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School Facilities & Infrastructures Guide



Advisory Services



Creating a Great Learning Environment

The academic and functional success of any institution is heavily impacted by the atmosphere and physical makeup of its facilities.

Whether you are planning a private school or any educational facility from kindergarten through university, there's no getting around the fact that it needs to be thoughtfully and carefully structured so as to facilitate an environment that supports learning and a broad range of educational goals.

Planners of schools have long struggled to find an answer to how to design school facilities that are conducive to teaching and learning in the most effective manner. This requires a very clear vision of the present situation, of the expectations of all stakeholders, and of the best feasible route to satisfy these expectations.

There is a substantial body of research indicating that each of the following elements has a favourable influence on the academic achievements of students of all ages:

- natural atmosphere in relation to temperature, lighting, access to outdoor elements and acoustics.
- learning spaces that are age-appropriate and which offer adaptable learning opportunities which students can customize to their personal needs.
- easily navigable connections between group and individual learning spaces that offer a break from stimulus.
- mid-level sensory stimulation with color and visual variations.
- climate, natural environment and culturally aware designs.
- "small-to-large" school design process that starts with learning spaces and builds out.





In many cases, school facilities are designed by architects eager to make an artistic impression without paying enough heed to the importance of function and education. Considering factors that may impede or place obstacles to learning is much more important than an awe-inspiring or creative design. In the case of school facilities, form must follow function, not the other way around. A physical environment that is conducive to learning should not be one that is unpleasant, one that isolates its inhabitants, or one that is either dull or chaotic.

Many of the elements that determine whether an educational environment is healthy have a big effect on education. However, other elements, such as furnishings, fittings and how the rooms are "dressed" and utilized, all play a role.

A great many schools that are already in operation have plenty of room for improvement, and the learning imperative may be supported in the design of new schools.



Importance of Good School Infrastructure

When it comes to a young student's life, school is like a second home to them. In his or her life, it performs a number of important duties. Schools shape a child's life in many ways, from fostering self-assurance to instilling the importance of an education in them. When they are not at home, youngsters tend to spend the majority of their time at school. From kindergarten to undergrad, the majority of the students' time is spent attending classes. Therefore, the infrastructure of a school plays a significant part in the daily lives of its students. Students will find it easier to focus on their studies in an atmosphere that is conducive to their needs thanks to the existence of quality facilities and infrastructure. The kids will find it more intriguing, which will motivate them to attend classes, leading to an increase in both attendance and the students' enthusiasm for studying.



Students devote the majority of their waking hours at school on academic pursuits and other activities required for graduation. It is the responsibility of educational institutions to concentrate on the physical facilities and to provide an infrastructure that not only fosters academic growth but also pays attention to the emotional and physiological well-being of the students.

From an educational facility's point of view, it is always important to have some common quantitative denominators or parameters that allow planners and designers to create solutions that address current and long-term needs, goals, and regulations.

The following are some of the most important requirements for your school

buildings and common needs you should think about:

- **Location** - The school should be accessible to both in-town students and those who have a longer commute.
- **Size** - The size should meet the immediate needs of the community as well as anticipated future needs.
- **Class Size and Density** - Bear in mind the teacher to student ratio. There needs to be adequate "empty" space so students do not feel congested.
- **Types of Buildings/Space** - Form should follow function.
- **Equipment** - Adequate use and storage space should be available for technology, traditional equipment and recreational equipment.

- **Technology** - Power infrastructure needs to support a wide range of technological equipment.
- **Interior Space Design** - All spaces should be aesthetically pleasing and moderately stimulating and include spaces where stimulus is minimal.
- **Legal Requirements** - Reliance on certified professionals is essential to ensure legal compliance.
- **Safety, Comfort and Security** - Individual spaces as well as the whole facility should be able to be made secure from outside threats as well as internal dangers (fire, smoke, carbon monoxide, etc.).

More detail is provided regarding each of these concerns on the following pages.





School Location

Factors to consider when choosing the best location for a school. Remember, in addition to the following, the physical location should be accessible to both near and distant students in the community.

