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What are the advantages and disadvantages of different classroom layouts?

Senior managers need to be clear about the expected use of any room first as this will be central to the design chosen. For example, whether the key purpose is to enable small group-work for multimedia authoring projects or the imperative is to give thirty pupils an opportunity to work at a computer simultaneously for ICT 'lessons'. Alternatively, the aim might be to create a 'drop-in' resource centre with an informal look and feel or to create a computer aided design studio for a design technology department. Pupils will generally need time away from the computer screen to reflect or evaluate their work and to discuss with others, so this will need to be considered in the layout of the room.

The movement of pupils and teachers around the classroom and teachers' 'sight line checking' need to be considered in any design. For example, where equipment is arranged on outer walls, pupils have their backs to teachers. There is then a consequent classroom management requirement for very clear instructions so that pupils turn to watch the teacher during exposition and discussion sessions. Shape and space are important. Long thin rooms are generally more difficult to teach in.

Typical classrooms are between 50 and 75 square metres, so there will be a maximum number of desktop computers that can be comfortably and safely installed. For a new build, such as a City Learning Centre, larger rooms can be planned from the start. 90 square metres are likely to be the minimum for a room designed to accommodate 30 desktop workstations comfortably and safely.

Below is a summary of the basic designs with possible advantages and disadvantages. It is provided as a guide only. Some designs will be hybrids or combinations of those listed below. Some elements will have a quantitative or qualitative greater impact than others, depending on the purpose of the room. So, the number of ticks and crosses does not necessarily indicate a 'better' or 'worse' design.

For comparison, the diagrams below use an 80 square metre room (10 by 8) and there is 1.2 meters between each station. For simple comparison reasons only, each room has been allocated one black and white printer (Pb), one colour printer (Pc), one scanner (S) and a teacher's station (T).
(Designs based on some original work by Tim Peters.)

## Edges only (Simplest design - a classroom with computers)
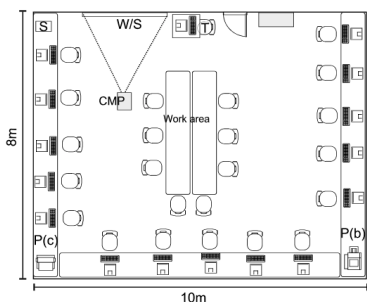
Advantages

✓ Teacher can see all computer screens from anywhere.
✓ It's simple and enables a cheaper installation.
✓ Pupils must turn away from computers when listening to the teacher.
✓ Provides opportunity to use the centre of the room for tables enabling work away from the computer, and to gather groups for discussion.
✓ Central tables make the room more flexible and also allow pupils more space to discuss, plan or evaluate ICT work.

Disadvantages

✗ It is not space efficient and fewer computers can be accommodated, unless the room is very large.
✗ Some corners end up with 2 computers, which means pupils are sharing the same chair space! (These 'dead' areas are however useful as printer /scanner locations)
✗ Some pupils have to turn 180° to see teacher or the board.
✗ The wall near the teacher is the only space for peripherals and storage.

## Edge with a 'stranded' Island (Edge with extra rows back-to-back in the room centre)
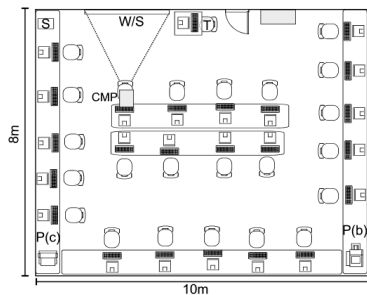
Advantages

✓ Space efficient.
✓ A slight improvement in visibility can be achieved by rotating the centre pier lengthways down the room.

Disadvantages

✗ No place where teacher can see all computer screens. (Advantages of the 'edges only' design are lost and teacher can find themselves 'racing' around the room.)
✗ Some corners end up with 2 computers, which means pupils are sharing the same chair space! (These 'dead' areas are however useful as printer /scanner locations)
✗ Some pupils have to turn 180° to see teacher or the board.
✗ Some pupils have to look through their computers when listening to the teacher.
✗ The wall near the teacher is the only space for peripherals and storage.
✗ Will be more expensive to provide power and network cabling to the central island, unless there is under floor ducting.
✗ No space for tables allowing for work away from computer screens.

