



Double Lessons? Discuss...

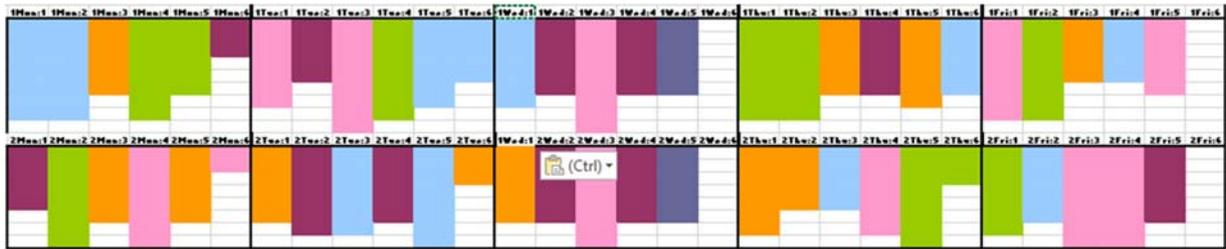
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Table of Contents

I.	Clustering	2
	Unwanted Vertical Clustering	
	Doubles with the Least Knock-On Effects	
	Escalating Effects	
II.	Arguing the Case	7
	Mission Statement	
	Ideal Lesson Spans	
	Clustering Fails!	
III.	About the Author	10



Art and DT were in the blue and green blocks. Look carefully at what has been the knock-on effects for the other three blocks. The clustering has occurred for every block and not always in the form of unwanted doubles! Instead, there are several unconnected repeated lessons (ie Maths Period 2 and Period 4, Sociology Period 3 and Period 5 etc, sometimes with the same teacher!)

Unwanted Vertical Clustering

It is easy to see how **unwanted horizontal clustering** occurs but how does Year 13 clustering affect the other year groups in the school? It takes an experienced timetabler to answer this question.

When you start scheduling a timetable, it doesn't take too long before you begin to identify blocks which fit well together (at the same time) and those that do not. For example:

Option block 13D fits well with Year 11 English 11m (because there are no teachers teaching in both) but it will never fit with Year 11 English 11n (because there are several teachers teaching English classes in both blocks)

On the other hand 11n English fits very well with 13C

Let us return to our trivial example

	Day 1					Day 2				
Year 13	Option A	Option B	Option C	Option C	Option E	Option D	Option D	Option E	Option A	Option B
Year 11m						English	English			
Year 11n			English	English						

If I cannot fit 11n English with the other option blocks, they will have to occur as a double on Day 1

If I cannot fit 11m English with the other option blocks, they will have double English on Day 2

If the Head of English says she doesn't want doubles, the only way for a timetabler to keep all parties happy is to force one of the English lessons for both 11m and 11n to schedule at the same time as a less compatible block.

Forcing blocks to occur at the same time (scheduling together) is something which can be done by various methods familiar to all timetablers (it is part of the timetabling skill-set). However, there are some round pegs which will not go in square holes without breaking the peg or the hole!

By clustering Year 13 Blocks C and D, the natural (easiest) scheduling of Year 11 English means it too will be clustered. To break the unwanted clustering, the timetabler must deliberately schedule some of the English in time slots which are much more difficult.

Doubles with the Least Knock-On Effects

Unfortunately, most requests for double lessons come from subjects which occur in KS4 or KS5 option blocks. As stated previously, allowing a class in an option block to have double lessons forces all the other classes sharing that option block to have doubles and probably forces other blocks and their associated classes to have doubles too!

The fewest knock-on effects from doubling lessons comes when clustering a block which contains just one subject, usually forming part of the KS3 curriculum. For example, look at the Year 9 block of Technology:

	D.T. Sets	4
24	Dt ₁	4
23	Dt ₁	4

Clustering these lessons into doubles would not have a **direct** (easily noticed) effect on any other subjects. However, experienced timetablers will tell you that by having double DT on a Monday means another block is likely to be squeezed into the other days! These effects are more difficult to predict and, only when the timetabler is deep into the scheduling process, will they manifest themselves.

