



Physical Space Design

Compiled by David M. Harrison, February 2005. Last modified March 29, 2005: Another furniture iteration to allow for future changes to SCALE UP; rough in the space requirements of the technologists.

The North Wing

We propose gutting the entire 1st floor of the North Wing of McLennan with the exception of the central block (MP133, 134, 135, 136, 137, 138). The space will then be configured to contain:

- The new Practical rooms.
- Office and work space for undergraduate technologists, all teaching stream academic staff, and the nonacademic undergraduate coordinator.
- A Xerox machine for student use.
- Storage.

In the new configuration, we wish to replace the current cinderblock walls with movable semi-permanent walls. An example of a space using this sort of material is the East part of the 3rd floor of Sidney Smith Hall.

In the *Pedagogical Design* section, we mentioned that at present this initiative is only targeting 2 courses: PHY110 (currently 370 students) and PHY138 (currently 1130 students). If we extend these Physics Practicals to other first year courses, preliminary sketching with the floor plan indicates that some extension into the 2nd floor of the North Wing of McLennan will be necessary.

Even if we restrict ourselves to PHY110 and PHY138, it is vital that we recover the currently empty space previously occupied by Photonics Research Ontario. In the *Pedagogical Design* section we point out that this proposal will involve releasing the rooms currently used for tutorials back to the university; this can strengthen our case for recovering the PRO space.

When a room is not otherwise occupied, re-arranging it for other Physics courses, lecture or seminar, can be almost trivially accomplished by moving some furniture.

Practical Rooms

Principles:

- Maximum flexibility
- Easy to re-configure

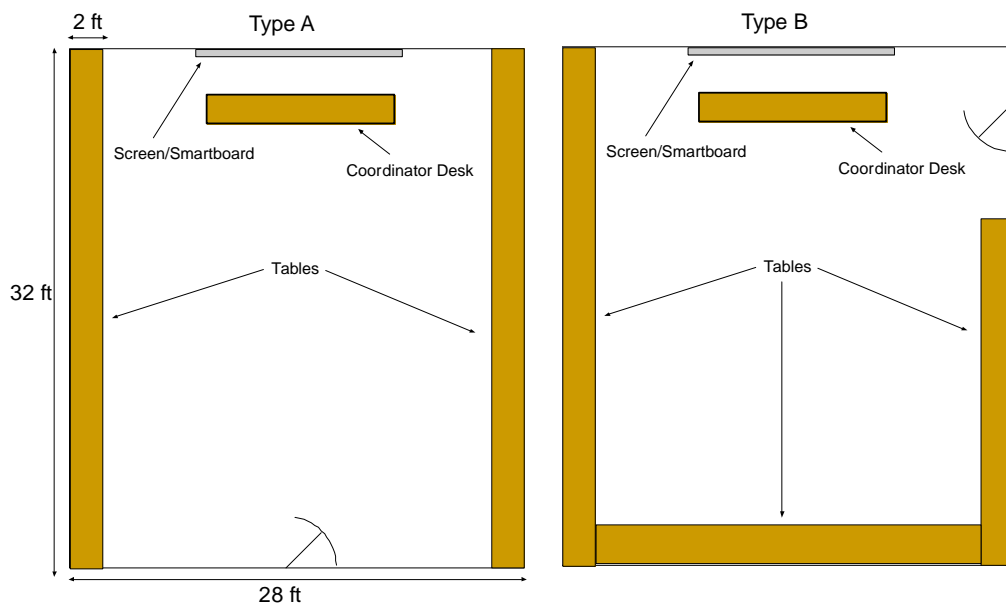
Assumptions:

- Every student to attend once per week.
- 10 sections.
- Every weekday will have 2 sections, either one in the morning and one in the afternoon, or two in the afternoon.
- 10 groups per section, with a maximum of 20 students per group, meeting in one room. This means when at full capacity we can in principle handle 2000 students.

Each room will have:

- At the front: a desk for the coordinator, a PC, a smart board and screen.
- A projector.
- Wireless connectivity.
- A networked printer.
- Abundant electric power including outlets from the ceiling in the middle of the room.
- Water?

Preliminary work with a floor plan of the North Wing indicates we need 2 very similar room designs, which are shown below. The rooms are both 28 x 32 feet.



