

Variations of Timetabling

— from past experience to preparation for New Senior Secondary Curriculum

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Abstract

In this paper, student-oriented workflow in elective subject combination is introduced to cater for students' needs and preferences. Multi-term-multi-timetable System is introduced to solve some common problems in the Weekly System and time allocation of subjects. Variations in period length for facilitating pedagogical changes are also presented. Based on the analysis in this paper, implication on preparation for New Senior Secondary Curriculum is then summarized. Overall, the idea of using variations of timetabling to support learning and teaching is emphasized.

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1. Introduction

The issue of timetabling can be discussed in various perspectives. Rapid development of computer technology facilitates mathematicians and computer scientists to do extensive researches in algorithm for timetabling; see for instance Burke & Newall (1999) and Ozcan & Alkan (2007). Educationalists have done lots of researches in the enhancement of teaching effectiveness through block timetabling, see for instance Buckman, King & Ryan (1995) and Canady & Rettig (1995). In this paper, the author attempts to discuss the issues of timetabling based on his practical experiences, which are rarely found in research papers and textbooks. It is hoped that the experiences would be useful for schools to make preparation for New Senior Secondary (NSS[‡]) Curriculum.

Education Bureau recently holds a series of ‘Middle Managers Workshops for Migration to “334” (abbreviated as MMW workshops in the following)’. A part of the workshop, namely “Leading from the Middle and Distributed Leadership – NSS time-tabling arrangement and sharing on pilot school experiences”, provides examples of elective subject combinations and timetabling arrangement for NSS. While the workshops introduced new ideas for schools to prepare for NSS, the author attempts to supplement the idea with reference to his past practical experiences. The outline of this paper is as follows. In Section 2, past experiences in organizing elective subject combinations will be shared in parallel to the examples given by EDB in the workshops. Then the author will introduce more ideas about timetabling arrangement other than “Cycle” or “Week” in Section 3. Discussion about period length (duration of a lesson) will be presented in Section 4. Finally, implication of the author’s past experience on preparing for NSS Curriculum and concluding remarks will be given in Section 5 and Section 6 respectively.

2. Elective Subject Combinations

In MMW workshops, three examples of elective subject combinations were given. Since the author wants to share his past experience in parallel to those examples, present (or past) subject names instead of the new ones (in NSS) will be used. It is assumed that there are five classes in Form Four and each student takes Chinese Language, English Language, Mathematics and four elective subjects in the following examples.

2.1 Traditional Workflow and Subject Combinations

A common workflow is that schools provide a pre-set “menu” for students as given in the following example:

[‡] NSS is used as an abbreviation of “New Senior Secondary” in this paper.

Example 1	Class A	Class B	Class C	Class D	Class E
Elective 1	Chinese History	History	Travel and Tourism	Physics	Physics
Elective 2	Chinese Literature	Geography	Commerce	Chemistry	Chemistry
Elective 3	Geography	Principles of Accounts	Principles of Accounts	Biology	Biology
Elective 4	Economics	Economics	Economics	Computer and Information Technology	Additional Mathematics

This is the simplest type of elective subject combination. Students have only five choices and the administrative workload is low.

The second example is given below.

Example 2	Class A	Class B	Class C	Class D	Class E
Elective 1	Chinese History	Chinese History	Commerce	Physics	Physics
Elective 2	Chinese Literature	Principles of Accounts	Principles of Accounts	Chemistry	Chemistry
Elective 3	Economics	Economics	Economics	Biology	Biology
Elective 4	History / Geography / Visual Arts / Computer and Information Technology			Additional Mathematics / Computer and Information Technology	

In this case, there are sixteen combinations. This is also a common type of elective subject combination. Further explanation is not necessary.

2.2 Student-oriented Workflow and Subject Combinations

The third example is a real case in a school, where the author was the former coordinator of Educational Administration. Before showing the subject combinations, some background information about the school context would help understand the practices. The case happened in a new secondary school in West New Territories in 1996. In the foundation year, the school offered five classes of Form One and Form Four respectively. As expected, the Form Four students were academically weak and most of them regarded themselves as “losers” in the education system. Some of them eventually became “anti-schooling practitioners”. As the school wanted to give the students a “new start”, the teachers attempted to fulfill their “first choice” in elective subject combinations as far as possible. (The philosophy behind was based on the pastoral care system of the school. Teachers wanted to respect the students’ rights to have choice over elective subject combination as well as other activities independent of their past performance.) Therefore no subject combinations were preset in advance. Instead, the teachers showed the thirteen subjects provided and collected students’ inclination by asking

students to show their preference in order (from one to thirteen). After having collected students' preference, the combination of the first four preferred subjects of each student was regarded as her "first choice" (as each student had to study four elective subjects). The teachers then eliminated some "unreasonable" combinations. For example, some students chose biology and human biology simultaneously, which was prohibited by the Examination Authority. Likewise, some other students chose a combination which deprived themselves the opportunity of promoting to Form Six. The teachers discovered that thirty-five combinations were enough to cope with all the reasonable choices. Then they asked students to indicate their preference out of the thirty-five combinations. The result was less complicated than expected. The teachers finally used twenty-three combinations to fulfill a 92% success rate for the first preference. Details can be found in Appendix 1.

