Smart Glazing:
The Future of Glass Architecture?

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Smart glazing

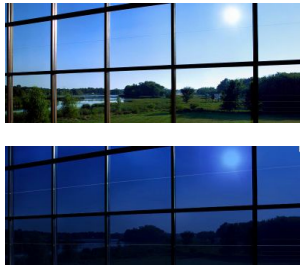
Smart or **switchable glazing** is glazing whose optical properties are altered by the application of an external stimulus such as voltage, heat or light. Generally, the change results in an increase or decrease in the visible transparency of the glass.

Smart glazing

Photochromic

Thermochromic

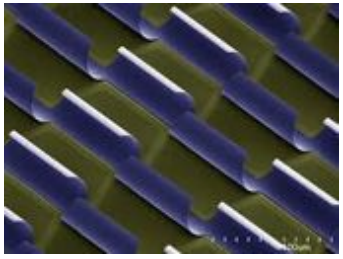
Gasochromic



Electrochromic

Liquid crystal

Suspended particle



Microblinds

Smart glazing

- Daylight
- Transparency
- View & connection
- Visual lightness

- Overheating
- Façade furniture
- Visual discomfort
- Blinds down, lights on

Smart glazing

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Motorised shading

- Moving parts
- Distraction
- Control set-points
- User acceptance

New York Times HQ

Electrochromic (EC) glazing

Image courtesy of SAGE Electrochromics

Electrochromic (EC) glazing

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EC Glazing Study at DMU

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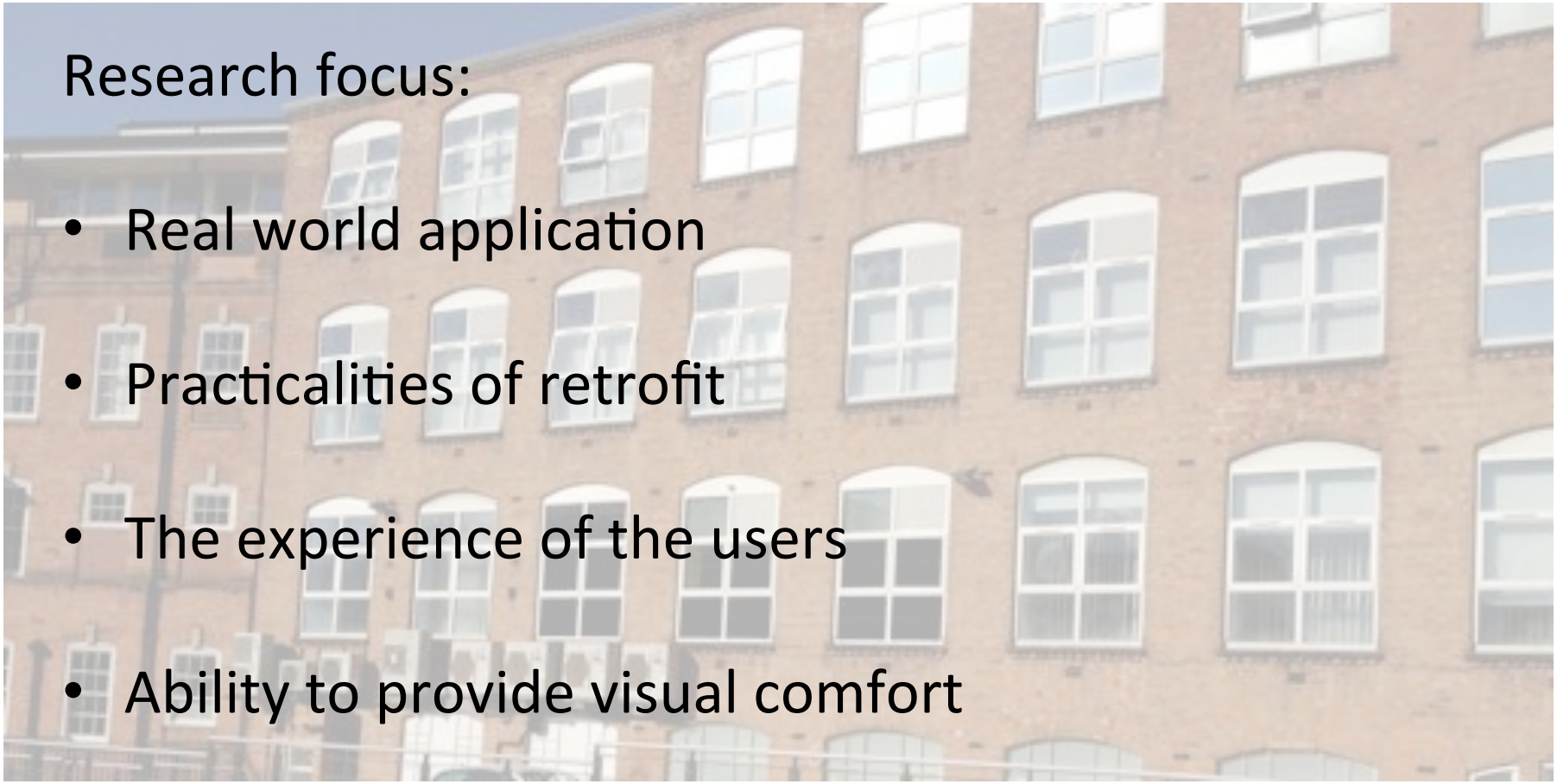
EC Glazing Study at DMU