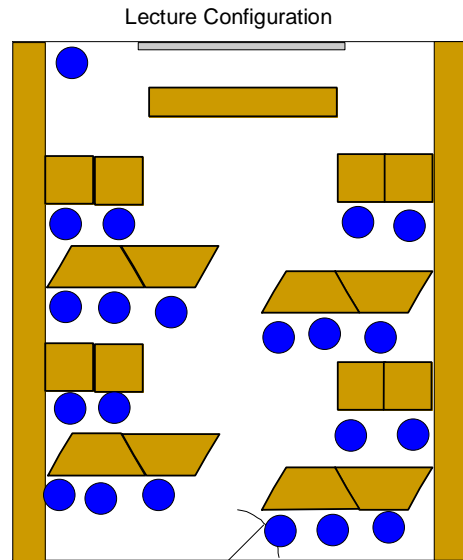
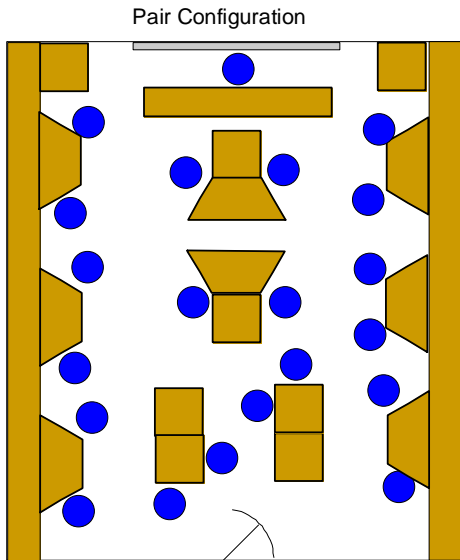
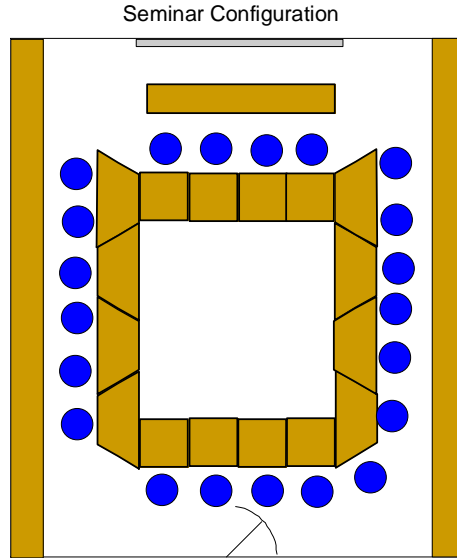
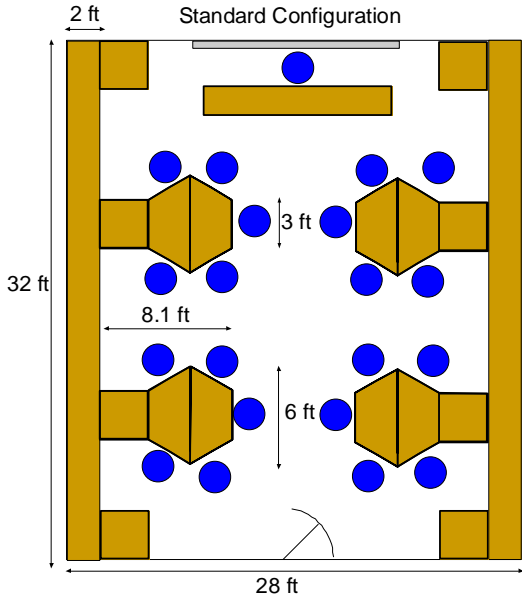
Unresolved issues with the above room designs include:

- Do we want a fixed coordinator desk? This could be sending the wrong message. Perhaps we could replace this with a couple of square 3 ft x 3 ft tables similar to those shown below.
- Cupboards in each room containing commonly-used apparatus could be a good idea. Then the students can get what they need from the cupboard without needing our technologists.

