



SPACES Study Day 2016: Designing for positive outcomes: Clever Classroom

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IBI Group

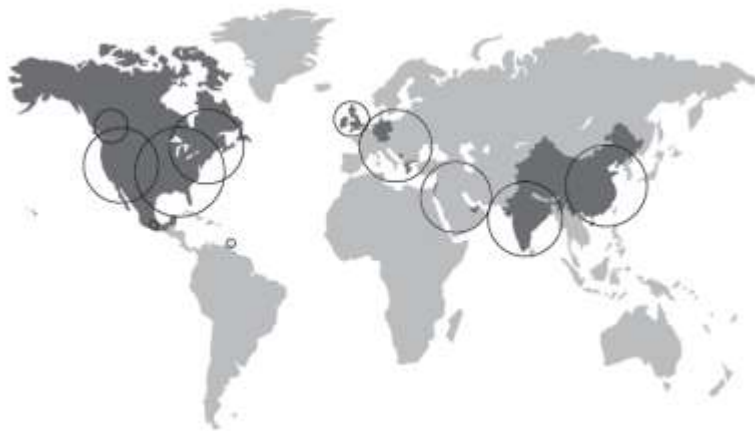
IBI Group is a globally integrated architecture, planning, engineering, and technology firm.

Studios > 10 UK + 62 Global

People > 250 UK + 2400 Global

Revenue > £16.3m UK + \$165m Global

At IBI, we are defining the cities of tomorrow.

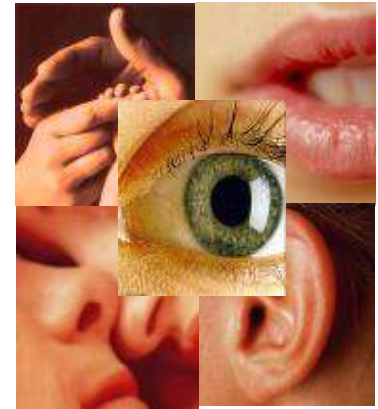
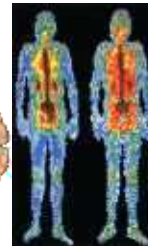
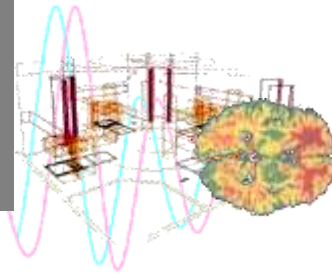


IBI Learning+

IBI Learning+ is a branch of IBI Group dedicated to creating holistic education environments.

- We are focused on the learner
- We are engaged within the community
- We are driving design innovation

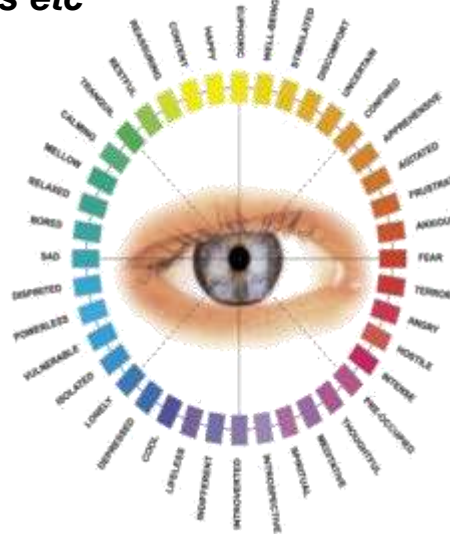




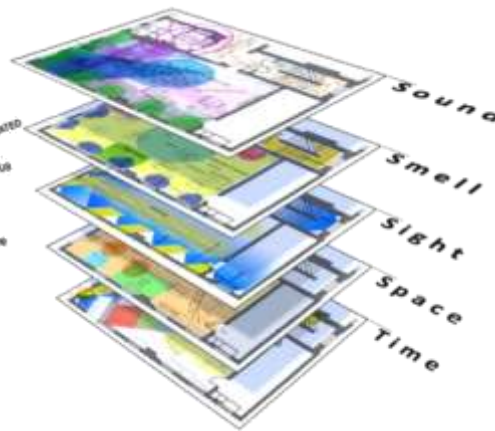
New Child Healthcare Documents HBN's, NSF's etc



Emotional Mapping



Sensory Audit



Collaborative Research

HEAD
Holistic Evidence
and Design
Research
Partnership with
Salford
University

HEAD Project: Holistic Evidence and Design – Sensory impacts & Practical Outcomes

Purpose . . .

