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

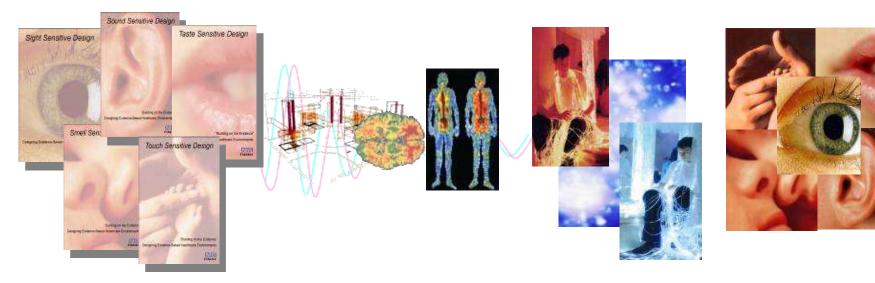




Creating the Optimum Learning Environment

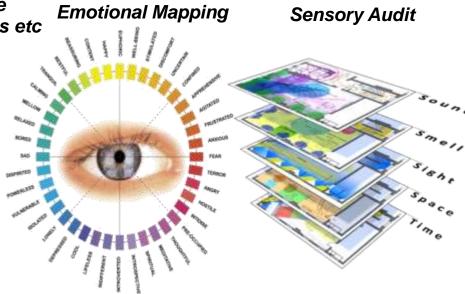
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IBI THINK



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





Collaborative Research

HEAD Holistic Evidence and Design Research Partnership with Salford University

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H.E.A.D Research Programme

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.



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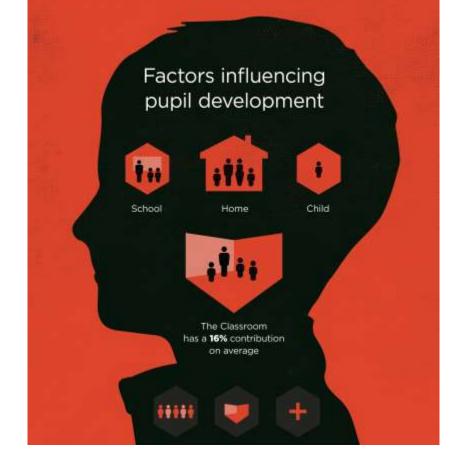
University of Salford



H.E.A.D. Research results

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SENSORY IMPACTS ON LEARNING

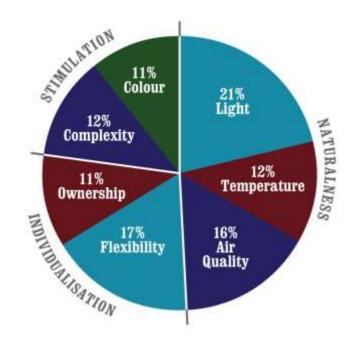


3766 pupils in 153 classrooms participated

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



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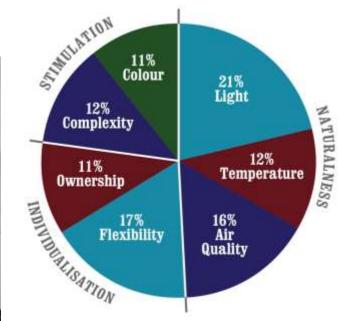
Applying the Results: Naturalness

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Naturalness:

- -Light
- -Temperature
- Air Quality



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Light

Glazing Orientation and Glazing Area

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

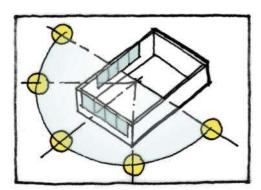
Artificial / Electric Lighting

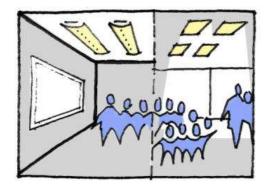
Good quality and quantity

Ability to control and calibrate

 Easy & accessible to control for both natural and artificial light









Light Temperature Air Quality Ownership Flexibility Colour Complexity

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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