The four possible configurations of the room are:

- 1) **Standard:** the room consists of 4 “pods” of five students each to engage in small-group activities. This will be the configuration for a large fraction of the academic year.
 - a) Each pod will have a PC and a data interface unit. A 19” flat monitor could be mounted on the wall instead of on a table top.
 - b) A control panel allows the output of any PC to be projected on the main screen.
- 2) **Seminar:** for discussions amongst all 20 students and the coordinator.
- 3) **Pairs:** 10 pairs of students. This will likely be the configuration towards the end of the year when the students begin *Discovery Practicals*.
- 4) **Lecture:** in case a traditional “I speak, you listen and learn” model is desired.

Below I show rough floor plans for these 4 configurations. I only show *Type A* rooms, although *Type B* rooms are almost identical. Note that the number of furniture modules in each configuration is the same.



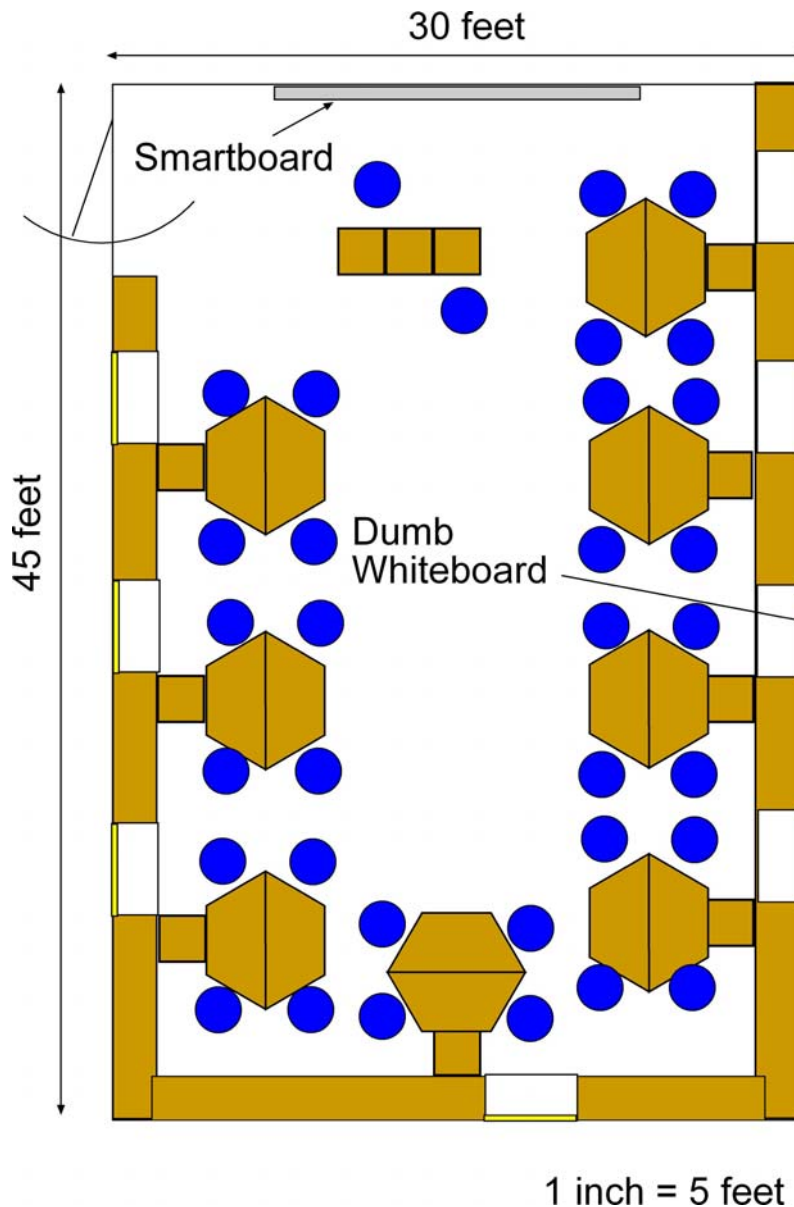
Plan B

This is an alternative plan to the above. In it:

