LIGHTING FOR EDUCATION

INNOVATIVE AND ESSENTIAL LIGHTING SOLUTIONS FOR EDUCATIONAL & CHILDCARE FACILITIES

APPLICATION GUIDE
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# APPLICATION GUIDES

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MAKE SURE TO GRAB YOUR COPY OF THE LIGHTING FOR EDUCATION PRODUCT SELECTION.
INFINITI

VISP LED is a modular LED suspended luminaire designed for easy installation and removal. The product can be used in offices, retail, education or medical environments, giving designers freedom of choice.

The luminaire is available in four finishes - black, white, silver and copper. It is supplied with a Frosted diffuser as standard.

DESIGN
- Lightweight design for easy installation
- Available in four finishes (black, white, silver, copper)
- Frosted diffuser for soft lighting

PERFORMANCE
- Triac Dimmable
- 3000K White, 4000K Cool White
- IP65 Rated
- 1m x 1m or 1m x 2m
- 2000lm
- 27W
- 40W
- 50W
- 60W

APPLICATION
- Offices
- Retail
- Education
- Hospitality
- Healthcare
- Restaurants
- Retail
- Hotels
- Conference

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THE BRAIN

The development of the human brain is the key to our rise as a species, yet it comes with a hefty price tag. At the time of birth our brains are far less developed than they need to be for civilised survival.

The nurturing care provided by parents and community for the biological and emotional needs of our children has changed little over time. However, as we increasingly rely on technologies and machinery to shape our world, we must therefore provide excellent and efficient learning facilities, capable of delivering timely, engaging, and powerful lessons to our most important assets – our children.

‘Illumination’ – it is both the goal and the method of Lighting for Education.
Clear communication is pivotal for effective education, and in most cases will revolve around the auditory and visual senses. Educators and students perform visually demanding tasks for extended periods; the lighting design must strengthen this process.
EDUCATOR

In a typical classroom, a teacher will be constantly changing visual focus to engage with students at many different angles. They will be mobile, at times facing walls and other times facing windows. When writing on, or expounding concepts from the whiteboard/blackboard, they will often have to perform a complete about-face, changing focal length from a few hundred millimetres, to many metres.

They will need to perceive the visual cues of their students, to gauge levels of understanding as well as to perceive the emotional states prevailing. Students that stay interested and engaged will take part in the learning process; a loss of engagement can result in a complete disruption of the class, affecting all students at a variety of levels.

STUDENT

A student usually has three primary focus zones — their own workspace, the teacher, and any teaching aids (e.g. the whiteboard/blackboard, a geographical globe, anatomical models, etc.). The teacher and the teaching aids will usually occupy a similar zone at the front of the class, meaning that there are two primary focal lengths for a student.

Usually students will focus on their teacher, teaching aids, and their own workspace for prolonged periods, rather than in short, back-and-forth cycles. There will also be occasional, short-term focus on fellow students around the room where the visual field may include windows.
Jean Piaget, a pioneer in the field of child development, proposed a comprehensive and hugely successful theory about the nature and development of human intelligence, or cognitive development for short. It proposes age-related stages of development, showing greater benefits of distinct types of stimulus as children age and mature. Naturally the scientific community has challenged and tested this theory, even Piaget himself has recognised some of its limitations, yet it has given the foundation for teaching methods for education systems across the world.
SENSORIMOTOR

This is the period between birth and language development. It involves coordination of experiences (sight, sounds) with physical interactions (grasping, striking, sucking, and stepping). It moves from reflexive and instinctive action to foundations of symbolic thought.

PREOPERATIONAL

Piaget showed that once a child begins to learn to speak a new quality of psychological function occurs. From this time until the early primary school years he noted that children do not yet understand concrete logic, nor mentally manipulate information. In amongst other things, play and imagination become an important focus for the child, with symbolic references being acceptable for objects and characters needed in their chosen activity.

It involves egocentrism, a stage where children struggle to see things from other points of view. Later, around pre-school and early school years, the child’s curiosity spikes and they begin to ask many questions and apply primitive reasoning.

