Timetabling and other practical ideas:

Some possibilities arising from the Review of the syllabuses for the senior phase of learning

A paper prepared for the QSA by Mike Middleton
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Queensland Government

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Introduction

This paper was commissioned by the Queensland Studies Authority as a contribution to the review of syllabuses for the senior phase of learning. It offers an external expert's perspective on practical implications for implementing more flexible learning opportunities in the senior phase. The ideas are based on the syllabus design currently being considered by the review of the syllabuses, which includes core disciplinary learning and three types of electives.

Mike Middleton has had a long career in both secondary and tertiary education. He has been involved in several national curriculum projects, including the Australian Science Education Project, the National Core Curriculum Project, the Participation and Equity Project and a review of secondary education policy for the Commonwealth Schools Commission. In Queensland he chaired the Ministerial Consultative Council on Curriculum. He now works with individual schools and schooling systems across Australia providing advice on flexible, innovative and practical solutions to deliver learning in schools. This paper shares his perspective, and collates strategies being used by schools, both urban and rural, to timetable a broad senior curriculum.

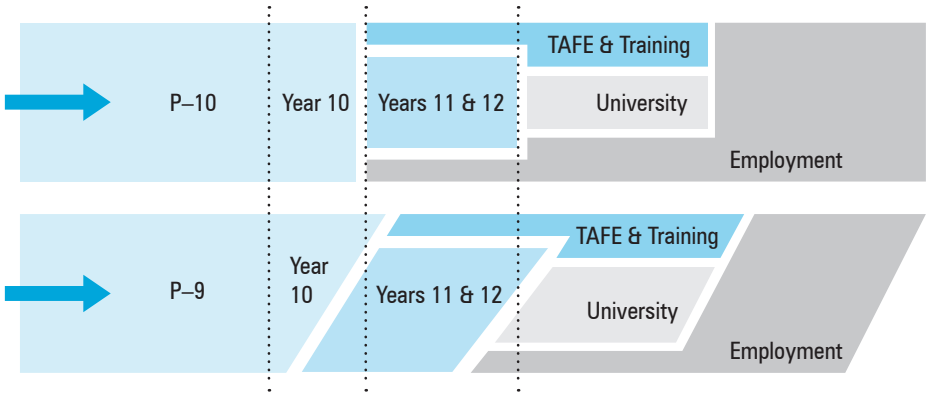
1. Background

For some hundred years, until the 1970s, secondary schooling served to allocate young Australians into social roles. Students attended schools then they either "passed" onto the next phase of formal education or they left school to enter the workforce. Since secondary education became compulsory during the early 1960s, the major times for leaving formal education have been at the end of Year 10, at the end of Year 12, or at the completion of tertiary studies. For most, it was a process of progressive elimination. Until the 1970s, no matter the stage at which Australians left school, there was a hungry labour market providing full-time employment for all who sought it. Much of this employment was unskilled. As Jones (1990) in *Sleepers Wake: Technology and the Future of Work (revised)* has pointed out, since the mid 1970s, unskilled full-time careers have been disappearing rapidly from the Australian workforce. This has led to a greater retention rate in the senior years of secondary schooling, and to an understanding that there are certain "essential learnings" that all students need if they are to become fully participating members of Australia's adult population.

Consequently, the logic underpinning the use of time in secondary education has shifted. Instead of using time as a fixed resource guaranteeing a wide spread of results in formal learning programs, the appropriate rationale is now quite different. It involves encouraging students to set their own working goals, and providing them with the optimum opportunities to achieve these goals (or to discover that the goals are unrealistic). Because different students need different amounts of time to achieve learning goals, it is important that schools are organised to make this variability in time possible. Such flexibility applies to students who learn certain skills or understandings more quickly than most. They should not have to wait until the Earth completes its annual orbit to move on to the next phase in their learning. It applies equally to students who have run out of time. They should not be told to "stop now" and move on to the next phase, despite their lack of readiness to do so. It is about pace and progression. If systems are to be rigorous in their learning demands, then time must be allocated in such a way that it ensures this rigour.

The change in the underpinning logic is represented in Figure 1.

FIGURE 1



The top part of the figure represents the previous "meritocratic" logic while the lower part indicates the way the transition from school to work is now occurring.

In terms of its relevance to school structures and to timetabling, the change in practice and logic has three main implications.

1) Time no longer needs to be fixed and common to all students studying a discipline — in fact it should not be.
2) Senior schooling is no longer a two–calendar-year course.
3) Schools need to accommodate a range of pathways including QSA courses, VET programs, TAFE and University components and perhaps other elements, such as the International Baccalaureate.

Figure 2 summarises some of the important differences between the previous logic and the new logic.

FIGURE 2

	PREVIOUS LOGIC	NEW LOGIC
Use of time	**Time fixed — results variable** Time fixed for all students doing a course, elective or otherwise. Maths and English — time fixed so comparisons can be made. Students move on when they've "done the time" — ready or not.	**Defined standards — require variable time for some students** Time may need to be modified for different students, depending on their goals. Time for Maths and English may need to vary so that students achieve thresholds. Students move on when they've "done the work" (achieved any necessary prior learning, or achieved their goals).
Senior school concept	Year 11 and 12, with some minor exceptions.	Part or all of Years 10, 11 and 12, with greater allowance for extension beyond Year 12.
Mix of courses	"Authority" subjects — first priority in the timetable structure. "Authority Registered" subjects and "School subjects" if they can be accommodated. VET subjects seen as additional to the mainstream curriculum, often compromising it.	A mix of courses including: • prep courses • discipline-based courses • electives • enrichment • VET • projects • advanced courses Timetable designed from the start to accommodate the full mix.

We are now in a position to examine in more detail the timetabling implications and possibilities that are possible when schools:

- provide variable time for students
- consider Year 10 as part of senior schooling, and also cater for post–Year 12 students
- provide for a mix of courses.

It needs to be stressed that most schools already have timetables that *accommodate* the new pattern of QSA senior programs. The accommodation can be made without large timetabling changes. In the first instance, the main modification might be to change what happens within each program. For example, consider a situation where a school has organised the Year 11 and 12 subjects on six timetable lines in the following way (assuming two-year courses). The course of a particular student, Max[1], is shown in Figure 3.

1 All names used in this report are fictitious, for the purpose of illustration.

FIGURE 3

Maths (of various levels)	**Line 1**
English (of various levels)	**Line 2**
Legal Studies Physics History Drama Manufacturing … etc.	**Line 3**
Indonesian Chemistry Ancient History Visual Arts Home Economics … etc.	**Line 4**
Multi-Strand Science Construction German Media Health and Physical Education … etc.	**Line 5**
Geography Accounting Music Health & PE Home Economics IT … etc.	**Line 6**

As far as timetabling is concerned, Max's choice can be massaged to fit the new QSA guidelines as follows.

CORE DISCIPLINARY LEARNING		ELECTIVE		EXTENSION
Maths	+	Maths		
English	+	English		
Science	+	Physics	+	Physics
Science	+	Chemistry	+	Chemistry
HPE	+	Sport		
Technology	+	ICT PM		

The core disciplinary learning in Science might be taught on two lines in Semester 1 of Year 11. Or it might be taught on a single Year 11 line, concurrently with a semester of each of physics and/or chemistry on the other line.

Most students will be able to be accommodated similarly to Max. This will be important during the two- or three-year transition to the new pattern. Schools will thus be able to phase in the initiatives offered by the new framework, as they develop the new courses and introduce the supporting organisational and timetabling structures.

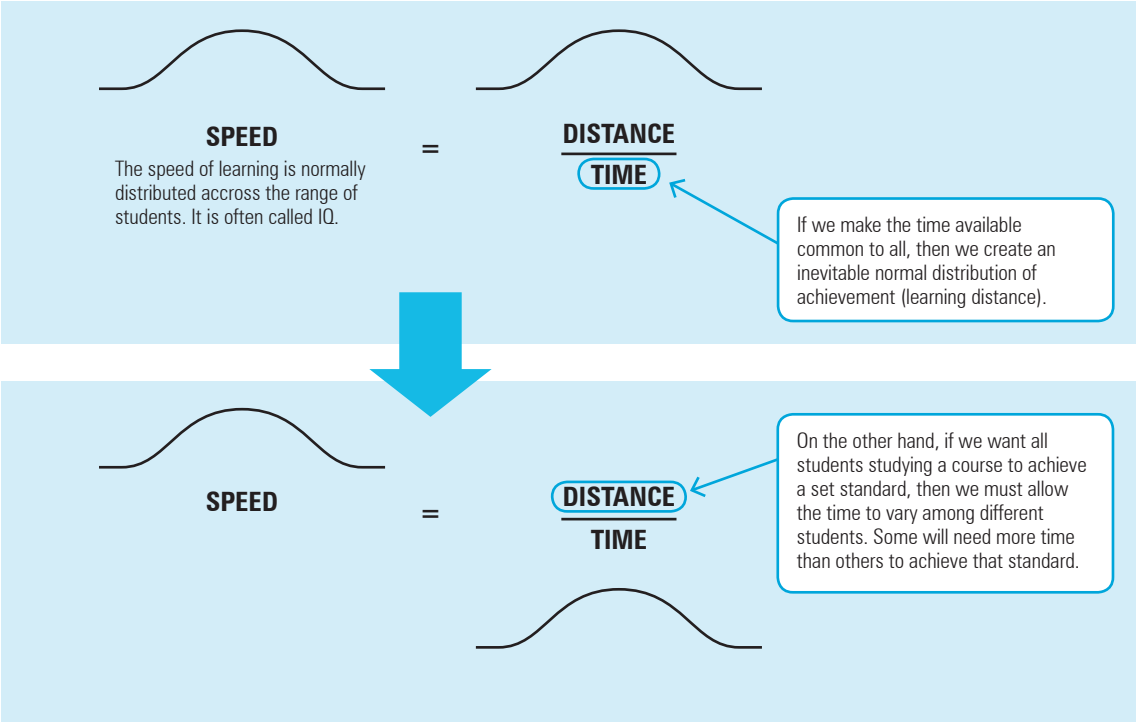
2. Creating variable time

The speed or pace of a vehicle is determined by dividing the distance travelled by the time taken.

$$\text{SPEED (50 km per hour)} = \frac{\text{DISTANCE (100 km)}}{\text{TIME (2 hours)}}$$

Let's apply this idea to learning.