The teachers then tried hard to arrange the twenty-three combinations in the four elective subject sessions and several solutions were found. The one finally used is listed below. Details can be found in Appendix 2.

Example 3	Class A	Class B	Class C	Class D	Class E
Elective 1	Economics / Commerce / Travel and Tourism / Chinese Literature / Chinese History / Physics / Biology				
Elective 2	Economics / Commerce / Principles of Accounts / Travel and Tourism / Human Biology / Chemistry / Additional Mathematics				
Elective 3	Economics / Commerce / Principles of Accounts / Geography / Human Biology / Physics / Chemistry				
Elective 4	Economics / Principles of Accounts / Travel and Tourism / Chinese History / Geography / Computer Studies / Biology				

It should be emphasized again that the above elective subject combination was not a "pre-set menu". It was produced to fulfill students' choices. Therefore this workflow is different from the traditional one.

The whole process made something good. Firstly, the idea of elective subjects employed by many universities was transferred to secondary schools. It blurred the boundary between Arts and Science (which is actually the idea of NSS). Secondly, the whole process was student-oriented. Students would feel good as their preferences were highly respected. Consequently, students could not excuse their poor performance by saying that they were forced to study certain subjects. Finally, small class teaching was made possible as the five classes were divided into seven groups during elective subject lessons and each group contained only around thirty students. This arrangement facilitated the adoption of more interactive and diversified pedagogy.

However, the following remarks may show the other side of the coin. As

five classes were further divided into seven groups, the total number of lessons was increased. This required greater demand in human resources. In fact, the school hired two more teachers with generous support from the school management committee. (Please note that there was no Capacity Enhancement Grant at that time.) Also, this subject combination induced very complicated timetabling conditions. It was likely that teachers' timetables would become unsatisfactory. Moreover, class cohesion might be weakened as whole-class teaching was only arranged in the three core subjects. This kind of invisible cohesion is valuable. It can also be regarded as a major difference between university life and secondary school life. In addition, the lesson-changing ripples were produced as students were required to flow from five homerooms to seven classrooms. These ripples include time delay, discipline problems and distraction of students' attention. What's more? Subject teachers found difficulties in taking attendance, arranging supplementary lessons and making follow-up actions about unsatisfactory assignments.

2.3 Reflection and Implication

While we are considering the pros and cons of the variations of elective subject combinations, we should note the following points. Firstly, we should ask a question: "What is our ultimate purpose?" In the above story, the purpose was to fulfill the "hope" of the "long-term losers" based on the philosophy of the pastoral care system of the school. However, the author would like to ask a further question today: "Is *the first choice* more important for bright students?" If we agree that the bright students are willing to pay greater effort in studying, should we make every effort to fulfill their needs in choosing elective subjects? It may be difficult for school leaders to make changes immediately, but NSS may be a good turning point. The implication of the past experience for preparing NSS will be discussed in Section 5.

3. Timetabling Arrangement

While the "Weekly System" is used in the real world, many secondary schools in Hong Kong apply the "Cycle System" in their school calendar. In this section, we will first explore the major reasons for using the "Cycle System" in most of the local schools. Then an alternative solution will be presented.

3.1 Why Do Schools Use Cycle System?

There are three major reasons for schools to use Cycle System. Firstly, schools may find that the weekdays are not equally distributed in school days as

there may be more school holidays on a particular day of a week. There may be, for example, fifteen Mondays but only twelve Fridays in one term. This problem can be solved by the Cycle System.

Secondly, subject teachers usually want to have more contact time with their students and they tend to bargain for more lesson time. They may think that it is not enough for a subject to have only 3 lessons per week, but the school may not be able to offer 4 lessons to that subject within a week as “the cake is not large enough”. Under this circumstance, the school may use 6-day Cycle System and offer 4 lessons to that subject per one 6-day cycle. The time ratio of this case is demonstrated below:

	Week		6-day Cycle
Total Number of lessons	40		48
Number of lessons of a certain subject per week	3	4	4
Percentage of lesson time of the subject occupied	7.5%	10%	8.33%

This shows that Cycle System provides an “intermediate” time ratio to the subject.

Finally, many schools want to increase the contact time of traditional academic subjects. Thus they would not increase the contact time of cultural subjects, such as Physical Education and Visual Arts, even if they change from the Weekly System to the Cycle System. This implies that Cycle System changes the ratio of lessons between academic subjects and cultural subjects, with the fact that academic subjects occupy a larger portion of the “cake”. (This ratio is further increased by using 7-day Cycle System.)