CONCRETE OPERATIONAL

From early school years to the end of primary school, children develop the ability to use logic appropriately. They lose their egocentrism, and can apply inductive reasoning, and solve problems that relate to concrete events or objects. Hypothetical problems are still beyond them, and they are yet to adapt common-sense knowledge and application.

Social matters become more open to them, and they become able to understand love, logical proofs and values; they can also envision future possibilities and are fascinated with what they can be.

FORMAL OPERATIONAL

From adolescence to adulthood, the secondary-school years, children develop hypothetical and deductive reasoning, learning to manipulate abstract concepts in their minds. These form important foundations for scientific and mathematical ideas, as well as philosophical and ethical notions.

In this stage, deductive reasoning develops, and the child can problem-solve using trial-and-error, logic, and systematic approaches.

Early in this stage the thought processes are concrete and specific, later developing into an ability for ‘thinking about thinking’ – an approach that allows adolescents and adults to reason about their thought processes and monitor them.
VISUAL PERCEPTION

The development of adult-level visual perception relates to both biological and cognitive developments. Biologically the visual cortex develops to near adult levels by around early primary school ages, and the eye is even earlier at around three years of age. An infant’s eyes eventually grow to three times their birth size, with one third of the diameter increase happening in the first year of life.

Cognitively, the development progresses until around the early secondary-school ages. We cover those issues in our discussions of Piaget’s theory. Here we clarify the biological development stages.
0-3 MONTHS

At birth the pupils of a human eye cannot dilate fully, the lens curvature is near-spherical, and the retina (especially the macula) is not fully developed. Visually the infant is moderately far-sighted, a degree of astigmatism, poor fixation ability, very limited colour discrimination, and limited field of vision. Visual acuity is estimated somewhere between 20/200 and 40/200. Infants orient to single targets only and they prefer black and white contrasting shapes, especially with angles.

By the end of this time eye and head movements allow attention switching, ocular movements coordinate most of the time, colour preferences begin (especially for yellow and red targets), smaller targets (approx. 2.5cm) can be picked out, visual attention and visual searching begin, and the infant begins to associate visual stimuli with events (e.g. seeing a bottle and subsequently feeding).

4-6 MONTHS

Infants develop the ability to look at an object in their own hands, their ocular movement is smoother, they visually ‘explore’ their environment, and can easily shift their focus from near to far objects. They can converge their ocular focus on near objects, can fixate at 1m, and usually achieve the important hand-eye coordination for reach by the end of this period.
6-9 MONTHS

Acuity improves (to near mature levels), and visual exploration of the environment and objects in their hands is more sophisticated. Geometric patterns become of interest to the infant, and they can transfer objects from hand to hand.

9-12 MONTHS

Very small (2-3mm) nearby objects can be spotted by the child, it watches faces and attempts to imitate expressions, searches for hidden objects after observing the ‘hiding’, is visually alert to new people, objects, and surroundings, can differentiate between familiar and unfamiliar people, and its vision motivates and monitors movement towards a desired object.
1-2 YEARS

Over this period the child develops vertical (upright) orientation, all optical skills are smooth and well-coordinated, acuity is 20/20 to 20/30 (normal), the child can imitate movements, match same objects by single properties (e.g. colour, shape, etc.), and point to specific pictures in a book.

2-3 YEARS

Retinal tissue has matured, the child can complete a simple form board correctly (based on visual memory) do simple puzzles, draw a crude circle, and put 2.5cm pegs into holes.
3-7 YEARS

The biological elements of visual sense are largely in place over this period, aside from a later spurt in growth of synapses, then pruned around puberty. With the mechanical elements formed, the cognitive development continues to process the improved input it is receiving to create ‘adult-level’ visual sense around the time of early secondary school.

For a lighting designer, understanding the biological development of the visual perception systems, Piaget’s cognitive development theory’s stages, and the ways that education systems respond to them creates a path to best practises that support the needs of the educators and students.
AGE RESPONSIVE SOLUTIONS

To create effective lighting solutions for an education facility, the lighting designer must assess the student age groups. We recommend three discrete approaches based upon three age zones — up to 7, 7-12, and 12+.