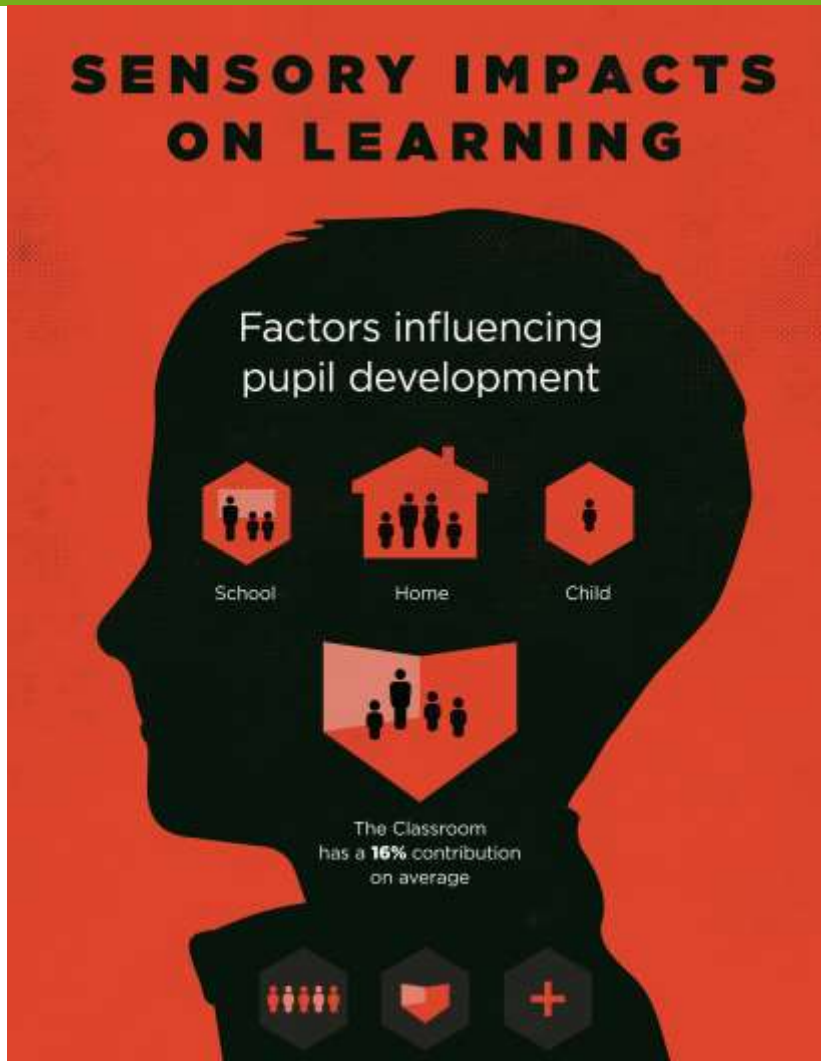
To explore if there is any evidence for demonstrable impacts of school building design on the learning rates of children in primary schools.