Research focus:

- Real world application
- Practicalities of retrofit
- The experience of the users
- Ability to provide visual comfort

EC Glazing Study at DMU

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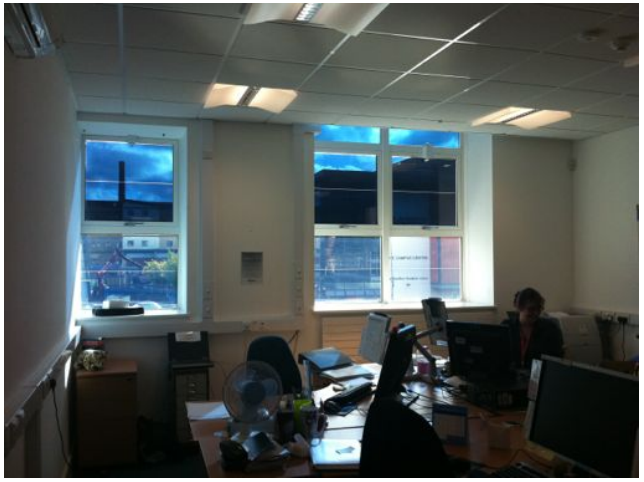
Before:

After:



EC Glazing Study at DMU

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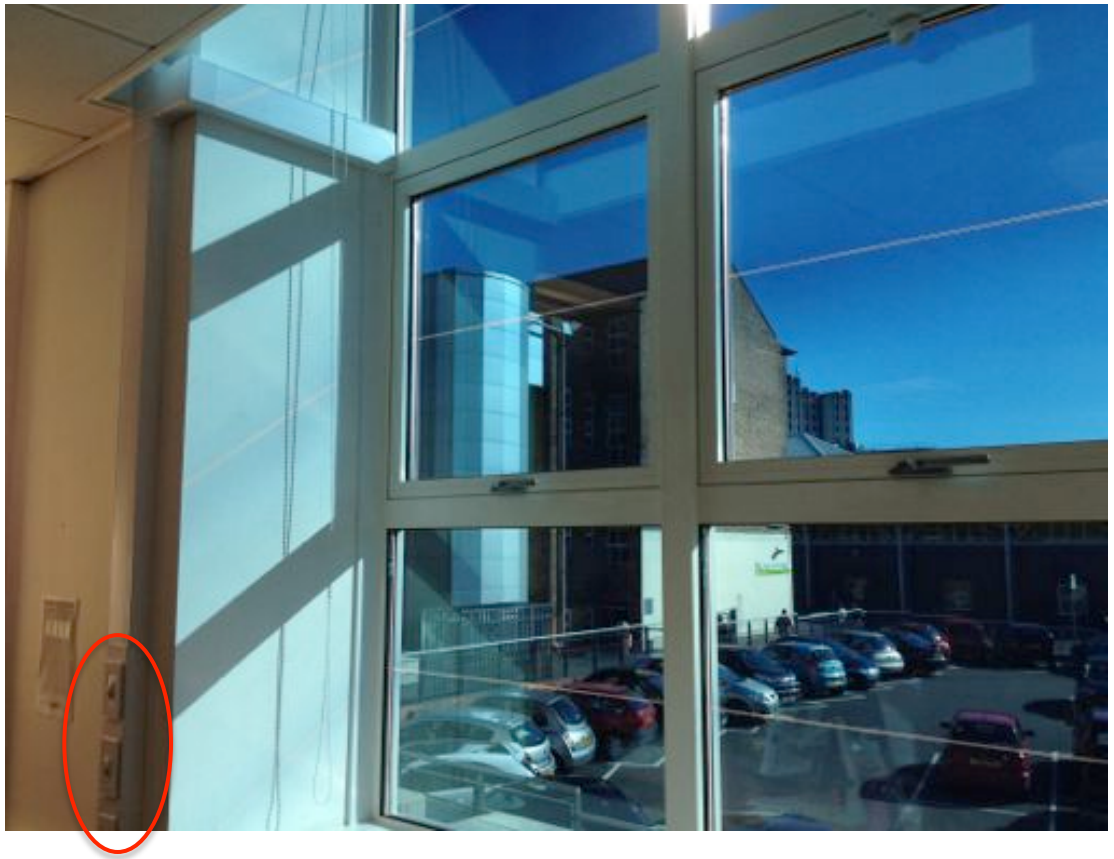

EC Glazing Study at DMU

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Methodology

