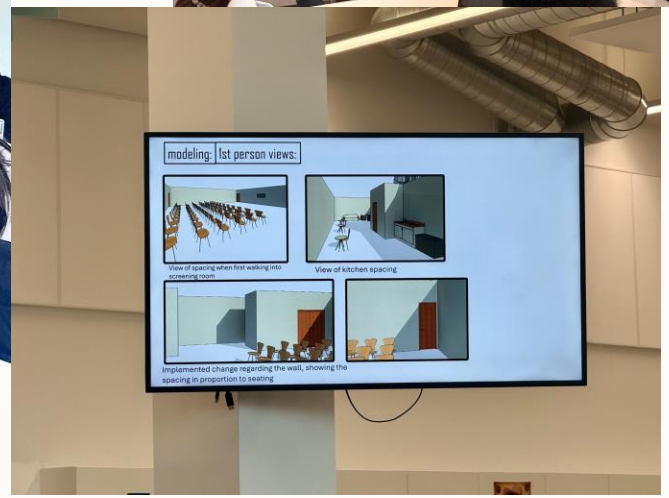
Students' Presentation to Industry Experts for Feedback



Student Presentation @ Sustainability Research Conference (SSRC 26), University of Leeds







University of Huddersfield

Students' Feedback

Delivery	"The interim presentations are always helpful in terms of shaping the content and also the pacing of a presentation" "Getting the architect of the building to do a presentation and then hear our ideas was also extremely helpful for shaping our ideas and having that instant feedback was great" "The rotation of having CPM, QS and AT-focused lessons was good."
Assessments	"Members were not willing to share due to the fear of work being copied or breaching rules when we submitted." "It was clear who had done the work and who had not, based on how much we spoke and the confidence with which we presented." "I'm not overworking to make up for people."

Students' Feedback

Groups	"Seven members seems really high to me." "I would personally not get into a situation where you pick the groups and do not allow the students to do so."
Autodesk Construction Cloud	"I think for the members of our group that did use it how it was intended it was a helpful tool, however it was nothing that we could not have achieved using other methods and it did not feel like we were getting useful experience with a tool in the industry"

Major challenges	Lessons learned	Improvements for next delivery
Maintaining student engagement throughout a year-long project delivered by three tutors	Students need consistent guidance and clearly communicated milestones	Establish a shared teaching plan and project roadmap
Uneven distribution of work across AT, QS and CPM students	Roles and discipline-specific responsibilities must be agreed early	Introduce peer assessment to evaluate individual contributions
Limited engagement with the agreed Common Data Environment	Students need early training and continued support with collaboration platforms	Provide a practical induction and monitor platform engagement
Tension between teamwork and the 70% individually assessed portfolio	Collaborative and individual outputs must be clearly distinguished	Provide explicit guidance and examples of acceptable collaboration
Loss of an AT student left one group without adequate design input	Groups need support when a key discipline becomes unavailable	Establish contingency arrangements and provide targeted tutor support

Summary

- Sufficient evidence for achievement of collaborative learning outcomes
- Maintaining student engagement is a continuous challenge
- Scope for improving the delivery & assessments
  - Mitigation for unbalanced representation of disciplines
  - Group assessments
- Exploration of use of collaborative tools & techniques

Thank You!

University of Huddersfield
Yorkshire roots. Global reach.

P.C.Vasantharaj@hud.ac.uk

University of Huddersfield
Paul C. Charlesraj Vasantharaj
BE MS MRICS PMP® MAPM FHEA M.ASCE CKM PGCertHE GMICE MIE CEng(I)
Senior Lecturer in Construction Project Management
Course Leader – MSc Advanced Project Management in Construction
Course Leader – BSc(Hons) Construction Project Management

Credits

Module Team

- Tharaka Pathperiyage
- Chamindi Malalgoda
- Tamiris Ferreira