IBI Education

University of
Salford
MANCHESTER

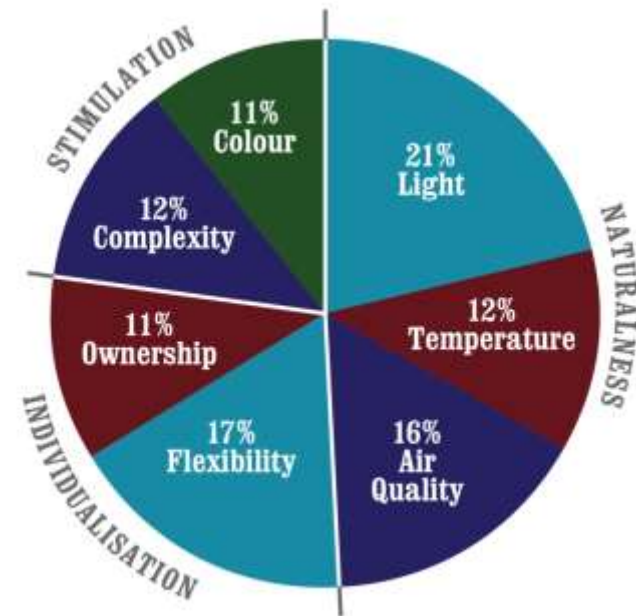




Classroom = Base Unit of Learning

Classroom environment found to have a **16%** impact on pupil performance

7 out of 10 parameters had a significant impact

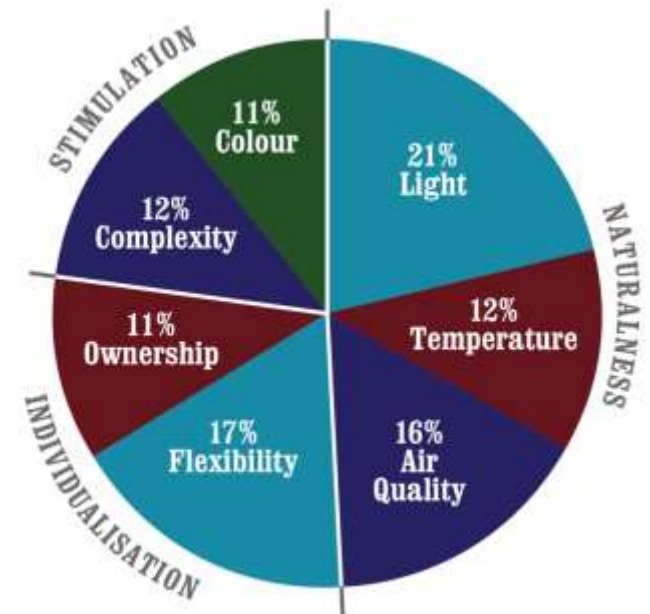


3766 pupils in 153 classrooms participated



Naturalness:

- Light
- Temperature
- Air Quality



Light

Glazing Orientation and Glazing Area

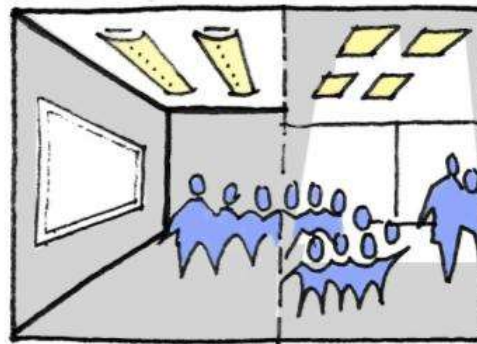
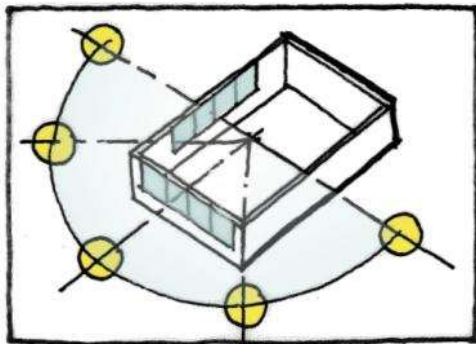
- High levels of light are optimum
- Glare from direct sunlight

Artificial / Electric Lighting

- Good quality and quantity

Ability to control and calibrate

- Easy & accessible to control for both natural and artificial light



Light Temperature Air Quality Ownership Flexibility Colour Complexity

Temperature

Teacher/Classroom control of temperature was found to be the most important factor in temperature category

- Orientation and shading control
External shading most effective
- Central heating control
Localized heat control by room user had best results
- Under floor heating scored poorly due to poor response time