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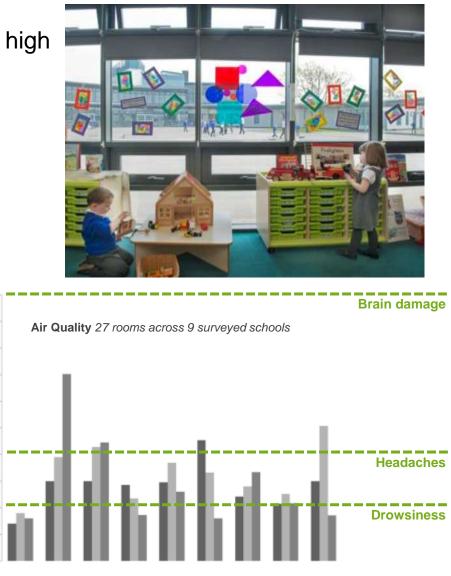
Air Quality

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

4500

3500

3000

2500

1500

1000

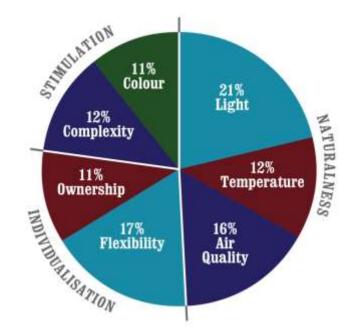
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Applying the Results: Individualisation

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Individualisation: -Ownership -Flexibility



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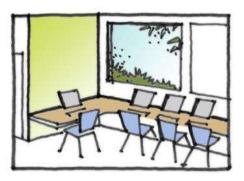
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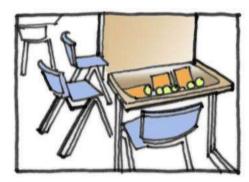
Ownership

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

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Flexibility

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 IBI Group (UK) Creating the Optimum Learning Environment

Applying the Results: Stimulation

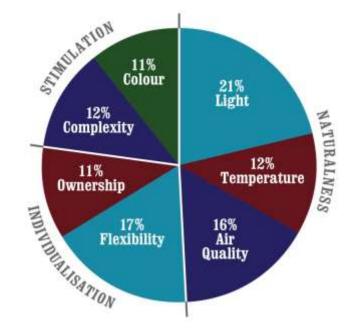
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Stimulation: -Complexity -Color



Colour





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

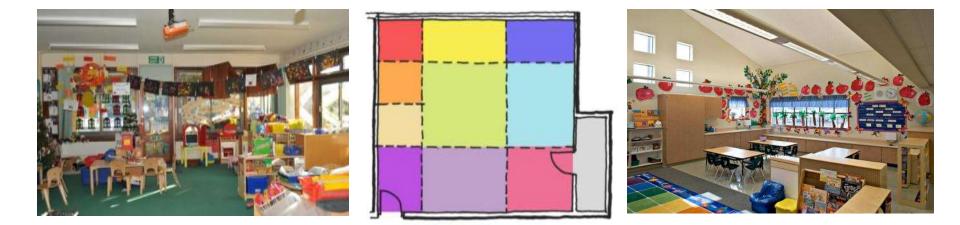
 Light
 Temperature Air Quality Ownership
 Flexibility
 Colour
 Complexity

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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

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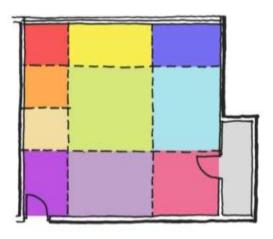
Complexity - Display

Appropriate level of stimulation within classroom and school



HEAD study: students in classrooms with confused or cluttered appearance performed worse







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Evidence Based Design

Applying the research..... Existing Schools



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Learning Environment Assessment Tool

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

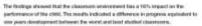
Assist teachers in understanding how to make the most of the space at their disposal





to maximise pupil performance.