Transportation to and from the School

How will students and/or their parents access the school? Traffic patterns need to be thoroughly assessed to facilitate both access to the school in the morning, and exit from the school after classes. Local traffic should be disrupted as little as possible to create a calm dropping off and picking up period. Consider building on a frontage road to avoid the facility being on a main road.

Public Transportation

Stakeholders should work with local public transportation authorities as needed to add a bus stop, or to supply students with public transportation subsidies.

Transportation on School Grounds

How will students move from building to building ? Many students may wish to

utilize skateboards, scooters, roller skates and bicycles. Paved paths are essential for these and possibly separate walking paths.

Parking Considerations

Adequate parking spaces must be available for students, educators, visitors and contract personnel.

Surroundings

For boarding educational facilities or where students live on campus, reasonable proximity to essential amenities like groceries, restaurants, laundry, outdoor natural recreation areas and entertainment complexes is necessary.

The immediate surroundings should be pleasing. When possible, a natural environment with trees, shrubberies, etc. is preferable.

Climate

Consider the climate where the educational facility is located. In hot climates, high ceilings, ceiling fans and rooms that facilitate airflow are essential. Open corridors between classrooms are ideal, where students can get fresh air and enjoy fresh breezes in between classes.

In colder climates, heavy, double or triple insulated windows that face the sun help to create a warm environment filled with natural light. Individual temperature controls should be in each learning space. Trying to properly climatize an entire educational facility is impossible, due to too many variables within each space.

Allowing educators and students to control their own learning space temperature enables better comfort and promotes a better learning environment.



School Size

The size of the school and classrooms should meet the immediate needs of the community as well as anticipated future needs as the community grows.

When it comes to the size of a school, there is no size that works best for all students. Some students do better in a smaller school where they get a lot of personal attention, while others may fare better in a larger school where they can have access to more things and meet more people. Both small and big schools have their good and bad points.





During the 1960s, the prevalent school of thought was that bigger schools were able to provide more all-encompassing educational programs of a higher quality at a lesser expense than smaller schools could. But in recent years, studies have shown that the financial reductions afforded by big schools have had a detrimental impact on student performance as well as graduation rates. This is because large schools have more students in each class. Student performance tends to deteriorate in proportion to the size of a school, and larger schools also tend to have greater rates of absenteeism, dropouts, and behavioral issues.

In addition, the "Dollars and Sense II" research, which was conducted in 2005 and looked at 25 different small schools around the USA, revealed that tiny schools spent, on average, 17 percent less per student than similar schools in their districts while getting identical or better outcomes.

The size of the school should be tailored not only to the instructional goals, but also to a wide range of additional considerations. It is necessary to provide an atmosphere in which students, instructors, and other individuals can see themselves as members of a community and address learning in an educational setting that feels like a home away from home.

This should be paired with the optimal number of pupils that may be in attendance within each learning space or classroom, as well as the necessary and available school amenities such as:

- washrooms/locker rooms,
- sports/recreational facilities,
- theatrical/arts facilities,
- library/multimedia rooms,
- administrative offices,
- utility rooms, and more.

Class Size and Density

Classrooms that are overcrowded and disorganized may be a breeding ground for disruptive behavior. The optimal layout for a classroom enables a smooth traffic pattern in which the educators and students can move about the space without stumbling into one another or other things, as well as without disrupting the concentration of those who are engaged in work. The classroom should be set up in a way that encourages interaction between the instructor and students while reducing the number of opportunities for students to get distracted.

There is compelling evidence from all across the globe concerning the advantages of having lower class sizes, including improved academic performance.

It has been argued that in order to fully reap the advantages of smaller class sizes and to effect a shift in teaching techniques toward a more student-centered education, the optimal number of students for a class should be between 15 and 20. However, bear in mind that this number may vary depending upon the academic level as well as the subject of learning within a particular classroom.





In general, a smaller ratio of teacher to students brings several benefits, such as:

Reducing Educator Workload

If you cut the number of students in a class in half, the instructor will have a lot less work to do, which will allow them to perform a better job overall.