Key *objective* measures:
How does EC glazing physically effect the room?

- High Dynamic Range (HDR) images
- Horizontal workplane illuminance
- Lighting energy consumption
- EC window control system data
- Room temperature
- Weather data

Methodology

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Methodology

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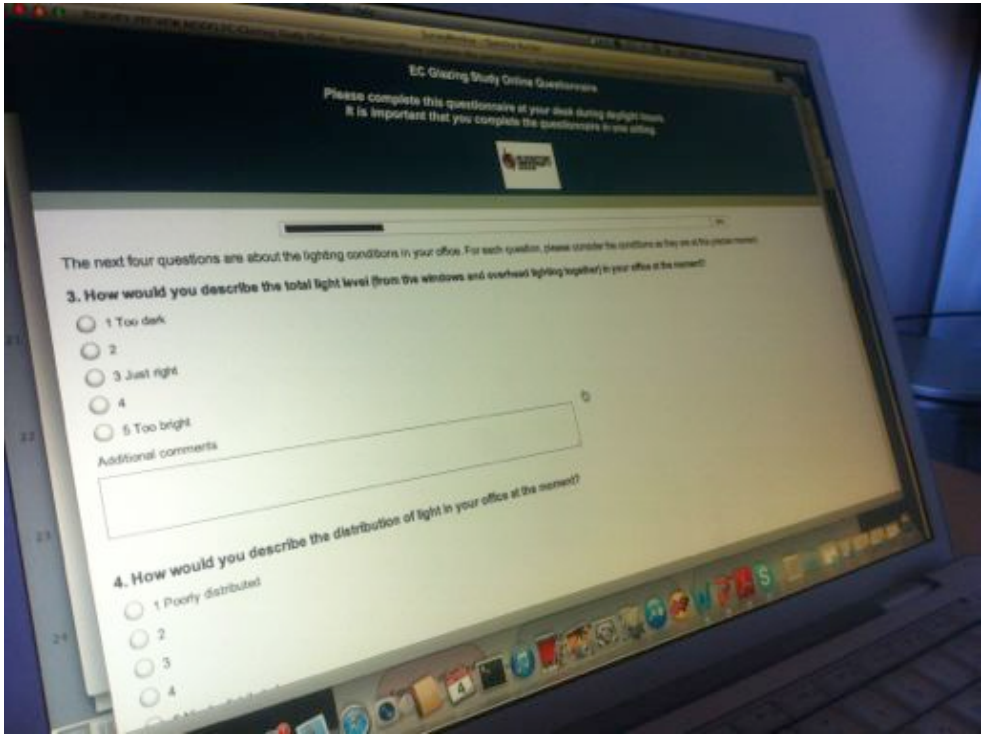
Key *subjective* measures:

