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Energy, Heating and Free Flow Space in Early Years Environments

Following the publication of the EYFS Framework in 2012 and the extensive research base there is an ever-increasing drive in early years teaching to provide free access between indoor and outdoor play space so the child can freely choose and access where and how they would like to play and learn.

The interpretation of this, seemingly reinforced by some advisors and OFSTED inspectors has led many to want to have a propped open door from the inside classroom to the outside playground in all conditions. This leads to an obvious conflict between trying to provide this free-flow access, maintain indoor temperatures at a comfortable level and not the blow the school's energy budget in doing so!

The absolute requirement for there to be an external door propped fully open in all conditions and the thought that failure to do so will result in critic from OFSTED is somewhat of an 'urban myth'. The actual guidance in the EYFS framework is:

> *Wherever possible, there should be access to an outdoor play area. Where, in exceptional circumstances, outdoor play space cannot be provided, outings should be planned and taken on a daily basis (unless circumstanced make this inappropriate, e.g. inclement weather).*
>
> *There should be adequate space to give scope for free movement and spread out activities.*
>
> *Rooms should be maintained at a temperature which ensures the comfort of the children and staff, including non-mobile children.*

What is a Comfortable Indoor Temperature?

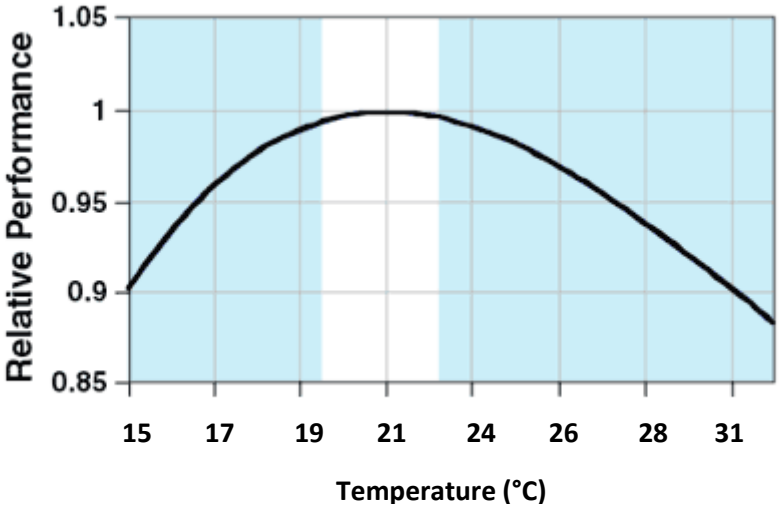
As can be seen form this, there is an absolute requirement for the indoor room temperature to be at a comfortable level. This poses the question about what is a comfortable level and what level is best for the child's learning.

The Workplace (Health, Safety and Welfare) Regulations 1992 lay down particular requirements for most aspects of the working environment. Regulation 7 deals specifically with the temperature in indoor workplaces and states that:

'During working hours, the temperature in all workplaces inside buildings shall be reasonable.'

The Health and Safety Executive previously defined thermal comfort in the workplace, as: 'An acceptable zone of thermal comfort for most people in the UK lies roughly between 13°C (56°F) and 30°C (86°F), with acceptable temperatures for more strenuous work activities concentrated towards the bottom end of the range, and more sedentary activities towards the higher end.'

In 2006 the Lawrence Berkeley National Laboratory reviewed 24 studies into the relationship between indoor air temperature and productivity. This resulted in the following findings.



This suggests that staff and pupils will be most productive when indoor air temperature are between 19.5 and 23 deg C and this should be used as the target range for indoor air temperatures. On balance between comfort, energy efficiency and productivity it is recommended that an internal set point of 20 deg C is used for indoor classroom space. This is in line with the requirements in most PFI school output specifications.

Providing Indoor Comfort and Access to Outdoor Play Space

The benefits of children having free flow access to outdoor space are well published and while there is no absolute requirement for this within the EYFS framework or within OFSTED inspections it should be noted that such provision is desirable. Most schools that have instigated this have reported that they have experienced two major challenges: that of providing adequate supervision in both the indoor and outdoor space and that of maintaining a comfortable indoor temperature while at the same time providing easy access to the outdoor environment.

The outdoor air temperature clearly determines how easy it is to allow unrestricted access to the outdoor space while maintaining indoor air temperatures. When outdoor temperatures are above 17 deg C then is can be considered to be entirely possible to maintain a comfortable indoor temperature with the external door propped open and in these conditions the heating system should be off and natural internal heat gains will keep the indoor temperature at the desired level. It is when the outdoor weather conditions are below this that further consideration is required.