For a child-care facility where ages are from infant to pre-school, the systems can be simpler in terms of control, as is the case for kindergartens. Primary schools, however, present a more complex problem, as the lighting must cater to two different sets of student needs. A potential crossover of student ages also exists in the early years of secondary school, especially if the facility includes students below Year 7 level, and again the lighting would need to cater to multiple sets of student needs.
UP TO 7 YEARS OLD

Pre-operational stage children learn best via play-based activities. They begin to judge distance, increase fine motor skills, differentiate colours, and understand 3-dimensional shapes. To support this the lighting system must favour direct illumination to increase depth view via shadows. Although children are more sensitive to light, they are less affected by glare, and therefore direct illumination does not create issues for them. However, flickering illumination sources can affect children, thus we recommend high-frequency electronic luminaires for these spaces.

7-12 YEARS OLD

At concrete operational stage, a child’s visual senses are improved, they gain the capacity for paper and screen-based learning, and they begin to appreciate abstract level concepts relating to subject such as quantity, weight, and volume. However significant learning still occurs through play, physical activity, and object-based teaching aids, and they still develop further in perception of 3-dimensional shapes. They are benefitted by lighting solutions that increase the diffusion of light, especially indirect illumination, and vertical illumination on primary surfaces is necessary.
Since visual perceptions for the formal-operational age child are now fully matured, these students benefit from illumination that supports reading and writing activities. 2-dimensional formats are the primary method of input and processed very successfully by the students in this way. A lighting scheme for this age group needs to further improve contrasts, reduce glare, and improve verticals, therefore indirect illumination becomes even more critical.
VISUAL COMMUNICATION FOR EFFECTIVE LEARNING
The visual cues humans take from facial expressions are vital for effective communication. Students must be able to discern eye and lip movement, emotions and general expressions from their teachers to optimise their understanding of the presented material.

Therefore, illumination of a teacher’s face is necessary, however simply adding light is not enough; if shadows are eliminated it will result in washing out important details. Good modelling of the facial features is vital and is achieved by an approach that defines the face and head with contrasts and shadows. A new metric adopted this decade in Europe (in EN 12464-1:2011) for this purpose is to compare a horizontal illumination level (EH) against ‘cylindrical illumination’ (EZ) (average of all illumination on the walls of an imaginary cylinder) at face height.

For sitting work, measurements are at 1.2m, and standing work it is at 1.6m. When the ratio of EZ:EH is between 0.3 and 0.6 it is considered that good modelling of the facial features will be achieved. Of course, these calculations are only intended to be performed where visual communication is expected to take place (e.g. For a teacher in a classroom, a zone between the students and the whiteboard / blackboard would be the likely area for calculations).
OPTIMAL RESULT

The optimal result is where EZ:EH is within the 0.3-0.6 range – the result is that facial expressions are clearly visible, meaning that conditions for visual communication are good.

ALL SIDES

When EZ:EH exceeds 0.6, the balance of illumination is too vertically biased, and facial details become washed out and featureless.
When EZ-EH falls below 0.3, the balance of illumination is too horizontally biased, and distracting shadows will form around the eyes, under the nose and potentially under the cheeks.

Another scenario to be avoided is a non-uniform direction of vertical illumination, where one side of the face will be illuminated whilst the other appears dark.
Versatility is paramount in modern classroom illumination. Factors such as fluctuations in enrolment numbers and future expansion mean that student ages are not able to be clearly identified for a classroom over its useful lifetime. Given that the visual requirements of students change as they age, it is vital that the lighting scheme can adapt accordingly.

For the main body of the area, an optimal system is one with low glare direct optics and powerful indirect illumination, with the ability to easily blend the two in varying amounts. The educator needs clear, simple scene setups to dim and switch the optics according to the student age group.