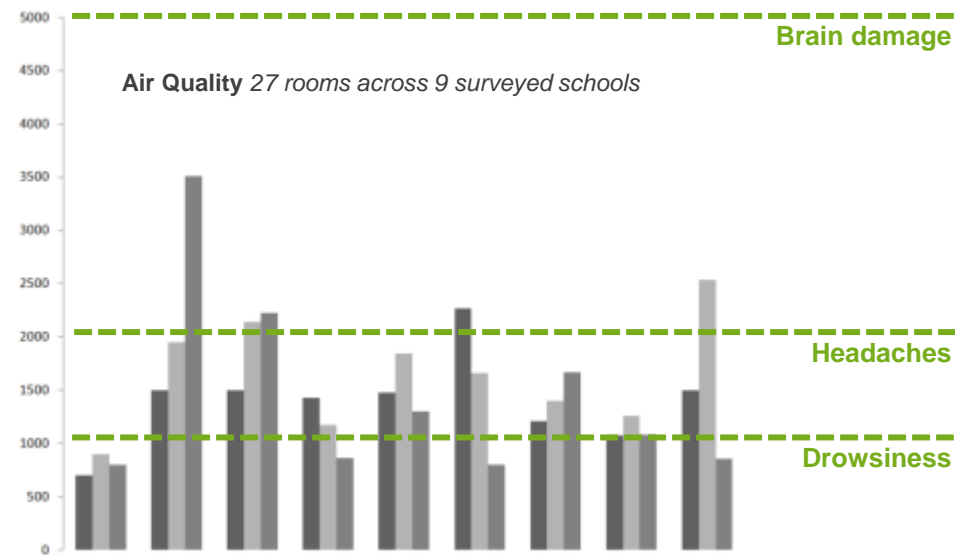


Light **Temperature** Air Quality Ownership Flexibility Colour Complexity

Many classrooms found to have build up of high levels of Carbon Dioxide through the day

Important features include:

- User created ventilation – windows with multiple openings and large windows were more effective
- Roller blinds frequently obstructed natural ventilation
- Mechanical ventilation performed better
- Large room volumes more effective to combat excessive levels of Carbon Dioxide



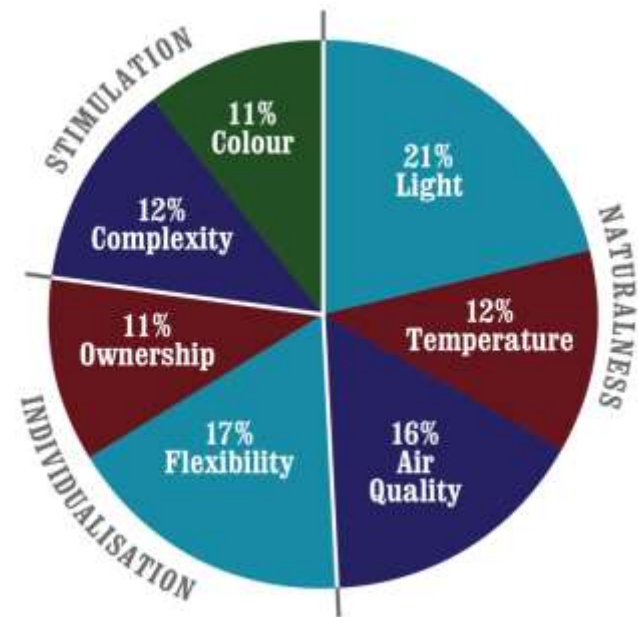
Light Temperature **Air Quality** Ownership Flexibility Colour Complexity



Individualisation:

-Ownership

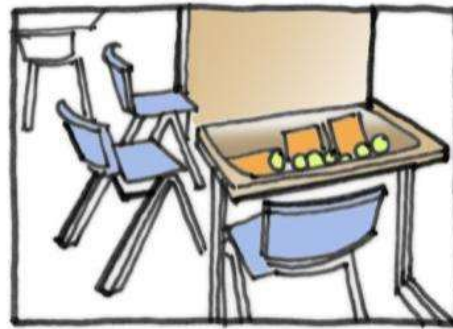
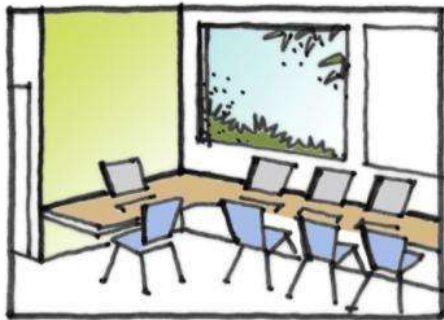
-Flexibility



Empowering the student

Positive features include:

- Classrooms with distinct design or feature
- Students feel ownership when their work is displayed
- Elements of the room are personalized (e.g. coat hook / lockers)
- Well designed furniture – child centred
- Comfortable chairs & desks



Light Temperature Air Quality **Ownership** Flexibility Colour Complexity

Empowering the teacher

Does the room allow for varied learning methods/activities?