FIGURE 4



It is important to recognise that learning takes time. Some people learn more slowly than others. This does not necessarily mean that they learn less thoroughly. (Einstein had to repeat Year 10 to get into Maths in Year 11).

Historically, it served the schooling system well to keep the time constant, so that students could be encouraged to "give up", leaving the school system and entering the workforce, perhaps as unskilled workers.

In the new social and technological environment, this is no longer the case. There are agreed learnings and skills that are essential for all young Australians. Learning time needs to vary accordingly among different students.

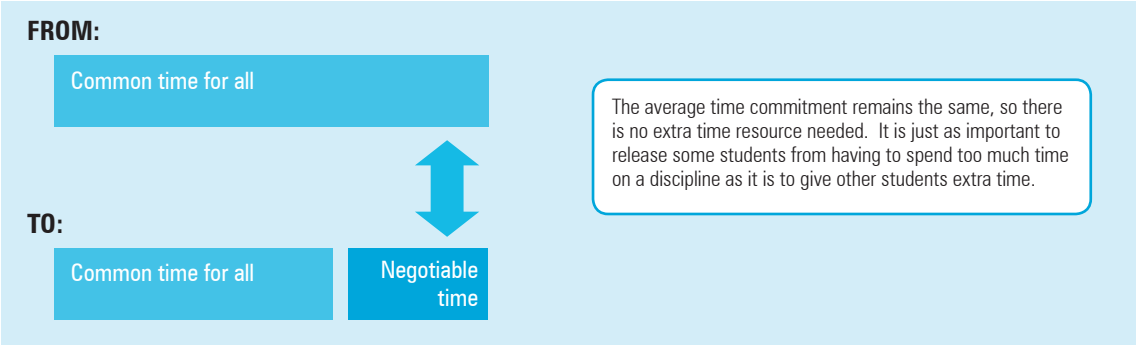
Many schools have not yet created such possibilities, as shown by the flourishing tutorial companies, such as Kip McGrath, and the Federal government budget announcements in 2006 and 2007 that provide funding for outside tutoring for families whose children are struggling at school.

The Future of Schooling in Australia (Federalist Paper 2, April 2007) states:

… it is not the standards embodied in the curriculum that are the problem; rather it is the challenge of getting the lower performers to meet the standards … it is important to allow for flexibility in schools catering for different groups of students to achieve these standards in different ways. This is not an argument for lower standards for some students … This process of personalisation is increasingly recognised as being an essential part of increasing retention and attainment rates.

Creating greater flexibility does not necessarily mean abandoning traditional timetabling methods. It may merely mean creating some flexibility at the boundaries. In any course, there are students capable of achieving excellence in less time than was commonly allocated. There are others who, given some extra time, would be capable of achieving set minimum standards. Figure 5 shows that creating greater flexibility is a less daunting task than it first appears.

FIGURE 5

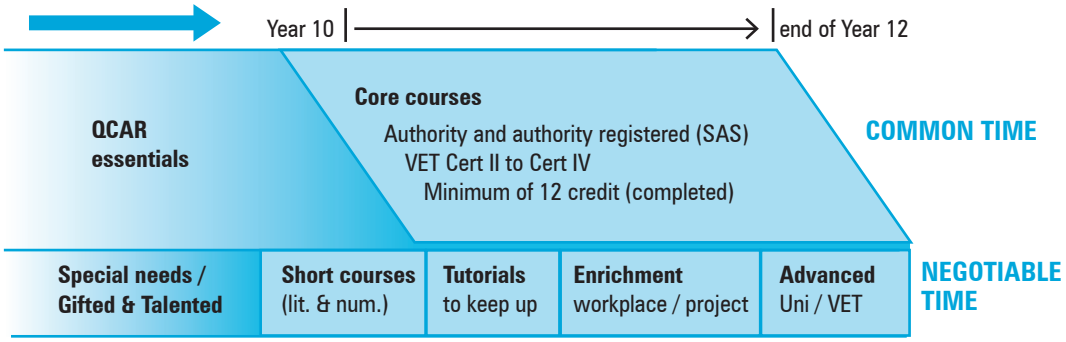


Creating flexible time is important for students who:

- normally speak a language other than English outside of school
- have not achieved the required levels of literacy or numeracy at Year 9
- need more time than most to achieve the required standard
- have definite aspirational goals but need more time than most to achieve them
- are capable of learning faster than most and are in danger of disengagement
- are motivated to undertake a specific personal project.

In the context of QSA's proposed framework, *structured flexibility* can be conceived as follows:

FIGURE 6



Let us now consider practical ways of structuring the negotiable time.

2.1 Short courses — Literacy and numeracy

The literacy and numeracy short courses are designed to include one or two modules of learning, each of about 55 hours. They are concerned with essential underpinning learning in Mathematics and English. They can be studied in Year 10, or concurrently with core disciplinary learning in Year 11. The students who may need to undertake these courses include those who did not reach the required standards in the Year 9 statewide assessment, as well as ESL students (who may be Indigenous students, recent immigrants or international students). During Year 10, the modules are not designed to replace mainstream Mathematics or mainstream English. The aim is to provide these students with extra time in these areas of learning. There are two main ways to cater for these students' needs, depending on the numbers of students involved. If there are sufficient students to justify forming a class, then the short courses could replace an elective either for a semester or for the whole year, if required. An elective line containing a LOTE might be best suited.

If there are insufficient students to justify forming a class, then there are several strategies available. The first is to use the services of an outside provider. This has the advantage of not requiring the student to 'drop' another curriculum element in order to complete the short course. It has the disadvantage of requiring the student to spend extra time on schoolwork, with the associated stresses this might involve. In any case, such providers may not be locally available, or might be beyond the financial resources available. A second strategy is to use the "special needs" facility of the school. The advantage of this approach is that the teachers involved are skilled in catering for students with special needs in literacy or numeracy. On the other hand, the special needs facility might already be stretched to its limit catering for other students. There are at least two other strategies available, and these will be described more fully in the following section of this paper (because they are strategies that can be used for a range of needs beyond the short courses). The strategies involve structured tutorial programs, on the one hand, or specialised learning centres, on the other.

2.2 Tutorial approaches

Tutorial approaches involve marginally reducing the time allocated to curriculum elements, and then making it available on a needs basis. Sometimes the curriculum elements that can be reduced are not mainstream elements anyway. For example, a school might be operating a six-line timetable with a four-period day, as shown in Figure 7. This actually leaves two periods of about 70 minutes either unallocated, or allocated to "hobbies" or to some other convenient "fill in". Or perhaps the time is used for sport. If it is, there is usually a remaining period of time. This time represents a chance for students needing extra help or extra time to receive it in a structured way.

FIGURE 7

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Subject **1**	Subject **5**	Subject **4**	Subject **2**	Subject **6**
Period 2	Subject **2**	Subject **6**	**Tutorial**	Subject **5**	Subject **3**
Period 3	Subject **3**	Subject **1**		Subject **6**	Subject **4**
Period 4	Subject **4**	Subject **2**	Subject **3**	Subject **1**	Subject **5**

A school may wish to make the tutorials non-compulsory for senior students. In this case, the timetable might appear as follows in Figure 8. Students who do not wish to take advantage of the tutorials might go home to study, or undertake VET placements or part-time work.

FIGURE 8

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Subject **1**	Subject **5**	Subject **4**	Subject **2**	Subject **6**
Period 2	Subject **2**	Subject **6**	Subject **3**	Subject **5**	Subject **3**
Period 3	Subject **3**	Subject **1**	**Tutorial**	Subject **6**	Subject **4**
Period 4	Subject **4**	Subject **2**		Subject **1**	Subject **5**

The tutorials are not designed to be *ad hoc*. They are designed to be structured around the disciplines and to be responsive to the needs of students. The commitment to the tutorial program might be such that students choose a new tutorial every five weeks, say. This can be arranged in their "home room" time by means of a choice sheet like that shown in Figure 9:

FIGURE 9

Tutorials for April, May and June 2008

Student name: .....

Choose a first and second choice for your tutorial by writing 1 and 2 beside your preferred discipline areas. On the back of the sheet, briefly write the specific help or support you believe you need. Your tutor will read this and be prepared to help you.

English	
Science	
Social Sciences	
Technologies	
Maths	
LOTE	
History	
Business & Enterprise	
Personal project	
Short course (lit. & num.)	
Non-specific (library)	

If you do not get your first choice this time, you will be placed on the top of the list for the next round of tutorials.

There are many other patterns possible for schools with five-, six- or seven-period days. Some schools have sport built in. Others do not. Some work on seven lines, others on six. Let's look at two other examples.

The first example, in Figure 10, shows a seven-period day with six lines, sport and assembly. The second example, in Figure 11, shows a six-period day with seven lines, no sport and no assembly. There are many different ways to build tutorial patterns into the timetable structure. Importantly, there are still the same numbers of students for the same amount of time so that there is no extra loading for teachers.

FIGURE 10

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Subject **1**	Subject **2**	Subject **3**	Subject **4**	Subject **5**
Period 2	Subject **1**	Subject **2**	Subject **3**	Subject **4**	Subject **5**
Period 3	Subject **2**	Subject **3**	Subject **6**	**ASSEMBLY**	Subject **1**
Period 4	Subject **3**	Subject **4**	Subject **6**	**Tutorial**	Subject **3**
Period 5	Subject **4**	Subject **5**	Subject **2**		Subject **6**
Period 6	Subject **5**	Subject **6**	Subject **4**	Subject **1**	**SPORT**
Period 7	Subject **6**	Subject **1**	Subject **5**	Subject **2**	**SPORT**

FIGURE 11

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Subject **1**	Subject **2**	Subject **3**	Subject **4**	Subject **5**
Period 2					
Period 3	Subject **6**	Subject **7**	**Tutorial**	Subject **5**	Subject **4**
Period 4				Subject **2**	Subject **1**
Period 5	Subject **7**	Subject **4**	Subject **6**	Subject **3**	Subject **6**
Period 6	Subject **5**	Subject **5**	Subject **1**	Subject **7**	Subject **2**

Both of these patterns (Figures 10 and 11) could be converted to optional tutorials by shifting them to the first or last periods in the day.

