TRILUX/LIGHTING EDUCATION FORUM

Ray Molony: There's been a massive investment in the education sector. What lessons can we learn from the first wave of installations? What creates an environment in which people are happy and learn best? Julia, you were involved with Joined Up Design for Schools, which talked to pupils about what they want.

Julia Barfield: It was organised by the Sorrell Foundation and has been going for two or three years. It's an initiative to make the pupils the client. The first wave included architects, graphic designers, fashion designers such as Paul Smith and others. They went into secondary schools and talked to Year 9 and 10 pupils.

The group would then look at the schools in all their aspects and match the schools with an appropriate designer.

Now they're joining together design students in higher education with schools.

All the work is published and there are regular exhibitions at Somerset House of the work that has been done.

Stefan Jakobek: The really important thing that we have to remember is that schools are not only places for learning, they're places for teaching. We need to provide teaching environments that allow teachers to get on with their job effectively.

On the one hand you have to get the lighting right and effective, but it must be an inspiring and pleasant place to be. Anybody can design 500 lux on the working plane, but an effective learning environment is much more than that, and artificial lighting and daylight is going to play an important part. If we do our job properly, you shouldn't need artificial lighting most of the time.

Theo Paradise-Hirst: Max Fordham Consulting Engineers was brought in to work on a range of projects called Millennium Plazas. We worked on a prototype with Alsops, and that involved engaging with teachers.

The first prototype was done three or four years ago and that was a simple lighting system with some controls. A number of schools at this prototype stage were looking at spaces that were redundant or underused, so they started looking at converting gyms – which don't have much natural light – into a pseudo-office environment.

Lighting changes throughout the day to create a slightly more inspirational atmosphere. After lunch is a time when pupils are quite disruptive or hard to engage with, so we looked at changing the quality of light distribution and direction to change the atmosphere.We were adjusting the direction, intensity and quality of light. We introduced coloured light too, so the quality of the interior surfaces change

slowly over time. We worked with manufacturers to make the controls as easy as possible to use.

One thing that we've been very surprised about is that the teaching staff have been very pro-colour. They want quite stunning, vivid colours.

Ray Molony: Has any research been done on the effect of lighting in education?

Mark Ridler: In the US, they took a whole series of schools that had no access to daylight and others that had good access and did a very rigourous piece of research that takes other factors into account and has a very large sample.

The differential in literacy and numeracy between daylit and non-daylit schools can be 20 or 25 per cent.

Julia Barfield: It's a combination of light and ventilation.

Mark Ridler: One of the punishments in prison is to deny people access to daylight and fresh air.

Julia Barfield: Joy is important, but you can't measure joy.

Mark Ridler: One school that we've been involved with in Ramsgate moved into a new academy building. The pupil, teacher and parent surveys let you measure subjective things. Truancy and graffiti plummeted, there was a sense of pride.

Daylight is absolutely crucial, and the view is very, very important.

Ray Molony: Victorian schools had high windows so the pupils couldn't look out.

Mark Ridler: I think that is changing, although the teaching profession is quite split. Of course, it depends what the view is of. The curriculum is moving more towards recognising the role of creativity.

Julia Barfield: We did a study of schools in Lambeth and Southwark comparing the Victorian schools with the sixties schools, and the Victorian schools are so much more flexible.

Robin Dryer: We work on higher and further education projects. It's a different animal. Projects vary from car parks to nurseries to gyms and teaching facilities. The importance of lighting is therefore vast and varied.

But estate managers don't talk about lighting directly, it's something that gets left behind. The architect or the lighting designer has to bring it to their attention. It might, however, be tied in with Breeam or daylighting requirements.

You're pulling in fittings that would traditionally be seen elsewhere and putting them into an education environment. Colour changing, for example, is a tool at your disposal.

Theo Paradise-Hirst: And that is applicable to primary and secondary schools. I think further education would demand a different approach. But we are using coloured lighting in a very controlled way – it's not a disco, the colours are appropriate to that teaching environment.

Richard Cameron: It's quite a standard practice using coloured light to create a stimulating environment for special needs children.

Julia Barfield: That tends to be concentrated in the sensory room, and a special consultant comes in. It's complicated because some children need a stimulus and others certainly don't, and you can't predict what the next intake of students will need.

We've got a colour strategy for all the wayfinding.