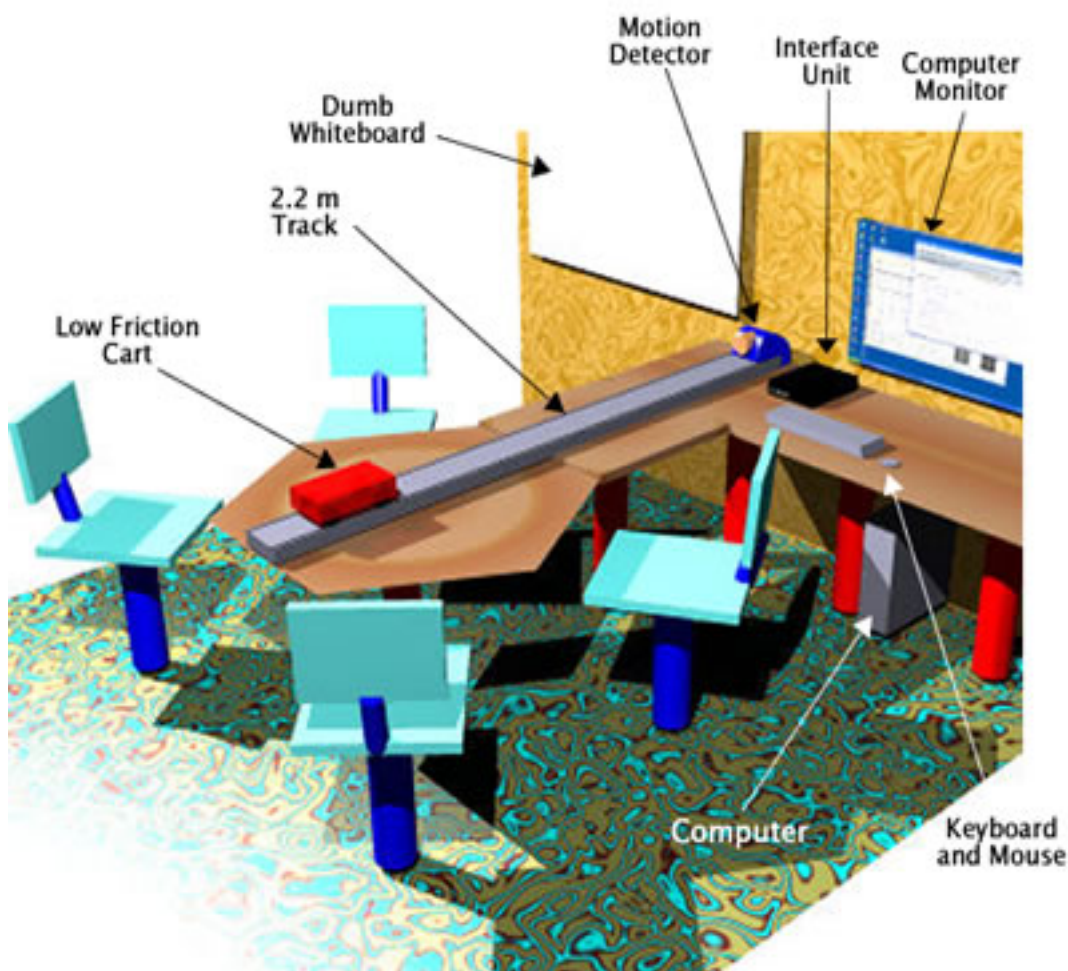
- There are 6 identical rooms with space for up to 32 students, instead of 10 rooms each with space for up to 20 students.
- In the “Standard” configuration the students will work in groups of 4, instead of 5.
- There is not a fixed table at the front for the instructors.

This configuration makes having 2 TA’s per group possible.

Below is a rough floor plan for the rooms in a “Standard” configuration. Each room is 30 feet by 45 feet. All furniture modules are the same size as in the previous drawings.



Here is a visualization of a pod including a low-friction cart and 2.2m track.