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Temperature

· Colour Cumultured Line of Colour · Consolektic Provance he statist attaction

+ AV Guality

The shally has shown that the corner's statistication of Party larger may contribute up to 10% lowante the stalid's devolopment. This gives as as designers a protectal tool for helping schools assess their existing and new classroom developments







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



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Learning Environment Assessment Tool

Site Surv	ey					AREA 1 Clas Assessment Criteria	stoom No/Name RATING	Correct of C	ASSES5 MENT
	1			194277700000		FLEXIBILITY		-	
		And a second	1 Classroom N		[12]	The degree to which the room plan allows varied learning			
		ASSESSMENT-CRITERIA		RATIN	M	methods and activities			
	1948	AIR GUALITE			M1	Zones for varied learning activities			
		The degree to which the stuffy heeling can be adjusted measurable			-	>6	1	5	6
	113	Does the room have openable windows?	1			5 to 6	0.8	4	
	- F	All openable	<u> </u>	1	1	3 to 4	0.6	3	
ASSESSMENT CRITERIA		100-50% openable				2	0.4	2	
J DGHT	<u> - 1</u>	50 % openable				1	0.2	1	
The amount of natural light the room		50-0% openable	L	-	M2	Attractive (or useful) space attached to the classroom			
Amount of sunlight	<u>-</u> -	None operable Are the windows fully accessible? is furniture or height	i	1 1	-	storage or breakout space, available all the time	1	5	-
Permoune of Sumgrie	112	impeding accessibility?	l				0.8		+ +
		All early accessible	I	1	1	breakout space, available all the time storage space, available all the time	0.8	4	
	-1	105-50% accessible				either breakout or storage space, borrowed from other space og	.0.5		
	-1	50 % accessible					0.4	2	
	-1-	50-0% accessible	L			corridor bothbreakout or storage space, borrowed from other space eg	. 0.4	4	
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Daylight factor = glazing area / total a	1111	claisroom	and the second		TOTAL M	0.2		-	
š		not at all idutant from the kitchen tailet or other polluted			1			_	
	- 1 -	sourcesi	1	-		FLEXIBILITY TOTAL SCORE			
The distribution of natural light in the		rarely inser but high quality facilities			-				
Distance of most distant point from g		a little (ballet, kitchen or other contaminated air)	i		000	I CONNECTION			
Glazing factor- window area/floor an	4	way much	<u> </u>	-	-	The presence of wide and clear pathway and orienting objects			
	- -	TOTALH		1.	N	with identifiable destinations			
	-1-	AIR OLIAUTY TOTAL SCORE			N1	clear corridor			
The degree to which the lighting level	<u> </u>					wide and clear, no other purpose usage except display	1	5	
Quality of Electrical Lighting		DHOICE				wide and clear, slight usage for storage	0.8	4	4
Flicker free, sensor con	an i	The degree to which the distinct characteristics of the			Τ.	wide and clear, slight usage for storage and breakout space	0.6	3	
	-	classroom allow the server of autoratig			L .	heavy usage for storage or breakout space	0.4	2	
- FI	an	This is our classroom	 		- L.	heavy usage for storage and breakout space	0.2	1	
		eterior decor and display that are different hom other claurooms, clear and easily recognised	1		NZ	orienting corridor	10		-
		maderata decur				distinctive design to navigate the wayfinding	1	5	5
Shading Covering Control - Status of E	10	basic decor							
-				1 14					
				-	-	Same everywhere	0.2	1	
	12 This is missel every p	every pupil has their own place to put their personal stuff	1	-		TOTALN		-	41
	-	artestaty						_	
	-	every pupil has their own place to put their personal staff				CONNECTION TOTAL SCORE			
		privately every pupil has their own place to put their personal stuff upenly		1.14	L	CONNECTION TOTAL SCORE			
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Shading Covering Control - Any obstr		every pupil has their own place to put their personal staff sperty popils share places to put personal staff pupils have little place to put personal stuff		4	q	COMPLEXITY The degree to which the classroom provides appropriate diversity (novelty) and order (familiarity)			
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Shading Covering Control - Any obstr		every pupil has their own place to put their personal start up ofly pupils there places to put personal start pupils have not place to put personal start pupils have not place to put personal start TOTAL3 The diagnees to which the FFE are confortables and familiar, supporting the learning and familiar, Variety of familiare, doign features and personal objects			q	COMPLEXITY The degree to which the classroom provides appropriate diversity (novelty) and order (familianty) Diversity (novelty)	1	5	
Shading Covering Control - Any obstr		every pupil has their own place to put their personal staff sperty propils share places to put personal staff pupils have replace to put personal staff pupils have no place to put personal staff pupils have no place to put personal staff TotAL3 The degree to which the FFE are constructable and lamiliar, supporting the learning and heading Variety of familtance, eaching variety of familtance, working, cabinet, drink station, soft floor high quality shift, tag, working, cabinet, drink station, soft floor			q	COMPLEXITY The degree to which the classroom provides appropriate diversity (novelty) and order (familiarity) Diversity (novelty) Interior decors that catch the pupils' attention and arousal:	108	5	
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Shading Covering Control - Any obstr		every pupil has their own place to put their personal start up only pupils thare places to put personal start pupils have not place to put personal start pupils have not place to put personal start Total 3 The degree to which the TFE are constantiate and hamiliar, supporting the learning and heading Variety of familiare, design features and personal object: high quality sick, tog, workop, cabiert, drivi station, with floor converse, how-have and oppil solide furniture			q	COMPLEXITY The degree to which the classroom provides appropriate diversity (novelty) and order (familiarity) Diversity (novelty) Interior decors that catch the pupils' attention and arousal:	0.6	4	2