- How easy is it to change the space configuration
- **Variety of activities** take place simultaneously

Number of learning zones

Break out space attached to classroom

Flexible spaces and furniture

Good and accessible storage

Varied shape for younger students

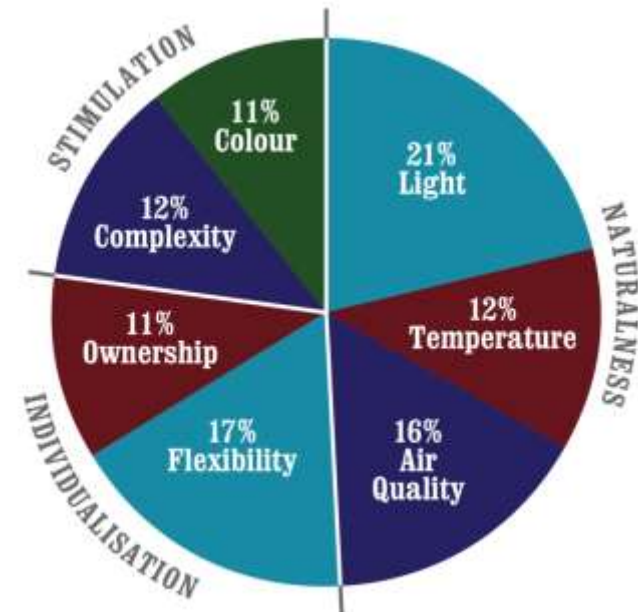
Regular shape for older students



Light Temperature Air Quality Ownership **Flexibility** Colour Complexity



Stimulation:
-Complexity
-Color





Measure of colour is curvilinear

Highly coloured large areas rated poorly

White walls with few colour elements rated poorly

- Intermediate found to be best
- White walls with feature wall with highlighting of a vivid or light colour rated highest



Additional elements of colour increased stimulation:

- Furniture colour
- Floor covering
- Display colour – warm bright themes in displays

Light Temperature Air Quality Ownership Flexibility **Colour** Complexity

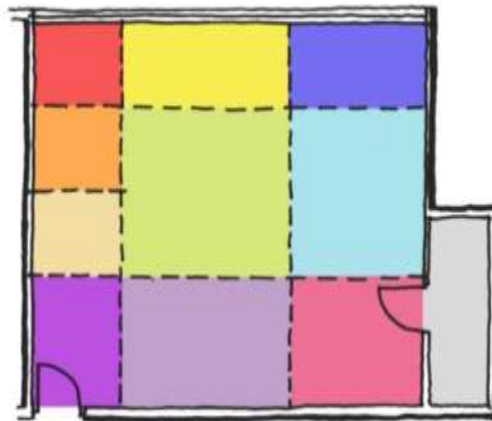
Complexity

Three elements of Complexity – Layout, Ceiling & Display

Overall room complexity that has the major impact

Effect is curvilinear – too much and too little are equally bad

- Visual diversity of layout and ceiling – capture attention and stimulation but balanced with degree of order
- Visual diversity of display – well designed and balanced