Escalating Effects

Timetable blocks can be scheduled together naturally (easy to do) or unnaturally (difficult to do). As you approach the end of your timetable, you have fewer free teachers for each time slot and so you find yourself having to **force** blocks into time slots where some of the teachers are already teaching. To achieve this, a timetabler can adopt various methods

1. In shared classes, swapping teachers between two time slots (with no negative implications)
2. In linear blocks, swapping teachers between two time slots (with no negative implications)
3. Swapping teachers between different classes (with probable significant negative implications)
4. Swapping teachers between different classes in different blocks (with probable significant negative implications)

If you find yourself having to resort to 3 or 4, it is likely you are already having difficulties. If you reach a point where you cannot think of anything to do, you start looking for other unsavoury compromises.

Unfortunately, fighting to reduce the unwanted knock-on effects of clustering can become increasingly difficult as the scheduling approaches the last blocks.

Returning, to the actual example shown above (the two-week clustered Year 13 timetable), let us look at how the school's Year 7 timetable developed:

1Mon:1	1Mon:2	1Mon:3	1Mon:4	1Mon:5	1Mon:6	1Tue:1	1Tue:2	1Tue:3	1Tue:4	1Tue:5	1Tue:6	1Wed:1	1Wed:2	1Wed:3	1Wed:4	1Wed:5	1Wed:6	1Thu:1	1Thu:2	1Thu:3	1Thu:4	1Thu:5	1Thu:6	1Fri:1	1Fri:2	1Fri:3	1Fri:4	1Fri:5	1Fri:6
7m	7n																												
7m	7n																												
7m	7n																												

This is the Year 7 timetable (see above). Let us examine the linear (easiest) blocks, those shown in pale green which were the very last blocks in the timetable to be scheduled:

Each block (7m and 7n) must have 20 lessons so ideally we should be aiming for:

- 10 in Week 1, 10 in Week 2
- 2 every day

Clustering certain lessons in the upper school has forced the timetabler into clustering the Year 7 lessons like this:

- 7m Week 1: 3-3-2-2-4 = 14
- 7m Week 2: 0-1-2-2-1 = 6
- 7n Week 1: 3-1-0-3-2 = 9
- 7n Week 2: 2-1-1-2-5 = 11

Look at the bottom of the second Friday – yes, 7n will be doing EVERYTHING together as a group ALL DAY!

Of course, bad distribution in one place creates bad distribution in another. I will leave you to count the appearances of all the other coloured blocks but let me leave you with one last point. Look at the dark green blocks (English lessons)

- 7m have English Week 1: 1-0-0-0-0 = 1
- 7m have English Week 2: 1-1-1-1-1 = 5
- 7n have English Week 1: 1-1-1-1-0 = 4
- 7n have English Week 2: 0-1-0-1-0 = 2

Arguing the Case

Mission Statement

Yes, I call this a mission statement because I want to be honest about my opinions.

An expert timetabler will be able to offer certain subjects double lessons whilst minimising the unwanted clustering effects but:

- *The double lessons will make the scheduling task much more difficult and*
- *There will still be unwanted knock-on effects regardless of expertise or effort*

If you can avoid doubles, do so.

It is common knowledge that there is a limit on the concentration span of students. As a teacher of mathematics, I wouldn't expect my 12 year olds to concentrate on a new idea for more than 15 minutes. After that, it was practice and investigation. For Sixth Form students, the limit was 30-40 minutes. What, then is the value of a two-hour maths lesson? In my opinion, it is twice as long as is useful!

Now I know that the teachers of Art, Design, Technology, PE etc will disagree with my opinions but I would like to point out the following:

- *In subjects where the students are physically active or working on a lengthy creative project, only a small part of the lesson will be consumed by whole class instruction. The remainder will consist of students doing the activity with the teacher "supervising". Yes, I can see why you would ask for two-hour lessons*
- *In subjects where there needs to be much more concentrated engagement between teacher and students or which involve complicated theory, the students will switch off after a short time and the progress made over two hours could have been made in just one!*
- *The secondary school curriculum (as defined by the powers that be!) is made up of far more subjects where one hour lessons are more efficient than two hour lessons*

Ideal Lesson Spans

When I started teaching in the early eighties, my school day consisted of eight 35-minute lessons. In my subject (maths), this was just enough time for students to:

1. *Get books and equipment ready*
2. *Teach one new idea (briefly!)*
3. *Practice a few questions*
4. *Put away books and equipment*

The day felt to both students and staff as though we were on a frantic rollercoaster ride with no chance at all to settle or contemplate what we were doing. Amazingly, subjects such as Art and Technology did not have double lessons – I have no idea how they managed.