Barrie Wilde: We did a school in Newham four or five years ago which was mixed ability. The use of colour was very important for wayfinding, either for children with visual disabilities or those who couldn't read or write. It worked extremely well.

Florence Lam: There are very different needs between primary, secondary and tertiary education. Primary schools should be stimulating and daylighting is great. But there's no regulation about what is good and bad. Even some of the research is not very prescriptive about what is good for children.

We need to ask the architect how the building can be designed so the natural light comes into the building and, for example, how the learning facilities are clustered. The problems should be designed out rather than dealt with later on.

In secondary and higher education, heads are being encouraged to be more like a businessperson. So a school hall has to be truly multifunctional.

In the past, we tended to get more involved with higher education, but now there's a wave of change coming. A key driver is the way in which schools are run. They are looking for ways to use the school buildings in the evenings, at the weekends and during the summer to generate revenue.

We need to convince clients to look at things differently and to see how good lighting can help generate revenue for them. Lighting designers should get more involved and influence others to adopt a more holistic approach.

Florence Lam: We also need intuitive controls. Without controls, if the sun comes onto a room one day and the blinds are lowered, the next day they'll still be down.

Stefan Jakobek: Yes, if designers don't control glare, down go the blinds and on come the artificial lights and it stays like that for the rest of the day. We have made a massive switch to [Autodesk's] Revit so we can look at buildings as three-dimensional models very early on. It makes it easier to use daylight.

Florence Lam: With the advances in computer technology, there's no reason we can't use climate-based modelling to determine the useful daylight.

Stefan Jakobek: And the introduction of ICT and interactive whiteboards has made this worse.

Florence Lam: As designers, we can help with this.

Barrie Wilde: One of the tragedies in the lighting industry is the use of the average daylight factor condemns half the room to less than the average, yet the foreword in the British Standard says the rules are there to "enhance the experience of the end user". But half of the class will not be enjoying it.

Daylight factor in schools used to be a minimum. It was in the darkest corner of the farthest part of the room. That meant you had to handle your windows very carefully. Words fail me that we reissued this document describing exactly the same criteria that we knew were failing previously.

Martin Valentine: There's a tendency to pull classrooms into the school to solve heat and cooling issues, and relying on a central street as a trendy central space. But there is less likelihood of windows, and if there are windows, they are shrinking.

There are planning issues too for windows overlooking neighbourhoods. It could get worse.

Gary Tozer: You've got to look at the neighbouring buildings at the early stages, and then you can advise the architect.

Ray Molony: What are the briefs like? Is daylighting and artificial lighting on the agenda?

Robin Dryer: On a project we worked on in Glasgow, light levels were set out as part of the brief. That was quite good to see.

Gary Tozer: We are working on a BSF school at the moment and daylighting is an important part of the brief.

Helen Loomes: Does anyone use reflectors to get the daylight deeper into the building?

Julia Barfield: We had them in one of our schools and they were taken out by the contractor.

Theo Paradise-Hirst: We've been exploring that and modelling it, looking at harvesting blinds that direct light towards the ceiling and films that divert light onto the soffit. The quality of the glass is quite an important factor. Some glasses are very green and you get a different representation of light through the glass.

Ray Molony: Do people want high Breeam ratings?

Theo Paradise-Hirst: Certainly we're trying to get the best we can out of the buildings.

Mark Ridler: People do understand Breeam and sometimes there's even money there to achieve an 'Excellent' rating.

Julia Barfield: It's certainly my experience that they're only trying to get to 'Very Good'.

Mark Ridler: We did a campus building at Newport in Wales where £10 million of funding was contingent on achieving 'Excellent'. That came from the client.

The problem is about numbers. If you're having a conversation about windows and the QS is in the room, they'll say: "How little can we get away with?" Then they'll say: "Is there an absolute requirement?" Well, no there isn't, but do you want the children to learn well?

There has to be financial muscle behind it.

Julia Barfield: Yes, it has to come from the client.

Mark Ridler: Lots of the early work we did was on the academies, where there was a more traditional design process. Under BSF, things are being designed in competition – two or three people trying to minimise design activity at that stage. As soon as someone wins the contract, they say "right, we've designed the school" and now we're going to planning.

There are also a lot of 'design chain solutions', where the contractor a relationship with a manufacturer that provides a 'solution'.