There is no requirement for the access to the outdoor space to be ‘open’. It could be that the access is through a door which the children themselves can open and close as they wish to however the reality is that most external doors in schools (especially with the modern requirement for double glazing in them,) are heavy and a child of 4 to 5 would struggle to safely open it. In new build schools, designers should be

encouraged to design a lobby area which has a light-weight internal door that young children can easily open and then an external door at 90 degrees to this (to avoid through draughts). However, in the majority of existing school building this will not be feasible. Therefore, the options for managing the two issues of maintaining a comfortable indoor temperature and having free flow access to outside space are:

Fit plastic 'curtains' to the external doors

Use over door air curtains to the external doors

Fit a power assisted door mechanism

All these options will reduce heat lost to varying degrees and the pros and cons of these options are reviewed below, however, with all these options is it recommended that when the outside air temperature falls below 4 degrees the free access to the outdoor space is restricted and the door is closed. This management process will also ensure that the children are adequately dressed in costs and hats before going outside in the very cold weather.

It must also be stressed that without one of these measures being in place, the door should not be left open when the outside temperature is below 17 deg C as this will result in the indoor environment becoming uncomfortable which is a more fixed requirement in the EYFS framework than the 'free flow' access to outdoor space. Schools should therefore plan and budget for one of these provisions when making the decision to operate free low access.

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Option 1 – Plastic Door Curtains

Curtains comprising of strips of thick plastic have been retro fitted to door openings. These are similar to those seen on catering fridge doors and the like and allow for people, including small children, to walk through.

These curtains are relatively inexpensive and simple to install. The plastic does allow some visibility through the opening although this can reduce over time as the plastic gets scratched. There are some comments that these curtains can be troublesome to clean and over time they do tend to loose individual strips, which will requirement replacement or repair. They are useful at retaining heat within the internal space and not allowing excessive cold air in but they are only a layer of plastic and therefore their insulating effect is limited and the area around the doorway should be expected to be cooler.

For a quick, simple measure in schools which do not have funds for any more substantial works, these can provide a solution at least until more permanent works can be arranged and funded.

Capital Cost	Low (Approx £100/single door)
Ability to reduce heat loss	Medium
Operating Cost	Nil
On-going maintenance requirement	Medium

Example Suppliers:

www.freeflowcurtains.co.uk

www.plastic-curtains.co.uk/free-flow-play-curtains/

www.pvc-strip-doors.co.uk/c/school_curtains

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Option 2 – Over Door Air Curtain

Most people will be familiar with walking into retail shops and having a blast of warm air from an air curtain greet them from above as they walk in the door. The same arrangement can be made to the open door within an EYFS room by using a heated over-door air curtain. This prevent the warmth from inside escaping by providing a barrier of relative high-speed air blowing downwards. This is usually heated air and while non-heated solutions are available on the market the air speed of these units need to be much higher and require specialist installation.

As these units are mainly heated and have a fan motor to blow the air, they can consume high levels of energy. These units, if installed and sized correctly, can maintain the indoor air temperatures but will do so by using high levels of energy. The units will also require an element of maintenance due to the moving parts within them. Both electrically heated and units heated from the water within the existing heating system are available, the later will be more efficient but the ease of installation will depend on the location of the heating pipework to the door. The electrical units will require an electrical cable of a suitable size and capacity to be run to it. In order to be successful the air curtain needs to stretch across the entire width of the door opening and the temptation to install a small 'off the shelf' unit should be resisted, as this is less likely to be successful.

Capital Cost	Medium/High (£2,500 to £10,000)
Ability to reduce heat loss	Medium
Operating Cost	High
On-going maintenance requirement	Medium

Example Suppliers:

www.biddle-air.co.uk/air-curtains-comfort.ashx

www.dimplex.co.uk/products/commercial_heating/select_by_product/air_curtains

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Option 3 – Power Assisted Door

In order to make the external door easier to open, a power assisted door opener can be added. These are often seen to assist disabled persons in entering public buildings but can be equally used to allow children to be able to open the door by pushing a button rather than the door.

The units typically consist of a door opener at the top of a door, which has an electrical supply going to it and a push button, which you press to open. The graphics on the push button can be changed to be more appropriate to children rather than disabled people.

This solution does require a small amount of electricity to operate the opening motor but this is very minor in comparison to the heating required in the other solution. As the door is shut and fully sealed at all times when it is not being used, this is very effective at retaining heat depending on the amount of traffic through the door. The systems work best on modern doors, which are glazed so that the children can see through to the outdoor space and check to see if there are others on the other side of the door. As there are moving parts there is some on-going maintenance implications to ensure that the mechanism is maintained but this is not extensive.

Overall, this option provides the most robust solution albeit that some guidance may need to be given to the children when they first join until they get used to the working of it.

Capital Cost	Medium/High (£2,000 to £6,000)
Ability to reduce heat loss	High
Operating Cost	Low
On-going maintenance requirement	Medium

Example Suppliers:

www.briton-hardware.co.uk

http://www.dorma.com/us/en/products/opening_closing/automatic_swing_door_operators/index-144-470.html

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Summary:

It is recommended that in order to meet both the indoor comfort temperature requirement of the EYFS framework and the desire to have free flow outdoor access that providers:

1. Close the external door fully and restrict outdoor access when the external temperature is below 4 degrees C
2. Open the external door fully and allow clear access when the outside air temperature is above 17 degrees C
3. When the external temperature is between 4 deg C and 17 deg C use one of the three options to retain heat within the internal space when allowing free flow outdoor access.

Matt Fulford
matt@inspiredefficiency.co.uk
07971 78733