Then, in line with many other UK schools at the time, the school moved to a more sensible arrangement. In order to avoid doubles, the school decided on one-hour lessons, shorter than requested by the practical/creative subjects but longer than

requested by the more theoretical-based subjects. It was a compromise deliberately chosen to avoid the need for clustering lessons.

Of course, there were other schools attempting more complicated scheduling with smaller time divisions and single, double and triple lessons but the resulting timetables often ended up being riddled with unwanted compromises because of the knock-on clustering effects.

Most timetables I have seen over the last 10 years have been those having a lesson duration of roughly an hour, in marked contrast to 30 years ago. However, one interesting point I have noticed is that, **no matter what duration a school selects to use, some teachers of creative/physical activity subjects will always want double lessons!** I can only conclude from this that, for some teachers, it is not the actual duration of the lesson which matters, it is the fact that they want a recognised differentiation between their subject and others!

Clustering Fails!

If you have been a timetabler for several years, it may have occurred to you (and those with whom you work) that your responses are more often negative than positive – you spend a much bigger percentage of your time trying to explain why something cannot be done rather than how it can be done. I am afraid this goes with the job!

Education is full of clever, creative, well-intentioned people who want to make a difference. By nature, they are idealists and will put forward ideas for change and back them up with sound educational arguments. The problem is that

A school timetable is a strict mathematical framework based on complicated laws which allow hundreds of students, grouped in hundreds of different ways to meet with a hundred or so staff in hundreds of different locations at agreed times so that not one teacher or pupil is expected to be in two places at the same time.

Unfortunately, as timetabler, it is possible you are the only person in the school who understands the laws and what happens when you bend or break them! Let me finish with two examples:

1. A school management team had come up with an idea to have KS3 Art and Technology taught entirely through project work. In half-year groups, each student would have one of their timetable days devoted solely to their project and the lessons would be taken by the entire Art and Technology teacher teams.

This may sound exciting and innovative but a timetabler looks at the whole curriculum for knock-on effects. If all the creative activities are concentrated into one day, all the non-creative activities are squeezed into the other days. A typical non-creative day would be Maths, English, Science, History, Geography etc – lots of sitting still, book-based work. For the average student, do the benefits of this one day outweigh the loss of variety/colour from all the other days?

2. In order to allow a group of students to access courses in a local college, the school reaches an agreement to schedule Year 10 Option A on the last two lessons of Mondays and Fridays so that the seven students in class 10A/Vo1 can travel to and attend the college.

For these seven children, this sounds perfect. A timetabler will point out that, for the other 233 students, it means whatever course they are taking in Block A, it will be taught to them before and after lunch on Mondays and Fridays. How would you feel, as a teacher, if you were told that you would be teaching GCSE French **ONLY WHEN THE CHILDREN WERE HUNGRY OR TIRED!**

When you are faced with a proposal for change, try not to respond instantly. Instead, ask the interested parties if you could have some time to calculate the knock-on effects across the entire timetable.

When making a recommendation, keep in mind the following:

Spock: Logic clearly dictates that the needs of the many outweigh the needs of the few.

Kirk: Or the one.



About the Author

Paul Vant worked for 35 years in secondary school as a Maths teacher, Senior Teacher, Timetabler and Systems Manager. He has acted as a consultant to many schools in timetabling and assessment. He designs software and web applications to solve problems relating to all his fields of expertise. In 2000 he designed the Student Sorting Kit (used for creating balanced groups of students, now in use in secondary schools throughout the UK and in other international institutions.)