Julia Barfield: A huge amount of money is being wasted in the procurement process. Each school gets designed multiple times by competing teams. It would be better to choose one designer and do it once.

Ray Molony: Does artificial lighting get cut back because its often the last thing to go in?

Theo Paradise-Hirst: Even from the outset, the budgets aren't always realistic, and lighting is often underplayed in the brief.

Mark Ridler: If you've got a contractor who treats the space like an office and puts Cat 2 in, that sorts the whiteboard problem out, but you're lighting for machines, not for people. Machines are tools, education is about interation between human beings.

Gary Tozer: We shouldn't be putting kids in office environments.

Ray Molony: Architects and multi-disciplinary practices are involved in education. What about independent lighting designers?

Mark Ridler: It's not the fees. It's pathetic when you think that maybe another £25,000 on a £25 million project is all that's needed.

Ray Molony: Who chooses the luminaires?

Mark Ridler: The contractor.

Ray Molony: Does BSF have a say?

Julia Barfield: We make suggestions and they come back with options.

Richard Holt: Often it's not the electrical contractor that's making the decision, it's the main contractor. The main contractor sets up a supply chain and everyone runs off that supply chain.

Richard Holt: One trend is the use of the slab as a heatsink for the building. I understand the Government is saying that it wants very green buildings, so suspended ceilings are being eliminated, the slab is being exposed and ceilings are getting higher. We're involved with BSF and are asked for suspended systems for classrooms.

Gary Tozer: Of the schools we are doing at the moment, the majority are exposed soffit. It is a trend. In those situations we generally use suspended direct/indirect fittings. We were looking at the integrated acoustic systems because they tidy things up, but it all comes back to cost.

Julia Barfield: But you don't want the lighting to effectively cut down the ceiling height.

Robin Dryer: On a design and build job, we find that if we can stay with the contractor, we've got a fighting chance of getting 50-60 per cent of the light fittings that we want. It depends how passionate you are.

Mark Ridler: Somebody must demand quality standards.

Robin Dryer: The contractor will try to substitute other fittings, it depends on how much energy you put in.

Richard Holt: You're being paid a fee, but the client isn't even listening to you?

Mark Ridler: This is where the relationship with the client becomes really important. You have no commercial relationship with the client, it's with the contractor.

Theo Paradise-Hirst: It's a bit of a false economy when things get changed because in the long term it's going to come back and bite the end user. One thing you can do is try to make the specification very detailed so that things are documented if substitution starts to occur.

Ray Molony: Are all the lamps T5 with high-frequency gear?

Martin Valentine: No! T8 is absolutely not a dead technology, there's a lot of research going into it, it's very low glare and if you look at the consumed power densities, T8 often performs better than T5.

Ray Molony: Is it easier to hold spec on good lamps and gear?

Mark Ridler: Funnily enough, that doesn't seem to be challenged in quite the same way. It tends to be less controversial. And on BSF you can get bulk buying opportunities across, say, five schools.

Ray Molony: Outside the classrooms, what about the circulation and 'chill-out' areas?

Mark Ridler: There's a real opportunity there. It's typically 20 per cent of the cost rather than 80 per cent and clients understand those spaces much more and have much stronger aspirations. They are the spaces that give you, as a head teacher, an identity.

There are some very good ways of designing good lighting in there, and designing the cost out, particularly if you have an early relationship with the architect and can integrate lighting into the building fabric.

Richard Cameron: These spaces are becoming more important. They are crucial from a lighting point of view, a lot of learning goes on there.

Theo Paradise-Hirst: We've been able to put lighting at low level, at a human scale, which makes the spaces very pleasant.

Mark Ridler: One of my frustrations is that you would think, in such a large building programme like this, that there would be some kind of consensus.

Julia Barfield: There were the exemplars, we did one of those. I just think it was such a shame that they didn't just go ahead and build one of each. A huge amount could have been learnt.

Mark Ridler: There's no feedback loop. Some of these shools are completed, why aren't they being assessed?

Julia Barfield: There is a programme to go back to the schools a year after. But it's not started yet.

Stefan Jakobek: And there are issues of commercial confidentiality. A lot of building failures are not necessarily the fault of designers, it's a very complex process. PFI is competitive, and it's not a great forum for sharing knowledge. It's been successful at driving down costs, but it's debatable whether it drives up quality.