Students spend long hours in the difficult task of constantly learning new material; lighting that feels natural will enhance the education process. It is beneficial for student wellbeing to incorporate a degree of controlled daylight, which also provides the potential for significant energy savings via daylight harvesting systems. Tuneable white systems have been documented to have beneficial effects on children’s concentration, test results, and in reducing hyperactivity.
PRESENTATION ZONES

Our education system is not online – it is based upon having educators front and centre in a classroom, able to deliver the material to the students in an interactive way. A teacher’s body language and expression are vital signals to the students for where key information lies. Standard illumination practises in classrooms fail to support this process, as the vertical illumination on the whiteboard / blackboard, and the horizontal illumination on students’ desks are the only metrics typically addressed.

It is vital to provide a teacher with adequate illumination on their face, in a manner that provides good modelling of facial features and expressions, whilst avoiding glare for the teacher or students.

This requirement can be addressed in a similar manner to the whiteboard / blackboard illumination, with dedicated luminaires designed with low-glare, asymmetrical distribution.
NURSERIES/PLAYROOMS

Very young children learn through sight and touch, and the critical motor-sensory development at this stage of their lives requires good colour rendition and high contrast. Their experience of and interaction with the world around them is different from school-age children and adults, and the lighting scheme must respond accordingly.

Low glare, direct illumination is important for these children to adequately comprehend their environment, as well as to judge distances and grasp items for play and discovery. Light sources with high colour rendering properties are essential for them to process their spaces and differentiate between objects. Tuneable white luminaires (where colour temperature can be changed between cool and warm appearance) have positive effects documented on children’s ability to focus attention on a task, as well as reducing hyperactivity.

Indirect lighting still has its place in various locations of child care, such as change-rooms for infants. Instead of downlights, a better approach in these areas can be wall mounted diffused fixtures or uplights, ensuring that the child is not forced into direct viewing of open reflectors.
PLEASE NOTE ALL PAGE NUMBERS RELATE TO THE LIGHTING FOR EDUCATION PRODUCT SELECTION BOOKLET
For best illumination in interior learning spaces beyond the general classrooms, thorough task assessment is essential. Taking a ‘one size fits all’ approach fails to honour the needs of the teachers and students, and risks undermining the education process. Many of these rooms rely on students learning physical manipulation of tools and instruments, in addition to reading (both printed and electronic texts), and two-way communication with their teacher.

Tablets are becoming more commonplace for students in these spaces, creating many screen and viewing angles incompatible with direct light sources. In these areas an indirect lighting scheme is preferable to uniformly illuminate the room.

Music, art, and craft rooms have demanding visual tasks, and in most cases higher illumination levels are required. Textile and art-based works require excellent colour rendition, and non-distracting light sources. Art, sculpture and pottery work are three dimensional, and high levels of direct illumination must be present to provide shadowing and modelling effects.

Care should be taken to avoid stroboscopic effects in workshops and areas with moving mechanical equipment. It should be noted that not all LED products are high-frequency – where AC chip LEDs or other mains frequency sources are used, adequate steps should be taken to reduce risk of injury from dangerous apparatus.
LABORATORIES

As a physical requirement, classroom laboratories and kitchens demand simple and effective cleaning of all surfaces. Luminaires must be robust, with the ability to be sealed and wiped down for safety.

In kitchens, class times are generally limited, creating a high-pressure activity that is often involving a risk of burns, spillage and laceration. Direct / Indirect solutions will deliver a balanced result for the rapidly changing task orientations such as reading recipes vs. manipulating utensils and ingredients. Light sources must have good colour rendition so that students can reliably assess ingredients and whether a recipe has reached a satisfactory stage in the preparation process.

For laboratories, elimination of glare is a high priority, as many glossy surfaces are involved. Students must perform reliable readings of measuring equipment, chemical labels, and text books. High colour rendition is important for assessing results of experiments, and direct / indirect illumination (with an emphasis on the direct component) is favourable in this area where acid-burns and explosion risks are common.

TOOB

ASTI

NOVA

VRL

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AUDITORIUMS

The need for good auditorium illumination becomes obvious as soon as students enter an auditorium, long before the presentation begins. Locating a suitable seat and safely navigating stairs and other occupants is the first task a student usually faces. Guiding their way with recessed wall or floor luminaires or strips is of benefit, with control to keep lighting matched to adapted eye levels along with the lighting level of the presentation itself.