3.2 An Alternative Solution: Multi-term-multi-timetable System

In this sub-section, “Multi-term-multi-timetable System” (abbreviated as MTMT System in the following) is introduced as an alternative solution to solve the problems induced by using the Weekly System. MTMT System is nothing new. It is almost the same as the “semester system” used in most universities. It means that different timetables are used in different terms. Students may study different subjects in the two terms respectively. This system can effectively solve the “cake-sharing problem”. Let’s imagine that we use Two-term-two-timetable System. If it is not enough for a subject to have 3 lessons per week and we may not be able to offer 4 lessons to that subject as “the cake is not large enough”, then we can provide 3 lessons in the First Term and 4 lessons in the Second Term to that subject. Then the average number of lessons is 3.5. We may even use Four-term-four-timetable System if smaller segments are required. Appendix 3

shows a real example of subject time distribution under Four-term-four-timetable System.

MTMT Weekly System has several advantages. First of all, it can solve the “cake-sharing problem” and preserve the Weekly System simultaneously. The school calendar would be consistent with the real world situation. It is more convenient to make arrangement for museum visit, teachers’ further study, etc. Moreover, some “minor” subjects may only have two lessons per week. Teachers may find that such an arrangement does not facilitate the effectiveness of their teaching process. If Two-term-two-timetable System is employed, that minor subject may get four lessons per week in the First Term and no lessons in the Second Term. The subject would be turned to a “major” one in terms of contact time in the First Term. According to the author’s past experience, some teachers found that the teaching effectiveness was increased. In addition, if the time arrangement of a subject in a class is not satisfactory, such as arranging as the last lesson of a day or the lesson immediately before lunch time, then it is not necessary to tolerate the bad condition for a year. The condition can be improved in the Second Term.

However, we have to use more man-power in timetabling. MTMT System not only induces complicated pre-timetabling work, but also generates more timetables in a year. Readers may note that the author led a nine-member timetable team when he used Four-term-four-timetable System.

After attempting Two-term-one-timetable System, Two-term-two-timetable System and Four-Term-four-timetable System, the author would regard Two-term-two-timetable System as the optimal solution.

4. Period Length

Traditionally, the length of a period (duration of a single lesson) is 35 minutes or 40 minutes in secondary schools. Some educationalists suggest that longer lesson is more likely to allow teachers to do a complete cycle of recapitulation, introduction, elucidation, transition and conclusion. It also provides greater flexibility in lesson design and hence is more effective. More schools have attempted to apply “long lesson” timetable since the late 1990’s. According to the author’s experience, some teachers might find that long lessons were useful but some others might simply use a 50-minute lesson as if a 40-minute lesson. Appendix 4(B) shows an example of timetable structure, which contains 55-minute lessons with five minutes in between changing lesson time. In practice, the real duration of almost all lessons is reduced by five minutes by changing lesson. Lesson-changing time exists no matter we show it in

the timetable or not.

Appendix 4(C) shows examples of Mixture of Long and Short Periods Structure (which is abbreviated as MLS Structure in the following). The advantages are as follows. Firstly, it provides lessons of 60 minutes and 100 minutes in addition to the traditional single lesson (40 minutes), double lessons (80 minutes) and triple lessons (120 minutes). These five combinations can cater for different needs of different subjects at different levels. Let's take Form One Science as an example. A teacher may sometimes do demonstration of experiment. It is common for the school to arrange a double lesson (80 minutes) to the teacher. As the experiments are relatively simple, a 60-minute lesson may be more appropriate. In this case, teachers may have higher motivation to use a 60-minute lesson to replace a 80-minute double lesson. Secondly, the cake-sharing problem mentioned in Section 3 can also be alleviated by MLS Structure. If the duration of a lesson is 40 minutes, it is reasonable to define a 60-minute lesson as 1.5 normal lessons. Then a subject may occupy, for example, 3.5 lessons per week. The function can be enlarged if Two-term-two-timetable System is applied simultaneously (so that a subject may have 3.5 lessons per week in First Term and 4 lessons per week in Second Term, which results in an average of 3.75 lessons per week). We may use different combinations of long and short periods according to the practical needs, as indicated in Appendix 4(C).

The pre-timetabling work is difficult. Appendix 5 shows the subject time distribution under MLS Structure with Two-term-two-timetable System. The arrangement of timetable is more difficult as long periods and short periods are not interchangeable.

5. Implication to Preparation for NSS

The author attempted all the above "new" structures of timetable as a frontline practitioner in the past. There were rationales behind all these initiatives: Special elective subject combinations mentioned in Section 2.2 were used to cater for the needs of the "school losers"; MTMT System was adopted because the Weekly System was chosen to match with the real world; Long periods were introduced as the school wanted to attempt interactive teaching methods such as cooperative learning.

As the "designer", the "producer" and the "user" of the above "new" ideas, the author would like to mention some implications to the preparation work for NSS. Firstly, readers may find that the workflow of elective subject combination mentioned in Section 2 is too complicated to be implemented. However, we should note that students are only required to study two or three elective subjects under NSS curriculum, hence the situation should be less complicated than the case mentioned in this paper. After all, the author strongly recommends schools to be student-focused by collecting

data about students' inclination on their favourite elective subjects, but the final combinations provided should be optimized according to school resources. By doing this, schools not only put curriculum planning at a higher level than constructing timetable, but also consider students' inclination before curriculum planning. Overall, timetabling would then be a meaningful tool to facilitate both curriculum planning as well as curriculum implementation.