Light Temperature Air Quality Ownership Flexibility Colour **Complexity**

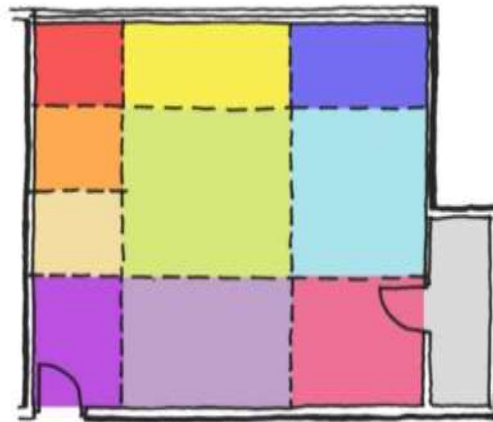
Complexity - Display

Appropriate level of stimulation within classroom and school



HEAD study:

students in classrooms with confused or cluttered appearance performed worse



Applying the research..... Existing Schools



A means to evaluate existing learning environments to maximise pupil performance

Based on the HEAD Study findings and IBI's extensive experience

IBI Team assess the learning space based on the key factors

Support design decisions throughout a project

Assist teachers in understanding how to make the most of the space at their disposal



Assessment Process:

- Phase 1: Telephone or face-to-face consultation to understand the requirements
- Phase 2: Site Survey of agreed spaces
- Phase 3: Assessment by IBI and report write up including presentation of report



Learning Environment Assessment Tool

Site Survey

ASSESSMENT CRITERIA		RATING	SCORE	ASSESSMENT	TOTAL
AREA 1 Classroom No/Name xx					
(I1) LIGHT					
A The amount of natural light the room gets					
A1	Amount of sunlight				
A2	Daylight factor = glazing area / total area				
B The distribution of natural light in the classroom					
B1	Distance of most distant point from glazing				
B2	Glazing factor = window area / floor area				
C The degree to which the lighting level is controlled					
C1	Quality of Electrical Lighting				
	Flicker free, sensor control				
	Flicker				
C2	Shading Covering Control - Status of Blinds				
C3	Shading Covering Control - Any obstruction				
AREA 1 Classroom No/Name xx					
ASSESSMENT CRITERIA					
(I2) FLEXIBILITY					
M The degree to which the room plan allows varied learning methods and activities					
M1	Zones for varied learning activities				
	>6	1	5		5
	5 to 6	0.8	4		
	3 to 4	0.6	3		
	2	0.4	2		
	1	0.2	1		
M2	Attractive (or useful) space attached to the classroom				
	storage or breakout space, available all the time	1	5		
	breakout space, available all the time	0.8	4		
	storage space, available all the time	0.6	3		
	either breakout or storage space, borrowed from other space eg corridor	0.4	2		
	both breakout or storage space, borrowed from other space eg corridor	0.2	1		
TOTAL M				8	8
FLEXIBILITY TOTAL SCORE				8	8
(I3) CONNECTION					
N The presence of wide and clear pathway and orienting objects with identifiable destinations					
N1	clear corridor				
	wide and clear, no other purpose usage except display	1	5		
	wide and clear, slight usage for storage	0.8	4		
	wide and clear, slight usage for storage and breakout space	0.6	3		
	heavy usage for storage or breakout space	0.4	2		
	heavy usage for storage and breakout space	0.2	1		
N2	orienting corridor				
	distinctive design to navigate the wayfinding	1	5		
	Same everywhere	0.2	1		
TOTAL N				9	9
CONNECTION TOTAL SCORE				9	9
(I4) COMPLEXITY					
Q The degree to which the classroom provides appropriate diversity (novelty) and order (familiarity)					
Q1	Diversity (novelty)				
	Interior decors that catch the pupils' attention and arousal: distinctive	1	5		
		0.8	4		
		0.6	3		
		0.4	2		
		0.2	1		
Q2	Order (familiarity)				
	Interior decors that help the pupils make sense of it eg friendly				

Report

Summary of HEAD Study

Outline of assessment process

Description of School and conditions at time of survey

Results Table

- Traffic light scoring system

Summary of Findings

Recommendations

Examples of creating optimum learning environments

SUMMARY SHEET		Scores from Assessment Sheets								TOTAL SCORE	AVERAGE SCORE
Criteria	Criteria category weighted percentage	LIGHT 11%	TEMPERATURE 15%	AIR QUALITY 18%	OWNERSHIP 11%	FLEXIBILITY 11%	COMPLEXITY 10%	COLOUR 12%			
AREAS OF ASSESSMENT											
Area 1	Year 1 Room G0035	88.00	40.00	33.00	90.00	50.00	80.00	53.33	341.67	48.81	
Area 2	Year 5 Room F0003	91.11	61.11	70.00	90.00	55.00	90.00	90.00	426.11	60.87	
Area 3	Year 7 Room G0067	75.56	40.00	55.00	78.00	35.00	60.00	90.00	421.56	60.22	
CLASSROOM WITH HIGHEST SCORE = F0003 Year 5											
CLASSROOM WITH LOWEST SCORE = G0035 year 1											



ABOVE: Overall Summary Table indicating the scores for each classroom and each learning environment factor.