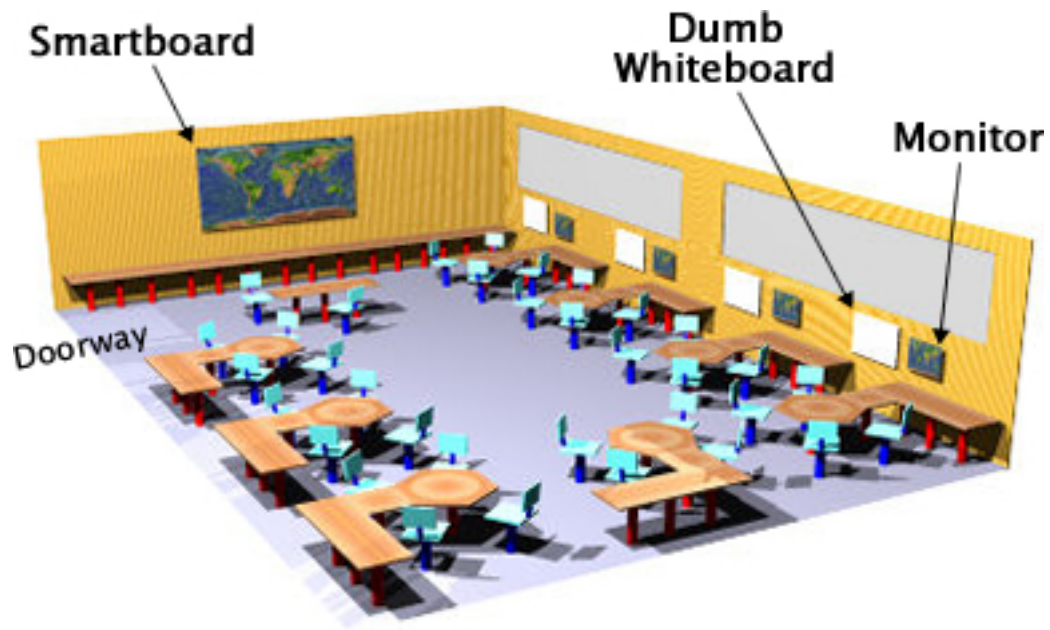


Implementing on the 2nd Floor

David Bailey has been thinking about implementing this project on the 2nd floor, moving the upper-year labs to the first floor. One nice thing about this idea is that, as recently realized, we will want a dumb whiteboard associated with each pod, and the windows on the second floor begin about 5 feet from the floor leaving a wall space for the whiteboard and possibly the computer monitor.

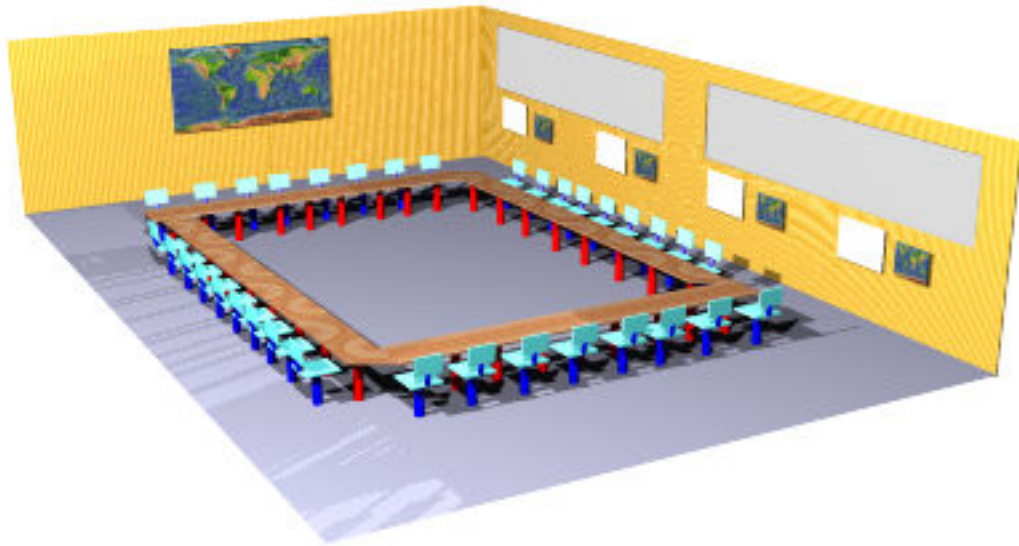
Just for fun, below is a visualization of what such a room might look like. Two walls are invisible.