In these examples, if a student has difficulty in a particular subject area, he or she is able to increase time in that subject by about 50% over the year. However, most students will choose to undertake tutorials in several subjects in the course of the year. Applied to Year 10 or 11, the tutorial structure would allow students to undertake a short course without missing mainstream time in any of their subjects.

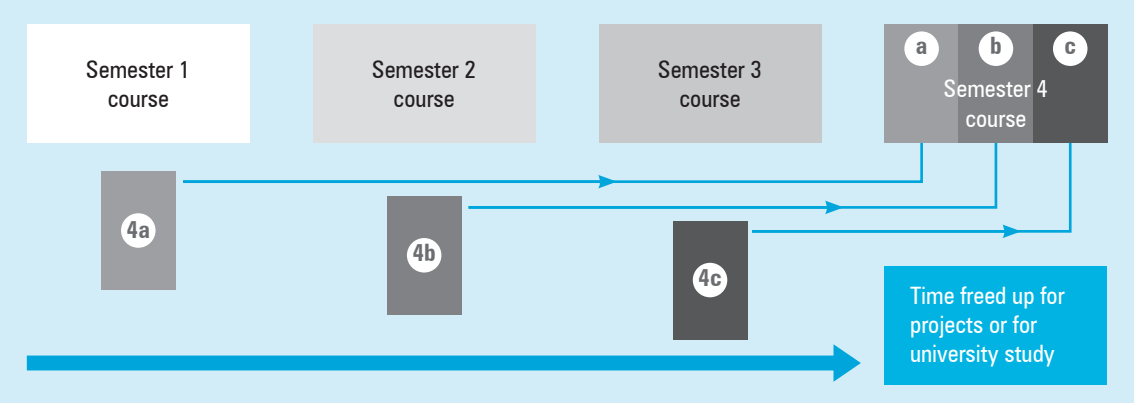
There are other ways of building in extra time. For example, some schools have used the idea of "week seven" for their tutorials. In this approach, students are encouraged to keep a journal of their learning difficulties and questions. Week seven each term is then structured into a series of tutorial sessions based on the discipline areas. Students use week seven for help in areas where they are struggling, for special projects, to spend more time in areas of interest, or for community or work-related projects. The organisation of a week such as this is complex for the first couple of terms, but becomes much more routine once the patterns are established. It might apply just to Year 10, or to the whole of the senior school. It is best that there are dedicated areas in each faculty so that the middle school classes are able to operate normally.

2.3 Acceleration and catering for students who need less time

In classes in many subjects, there are students who take less time than others to master concepts or skills. These students are not only in danger of disengaging; they can also be quite trying for teachers. For example, in a class where students are undertaking a series of tasks, be they problems or analyses, it is not uncommon for students to raise their hand with the comment, "Please, Miss, I've finished". All too often the response is something like: "Turn the page to the next set of problems," or "Wait till I find some more work".

Under these circumstances, students are likely to become frustrated. The reward for finishing their work is simply more work, to keep them busy. They soon learn to slow down to the pace of the group, often with accompanying behaviours that distract other students and annoy teachers. In designing courses, it often makes sense to create the potential for such students to "borrow" work from future modules or semester units. This can be achieved by designing a later semester course that can be accessed and mastered by talented students, one section at a time. This is illustrated in Figure 12.

FIGURE 12



In this case, the teachers who have designed the course have created an alternative approach to the semester 4 unit (or an elective unit under QSA's proposed framework). This approach allows the students to access the learning independently (perhaps in pairs), and asks them to undertake assessment tasks marking the completion of sections of the unit. In the example shown, some students complete the first third of the unit during Semester 1 in Year 11, the second third during Semester 2 in Year 11 and the final third during Semester 1 of Year 12. These students are then credited with the unit and are free to choose an alternative course for the final semester, to undertake advanced studies, or perhaps to choose a personal, community or vocational project. Such sequences do not have to wait until the final two years. They might be built into the program from Year 10 or even earlier.

2.4 Structured learning centres (SLC)

Over the past two decades, an increasing number of Australian schools have been introducing "independent learning centres". Some of these have been faculty based. Most have been "whole school". Some have been stimulated in small schools by the need to be proactive in providing student opportunities at the senior level. Others have involved networking between schools. All have used the rapid developments in Information and Communication Technology.

The QSA's proposed pattern for the senior curriculum makes the introduction of "structured learning centres" even more viable.

2.4.1 Rationale for structured learning centres

The nature of education and work in Australia is changing rapidly. People are more mobile. They change their jobs, even their professions, more frequently. They marry and have children later. Formal education is no longer a preparation for life and work. It is rapidly becoming a part of life and work. For many young (and older) adults, this means studying while they are working, and often studying as non-attending students.

These changes in patterns of education and work have fortunately been accompanied by changes in technology that provide people with access not only to the world's libraries through the internet, but also to a wide range of virtual courses offered by universities, TAFEs, Schools of Distance Education and other providers. Young people are able to interact with other young people across the world.

These are large-scale and global changes. There are also new demands and possibilities in our schools. Under any curriculum pattern, structured learning centres provide school-based practice and preparation

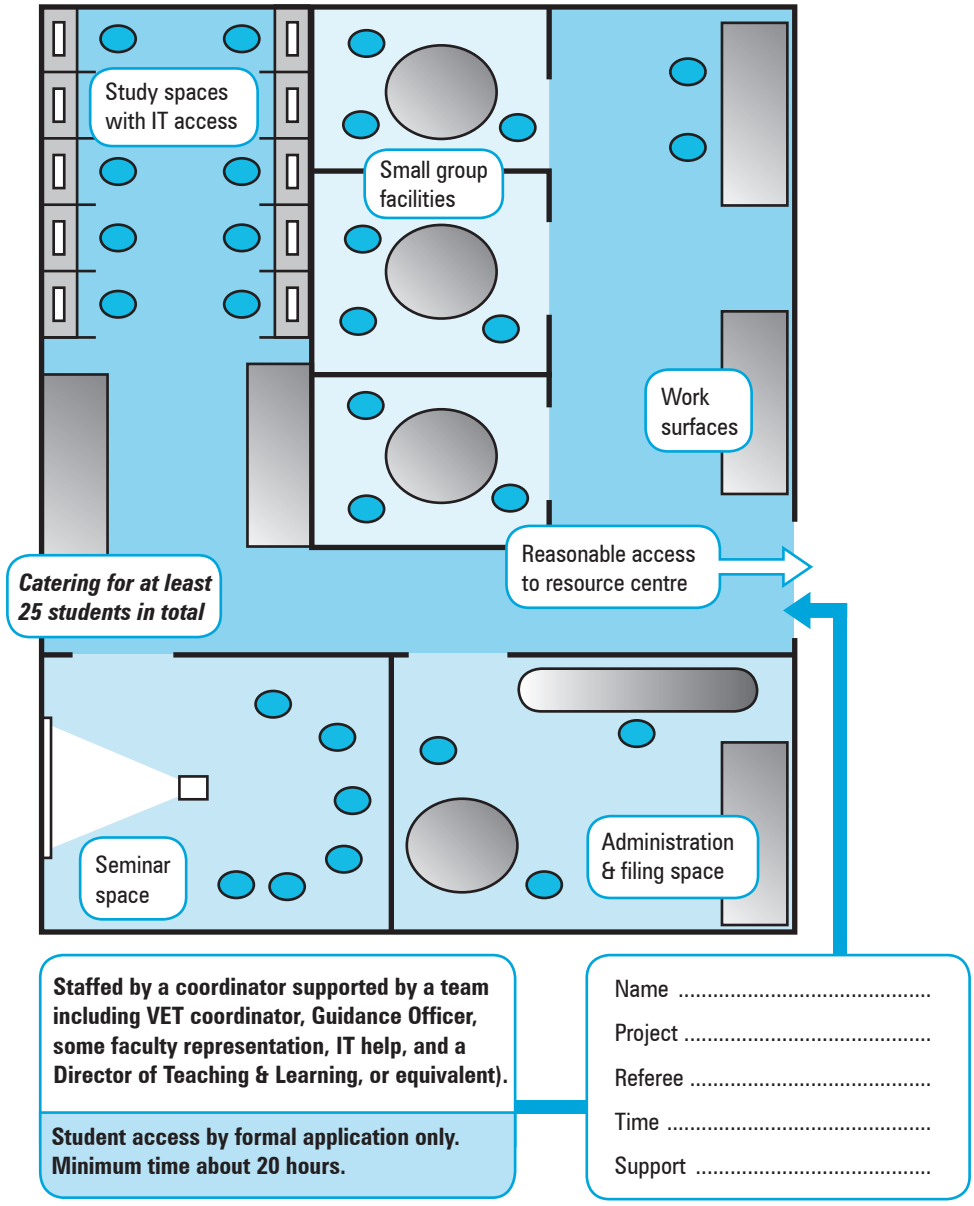
for much of the ongoing learning that will be needed in students' post-school years. In the light of the proposed QSA curriculum pattern, the opportunities offered by such learning centres are even greater. The centres provide the potential for much of the flexibility inherent in the curriculum design.

Let us first consider the ways in which a learning centre might be established spatially and organisationally. We will then be in a position to consider how it can serve the needs of students and teachers. Finally, we will consider the resourcing implications.

2.4.2 Organisation of a structured learning centre

There are many models of structured learning centres, depending upon enrolments and architecture. As a general rule, the centre needs to be able to accommodate at least 25 students at any one time. If the number is less than this, then the co-ordinator, or the learning coach, becomes a drain on the school's resources because they have a "class size" less than average. Many schools already have learning spaces associated with or near a resource centre that can well serve as a structured learning centre. Figure 13 shows the general concept.