Less Chaotic Classroom

When there are a lot of people in one place, there is more noise and less comfort. With a smaller class size, students have more privacy when working in groups. This can help them pay more attention, which in turn contributes to better performances.

Also, students feel more at ease because they have more room to move around and more space for themselves.

More Personal Attention

The more students in one classroom, the less time each student has to receive personal attention.

Better Student Engagement

Students are more likely to have high levels of engagement when they have great relationships with their teachers, which may ultimately lead to higher levels of academic achievement for the students.



Type of Buildings & Spaces

When designing educational buildings and spaces, form should always follow function. When you design your school, there is no right or wrong answer to the type of building you can use. Learning facilities can be found in office buildings, churches, homes, and custom-built campuses that cost several million dollars. Don't be afraid to look into non-traditional options before rushing out to buy or rent space in a typical school building.



Don't worry too much about what is perfect, and remember that you can always change your space or move as your school grows and your needs change.

The following are some things you should think about as you decide on the building and space for your educational facility.

If you start out with a small number of students, it makes a big difference as to how much space you need for your school. If you have more students, you will obviously need more space.

Start to think about what is possible for a school of your size.

Do you need a kitchen or a place to eat lunch?

If you're going to feed your students, you'll need space for a kitchen and lunchroom, as well as the equipment and seating that goes with them. You'll also need to make sure you're following any rules about how food should be stored, prepared, and served. Most countries have rules about kitchen inspections, but some places have different rules for schools and restaurants.

Do you need space for outdoor activities or physical education?

You may need this kind of space depending on how old your students are and, in some cases, how the education authority regulates recess and physical education time. In some places, you might not have to take care of your own outdoor space if you use public parks or other facilities.



Other space requirements may include:

- Workshop and labs areas,
- Study areas,
- Classrooms,
- Kitchens,
- Dining rooms,
- Accommodation,
- Washrooms,
- Changing rooms,
- Sports and recreational facilities,
- Library and multi-media center,
- Parking,
- Reception,
- Infirmary,
- Security Office,
- IT Center
- Delivery docks and storage
- Graduation halls,
- Visitor reception area,
- Offices,
- Conference rooms, and more.

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Equipment

There needs to be sufficient space for a broad range of equipment related to educational facilities. Considerations for equipment should include the use of the equipment, its storage and maintenance.

Equipment will include:

- Student desks and chairs, which should be ergonomic and in adequate numbers to accommodate existing students as well as anticipated students in the future.
 - Educator desks and chairs, while will vary according to the educator. For instance, a desk for a science educator might be different from the desk needs of a literature educator.
 - Lab equipment will be needed if the educational facility offers laboratory classes, biology classes and similar.
- Whiteboards, multi-media boards and similar equipment for teaching.
 - Lighting equipment.
 - Kitchens, appliances and supplies for educational facilities specializing in hospitality training.
 - Recreation equipment
 - Hybrid and Online teaching equipment



The necessity for equipment will vary depending upon the level of education and the education specialty of the facility. For instance, a kindergarten would need playthings, while a medical university would need a range of medical equipment.

The quality of any educational facility is at least in part judged by the availability of equipment related to its area of expertise.

For example, a carpentry trade school would be perceived as lower quality if there were only a limited number of electric and manual tools available for students to learn on. A charter school that specializes in teaching students about working in the computer and coding world would be considered a higher quality if it offered state-of-the-art technology equipment in sufficient numbers for every student.

For most educational facilities, equipment is a major aspect of the educational environment, representing not only a large source of attraction for prospective students, but a major economic outlay. Therefore, the equipment needs should be carefully analyzed and planned out ahead of time.





Technology

The power infrastructure needs to support a wide range of technological equipment. In schools that are well organized, technology is utilized for a variety of purposes, including administrative and operational work, as well as a tool for marketing and communications and to facilitate student learning.