Note taking during presentations requires high illumination levels, and the large spaces will usually benefit from low-glare recessed downlights or linear systems; conversely low levels are required during video or screen-based presentations, and may be achieved best by indirect sources such as pelmet fixtures, wall luminaires or other such diffusing effects, providing they do not interfere with the presentation.

Presenters have the same needs as teachers in terms of communication of facial expressions, but due to the larger distances to the students it is vital for bright and even vertical illumination at the lecturer’s face level.

Lighting control needs to be versatile, yet simple, as most presenters will be focused on the material rather than operation of technology, but will need to be able to set the illumination quickly and easily to the levels appropriate to any and all stages of their presentation.

Lastly, auditoriums are often seen as a prestige area for an education facility, and aesthetics take on higher levels of importance. It is worth considering the space and architecture of the facility and deciding if the lighting can be used to form both practical and appealing effect.
VENICE DL - VENICE DOWNLIGHT

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SPORTS HALLS

Whilst class rooms are the major learning centres of most educational facilities, the drawcards on Open Days and school tours are typically the sports halls and other similar showpieces. Good sports facilities also draw communities together, providing locations that can be offered to local sports teams for competition and training. Investment in a well-designed sports hall can return many significant benefits to a school or university.

Many such facilities have a multi-part role, offering locations for whole-school assemblies, examinations, and other such activities, all with the benefit of being ‘all weather’ facility resources. The design must account for these potential usages, in addition to being adequate for the level and type of sports involved. Typically lighting levels need increasing as speeds increase, or as size of the ball or other articles (e.g. shuttlecock, rhythmic gymnastics objects) reduce. Most such facilities also involve high roof and fixture heights to allow for sports such as basketball, volleyball and badminton to be played without restriction.

The lighting must intrinsically display a high level of visual comfort whilst still being powerful enough to cover the required sports and other functions. Players will need to rapidly and repeatedly change their viewing angles from the horizontal to vertically upward, therefore diffused optics are necessary. Objects travelling from dark to light areas appear to change speed, impacting not only the skills of the players but their safety as well. To avoid this the lighting must deliver uniform levels and high vertical illuminance (not merely meet the horizontal targets of the relevant AS2560 Standard) so that players can track thrown objects well above the court levels. Upward lighting is necessary to avoid glare and ‘cave effect’ in the space. Dimmable luminaires are required to avoid the non-uniform results that occur if switching is used to reduce lighting levels, and presence detection should be added to reduce unnecessary energy consumption when no users are present in the facility.
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Libraries and study areas need to be conducive to concentration and relaxation – in these students will need to develop self-discipline and self-study skills, as well as methods by which to locate resources relevant to their tasks. The education process can create periods of stress for students as they grapple with new concepts and information, therefore these facilities should be designed carefully, especially in terms of lighting.

A natural feel in terms of illumination is desirable, and glare is to be strictly avoided. Balancing the need for daylight against the potential for glare is important, especially in lower-ceiling facilities where large spaces will create bright 'tunnel end' effects as students look toward windows.

For shelving, adequate vertical illuminance is necessary, uniformly distributed from bottom to top of the racks; a linear asymmetric system is desirable for this purpose. Students need to be able to navigate to the correct shelf and find the required resource easily. Glossy book covers can easily reflect brighter sources; therefore the ceiling must be illuminated to reduce contrast between luminaires and their background.

Group study areas benefit from a cosier feeling in both the architecture and the lighting. Local lighting, especially where it increases vertical illumination on faces, can be an advantage. Reading stations should have adjustable asymmetric task lights for each user; these should be designed with parallel movement to keep the optic in the same plane as the desk, thus avoiding glare for other library users and computer monitors.
LOBBIES

For many people, the lobby is their first impression of an educational facility, and modern schools rely on these spaces to be versatile, practical, and appealing. Transitioning from outdoors to the lobby needs to ensure simple, clear orientation so that users are not left confused as to where to go, especially when there is a large amount of student traffic entering and exiting.