FIGURE 13



The co-ordinator need not work full time in the learning centre. There will be times when other teachers will be involved. However, the centre must never be used in such a way that teachers see the task as supervisory. They need to be committed to the concept and able to coach students in the learning processes involved.

2.4.3 Functions of a structured learning centre

The structured learning centre (SLC) is not a facility for private study. It is not a place where students can make occasional visits. Access to the structured learning centre is only available by formal application and includes a requirement for teacher/s to support the application as referee/s. Use of the structured learning centre usually involves a timetabled commitment of at least 20 hours.

However the student choices are translated onto a timetable (lines first or clash matrices), the SLC is an option on every line. Let us take an example of a set of lines where four of the subjects on each line are identified.

FIGURE 14

Line 1	Advanced Maths	Core Maths	English Language	Media	SLC
Line 2	Business Maths	Trade Maths	English Literature	Core English	SLC
Line 3	Chemistry	Drama	LOTE (German)	VET (Furniture)	SLC
Line 4	Physics	Accounting	Ethics	VET (Furniture)	SLC
Line 5	Geography	Health & PE	Economics	VET (Construction)	SLC
Line 6	History	ICT	Biology	VET (Construction)	SLC

It is now possible to consider a number of scenarios that illustrate the versatility and usefulness of a Structured Learning Centre.

LINE CLASHES

Rhiannon is an unusual student who is keen to become an engineer and is interested ultimately in running her own engineering business. On the timetable as it exists, she has a problem, because one of her chosen subjects (Physics) is on the same line as another chosen subject (Accounting). She is the only person in the school who wants to study this mix. She has not chosen any of the subjects on line 6. Rhiannon talks with her teachers and decides that she really does need to attend all or most of her Physics classes because of the practical work. Her Accounting teacher, on the other hand, indicates that the students in Accounting will be doing much of their learning online. Rhiannon negotiates with her Accounting teacher that she will spend line 6 studying Accounting, by application to the SLC. The Accounting teacher explains that, on the line 6 timeslot, she is teaching a keyboard class of Year 9s, so if Rhiannon has any problems she should come to see her during the Thursday period each week while the students are involved in their own keyboarding exercises. Rhiannon negotiates with the Physics teacher to miss a lesson now and again when there is a common assessment process involved in Accounting. The Physics and Accounting teachers act as referees for Rhiannon on her SLC application.

LOW CANDIDATURE

There are only four students wishing to study Ethics. However, they are all very keen and have Ethics as a part of their own well considered pathway. Four is too few students to warrant a whole class allocation; the school indicates that the pro-rata teacher allocation for four students would be one third of the normal time allocation for a subject. In liaison with the Ethics teacher, the four decide to apply for the SLC for three periods per week on line 4. So the Ethics teacher and the students design their course in such a way that their teacher is with them for a period each week (normally the Tuesday period). She will work intensively with them in the SLC at this time setting them work to do for the

other times, and making sure that the normal SLC coordinator is aware of what their tasks are and is available to help with resources and encouragement.

ACCESS TO VIRTUAL SCHOOLING

Robert plans to spend his gap year (between school and university) in Brazil as an exchange student. He is a very keen and talented soccer player. He would like to be able to learn Portuguese before he goes to Brazil. He makes contact with Rotary, who are sponsoring his exchange, and with the SLC coordinator. They discover that they can use an online program for Robert to tackle the language and that his family in Brazil will be happy to "chat" with him online. They speak a little English, so the arrangement is feasible. Robert makes sure, through the co-ordinator, that the Portuguese course can contribute credits for his QCE. He chooses line 3 for his Portuguese study and applies accordingly; his home room teacher acts as his referee.

KEEPING UP

James is an international student from Hong Kong. He speaks Cantonese as his first language, and learnt Mandarin and English at school in Hong Kong. He is a keen student who has a passion for literature, history and philosophy. He has found, in Year 10, that his understanding of English is adequate for normal interactions with his peers. However, he lacks the depth of English language understanding to appreciate the nuances of much of the literature. He also finds himself struggling with some of the more advanced vocabulary, and is quite slow when it comes to writing essays and long assignments. He is doing Advanced Maths on line 1, English Literature on line 2, Ethics on line 4, Geography on line 5 and History on line 6. He believes that he would benefit greatly from dropping a subject so that he can spend extra time on the tasks involved in English Literature, Ethics and History. He talks with the guidance counsellor and decides to put together a proposal for application to the SLC on line 3. The guidance counsellor is his referee.

PROJECTS

Madeleine is going into Year 11 and is considering her interests and the course that is best for her. She doesn't yet know for sure what career she wants to pursue, although she has some inclination towards teaching. Through her grandfather, she has met many older Australians who have talked with her about their life during the two world wars and the depression. She has always been interested in history, but these interactions have made her even more passionate about it — especially about Australian history. She chooses a Year 11 course in Modern 20th Century History on line 6. The core disciplinary learning is embedded in this course. For her final year, she decides to study social history and to supplement this with two history-based projects. The first is to write an oral history of a man who courted his wife during the depression years and has kept the letters they posted during this time. Finally, as an old man, he became an environmental activist. His eyesight makes it impossible for him to write his own story — but he is keen to have it written, and to make it available to his many descendants. The second project involves the second world war. She has studied it as part of a history class, but believes that she can only truly appreciate it if she "sees" it through the life of a soldier who fought in it. Her other grandfather died in New Guinea, having first taken part in the Syrian Campaign. She decides to write a diary of a soldier like her grandfather. She talks with her history teacher about these projects. They meet with the man who is the subject of the oral history. They contact the relevant Melbourne Battalion that fought in Syria and New Guinea and discuss the proposal. Finally, Madeleine develops her proposals, including the goals and the assessment criteria. With her History teacher as referee, she applies to work on her proposal on line 3 of the Year 12 timetable.

PRACTISING SELF-DIRECTED LEARNING

It is usually too much to ask most students to begin their formal independent learning tasks in the senior school. The SLC needs also to be available to students in the middle years. Their engagement with the SLC can be organised through their teachers, who make a different kind of application. For example, a teacher might indicate to a geography class that part of the assessment for the semester's work is to undertake a two-week independent study involving online learning and/or other research. The teacher applies to the SLC indicating that there will be two students at a time (each for two weeks

on a particular line) who will be undertaking their own study in the SLC. The SLC co-ordinator needs to know what the research tasks are. In return for the use of the SLC in this way, the faculty provides SLC equivalent SLC support by negotiation.

A BROKERAGE AND GATE-KEEPING FUNCTION

Increasingly, there will be students learning off campus, as well as in the SLC. Sometimes this off-campus learning is regular and highly structured — such as work placements or TAFE attendance. At other times it might involve individuals or small groups going off campus to pursue a workplace project, a community project or an advanced program at a university. The SLC can also act as a "broker", helping students with these community contacts and also keeping track of where students are while they are not on campus.

2.4.4 Resourcing implications of an SLC

On first consideration, many people believe that an SLC will incur significant extra costs. This is only true if it is undertaken half-heartedly and seen as an "addition" to the normal program. SLCs that are viewed in this way are never satisfactory. The SLC must be seen as an integral part of the intended timetabling arrangements. Students and teachers should not see it as any kind of "overflow". Rather, it represents a reallocation of existing resources. The same number of students is present for the same amount of time. Extra space is not required, because the SLC often frees up rooms by replacing whole classrooms previously used for low candidature subjects. Extra teachers are not required, because the SLC provides for a number of efficient flexibilities such as "pro-rata" teacher allocations for small classes as well as reducing class sizes where there are structured orientation programs in the middle school.

2.5 Alternative patterns of implementation

There are three main ways in which the pattern proposed by QSA (core disciplinary learning with three types of electives) can be implemented. These involve:

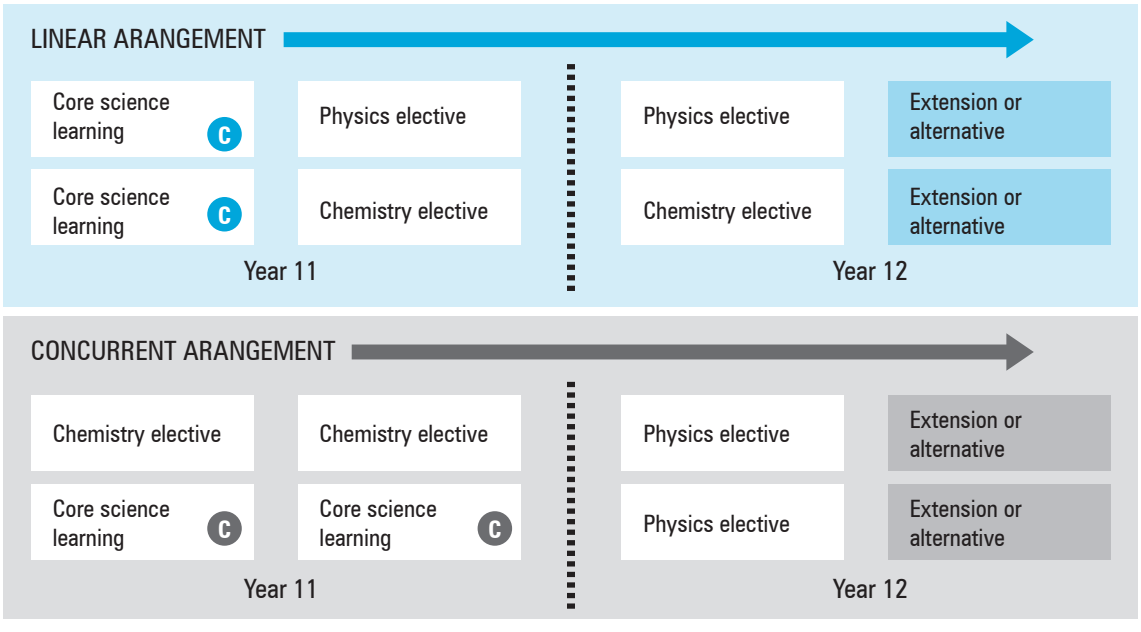
1) arranging the core discipline elements and the electives/projects in a linear fashion

2) arranging them concurrently

3) embedding them.