## Edges with joined islands (workstations down both sides of islands)
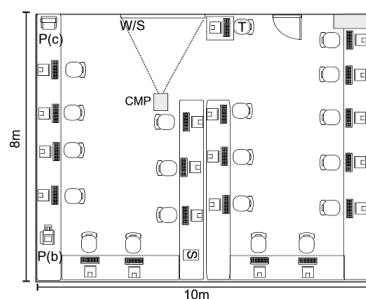
Advantages

✓ Reasonably space efficient without a 'typing pool' look and feel'.
✓ Pupils must turn away from computers when listening to teacher.
✓ Island ends can be used for printers / scanners / storage.
✓ Cheaper and easier to provide power and cabling out to the islands than 'stranded island' designs.

Disadvantages

✗ No place where teacher can see all computer screens.
✗ Several corners end up with 2 computers, which means pupils are sharing the same chair space!   (These 'dead' areas are however useful as printer /scanner locations).
✗ Some pupils have to turn 180° to see teacher or the board.
✗ Less space available for tables allowing work away from computer screens.

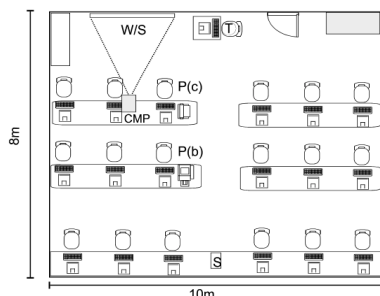## Rows (All facing the same way with the pupils facing the teacher)
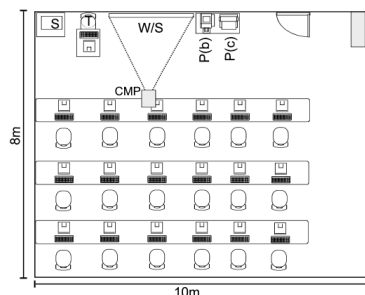
Advantages

✓ Space efficient.
✓ No corners with 2 computers or dead spots, so all corners can be use.
✓ So long as the rows are not too long, there may be two walls that can be used for storage spaces and printers/ scanners.
✓ Power and cabling can be provided out to the islands via bench trunking.

Disadvantages

✗ This design has the longest distance from the natural teaching focus to the furthest pupil, (particularly to reach pupils in middle rows by the walls).
✗ Difficult for the teacher to see the pupils in the back rows over the computers when they are at the 'front'.
✗ Teacher has to walk to back of room to see all the computer screens.
✗ All pupils have to look past / through their computers to see the board or the teacher.
✗ 'Typing pool' look and feel – less conducive for collaborative work.
✗ Limited space for peripherals if rows are long.
✗ No space for work away from computers.

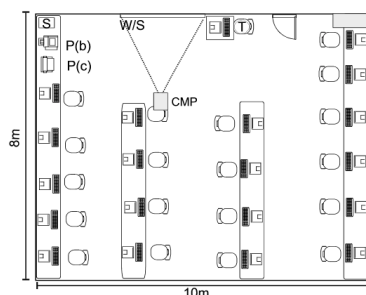## Piers (All facing the same way, with the screens facing the teacher)

Advantages

✓ Space efficient.
✓ No corners with 2 computers or dead spots, so all corners can be use.
✓ Teacher can see all computer monitors from the natural teaching position.
✓ Pupils must turn away from computers to listen to the teacher.
✓ The distance from the natural teaching focus to the furthest pupil is halved (when compared with the 'Rows' design)
✓ Ends of rows may have potential for printer/ scanner location.
✓ Power and cabling can be provided via bench trunking, out from the sides of the room.

Disadvantages

✘ All pupils have their backs to the teacher and have to turn 180° to see teacher or the board.

✘ 'Typing pool' look and feel, so more difficult to undertake group work.

✘ Limited space for storage and peripherals if rows are long.

✘ No space for work away from computer s.