What is the experience of the users?

- When and how often do they experience glare/screen reflections?
- How do they find the control interface?
- How do they find the system set-up (control settings)?
- Do they enjoy being able to see through the windows more?
- How does the tinting affect their ability to connect with outside?
- How does the tinting affect their perception of colours in the room?

Methodology



- Interviews
- Online questionnaires
- Daily experience sheets

Findings

Practicalities

Findings

System set-up

Findings

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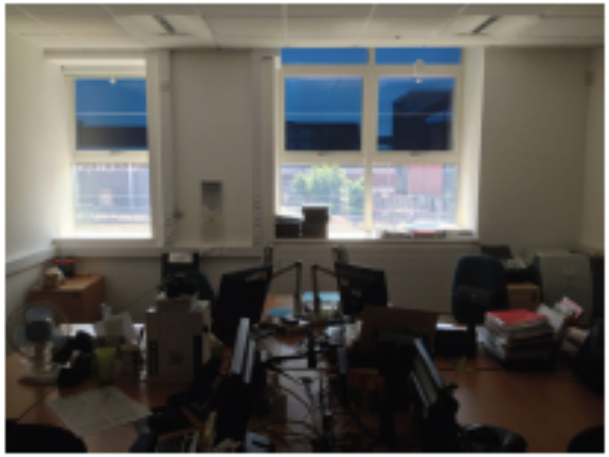
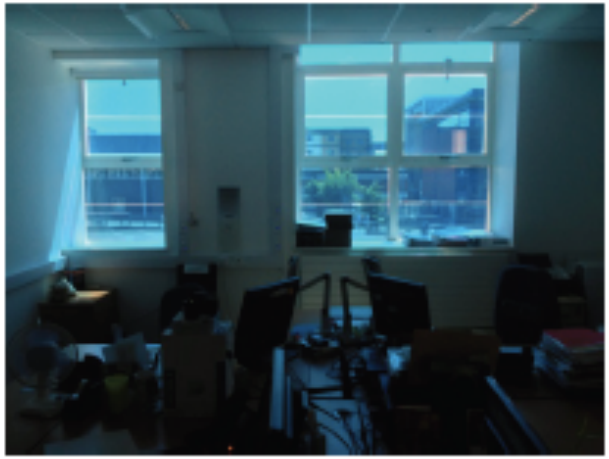
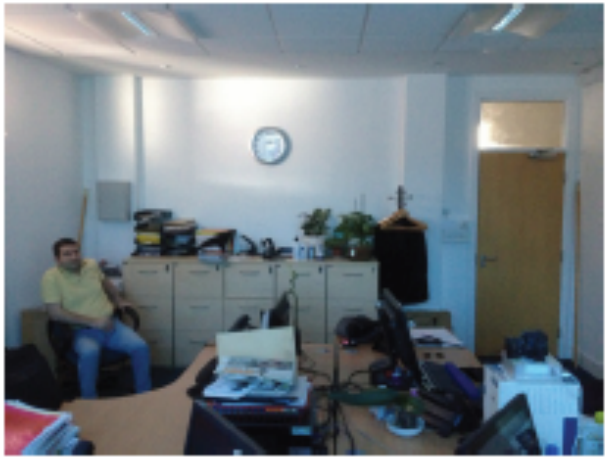
Daylight spectrum