Fixed signage for facilities and directing signs should be clearly visible, and corridors should also be distinct. Noticeboards and displays of upcoming plays, artworks, and awards should be easily visible and readable. As these areas are often social, high vertical illumination is desirable, and a natural feel including a good daylight component will avoid an institutional feeling in the space.

To accommodate these needs, the lighting needs to be attractive, flexible and functional. Direct / indirect illumination should play a major part in the scheme, aided by accent illumination and spotlighting (careful to avoid glare) as appropriate. Daylight sensors should be considered for reducing energy consumption due to the long daylight hours and fluctuating occupancy levels of a lobby.
VENECE DL - VENICE DOWNLIGHT
VENECE SL - VENICE SPOTLIGHT
VENECE P - VENICE PENDANT

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CIRCULATION

Stairs, corridors and other zones of people flow are possibly the most multifunctional spaces in an educational facility. Safe movement, navigation and orientation, signage reading, socialisation, and information gathering (e.g. noticeboards) are just some of the functions performed across their varied and often complex geometries. Daylight is often non-existent in these spaces, or only becomes visible at the end of a long, narrow space. In these facilities, corridors should be assessed more correctly as ‘lobbies’, and illuminated to appropriate levels. To light only to the minimums required by AS1680.1 for a corridor would be a mis-application of the Standard, as many of the tasks performed in them require higher levels.

In the social constructs of education facilities, facial recognition in all these spaces is vital. Therefore the lighting scheme must provide good vertical illumination in addition to its other properties. A mix of direct and indirect lighting in corridors may assist younger children in discerning distances and three-dimensional objects. Repeating patterns or shapes that follow pathways and highlight junctions can subtly reinforce a feeling of confidence when navigating new locations. Hard and long shadows should be avoided as they may be interpreted as steps or obstacles by visually impaired people. Corridors see much lower usage rates during classes, therefore stepped-levels of lighting controlled by presence detectors should be considered for energy savings. Where daylight is present via skylights, this can also be leveraged for more energy savings via sensor controls.

Stairwells are an increased risk area, and the contrast of the steps should be enhanced by illumination either on the steps or adjacent walls via low level recessed fixtures.
VENICE DL - VENICE DOWNLIGHT  
VENICE SL - VENICE SPOTLIGHT

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Changing facilities and locker rooms are used only sporadically, and presence detection for energy saving is a wise choice. They require bright, uniform illumination throughout the space that discourages students from lingering. The lockers should have sufficient vertical illumination present that the contents inside them can be easily identified.

Showers require appropriate IP rated fixtures, with broad, direct illumination that can utilise wall surfaces for interreflection (finishes should be chosen as highly reflective in these areas).

Hand basins and urinals are wall-based, requiring illumination between the person and the equipment. Wall mounted diffused fixtures can be used on a one-to-one or one-to-many basis, or relatively low output downlights can be used for each individual station in addition to the general lighting. Where downlights are used at hand basins, high reflective colour finishes can fill in shadows on the facial features in mirror reflections; alternatively wall mounted diffused fixtures should be considered for supplementation.
VENECE DL - VENICE DOWNLIGHT

**PLEASE NOTE** All page numbers relate to the Lighting for Education Product Selection Booklet.
STAFF ROOMS/ ADMIN / OFFICES & MEETING ROOMS

The administrative areas of educational facilities fill myriad roles for staff, but are primarily divided into work and relaxation zones. Offices, meeting rooms and other admin areas must be functional and bright enough for the demanding needs of educators in the modern world. During lunchtime and similar ‘down times’, the staff benefit from comfortable illumination levels and natural feeling environments.

Offices and work spaces that may be used for meetings with other staff, students and parents need a combination of direct and indirect illumination; decorative fixtures, pendants, wall fixtures can create a more friendly feel, whilst adjustable task lighting can be added for ensuring that workstation lighting levels are sufficient for paper and/or computer work.
VENEICE DL - VENICE DOWNLIGHT

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FIRST AID

When a child is injured or unwell, their immediate response is for the care and attention of their primary caregivers. In educational facilities, where this obviously cannot immediately be provided, children need comfort and a feeling of safety; creating a sterile or institutionalised room for first-aid can prove counter-effective to the staff trying to calm a frightened, stricken child.