Another important point is about choosing between the Weekly System and the Cycle System. The author would like to emphasize that he does not intend to promote the Weekly System. Schools should choose a system according to their own needs. For example, if a school wants to offer Applied Learning and less popular subjects by allying with neighbouring schools under NSS system, then the school may have to choose the Weekly System. Under this condition, the author's past experience mentioned in Section 3 may provide some insights to solve the problems.

Finally, long periods should not be introduced without pedagogical change. It would be useless if the timetable contains many long periods but the teachers use long periods as if they are short ones. School leaders are suggested to think more about the reasons for introducing long periods. If schools really want to bring pedagogical changes in classrooms and the necessary supplements (such as staff development programmes) are ready, the introduction of some long periods in the timetable will be meaningful.

6. Concluding Remarks

While practitioners may be agonizing over timetable structures and elective subject combinations for NSS, stories in this paper may give insights that new structures should be created according to school needs and students' needs. It is worth to emphasize again that all the "new" structures should be created under a problem-solving perspective.

Timetabling may be regarded as a technical duty, which can be performed by clerical officers. However, why do school principals usually ask senior teachers to do the job? The answer may be found by observing the difference between an engineer and a technician. Neither school principals nor teachers themselves should regard teachers as technicians. While teachers may feel tired of the above complicated pre-timetabling and timetabling work according to principal's instructions, they may be enthusiastic to do so if they are regarded as engineers and designers. Therefore the author suggests that school principals not only involve teachers to find out problems, but also encourage them to act as leaders to provide solutions. The empowerment process facilitates distributive leadership.

Nurturing is an important element of leadership; see for instance Walker &

Dimmock (2002), Leithwood, K. et. al. (2006) and Reinhartz & Beach (2004). Timetabling may provide good opportunities to nurture teachers. If we apply complicated systems, more teachers may be involved in the timetabling team. Although it is more demanding in deploying human resources, more and more teachers involved in timetabling work may be good for school development as it requires teachers to work with macro view at school level.

Finally, the author wants to emphasize that the ultimate purpose of this paper is not to introduce different types of timetable structures. This paper intends to remind practitioners that school administration should support learning and teaching (in a broad sense). Principals and teachers should neither choose an exquisite “timetabling ornament” in a department store, nor attempt to build timetabling structure for administrative convenience. It is essential to explore the necessary changes first for NSS, which include curriculum change, pedagogical change and assessment change, before designing the new timetable structure. An empty beautiful vase is never useful.

References

- Buckman, D., King, B. and Ryan, S. (1995). *Block scheduling: A means to improve school climate*. NASSP bulletin, 79 (571), 9-18.
- Burke, E. K. and Newall, J. P. (1999). *A Multi-Stage Evolutionary Algorithm for the Timetable Problem*, IEEE Transactions on Evolutionary Computation 3 (1) 63-74.
- Canady, R. and Rettig, M. (1995). *Block scheduling: A catalyst for change in high school*. Princeton, NJ: Eye on Education.
- Leithwood, K., Day, C., Sammons, P., Harris, A., Hopkins, D. (2006). *Successful School Leadership: What It Is and How It Influences Pupil Learning*, Research Report RR800, National College for School Leadership, University of Nottingham, pp.36 – 38.
- Ozcan, E. and Alkan, A. (2007). "A Memetic Algorithm for Solving a Timetabling Problem: An Incremental Strategy", Proc. of the 3rd Multidisciplinary Int. Conf. On Scheduling: Theory and Applications, P. Baptiste, G. Kendall, A. M. Kordon, F. Sourd (ed.), 394-401, 28-31 August 2007, Paris, France.
- Reinhartz, Judy and Beach, Don M. (2004). *Educational Leadership: Changing Schools, Changing Roles*, Pearson Education, Inc., p.5.
- Walker, A. and Dimmock, C. (2002). *The seven elements of leadership*. In A. Walker, *Developmental Needs Analysis for Aspiring Principals*, pp.16-18. Hong Kong Centre for the Development of Educational Leadership, Hong Kong.