Interior decors that help the pupils make sense of it og friendly

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Report

Summary of HEAD Study

Outline of assessment process

Description of School and conditions at time of survey

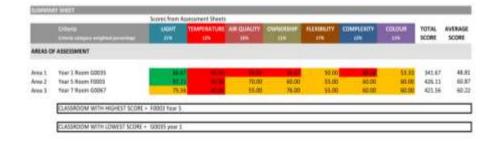
Results Table

Traffic light scoring system

Summary of Findings

Recommendations

Examples of creating optimum learning environments





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





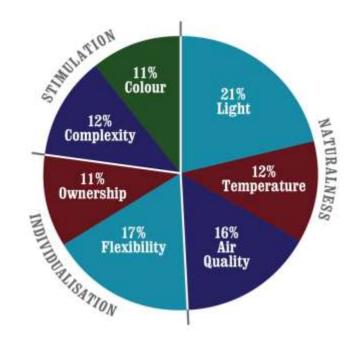
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Recommendations

- 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



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Learning Environment Assessment Tool

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Beta Test – 11 Schools – 33 Classrooms across South Wales



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Learning Environment Assessment Tool

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



Learning Environment Assessment Tool

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





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Key Benefits:

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



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Evidence Based Design

Applying the research..... New Schools





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The Clever Classroom – Moving Forward

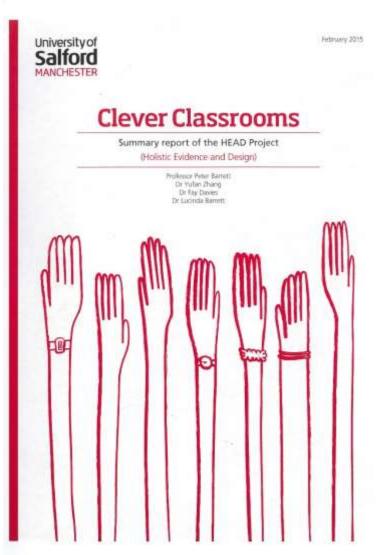




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https://www.salford.ac.uk/cleverclassrooms/1503-Salford-Uni-Report-DIGITAL.pdf

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