Lighting a first-aid station should be a multi-part scheme. Indirect, dimmable, warm illumination is of benefit for a child that needs to lie down and recover. For diagnosis and treatment, crisp overhead lighting can be beneficial, with a minor-procedure adjustable examination light added to be able to add high-quality illumination to an injury site.

Risk of anaphylaxis is increasingly common in school children, and Cyanosis Observation compliant light sources should be considered, however it should be acknowledged that not all patients can benefit from C.O. compliant fixtures.
CANTEENS

Where educational facilities include spaces for communal meals, they become an important part of the social interactions of students with their peer ‘family’. The illumination should be welcoming and relaxing, uniformly bright across the table spaces, with a balance of direct & indirect illumination for good facial modelling.

High colour rendition is important for ensuring food looks appetising, and luminaires with decorative aspects can be of benefit to create a fun and/or interesting space that contrasts well against the more structured class room aesthetic.
As a minimum, external security lighting is essential for educational facilities to deter vandalism and theft. Operating hours and street traffic should be considered when deciding whether additional external lighting could provide benefits in the perceived desirability of a school to prospective parents or the local community (neglect and a poor façade will mean a facility has more chance of closure than one that offers a pleasing visage in a neighbourhood).

Where staff and students will be navigating external pathways and stairs during non-daylight hours, floodlights provide broad space illumination (wall mounting will be cheaper than pole mounting, but low mounting heights may restrict throw distances and be an easier target for vandalism). Step-lights, bollards and under-eaves fixtures can help to define the buildings and how to navigate them. Modern LED fixtures are offering far greater efficiencies, design options and aesthetic choices than traditional sources in terms of exterior security and location lights, and judicious use of them can greatly improve the appeal of a facility.

Car parks requiring night time illumination should consider if multi-level illumination targets are applicable, and where possible use presence detection and timer technologies to save energy during off-peak hours.

If there are sports fields and external courts that will be used for dusk / night-time training or competition, pole mounted fixtures will be necessary. If the lighting level and/or pole height requirements are very high, consider if the LED technology available is reliable and advanced enough to make Metal Halide systems unnecessary. Short usage hours and high costs may greatly undermine many of the most common LED light source benefits when compared with high efficacy HID sources in sports lighting.
PLEASE NOTE ALL PAGE NUMBERS RELATE TO THE LIGHTING FOR EDUCATION PRODUCT SELECTION BOOKLET
Peter Sword, founder of Versalux in 1979, is still actively involved in the business as a Partner, Director and Board Member. The company’s ongoing success is greatly attributable to his lighting knowledge and vision.
ABOUT VERSALUX

Versalux has been bringing state-of-the-art products to the Australasian lighting market for 39 years and has been integral to the evolution and revolution that is part of the lighting journey. A heritage that spans almost 4 decades has forged a solid profile in many facets of commercial and industrial lighting and established strong relationships with key international suppliers. We are proud of our great depth of lighting experience and repertoire of major projects within Australia and New Zealand across a diverse range of markets and products.

That rich history extends to our relationships with market leading luminaire manufacturers such as Architech / Quality Art and the Glamox / Luxo group. They too have a proud history of product development and innovation across the lighting landscape. In particular, Luxo has 75 years of history in arm-based product development and are still market leaders in this area. With over fifty million units sold across the globe, the iconic L-1 is ground zero for task lamps and is an integral part of the LUXO story.

Lighting designers and producers alike are faced with increased compliance with a growing number of standards relating to lighting design and luminaire construction, as well as various energy and building construction codes and schemes. Versalux' commitment to quality in lighting design and luminaire assembly embraces the compliance regime and ensures best in class lighting solutions for our clients. Our innovative sales and design teams are the cream of the lighting industry with a formidable combination of expertise and passion for lighting, making us the logical partner for your next project or application.
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