LEFT: Scoring Parameters indicating the 'traffic light system'.

IBI GROUP - FLASH LEY PRIMARY SCHOOL

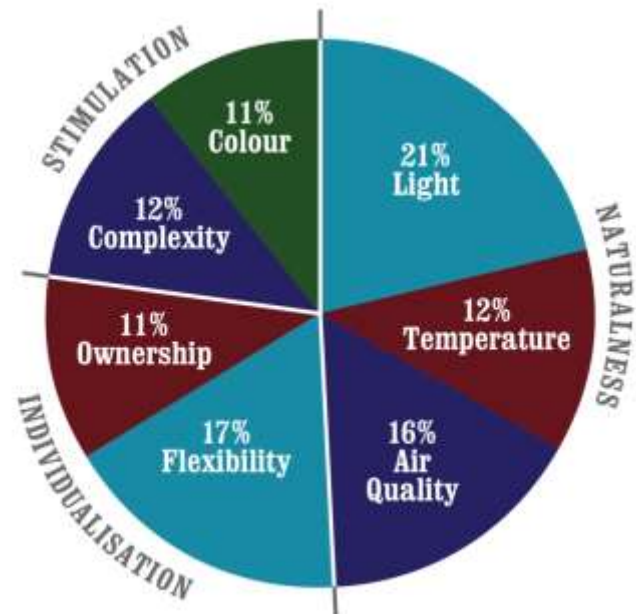
Recommendations

Examples of creating optimum learning environments



Recommendations

- Set out for each learning environment factor
- Prioritised to reflect the weightings of the research findings
- Ordered from low cost options to high cost options
- Options for Teaching staff
- Options for Designers



Beta Test – 11 Schools – 33 Classrooms across South Wales



Key Findings

Naturalness:

Light

- Furniture in front of windows obstructing access to blinds
- Flicker free common electrical lighting with good distribution

Temperature

- No external shading
- Control of heating in classroom poor, generally centrally controlled

Air Quality

- Very high levels of CO₂ in most classrooms
- Obstructions to openable windows



Key Findings

Individualisation:

Ownership

- Low levels of pupils work displayed within classroom
- All classrooms had good levels of ICT provided
- Standard desks and chairs in most classrooms

Flexibility

- Most classrooms achieved the required amount of learning zones
- Storage encroaching on teaching space
- No breakout spaces linked to classrooms



Key Findings

Stimulation:

Complexity

- Most classrooms had a high level of visual diversity but no degree of order
- Low levels of diversity to ceilings

Colour

- Colours to walls, floor and ceiling generally closed to neutral colours
- Furniture colour was mixed with no clear tendency
- Colour of displays were mixed with no clear tendency



Key Benefits:

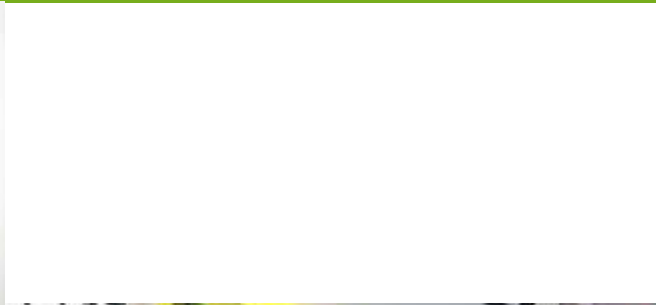
1. Evidence Based Design
2. Consideration rather than **cost**
3. Developing the brief



Applying the research..... New Schools



The Clever Classroom – Moving Forward



The Clever Classroom



<https://www.salford.ac.uk/cleverclassrooms/1503-Salford-Uni-Report-DIGITAL.pdf>