Let us take Science as an example, assuming that there are students who previously might have studied Physics and Chemistry. Figure 15 illustrates the linear and concurrent patterns.

FIGURE 15



Embedding the disciplinary core in the elective courses is problematic if we view the core as an area of content. This is because, in the case of physics and chemistry, there are three possible choices students might make.

- just chemistry (Cristos)
- just physics (Rachael)
- both physics and chemistry (Harold)

If the core as content is embedded in physics, Cristos will miss out.

If it is embedded in chemistry, Rachael will miss out.

If it is in both, Harold will have to do it twice.

The same will apply in any disciplinary area where there are electives flowing from a core of content. It is therefore critical that the core is not content. It needs to involve the underlying and generic concepts that define the discipline. In the case of science, the underpinning big ideas might include the scientific method: (hypothesis — testing — evidence — new hypothesis — etc.)

In addition, the dimensions of scientific enquiry might include:

- structure
- classification
- energy and its transformation
- equilibrium and change
- applications to improve the human condition.

In this way, the problem of duplicated or missing content outlined above can be largely overcome.

This is because each sub-discipline of science represents a different and unique exploration of these concepts, as shown in Figure 16.

FIGURE 16

	Chemistry enquiry	Physics enquiry	Biology enquiry	Geology enquiry
Structure	atoms, molecules	nature of light	cells, DNA	Earth's core
Classification	metal, non-metal	infra-red, ultra-violet	plants, animals	igneous, sedimentary
Energy and its transformation	burning	potential & kinetic	photo-synthesis	earthquakes
Equilibrium and change	native metals & others	centre of gravity	ecology	isostasy
Applications to improve the human condition	clean coal	solar energy	medicine	water supply

In this case, the "core disciplinary learning" could be taught separately — or it could be embedded in all the science electives without duplication.

This could be expanded to incorporate a framework for the core learnings in all disciplines. For example, it could be argued that all disciplines have their own unique way of:

- investigating
- understanding (making meaning — models, concepts, analysis, synthesis …)
- communicating the understanding
- solving problems
- creating products
- applying the discipline to create a better world.

Far from putting all the disciplines in one basket and blurring the edges, this framework actually highlights the uniqueness of each of the disciplines. Yet at the same time, it links the disciplines by allowing them to be considered according to the same conceptual framework. Such a framework would not only highlight the rigorous contribution each of the disciplines makes to human learning. It would also encourage trans-disciplinary enquiry and understanding. Examples of curriculum elements that fit the framework come easily when we consider a matrix like the one in Figure 17.

FIGURE 17

	Science	Maths	History	Geography	Art	Health & wellbeing	English	Technolgoy	Philosophy/ Religion	Business & enterprise	Music	LOTEs
Investigating												
Understanding												
Communicating												
Solving problems												
Creating products												
Application												

Using the Asian tsunami as an example, it is easy to see how each discipline makes its own unique and rigorous contribution to the investigation, understanding, communicating, problem solving, product creation and application relating to the event.

This kind of framework has the advantage of simplicity without compromising the unique place each discipline has in the way humans see, understand and shape their world.

2.6 Unitised approaches

For about thirty years, there have been schools in the Australian states that have unitised their programs. There are many variations. Some have used semester units, some term units and some trimester units. Some schools have arranged their units horizontally, so that students only work with those in the same year level. Others have introduced vertical arrangements where students have been able to study with students from the cohort ahead of them or the cohort behind them.

Many university courses have also been arranged in semesters.

Unitised courses in schools have been introduced because those schools believed one or both of the following. Unitisation results in a pattern whereby:

1) students are better able to negotiate the amount of time they spend on a discipline (by choosing more or fewer units in the same discipline)
2) the school is able to overcome the problem of automatic progression where students move on in a lock-step fashion whether or not they are achieving their learning goals.

Vertical and modular timetabling has been used across Years 7 to 12 in NSW and Tasmania and across Years 8 to 12 in Queensland, Western Australia and South Australia. Such timetabling has its advocates and its detractors, the latter often citing the logistic difficulties and the lack of continuity among their criticisms.

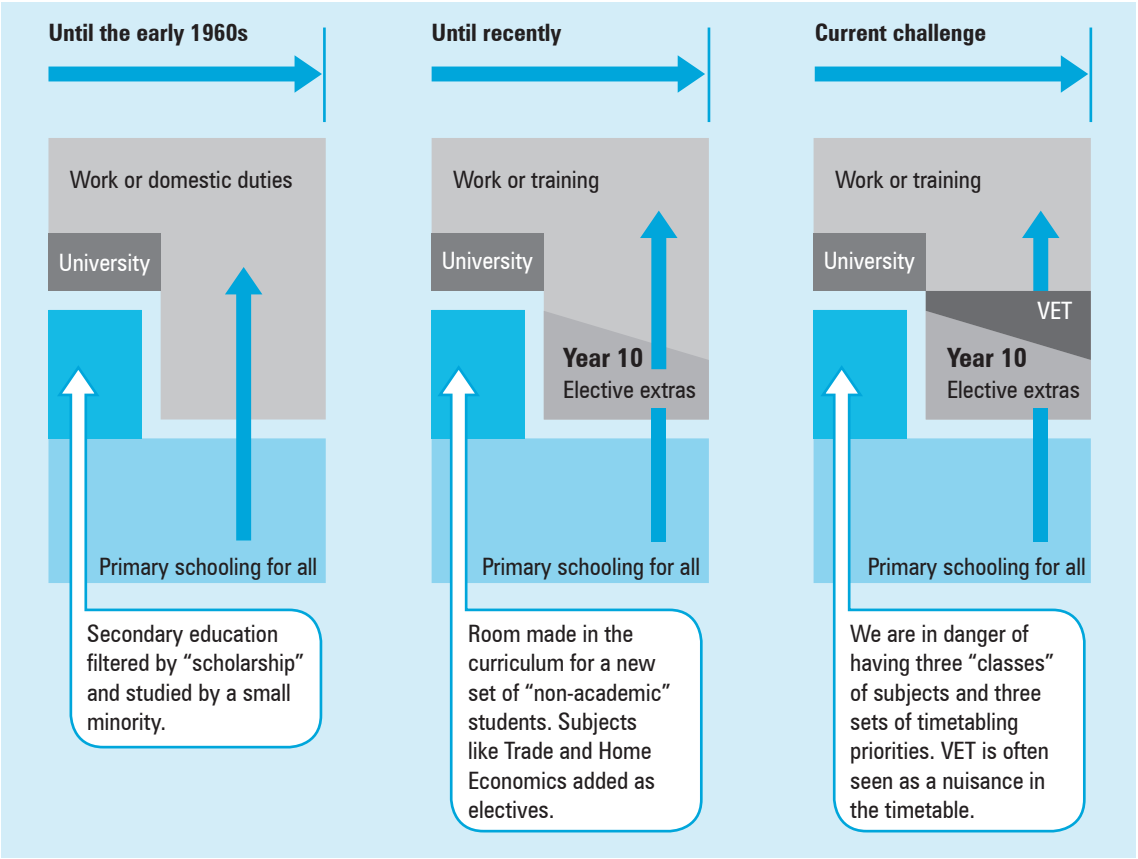
The QSA proposals do not require this kind of approach. Schools that are unitised will have a different pathway to the QSA reforms than others. In many cases, middle schools will be organised quite differently, adopting horizontal and team based strategies compatible with early adolescent needs. There are many ways of organising the senior secondary program depending on each school's history, its size, its demography, its location and the skills and interests of its teachers.

The next two sections of this paper provide examples of the kinds of strategies schools might use to take advantage of the QSA reforms and to serve the needs of a new generation of young people. Most of the examples are not new. They are being used already in some schools across the Australian states and overseas.

3. Catering for a mixture of pathways

Many current secondary school structures reflect the history of secondary education in the Australian states. The following diagram illustrates three stages in the history of secondary education and demonstrates the tendency there has been for new developments to be "grafted on" to old structures, as shown in Figure 18. However, it is important to recapture the integrity of timetabling so that the needs of all students are considered from the outset.

FIGURE 18



3.1 "Don'ts"

Examples of timetabling patterns that maintain old structures and merely attempt to graft on new demands include the use of "cyclic" timetables — perhaps six-day timetables. This means that students going out of the school to TAFE or to VET placements on a particular day of the week (e.g. Tuesday) will miss something different in their school-based program each week. They often have "spares" on their "VET line" and are expected to use this time to catch up. But often there is no structured support for this.

These kinds of strategies that treat the historical timetabling pattern as a "given" and then try to squeeze the pattern to accommodate new sets of students are rapidly disappearing as schools realise that such *ad hoc* practices are in no-one's best interests. There are a number of other strategies that are more suited to the full range of students and courses envisaged.

3.2 Using separate groups

Some schools create two groups which operate on separate timetables, to avoid the disruption to traditional timetabling caused by students undertaking work placements. Those who are 'vocational students' are in one set of classes for all their subjects. This often means that they are not eligible for university entrance through the formal certification. The remaining students, who are usually considered more "academic", are treated separately. Their program is thus unaffected by the school's work placement and vocational programs.

The potential advantages

In terms of the school organisation, this is a very neat strategy. It allows the students who are not involved in work placements to get the benefit of a full quota of study time. It does not involve situations where part of their class is missing because of the work placement program. Similarly, for those students who are undertaking work placements, they are not "missing" school work, because their whole class is involved in the work placement.

The potential disadvantages

This option is only available in larger schools. Even there, it has a number of disadvantages. There is a danger that such a program creates a "two stream" senior school which labels some students as "academic" while others are called "vocational". This can have negative consequences. Students are locked into their courses with little chance of transferring from one course to another. Often, the "vocational" students are studying "non-tertiary" courses and the "academic" students are precluded from taking a vocational course. Given that many academically oriented students will rely on significant part-time work for up to a decade of tertiary education, their immediate needs for vocational training may well be significant.