Appendix 1

Students' Choices of Elective Subject Combination (Result)

Combination Code	Number of Students	Elective Subject 1	Elective Subject 2	Elective Subject 3	Elective Subject 4
C1	5	Chinese Literature	Geography	Chinese History	Human Biology
C3	1	Chinese Literature	Geography	Economics	Human Biology
C4	1	Chinese Literature	Geography	Travel and Tourism	Human Biology
C6	14	Chinese Literature	Geography	Chinese History	Economics
C7	5	Chinese Literature	Geography	Chinese History	Travel and Tourism
C10	1	Chinese Literature	Geography	Economics	Travel and Tourism
C12	5	Chinese History	Geography	Economics	Commerce
C13	1	Chinese History	Geography	Travel and Tourism	Human Biology
C16	3	Geography	Economics	Travel and Tourism	Human Biology
C19	21	Geography	Economics	Travel and Tourism	Chinese History
C22	19	Physics	Chemistry	Biology	Additional Mathematics
C23	3	Physics	Chemistry	Biology	Geography
C24	9	Physics	Chemistry	Biology	Economics
C25	20	Physics	Chemistry	Biology	Computer Studies
C26	1	Commerce	Principles of Accounts	Chinese Literature	Human Biology
C28	3	Commerce	Principles of Accounts	Economics	Chinese Literature
C29	3	Commerce	Principles of Accounts	Travel and Tourism	Chinese Literature
C30	5	Commerce	Principles of Accounts	Geography	Human Biology
C31	7	Commerce	Principles of Accounts	Economics	Human Biology
C32	15	Commerce	Principles of Accounts	Travel and Tourism	Human Biology
C33	7	Commerce	Principles of Accounts	Economics	Geography
C34	1	Commerce	Principles of Accounts	Travel and Tourism	Geography
C35	47	Commerce	Principles of Accounts	Travel and Tourism	Economics
Total	197				

Remark: The following combinations were not chosen by any students or could not be arranged:
C2, C5, C8, C9, C11, C14, C15, C17, C18, C20, C21, C27.

Appendix 2

Student Head Count of Elective Subject Groups in Four Elective Block Time Sessions

	Group 1	Head Count	Group 2	Head Count	Group 3	Head Count	Group 4	Head Count	Group 5	Head Count	Group 6	Head Count	Group 7	Head Count	
Elective Block Time 1	Econ	26	Comm	28	T&T	36	Chi.Lit	34	Chi.Hist	22	Phy	28	Bio	23	
Head Count from Different Subject Combination Groups	C12	5	C30	5	C35A	30	C1	5	C13	1	C22	19	C23	3	
	C16	3	C32	15	C35C	6	C3	1	C19	21	C24	9	C25	20	
	C31	7	C33	7			C4	1							
	C35B	3	C34	1			C6	14							
	C35D	8					C7	5							
								C10	1						
								C26	1						
							C28	3							
							C29	3							
Elective Block Time 2	Econ	32	Comm	30	P.A.	34	T&T	37	H.Bio	22	Chem	23	A.Math	19	
Head Count from Different Subject Combination Groups	C6	14	C35A	30	C29	3	C4	1	C1	5	C23	3	C22	19	
	C24	9			C30	5	C7	5	C3	1	C25	20			
	C28	3			C32	15	C10	1	C12	5					
	C35C	6			C33	7	C13	1	C16	3					
					C34	1	C19	21	C26	1					
				C35B	3	C35D	8	C31	7						
Elective Block Time 3	Econ	30	Comm	31	P.A.	30	Geog	33	H.Bio	22	Phy	23	Chem	28	
Head Count from Different Subject Combination Groups	C3	1	C26	1	C35A	30	C1	5	C4	1	C23	3	C22	19	
	C10	1	C28	3			C6	14	C13	1	C25	20	C24	9	
	C19	21	C29	3			C7	5	C30	5					
	C33	7	C31	7			C12	5	C32	15					
			C35B	3			C16	3							
			C35C	6			C34	1							
		C35D	8												
Elective Block Time 4	Econ	30	P.A.	25	T&T	25	Chi.Hist	29	Geog	40	C.S.	20	Bio	28	
Head Count from Different Subject Combination Groups	C35A	30	C26	1	C16	3	C1	5	C3	1	C25	20	C22	19	
			C28	3	C29	3	C6	14	C4	1			C24	9	
			C31	7	C32	15	C7	5	C10	1					
			C35C	6	C34	1	C12	5	C13	1					
			C35D	8	C35B	3			C19	21					
									C23	3					
									C30	5					
								C33	7						

Remarks:

- The subject codes are as follows:

A.Math: Additional Mathematics	Econ: Economics
Bio: Biology	Geog: Geography
Chem: Chemistry	H. Bio: Human Biology
Chi. Hist: Chinese History	P.A.: Principles of Accounts
Chi. Lit: Chinese Literature	Phy: Physics
Comm: Commerce	T&T: Travel and Tourism
C.S.: Computer Studies	

- As the combination C35 contained too many students, it was further broken down into four groups (C35A, C35B, C35C and C35D).