## Piers (All facing out at 90° to typical teaching position.)

Advantages

✓ Very space efficient

✓ No corners with 2 computers or dead spots, so all corners can be use.

✓ Teacher can more or less see all computer monitors from the natural teaching position.

✓ Pupils must turn away from computers when listening to teacher.

✓ The distance from the natural teaching focus to the furthest pupil is halved (when compared with the 'Rows' design).

✓ Ends of rows may have potential for printer/ scanner location.

✓ Power and cabling can be provided via bench trunking out from the sides of the room.

Disadvantages

✘ All pupils have to turn 90° to see the teacher or board.

✘ 'Typing pool' look and feel and group work can be more difficult to organise.

✘ Limited space for storage and peripherals if rows are long.

✘ No space for tables allowing work away from the computer screens.

Pods (Separate circular / hexagonal / octagonal benches with workstations around)
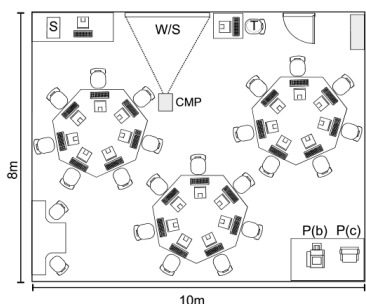
Advantages

✓ No corners with 2 computers, so no dead spots that cannot be used.

✓ No extra space required for 2 pupils to share a computer.

✓ Can support collaborative work as users working around 'one pod'.

✓ Can give a spacious 'look and feel', and less like a 'traditional' ICT classroom.

✓ Can be more space for printers and scanners.

Disadvantages

✘ Not space efficient.

✘ Nowhere in the room from where the teacher can see all the computer screens.

✘ Difficult for the teacher to see the back pupils over the other pods.

✘ All pupils have to turn odd angles / look past their computers to see the teacher or the board.

✘ Requires different classroom management methodology as less like a 'traditional' classroom.

✘ Electrics and cabling require under floor ducting or dropped down in columns from ceiling.
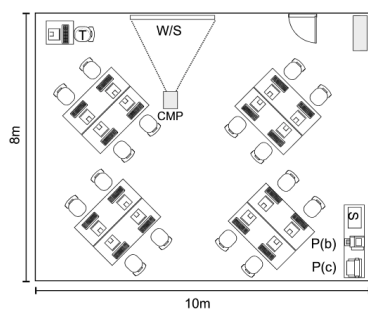
Pods (squares) with computers on two sides only)

Advantages

- ✓ No corners with 2 computers, so no dead spots that cannot be used.
- ✓ No extra space required for 2 pupils to share a computer.
- ✓ Can support collaborative work as users working around 'one pod'.
- ✓ Can give a more spacious 'look and feel' as required by a drop-in centre or a laboratory.
- ✓ May be space for storage and printers along the walls.

Disadvantages

- ✗ Very space inefficient as fewer computers can be accommodated.
- ✗ Nowhere in the room from where the teacher can see all the computers.
- ✗ All pupils have to turn 90° to see the teacher or the board.
- ✗ Electrics and cabling require under floor ducting or dropped down in columns from ceiling.

Bays built along walls
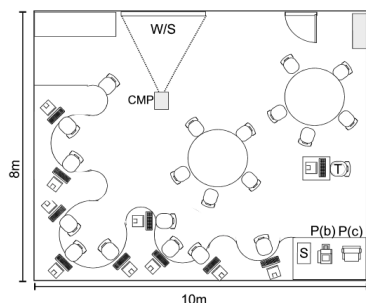
Advantages

- ✓ Teacher can more or less see all computer screens from the centre of the room.
- ✓ Pupils must turn away from computers when listening to the teacher.
- ✓ Provides opportunity to use the centre of the room for tables enabling work away from the computer, and to gather groups for discussion.
- ✓ Cabling and electrical work is cheaper and easier than 'pod' designs as along the room edge.
- ✓ The room is better suited to a dual purpose and so is more flexible for timetabling.
- ✓ It doesn't look like a typical classroom and has a style that might suit a drop-in resource centre.