There are real equity issues at stake here. Many would argue that we need to avoid seeing vocational training as being mainly for the less able students. Medicine, law and engineering are, after all, pretty vocational. And many skilled tradespeople require levels of mathematical, spatial and communication skills at least equivalent to those of tertiary graduates.

3.3 Using a four-day week

This strategy involves freeing up a significant proportion of the week (e.g. a day) so that there are no formal lessons for the senior school on this day. This is usually achieved by lengthening the other four days in the week to make up for the time lost. The junior school continues to operate within the normal school hours. An existing timetable of this type, similar to many that have been used in schools, is shown in Figure 19.

FIGURE 19

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Line **6**	Line **5**	Line **3**	Line **1**	Line **4**
Period 2	Line **6**	Line **5**	Line **3**	Line **2**	Line **4**
Period 3	**ASSEMBLY**	Line **6**	**PC**	Line **3**	**HOUSE MEETING**
Period 4	Line **3**	Line **1**	Line **5**	Line **4**	Line **2**
Period 5	Line **3**	Line **1**	Line **5**	Line **5**	Line **2**
Period 6	Line **4**	Line **2**	**SPORT**	Line **6**	Line **1**
Period 7	Line **4**	Line **2**	**SPORT**	Line **6**	Line **1**

It is not difficult to modify this timetable to create a four day week for the senior school — either Years 11 and 12 or 10 to 12. This can be done by taking the Thursday periods and shifting them to periods added to the beginning or the end of the other four days. It can be done in a number of ways. In Figure 20, the timetabler has used the modification to create longer blocks of time for classes in the senior school. It need not be done this way. For example, on Monday period 8, lines 2 and 4 could be interchanged, providing shorter lessons.

FIGURE 20

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 0	Line **6**	Line **5**	Line **3**		Line **6**
Period 1	Line **6**	Line **5**	Line **3**	Normal middle school timetable	Line **4**
Period 2	Line **6**	Line **5**	Line **3**		Line **4**
Period 3	**ASSEMBLY**	Line **6**	**PC**		**HOUSE MEETING**
Period 4	Line **3**	Line **1**	Line **5**		Line **2**
Period 5	Line **3**	Line **1**	Line **5**		Line **2**
Period 6	Line **4**	Line **2**	**SPORT**		Line **1**
Period 7	Line **4**	Line **2**	**SPORT**		Line **1**
Period 8	Line **4**	Line **2**			Line **1**

The shaded periods at the beginning and the end of the day are for the senior school only. In this case, they provide alternative times for the senior school "lines" which would otherwise occur on a Thursday. In this way, Thursday is "freed" so that work placements and other out-of-school programs can take place each week on this day.

For the students who are not doing work placements, the whole week is now focussed on four days only. This allows these students to use Thursdays for study, part-time work or leisure. They are, after all, fulfilling the time requirements on the other four days. If sport were not sacrosanct for the senior students, then Wednesday could be used.

For students who are doing work placements, there are three choices. They can undertake the work placement component in addition to a full secondary course, tertiary oriented or otherwise. They would thus be doing an 'extra' subject. Alternatively, they could choose their work placement study as one of their 'normal' subjects. This means that they would have a line 'free' during the other four days in the week. For example, if line 6 became their free line, they would not need to come to school until 11.20 am on a Monday.

THE POTENTIAL ADVANTAGES

This strategy has the advantage of allowing students to study a mixture of academic and vocational courses without paying a penalty by missing work or by having others missing at times from their classes.

THE POTENTIAL DISADVANTAGES

There is often not a day that is common to all students wishing to undertake work placements. There are also implications for bus travel. In some schools, it is very difficult to organise transport so that students can start earlier or finish later. Another implication is that some teachers will have to start earlier or finish later. Where this occurs, it is essential that they are afforded "flex" time either at the beginning or at the end of the day on at least one day each week. The strategy facilitates this because teachers are "off" on one line or another. As long as each line occurs at the beginning or the end of the day in each week, then the "flex" time is available.

3.4 Structuring the school week differently

There are a number of ways of restructuring the way the line structure is distributed across the school week. This can provide much greater flexibility. Let us look at just two examples (Figures 21 & 22).

FIGURE 21

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Line **1**	Line **4**	Line **5**	Line **3**	Line **6**
Period 2	Line **2**	Line **3**	Line **5**	Line **4**	Line **6**
Period 3	Line **3**	Line **2**	Line **6**	Line **1**	Line **5**
Period 4	Line **4**	Line **1**	**SPORT or TUTORIAL**	Line **2**	**SPORT or TUTORIAL**

In Figure 21, students can choose their VET subjects on lines five and six. Indeed, as much as possible the school would arrange VET on these lines. With the pattern shown above, these students would have two full days during which they could undertake their study, either at school or at another location. The students who are studying other subjects on lines 5 and 6 would either have longer blocks of time, or could distribute the first period on Wednesday (line 5) and/or the first period on Friday (line 6) to shorter sessions either before or after normal school time on Monday, Tuesday or Thursday.

FIGURE 22

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Line **1**	Line **2**	Line **5**	Line **1**	Line **4**
Period 2	Line **2**	Line **1**	Line **6**	Line **2**	Line **3**
Period 3	Line **3**	Line **4**	**SPORT or TUTORIAL**	Line **6**	Line **6**
Period 4	Line **4**	Line **3**	**SPORT or TUTORIAL**	Line **5**	Line **5**

In the case shown in Figure 22, all of Wednesday, and Thursday and Friday afternoons are freed.

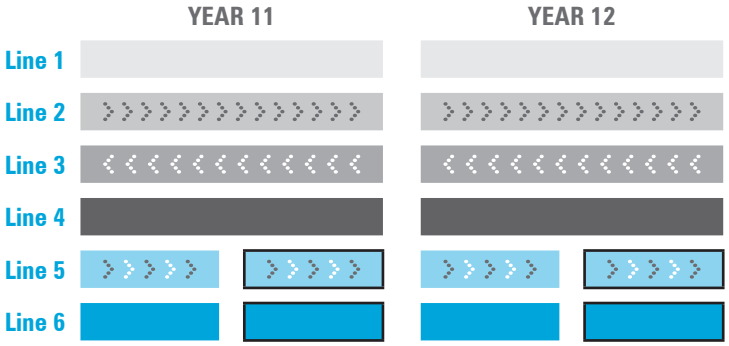
There are many variations on these patterns, and different schools will see the potential in a variety of patterns to suit their own needs.

3.5 Intensive senior courses

The concept of intensive senior courses has not been easy in Queensland until now because of the moderation procedures. With more flexible arrangements, a number of options are opened up.

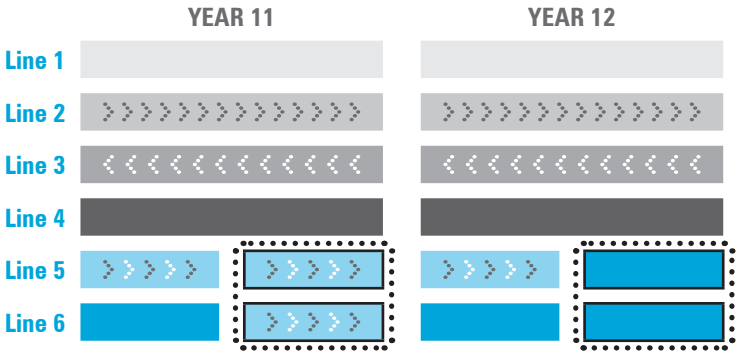
We will explore some of the possibilities in a six-line timetable, with various options shown through Figures 23 to 26.

FIGURE 23



The concept is quite simple. Imagine that the choices on lines for Years 11 and 12 have been made in the normal way. However, there are courses labelled "intensive" on each of lines 5 and 6. Students need to decide whether both their choices on these lines are intensive or whether neither are intensive. As shown in the next diagram, the timetabler then "swaps" the intensive courses on line 6 in Year 11 with the intensive course on line 5 in Year 12. This creates a situation where some students would be studying four "normal" subjects and one "intensive" subject.

FIGURE 24



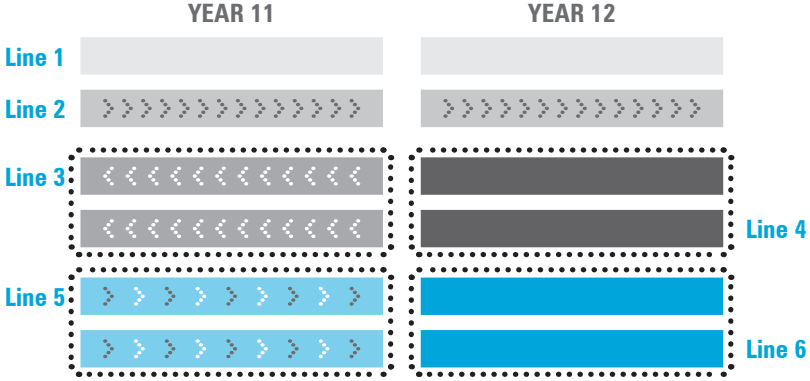
There are a number of advantages to this arrangement. First, it provides a more immersed program for some courses — particularly, but not exclusively VET courses. Students might, for example, do Furnishing in Year 11 for seven hours per week and then do Construction in Year 12 for 7 hours per week. The study of these subjects would be facilitated by arrangements like those in Figures 23 or 24 above. In this way, not only would they be studying more intensively, they would study in big blocks of time, often off-campus. Furthermore, they would miss none of their other subjects. An advantage for the school is that it gets rid of any composite classes where students are joining a class part-way through. It also doubles the viability of classes where the numbers might be small; it does this by offering a course every two years instead of every year, thus doubling the class size. In the example given, Furniture might be offered every even year (2008, 2010, 2112, etc.) while Construction is offered every odd year (2009, 2111, 2113, etc.).

There are other advantages too. The fact that the students studying intensive courses have long blocks of time does not force other subjects to do the same. In the example above, while Ahmed was doing Furniture for 140 minutes on lines 5 and 6, Maria might have been spending 70 minutes on each of Geography and History on the same lines.