Appendix 3

Time Distribution of Subjects in the Four Terms

Form 1

	Chi	Eng(1)	Eng(2)	Math	IS	IH	Geog	A&D	Music	PE	CL	D&T	PTH	PSE
Term 1	6	*	*	5	4	5	0	0	1	2	2	*	*	1
Term 2	6	*	*	6	3	5	2	0	1	2	0	*	*	1
Term 3	6	*	*	6	3	4	2	3	1	2	0	*	*	1
Term 4	6	*	*	5	4	5	2	3	0	0	1	*	*	1
Mean	6.00	6.5	0.5	5.50	3.50	4.75	1.50	1.50	0.75	1.5	0.75	0.5	0.75	1.00

*Four classes have different distributions (which are listed below:)

	Eng(1)				Eng(2)				D&T				PTH			
	1A	1B	1C	1D	1A	1B	1C	1D	1A	1B	1C	1D	1A	1B	1C	1D
Term1	5	5	7	7	2	2	0	0	2	2	0	0	0	0	2	2
Term2	7	7	5	5	0	0	2	2	0	0	2	2	2	2	0	0
Term3	7	7	7	7	0	0	0	0	0	0	0	0	0	0	0	0
Term4	7	7	7	7	0	0	0	0	0	0	0	0	1	1	1	1

Form 2

	Chi	Eng(1)	Eng(2)	Math	IS	IH	Geog	A&D	Music	PE	CL	HEc	PTH	PSE
Term 1	6	*	*	5	4	5	2	*	1	2	0	*	*	1
Term 2	6	*	*	5	4	4	1	*	1	0	2	*	*	1
Term 3	6	*	*	6	3	5	2	*	1	2	0	*	*	1
Term 4	6	*	*	6	3	5	2	*	0	2	1	*	*	1
Mean	6.00	6	1	5.50	3.50	4.75	1.75	1	0.75	1.5	0.75	1	0.5	1.00

* Five classes have different distributions (which are listed below:)

	Eng (1)					Eng (2)					HEc					A&D					PTH				
	2A	2B	2C	2D	2E	2A	2B	2C	2D	2E	2A	2B	2C	2D	2E	2A	2B	2C	2D	2E	2A	2B	2C	2D	2E
Term1	5	5	5	7	7	2	2	2	0	0	2	2	2	0	0	0	0	0	2	2	0	0	0	0	0
Term2	5	5	5	7	7	2	2	2	0	0	2	2	2	0	0	2	2	2	2	2	0	0	0	2	2
Term3	7	7	7	5	5	0	0	0	2	2	0	0	0	2	2	2	2	2	0	0	0	0	0	0	0
Term4	7	7	7	5	5	0	0	0	2	2	0	0	0	2	2	0	0	0	0	0	2	2	2	0	0

Form 3

	Chi	Eng(1)	Eng(2)	Eng(3)	Math	IS	IH	Geog	A&D	Music	PE	CL	D&T	PTH	PSE
Term 1	6	*	*	2	6	4	5	2	2	0	2	0	*	*	1
Term 2	6	*	*	2	5	4	5	2	2	1	2	0	*	*	1
Term 3	6	*	*	2	6	4	5	2	0	1	0	1	*	*	1
Term 4	6	*	*	2	5	4	4	1	0	1	2	2	*	*	1
Mean	6.00	4.5	0.5	2	5.50	4	4.75	1.75	1	0.75	1.5	0.75	0.5	0.5	1.00

* Five classes have different distributions (which are listed below:)

	Eng(1)					Eng(2)					D&T					PTH				
	3A	3B	3C	3D	3E	3A	3B	3C	3D	3E	3A	3B	3C	3D	3E	3A	3B	3C	3D	3E
Term1	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Term2	5	5	5	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Term3	3	5	5	3	5	2	0	0	2	0	2	0	0	2	0	0	2	2	0	2
Term4	5	3	3	5	3	0	2	2	0	2	0	2	2	0	2	2	0	0	2	0

Form 4

	Chi	Eng	Math	CLit	AMath	Phy	Chem	Bio	CHist	Geog	Econ	Comm	PA	T&T	CS	Music	PE	IT	PSE
Term 1	5	7	5	4	4	3	4	3	4	3	3	4	3	4	4	1	0	2	1
Term 2	6	6	6	3	3	4	3	4	3	4	4	3	4	3	3	0	2	0	1
Term 3	6	6	5	3	4	3	3	3	4	3	3	4	3	3	4	0	2	2	1
Term 4	5	7	5	4	3	4	4	4	3	4	4	3	4	4	3	0	2	0	1
Mean	5.50	6.50	5.25	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	0.25	1.5	1.00	1.00

Form 5

	Chi	Eng	Math	CLit	AMath	Phy	Chem	Bio	HBio	CHist	Geog	Econ	Comm	PA	T&T	CS	PE
Term 1	6	7	5	4	4	4	4	4	4	4	4	4	4	4	4	4	1
Term 2	6	6	6	4	4	4	4	4	4	4	4	4	4	4	4	4	1
Term 3	6	7	6	4	4	4	4	4	4	4	4	4	4	4	4	4	0
Mean	6	6.67	5.67	4	4	4	4	4	4	4	4	4	4	4	4	4	0.67

Remarks:

1. The distribution is expressed in number of periods per week.
2. Eng(2) for Form 1 – 3 denotes English lessons which are split with D&T and held by the native English teacher..
3. Eng(3) for Form 3 denotes English lessons to which team teaching is applied.