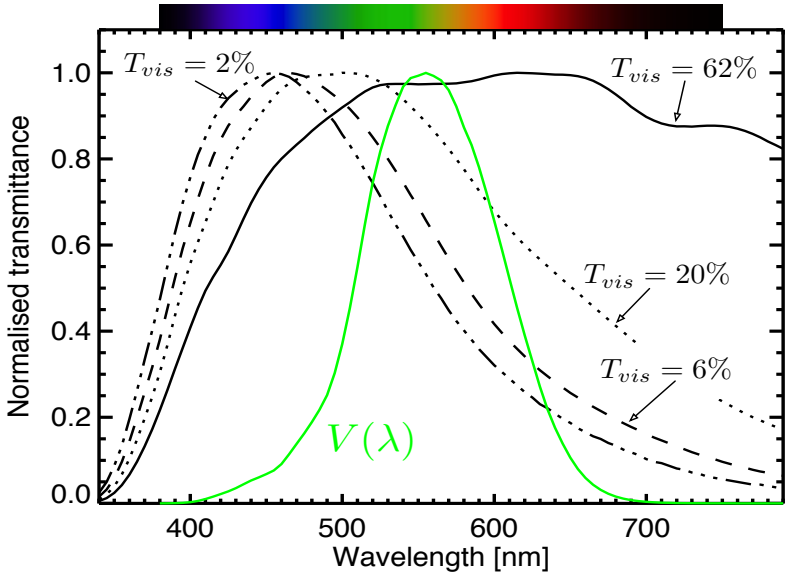


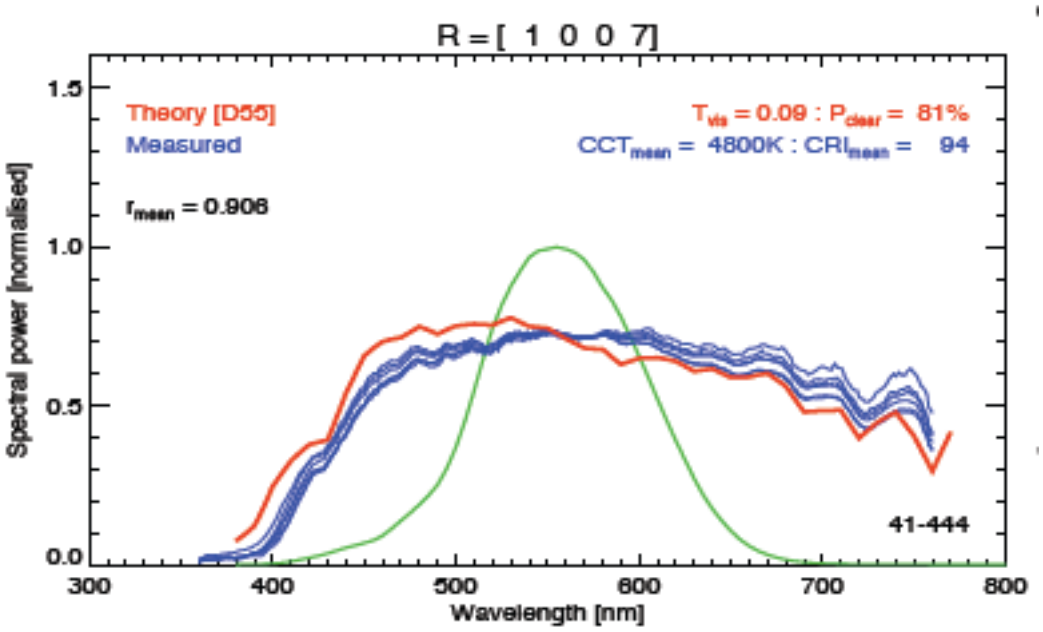




Findings

Daylight spectrum





Technological advances

Recent (SAGE):

- Within-pane zoning
- PV power supply
- 1% transmittance

Future:

- Electrochromic foil
- Faster transition time
- Cheaper manufacturing process

Thank you

Ruth Kelly Waskett

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