These kinds of arrangements suit a range of purposes. For example, a small school might choose to offer Physics in the odd-numbered years and Chemistry in the even-numbered years. This would double the viability. There are possibilities too for small candidature subjects even in larger schools. The pattern is also useful where schools wish to work in "clusters" with a hub school for certain subjects.

Clearly, it is also possible to link two pairs of lines in this way, creating a pattern like the one in Figure 25. This may apply only to those students choosing intensive courses or, as shown in Figure 25, to all students in a smaller school.

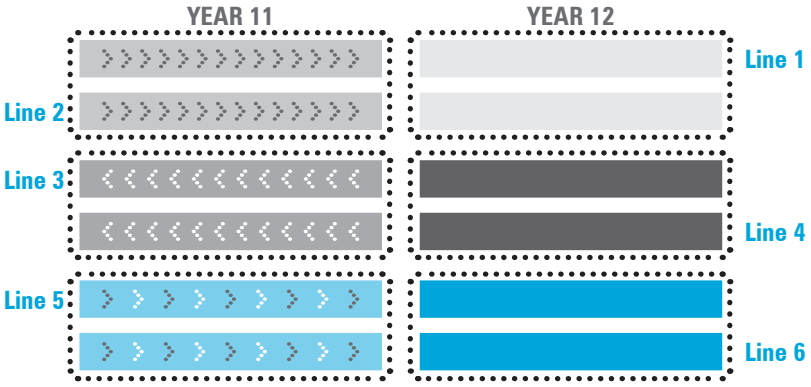
FIGURE 25



In this case, students are only studying four subjects each year, two of them intensively. This has advantages in terms of students' commitment and depth of study.

Where desired, the pattern could pair all sets of lines. In this case students would study three subjects one year, and three the next year. While this might seem extreme, it is a pattern that is used in a number of places, including Tasmania. The argument that Year 11 students are too young and that their culture is not sufficiently mature needs to be tested. Where the senior course is patterned as it is in Tasmania, the culture of the whole senior school is transformed.

FIGURE 26



3.6 Separate Senior Secondary Schools

In Queensland, as well as in other states, there are many examples of schools and colleges that have divided their schools into separate campuses, including a separate Senior School Campus, usually catering for Years 10, 11 and 12. In some states and territories, such as the Australian Capital Territory and Tasmania, this is the dominant pattern in the government systems. In their case the senior colleges involve post–Year 10 learning, often linked closely with TAFE and other training institutions as well as with universities. There are some cultural and logistical advantages in this separation. However, all of the strategies outlined in previous sections of this report are possible with schools that are Years 8 to 12 or P to 12.

4. Extending the "senior" years

Under the proposed pattern, senior schooling is no longer confined to what happens in Years 11 and 12. It can begin earlier than this for most students, and it will continue beyond Year 12 for many. The intention here is to explore logistic and structural aspects of these extensions.

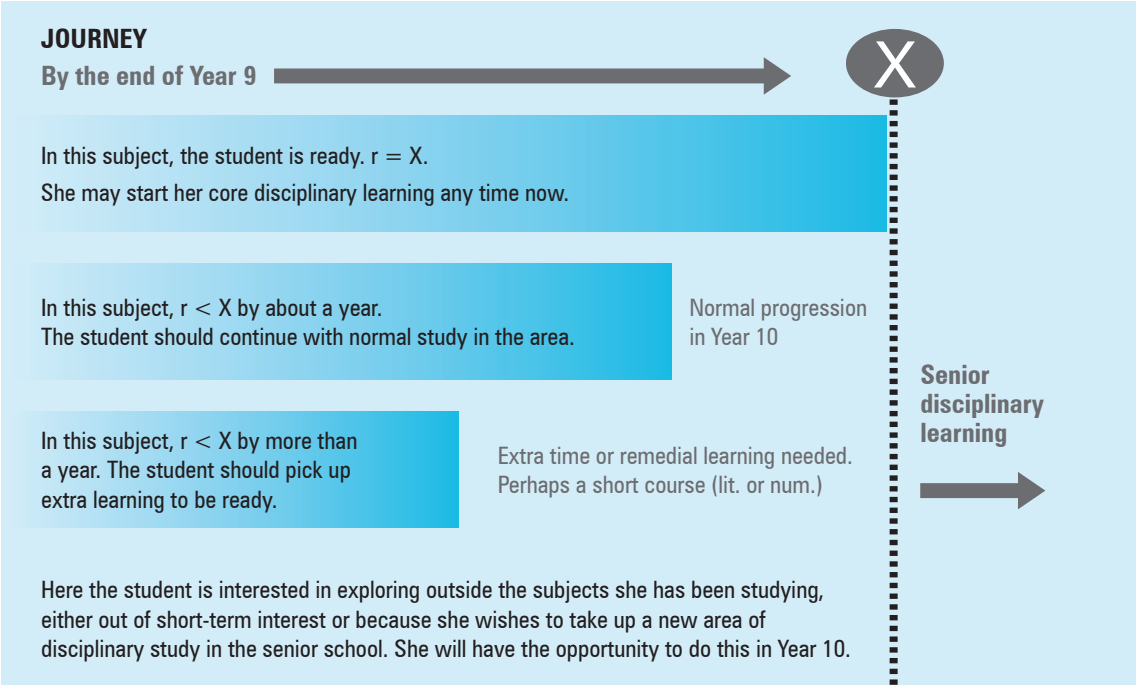
4.1 Year 10

Let us begin with Year 10, which can now become a part of the senior school span. This makes sense because there are many schools that have well developed middle schooling across Years 5 to 9, or Years 6 to 9 or even Years 7 to 9. In many cases, this has left Year 10 in something of a vacuum. Its inclusion as part of senior schooling will be viewed differently in different schools.

One way of viewing it is to see it catering for four different kinds of student needs. Let's explore an example of how this might be considered. As students exit Year 9, they will do so with a variety of previous experiences and achievements. The degree to which they are ready to begin the core disciplinary learning that marks the springboard into the more specialised senior learning will determine the way Year 10 can be used. It is possible to contrast the new journey into senior schooling with the old journey. In the past, students moved from Year 10 to Year 11 automatically. It was a matter of "coming, ready or not".

There is now the opportunity for schools to help students understand whether they are ready or not. There are four possibilities. Let's think of "X" as the necessary level of readiness for a discipline and "r" as the readiness of a particular student or students.

FIGURE 27



For this kind of thinking to occur, schools will need some clear information before the end of Year 9 about each student's learning. The statewide Year 9 tests in literacy and numeracy will provide some information, however, schools will need other information about learning in other areas so that students can be advised and SET planning undertaken.

In terms of timetabling, many of the strategies to make these variations possible have already been discussed. The structured learning centre and the tutorial approach are ways of catering for the first and third cases. The normal structures of Year 10 would facilitate the second and fourth cases, the latter by means of elective lines.

In some cases, it might be possible for the first case to be facilitated by blurring the boundaries between Years 10 and 11, allowing those few students who are ready, to move across the boundary and begin their core disciplinary learning with the cohort above them. If this strategy is to be possible, then there must be a timetable matrix that flows across Years 10, 11 and 12 — at least on some lines. Schools with vertical timetables will already have this facility built in.

4.2 Catering for part-time and re-entry students

Re-entry students who are studying full time will present the same needs as any full-time students. Part-time students are different. Most of the logistical problems outlined in the strategies discussed so far have resulted from an assumption that all students are full time. Many of the problems disappear if students are attending school part-time while they are undertaking training or apprenticeships or other training programs. The average age of entry into full-time work is now well into the twenties, so there is no good reason for most students to rush to complete their secondary schooling; most are working part-time anyway. As the number of people in paid traineeships increases, this will become an increasingly promising alternative. But even when the decision is made to encourage students to take up such an option, the question remains about the best pattern to adopt.

Clearly, the simplest pattern would be for them to be able to study, say, two whole subjects per year over three years. It would then not take much juggling of the timetable to make sure that the four lines on which the two subjects take place occur on three days in the week. Figures 28 and 29 show an example of this kind of approach.

FIGURE 28

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Line **1**	Line **4**	Line **5**	Line **3**	Line **6**
Period 2	Line **2**	Line **3**	Line **5**	Line **4**	Line **6**
Period 3	Line **3**	Line **2**	Line **6**	Line **1**	Line **5**
Period 4	Line **4**	Line **1**	**SPORT or TUTORIAL**	Line **2**	**SPORT or TUTORIAL**

In this case the student could study a third of their course by coming to school on Monday morning, Tuesday afternoon and Thursday afternoon. This means that they have considerable time to negotiate with their employer or training organisation, or to organise part-time work that avoids these times. Figure 29 shows how the following two years might be organised.

FIGURE 29

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Line **1**	Line **4**	Line **5**	Line **3**	Line **6**
Period 2	Line **2**	Line **3**	Line **5**	Line **4**	Line **6**
Period 3	Line **3**	Line **2**	Line **6**	Line **1**	Line **5**
Period 4	Line **4**	Line **1**	**SPORT or TUTORIAL**	Line **2**	**SPORT or TUTORIAL**

Second year *Third year*

THE POTENTIAL ADVANTAGES

The advantages of having students take longer to complete their senior years are obvious. There is no need to squeeze their whole program into about four hundred days of 9.00–3.00 study. There is time for more to be learned and the flexibility to provide varying combinations of work, paid training and school-based study.

THE POTENTIAL DISADVANTAGES

The disadvantages have mainly to do with the culture of schooling and the behaviour management policies which see schools as places where the rules remain pretty much the same from Year 7 or 8 to Year 12. Changing this culture to make way for part-time students is perhaps the greatest hurdle to educational reform in this area.