Appendix 4

Examples of Timetable Structure

A. Common Structure

The duration of each period is 40 minutes.

A recess follows from every two periods.

8:00 – 8:20	Assembly
8:20 – 9:00	1st Period
9:00 – 9:40	2nd Period
9:40 – 9:55	1st Recess
9:55 – 10:35	3rd Period
10:35 – 11:15	4th Period
11:15 – 11:30	2nd Recess
11:30 – 12:10	5th Period
12:10 – 12:50	6th Period
12:50 – 2:00	Lunch
2:00 – 2:40	7th Period
2:40 – 3:20	8th Period
3:20 – 4:00	9th Period (if any)

B. Long-period Structure

1. The frequency of “changing lesson” is reduced.
2. Teachers should have pedagogical changes to make good use of long period.

Two Examples of Long-period Structure are given below:

Example 1

8:00 – 8:15	Assembly
8:15 – 8:30	Reading Session
8:35 – 9:30	1st Period
9:35 – 10:30	2nd Period
10:30 – 10:50	1st Recess
10:50 – 11:45	3rd Period
11:50 – 12:45	4th Period
12:45 – 1:45	Lunch
1:45 – 2:40	5th Period
2:45 – 3:40	6th Period

Remarks

- (i) The duration of each period is 55 minutes.
- (ii) A 5-minute change lesson break is inserted.

Example 2

8:00 – 8:15	Assembly
8:15 – 9:05	1st Period
9:05 – 9:55	2nd Period
9:55 – 10:15	1st Recess
10:15 – 11:05	3rd Period
11:05 – 11:55	4th Period
11:55 – 12:05	2nd Recess
12:05 – 12:55	5th Period
12:55 – 2:00	Lunch
2:00 – 2:50	6th Period
2:50 – 3:40	7th Period

Remark:

The duration of each period is 50 minutes.

C. “Mixture of Long and Short Periods” (MLS) Structure

1. In the following examples, the duration of a long period is 60 minutes and the duration of a short period is 40 minutes.
2. Long and short periods can generate the following duration of lessons:
40 minutes, 60 minutes, 80 minutes, 100 minutes, 120 minutes
3. Teachers are encouraged to use 1 long period (60 minutes) to replace a double lesson (80 minutes) for some cases.

Some examples of MLS Structure are given below. In the following, we use “L” and “S” to denote Long period and Short period respectively.

Example 1: 3L + 4S

8:00 – 8:15	Assembly
8:15 – 9:15	1st Period
9:15 – 10:15	2nd Period
10:15 – 10:35	1st Recess
10:35 – 11:35	3rd Period
11:35 – 12:15	4th Period
12:15 – 12:25	2nd Recess
12:25 – 1:05	5th Period
1:05 – 2:10	Lunch
2:10 – 2:30	Reading Session
2:30 – 3:10	6th Period
3:10 – 3:50	7th Period

Example 2: 4L + 3S

8:00 – 8:20	Assembly
8:20 – 9:20	1st Period
9:20 – 10:00	2nd Period
10:00 – 10:20	1st Recess
10:20 – 11:20	3rd Period
11:20 – 12:20	4th Period
12:20 – 1:20	Lunch
1:20 – 2:20	5th Period
2:20 – 2:30	2nd Recess
2:30 – 3:10	6th Period
3:10 – 3:50	7th Period

Example 3: 3L + 3S + 1L/S

8:00 – 8:15	Assembly
8:15 – 8:30	Reading Session
8:30 – 9:30	1st Period
9:30 – 10:10	2nd Period
10:10 – 10:30	1st Recess
10:30 – 11:30	3rd Period
11:30 – 12:10	4th Period
12:10 – 1:10	Lunch
1:10 – 2:10	5th Period
2:10 – 2:50	6th Period
2:50 – 3:00	2nd Recess
3:00 – 3:40 or 3:00 – 4:00	7th Period (if any)

Example 4: 2L + 6S

8:00 – 8:15	Assembly
8:15 – 8:30	Reading Session
8:30 – 9:30	1st Period
9:30 – 10:10	2nd Period
10:10 – 10:30	1st Recess
10:30 – 11:10	3rd Period
11:10 – 11:50	4th Period
11:50 – 12:30	5th Period
12:30 – 1:30	Lunch
1:30 – 2:30	6th Period
2:30 – 3:10	7th Period
3:10 – 3:20	2nd Recess
3:20 – 4:00	8th Period (if any)

Appendix 5

An Example of Subject Time Distribution in Two-term-two-timetable System with MLS Structure