In doing this plan I began to realize that the room was pretty crowded. Thus the furniture in this view is smaller than in the previous plans. The tables are all 2 ft on a side. In the previous plans the dimensions were all 3 feet. Thus the distance from the wall to the edge of the hexagonal table is 7.46 feet = 2.27 m. The 2.2 m “Dynamics” tracks for low-friction carts will fit, but only barely; 2 m air tracks will fit easily.



Room: 30 x 45' Tables: 2' per side Chair seats: 1.5' per side

Again as a “proof of concept” here is a view of the room in a “seminar” configuration.



And here is the room in “lecture” configuration.



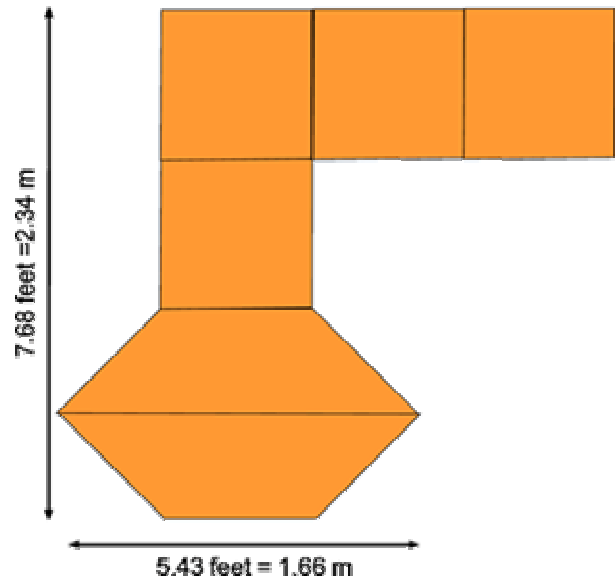
Another Iteration

SCALE UP and its variants replace tutorials, labs and lectures. Although our planning so far has assumed that we will keep our lecture sections, we may wish to design so that at some point in the future we are not precluded from adopting such a structure.

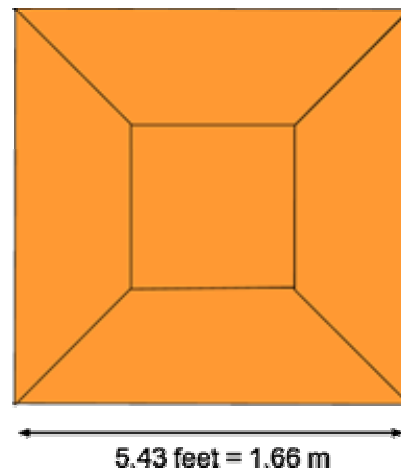
Personally, I still like the idea of separate rooms. But if the walls are movable, then we can easily expand the space to a fewer number of larger rooms.

Allowing for this possibility requires a small modification of the furniture. In previous plans the pods have included 2 trapezoidal tables which when combined form a regular hexagon with each side being 2 feet. We have also been designing to be sure that each pod can accommodate a 2.2 m track for mechanics experiments.

If we make the hexagon non-symmetric, one plan would involve having all tables have **2.25 ft** sides. To the right is a diagram of a pod; 2.2 m tracks still fit.



With this furniture if we can convert to large tables with up to 12 students by combining four of the trapezoidal tables and one square one. The diagonal distance is 7.68 feet, which is close to the 7 foot tables used by *SCALE UP*.



Technologist Space

Some critical questions that need to be answered include:

- 1) Will the 3rd/4th year tech be included in this room or will they be separated as the story is now ?
- 2) Should the Supervisor have their own office space ?
- 3) Should we design for a possible increase in staff ?

Each Tech would need:

-> Office space with partitions

each partition would include:

- *shelf space
- *desk with computer
- *file cabinet

-> Work space to include

- *work bench
- *tools
- *parts bins

-> Common work area

- *drill
- *lathe
- *large table for projects

-> Centralized "wicket"

- *work bench
- *tools
- *shelf space for back up equipment

We also will want a "common area" which would include space for a fridge, microwave, coffee maker etc.

Whether this would be in the same common room is a different story. There are health and safety issues when you mix food and work space. Currently we either eat at our desk or completely disappear to College street. Perhaps a common eating area separated from the work space would be beneficial for health and safety reasons not to mention some nice quiet time away from work for at least 1 hour of the day.