Students may find themselves spending more time outside of the classroom in recent years as a result of the increased incorporation of technology-based materials into the curriculum. They are able to study at their own speed in specially built break-out rooms, outdoor learning areas, or even halls, stairs, or cafeterias, thanks to educational technology that allows them to do so. Students may have the opportunity to develop non-cognitive skills if the design of formal and informal learning spaces is flexible and adaptable. This may not only provide students with a greater variety of learning opportunities, stimuli, and experiences, but it may also give students the opportunity to learn new things.



Here are some examples of technology needs:

Fast and Reliable Wifi

Schools need to spend money on fast, reliable Wifi so that technology can help rather than hurt the classroom. Even though high-quality Wifi may cost more at first, it will make things go much more smoothly and help the teachers and students learn more.

Data Storage and Backup Servers

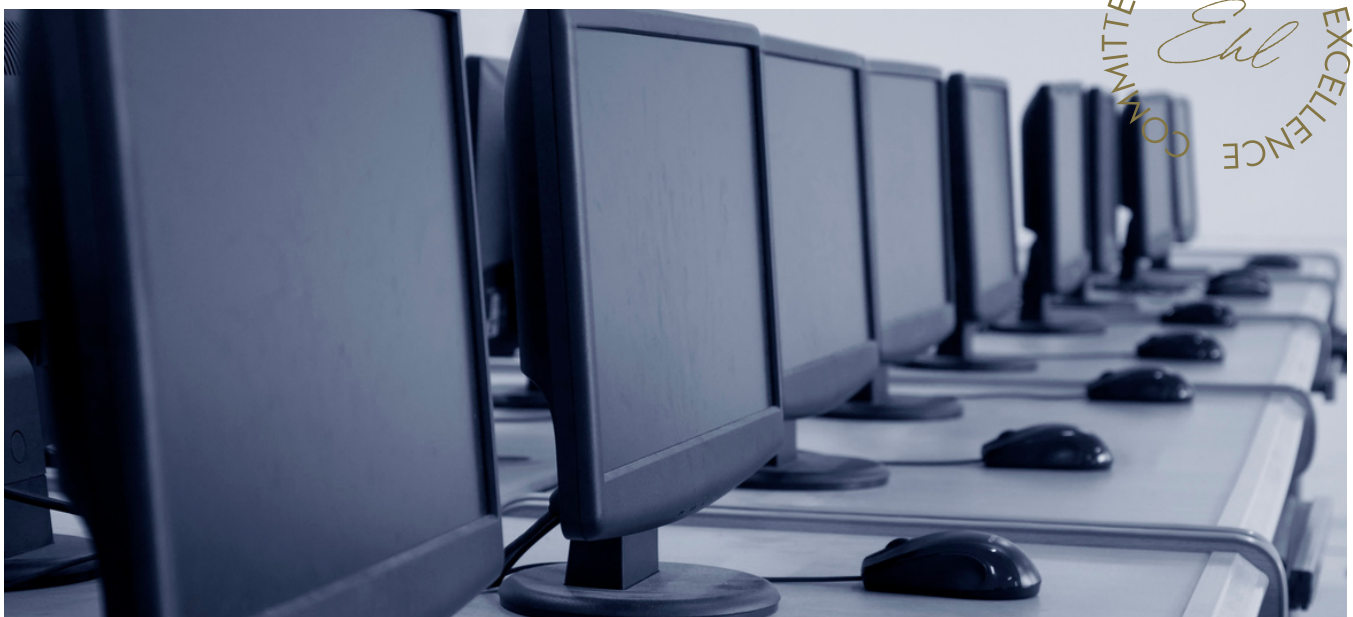
One of the bad things about technology is that systems can break down and data can be lost. Luckily, you can fix this by buying a server that backs up files and data automatically or purchasing a secured cloud storage service. This way, students won't waste any valuable class time and their private information will be safe.

Computers/Laptops

Students need computers and/or laptops to work, study, research, take notes, learn coding and much more. Today's world is barreling toward digitalization and students in all fields of study need to be proficient with computers.

Printers

Schools need printers to help with administrative tasks, like printing out visual displays, promotional materials. Teachers may also use printed material to complement the online learning experience with physical elements.