Disadvantages

- ✗ It is very space inefficient as fewer computers can be accommodated.
- ✗ It will require a custom build and will be more expensive.
- ✗ Bays need to be well designed to ensure pupils are not backing into each other, sharing the same chair space.
- ✗ Some pupils have to turn 180° to see teacher or the board.

Case Study Cameo 4: City Learning Centre A

The centre had a clear vision. In one room the staff wanted a design that provided a "wow factor", had lots of space, and enabled groups of (mainly secondary age pupils) to undertake collaborative multimedia authoring projects. They didn't want rooms that "looked like any computer room in any school". The room is large (104 square metres). Custom-made rounded tables on castors were commissioned. They are flexibly designed, so they can be wheeled out and used for written work. The flat screen monitors and small 'cubed' –shaped processors are sited on small raised central pedestals. All trunking is built into the pale blue tables. Each of the four islands has three stations and is designed for between three and nine pupils because there is plenty of space around each station for three pupils to collaborate. The rounded theme is reflected in the wall design, through clever use of bold blues, greens and yellows, behind which sit large storage cupboards. The mauve rubberised flooring is non slip, anti-static and reduces noise. Lighting is through pendant lights, spotlights on a track system and electrically operated vents in the roof, providing good, but softened light levels. Semi translucent roller blinds stop glare. The room looks inviting and works well for the planned activities.

Case Study Cameo 5:City Learning Centre B
The centre manager and ICT Adviser were keen to have a room that local primary schools would want to use. Therefore, they felt the imperative was to provide a space that had thirty pupil workstations as well as a focal teachers' area with an interactive whiteboard and ceiling mounted projector and video conferencing station. They decided that an 'edge and island' design was space efficient and cost effective. One station is height adjustable to take a wheel chair user and the large (93 square metre) room is designed to accommodate good pupil flow around it. They wanted clear desktops to give a sense of space and so pupils could collaborate when working on projects such as control technology. The standard tower processors are therefore housed underneath the desks in lockable cabinets, but sufficient space has been left between stations so that two pupils can sit comfortably. Trunking and power are incorporated into the high quality desking. An experienced company was used who were able to incorporate the high number of printers and scanners required, as well as some storage spaces. They chose matt grey desks and used shades of pink and mulberry in the carpet, chair material and pin-board to give a softened effect. The room has proved popular with local schools.

Case Study Cameo 6: Primary school D
The senior management team wanted to set-up an ICT suite and maximise the number of computer stations in it so that, as a minimum, pupils could work in pairs. They recognised that the room available (75 square metres) would not accommodate a one: one ratio. The school used a specialist company, recommended by word of mouth, to provide design options and to project manage their installation. They decided to use a 'facing out pier' design so that all pupils were at 90° to the teacher and only had to swivel on their chairs to see the interactive whiteboard. They kept the number of stations on each pier down to four so that the teacher did not have too far to walk along the piers and there was space for two pupils to sit comfortable at a station. This also provided wall space for printers, scanners and storage cupboards. This design easily housed sixteen computers. They decided to place the CPUs under the desks, locked in special bar safes incorporated as part of the legs to that control and other work had plenty of desk space. The special 'mouse-friendly' surface meant mouse mats were not needed and both right and left-handed children were readily accommodated. Hooks were added to the monitors to hold headphones.

How can we find a Supplier to help with our requirements?

Your LEA may well have a list of reputable companies. They may have also undertaken some tendering arrangements on behalf of local schools and be able to offer a preferred short-list of companies that have been through financial and quality checks. BESA provide a list of registered furniture companies. Key exhibitions, such as BETT or the Education Show are useful to visit. If you have a Managed Service Provider, then they will offer advice too.

To ensure best value, it is standard practice to get three quotes and to ask the company to provide three reference sites they have worked in. Find out if these schools would recommend the company. Ensure the company's employees are suitably qualified to undertake electrical work and that they operate an appropriate code of practice for operatives on sites. Ask the company to provide a costed design(s) based on your needs / specification. When selecting a company, ensure you have a quality, ergonomic design not just the cheapest option and that your selection criteria reflects these aspects.