			Total	Chi	Eng	Math	IBS	IS	Geog	Hist	CHist	CLit	GPA	Econ	Comm	PA	T&T	CS	AMath	Phy	Chem	Bio	PMath	LS	CA	CL	PTH	D&T	HEc	A&D	Music	PE	PSE		
S1	Term 1	Short	13	3	4	1	0	2	0																		0	0	1		0	1	0	1	
		Long	17	2	2	3	3	1	2																		1	0	1		0	0	1	1	
		Total	38.5	6	7	5.5	4.5	3.5	3																		1.5	0	2.5		0	1	1.5	2.5	
	Term 2	Short	13	4	3	1	1	1	0																		0	0	0		1	1	0	1	
		Long	17	2	3	3	3	2	0																		0	1	0		1	0	1	1	
		Total	38.5	7	7.5	5.5	5.5	4	0																		0	1.5	0		2.5	1	1.5	2.5	
	Year Mean		38.5	6.5	7.3	5.5	5	3.8	1.5																		0.8	0.8	1.3		1.3	1	1.5	2.5	
S2	Term 1	Short	13	3	3	1	1	1	0																		0	1	0	0	1	1	0	1	
		Long	17	2	3	3	3	2	2																		0	0	0	0	1	0	0	1	
		Total	38.5	6	7.5	5.5	5.5	4	3																		0	1	0	0	2.5	1	0	2.5	
	Term 2	Short	13	3	2	2	0	1	0																		0	0	1	1	0	1	1	1	
		Long	17	2	3	2	3	2	0																		1	0	1	1	0	0	1	1	
		Total	38.5	6	6.5	5	4.5	4	0																		1.5	0	2.5	2.5	0	1	2.5	2.5	
	Year Mean		38.5	6	7	5.3	5	4	1.5																		0.8	0.5	1.3	1.3	1.3	1	1.3	2.5	
S3	Term 1	Short	13	3	3	4	0	0	0																		0	0		1	1	0	0	1	
		Long	17	2	3	1	3	3	0																		1	0		1	1	0	1	1	
		Total	38.5	6	7.5	5.5	4.5	4.5	0																		1.5	0		2.5	2.5	0	1.5	2.5	
	Term 2	Short	13	3	3	4	1	1	0																			0	0		0	0	0	0	1
		Long	17	2	3	1	3	2	2																			0	1		0	0	1	1	1
		Total	38.5	6	7.5	5.5	5.5	4	3																			0	1.5		0	0	1.5	1.5	2.5
	Year Mean		38.5	6	7.5	5.5	5	4.3	1.5																		0.8	0.8		1.3	1.3	0.8	1.5	2.5	
S4	Term 1	Short	13	1	3	4			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1									0	1	
		Long	17	3	3	1			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2									1	1	
		Total	38.5	5.5	7.5	5.5			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4									1.5	2.5	
	Term 2	Short	13	2	3	3			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1										0	1
		Long	17	3	3	2			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2										1	0
		Total	38.5	6.5	7.5	6			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4									1.5	1	
	Year Mean		38.5	6	7.5	5.8			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4									1.5	1.8	
S5	Term 1	Short	13	2	3	3			1	1	1	1		1	1	1	1	1	1	1	1	1	1										0	1	
		Long	17	3	3	2			2	2	2	2		2	2	2	2	2	2	2	2	2	2										1	0	
		Total	38.5	6.5	7.5	6			4	4	4	4		4	4	4	4	4	4	4	4	4	4										1.5	1	
	Term 2	Short	13	3	4	1			1	1	1	1		1	1	1	1	1	1	1	1	1	1											0	1
		Long	17	2	3	3			2	2	2	2		2	2	2	2	2	2	2	2	2	2											1	0
		Total	38.5	6	8.5	5.5			4	4	4	4		4	4	4	4	4	4	4	4	4	4										1.5	1	
	Year Mean		38.5	6.3	8	5.8			4	4	4	4		4	4	4	4	4	4	4	4	4	4										1.5	1	
S6	Term 1	Short	11	1	3				2	2		2		2		2				2	2	2	2	2	2								0	1	
		Long	19	3	3				4	4		4		4		4					4	4	4	4	2	2							1	0	
		Total	39.5	5.5	7.5				8	8		8		8		8					8	8	8	8	5	5							1.5	1	
	Term 2	Short	11	1	3					2	2		2		2		2				2	2	2	2	2	2								0	1
		Long	19	3	3					4	4		4		4		4				4	4	4	4	2	2							1	0	
		Total	39.5	5.5	7.5					8	8		8		8		8				8	8	8	8	5	5							1.5	1	
	Year Mean		39.5	5.5	7.5					8	8		8		8		8				8	8	8	8	5	5							1.5	1	
S7	Term 1	Short	11	1	3				2			2		2		2				2	2	2	2	2	2								0	1	
		Long	19	3	3				4			4		4		4					4	4	4	4	2	2							1	0	
		Total	39.5	5.5	7.5				8			8		8		8					8	8	8	8	5	5							1.5	1	
	Term 2	Short	11	1	3					2			2		2		2				2	2	2	2	2	2								0	1
		Long	19	4	3					4			4		4		4				4	4	4	4	2	2							0	0	
		Total	39.5	7	7.5					8			8		8		8				8	8	8	8	5	5							0	1	
	Year Mean		39.5	6.3	7.5					8			8		8		8				8	8	8	8	5	5							0.8	1	

Remark: 1 long period is regarded as 1.5 short periods.