Interior Space Design

Interior space design should be optimized to stimulate thinking and creativity. From the chairs students sit in, to the colors on the walls, the way an interior space is designed can help make it a good place to learn. These design elements show in a subtle way that a school cares about student success.



The classrooms in the educational facilities of the 21st century do not have rows upon rows of tablet-arm school chairs. An educational institution may increase its attractiveness and effectiveness if experts are brought in to create a furniture plan, do strategic space analysis, and design the interior. When designing the inside of educational institutions, architects and designers need to create environments that stimulate students' ability to focus and use their imaginations while also taking into account the rapidly advancing technology found in today's classrooms.

Learning institutions should be able to readily adjust to changes in teaching and learning practices and should support a speedy transition from individual learning to activities involving groups of students.

Ideas include:

- Replace standard desks and chairs with modular ones that are much simpler to change during the day. This will help to increase student engagement in the learning process.

- Use tables and chairs on wheels, which allow for both solo study and learning in small groups to take place more easily
- Provide chairs with variable heights that are suitable for use at a number of different counter heights to accommodate students of varying heights
- Schools may seem more community-driven and stimulate students' creative thinking by making inventive use of color, student artwork, and murals that reinforce positive messaging. These elements can be displayed in unique ways.





Legal Requirements

Educational facilities are often required to comply with different legal requirements than other types of buildings. It's essential to familiarize yourself with the legal requirements for educational facilities in the area where your school would be. Since it's impossible to know every detail of every single legal requirement, stakeholders should rely upon certified professionals to ensure legal compliance, such as structural engineers, architects and builders. These professionals work with building codes on a daily basis. Architects work with educational facility legal requirements on a frequent basis and can help ensure that your educational facility is in full compliance.

Of course, it's also helpful to be at least a little knowledgeable about local codes. In most cases, the fire regulations, number of exits, accessibility for individuals with physical disabilities, number of restrooms, and many other particulars pertaining to schools are the responsibility of the local municipality in your area. In many instances, a visit from an inspector is required before the start of the school day.

You can reach out to your local municipality inquire about the construction rules and standards for schools. They are typically more than willing to supply you with the particulars of the legal requirements in your region.



Safety, Comfort & Security

The safety, comfort and security of your students, educators and administrative personnel should be paramount. It is possible for unsafe conditions to exist in schools on both the interior and the exterior of the buildings themselves. It is easy to envision how disruptive it would be if, for example, the school's structure was not able to withstand the next earthquake, or if the physical condition of the education facility was in a state of disrepair.

Therefore, it's imperative that the building be maintained both inside and outside. Repairs should be completed as soon as possible by qualified professionals. Fire sprinklers, smoke alarms and carbon monoxide detectors should always be tested on a regular basis. Fire drills should be carried out regularly, as well.



Another essential component to consider is parking and procedures. How will your school ensure the safety of student pedestrian traffic in parking areas around the school?

Also, how will visits to the school from outsiders be managed? Do parents and other visitors have to check in before entering the facility? Is there a locked entryway that "holds" visitors until they have been verified by staff? Will you require badges to be worn by personnel and visitors so they are readily identifiable? These are all considerations that have to be made in order to keep individuals safe in and around your school.

Individual spaces and classrooms should have the ability to be safeguarded and secluded from threats that occur to the school. If there is a fire, teachers should be able to provide their students with access to a place of safety outside the school without entering a danger zone.

Posted signs should be available throughout the educational facility so that, no matter where a student or educator finds themselves in an emergency, they have access to information on

where to locate an exit, access a telephone or set off sprinklers or a fire alarm.

Parents and guardians of students should be made aware of your standard operating procedures in the event of an emergency so that they can feel comfortable that a protocol is being followed to keep their children safe.



Final Thoughts

Designing a new school or re-designing an existing school is an exciting proposition, with great potential. It presents an opportunity to provide a vibrant and thriving learning environment to students who are hungry for knowledge. These tips for infrastructure should act as a guide as you plan and develop your educational facility, whether it's a large university campus or a local learning center for youngsters.



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