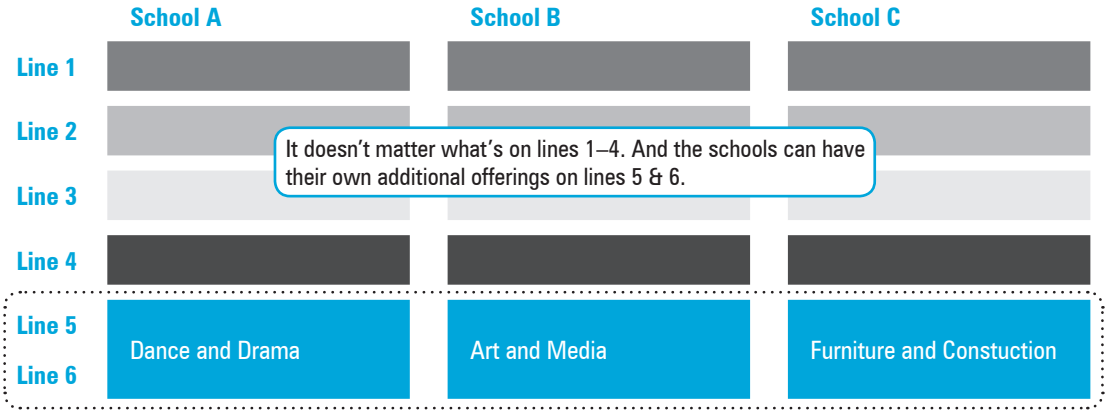
5. Timetabling for small schools

Because Queensland is so diverse, it is important to ensure that no particular sets of schools are disadvantaged by new requirements. Small rural schools have often struggled to offer the range of courses available to their urban counterparts. The QSA proposals do not add further complications to the offering of senior schooling. Rather, they improve the available options significantly. The obvious initiative for smaller schools is the Structured Learning Centre. This allows small schools to rid themselves of a culture that asserts that "individuals can only study a senior subject if there are eleven other students who want to learn it too". The SLC makes it possible for individual students and small groups of students to use a variety of distance and virtual learning techniques.

While the SLC has always been an option for smaller schools, the concept of intensive courses increases the viability of course offerings significantly. The intensive pattern provides two new sets of possibilities. First, it allows schools to offer an intensive course every second year. On average, this doubles the class size. The alternation of courses from one year to the next can usually be accommodated without staff changes. For example, Physics and Chemistry might alternate. Even core Science learning and core History learning might alternate. These kinds of alternations could usually be accommodated with the available staff. However, there may be occasions where two schools might collaborate so that two teachers (e.g. Art and Drama teachers) are appointed to a pair of schools, alternating yearly between the two.

A third advantage is that intensive courses normally involve longer blocks of time, making it feasible for students to travel between schools. This potential advantage is certainly not limited to small rural schools. There are many suburban or regional clusters of schools that could use this strategy. For example, three schools might each become a hub school for particular disciplines, as shown in Figure 30.

FIGURE 30



On Wednesdays and Fridays, students would attend whichever hub school serves their particular needs.

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Line **1**	Line **4**	Line **5**	Line **3**	Line **6**
Period 2	Line **2**	Line **3**	Line **5**	Line **4**	Line **6**
Period 3	Line **3**	Line **2**	Line **6**	Line **1**	Line **5**
Period 4	Line **4**	Line **1**	**SPORT or TUTORIAL**	Line **2**	**TUTORIAL**

5.1 "Line days"

Line days are valuable for more isolated schools, because they offer the opportunity for classes to visit places that would normally be quite difficult because of the time and distance constraints. The strategy involves a timetable created with two different cycles operating. In the example in Figure 31, the first cycle operates on a normal weekly basis occupying four days of the week. The second cycle takes six weeks to complete. It does this by taking one day each week (we'll take Tuesday this time) and making it a "line day". Thus, every Tuesday, the whole school undertakes whatever is on a particular line for the whole day. With six lines, the cycle will be complete after six weeks. The other three or four Tuesdays in the term can be used to "fill in" the public holidays or athletic carnivals or whatever. Thus, every subject will have a full day program once a term. Subjects which wish to run excursions or whole day activities are able to do so without interruption to the remaining classes in the school. Teachers gain an extra four student-free days per year if they choose to organise the program this way. Subjects which do not wish to have the same teacher with the same class for the whole day can organise a "rotation" so that there is a variation of groups and activities throughout the day.

FIGURE 31

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1	Line **1**		Line **6**	Line **3**	Line **2**
Period 2	Line **2**		Line **1**	Line **4**	Line **3**
Period 3	Line **3**		Line **2**	Line **5**	Line **4**
Period 4	Line **4**		SPORT or TUTORIAL	Line **6**	Line **5**
Period 5	Line **5**			Line **1**	Line **6**

This strategy provides the opportunity for schools to organise excursions and other extended activities without disrupting the rest of the school. Such things as sports carnivals and open days can be built into the program because six cycles of six weeks will leave some Tuesdays available for special events (which can easily be shifted to Tuesdays on the left-over weeks).

There is something to be gained by teachers having the opportunity to arrange four extra student-free days each year. This provides substantial blocks of time for marking, program writing, or professional development that might involve visiting each others' schools. While some teachers may hesitate to commit themselves to a full day's program once a term with a class, others will revel in the chance. In any case, there are a number of strategies, such as rotation, team teaching and team preparation which have the potential to facilitate very effective programs.

6. Human resource management

There are three important human resource considerations that schools will need to be aware of as they make changes.

These involve:

- decision-making processes
- protecting, and where possible improving, the working conditions of staff members
- appropriate professional development.

6.1 Decision-making processes

Implementing the proposals to syllabus design proposed by the QSA need not involve great change in a school. Many schools have already introduced suitable strategies. However, because the proposed changes provide the potential for much greater flexibility, some schools will wish to explore ways in which their timetabling might even better serve the needs of their students. Ironically, the more creative the teaching staff, the more difficult it can be to reach consensus. For example, if teachers have envisaged five different timetabling models that cater for students wanting to mix work placements with school-based learning, then it is unlikely that there will be a majority in favour of any one option. Simple show-of-hands decision making won't be appropriate because there won't be a majority. The status quo will win by default (even if no-one wants it). Nor will executive decisions based on consultation work, because there will still be a disgruntled majority who feel their voice was not heard.

One way of generating consensus is to take the following steps.

1) Identify the underlying values that can be used as criteria for decision-making.
2) Develop and articulate the options available, including the status quo.
3) Have some small working parties develop a PMI analysis (positive–minus–interesting) for each option, probably over a month or so.
4) Prepare a Lickert-scaled response sheet, listing each option and providing five responses ranging from "strongly agree" to "strongly disagree" beside each.
5) Use a small group technique in which respondents discuss each option and then make their own, individual response, bearing in mind the school's underlying values.
6) Analyse the pattern of responses. Some will be bi-polar with lots strongly agreeing and lots strongly disagreeing — civil war! Some will be wishy washy with many neutrals. Consensus is generated by identifying the pattern that contains the highest level of agreement alongside the lowest level of disagreement.
7) Communicate the decision carefully to all stakeholders, not just those who will be directly affected by the decision.

6.2 Working conditions

Increased flexibility can be viewed two ways. The negative view is that teachers will have to work longer hours because schools will be used for longer periods of time. The positive view is that the flexibility not only provides opportunities for students, it also has the potential to better cater for teachers' needs. It is important to take a positive view when developing timetabling models, and to take the working patterns of teachers strongly into account. Let us examine two examples to illustrate the point (Figures 32 & 33). In both examples, the aim is to create a four-day week for senior students.

FIGURE 32

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 0	Line **6**	Line **5**	Line **3**		Line **6**
Period 1	Line **6**	Line **5**	Line **3**	Normal middle school timetable	Line **4**
Period 2	Line **6**	Line **5**	Line **3**		Line **4**
Period 3	**ASSEMBLY**	Line **6**	**PC**		**HOUSE MEETING**
Period 4	Line **3**	Line **1**	Line **5**		Line **2**
Period 5	Line **3**	Line **1**	Line **5**		Line **2**
Period 6	Line **4**	Line **2**	**SPORT**		Line **1**
Period 7	Line **4**	Line **2**	**SPORT**		Line **1**
Period 8	Line **2**	Line **4**			Line **1**

It can be seen here that, for the senior school, the Thursday has been freed up by allocating a lesson of each line to either a "period 0" or a period 8. This makes it virtually inevitable that some teachers will have a longer day on some days. This can be compensated for by having a day or days where a teacher can have some "flex" time. Consider Figure 32: assuming a rational matrix from 8 to 12, then every teacher will have at least one free "line". If the free line is line 1, for example, the teacher could recoup the extra hours they have worked during the week on a Friday afternoon. It is easy to see that teachers with free lines 6, 5 or 3 could make a late start on Monday, Tuesday or Wednesday mornings respectively. But what about teachers with free lines on line 2 or line 4? Their available "flex" time is neither at the beginning of the day nor the end of the day — it is therefore a Clayton's deal. Fortunately, the timetabler can solve this problem by interchanging period 8 on Monday and Tuesday, as shown in Figure 33.

FIGURE 33

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 0	Line **6**	Line **5**	Line **3**		Line **6**
Period 1	Line **6**	Line **5**	Line **3**	Normal middle school timetable	Line **4**
Period 2	Line **6**	Line **5**	Line **3**		Line **4**
Period 3	**ASSEMBLY**	Line **6**	**PC**		**HOUSE MEETING**
Period 4	Line **3**	Line **1**	Line **5**		Line **2**
Period 5	Line **3**	Line **1**	Line **5**		Line **2**
Period 6	Line **4**	Line **2**	**SPORT**		Line **1**
Period 7	Line **4**	Line **2**	**SPORT**		Line **1**
Period 8	Line **4**	Line **2**			Line **1**

These considerations are very important. Experience shows that where schools provide routine "flex" time, and insist that teachers take it, teacher absences from school drop remarkably. This is understandable because, if a teacher knows that they are free on a Monday morning until 11.00 am, they will make their family's medical, dental, and other appointments at this time. They don't need to take time off. Obviously, there is a need for home room to meet after morning recess in this model.

6.3 Professional development and networking

It is important for as many people as possible within a school to understand the basic timetabling patterns and processes. Without this understanding, they will not be able to envisage proactive organisational solutions to student needs. Too often, there is a culture in schools where the timetabler is the "gatekeeper" of innovation because he or she is able to make unchallenged decisions about the organisational feasibility of proposals. It is not a usual topic for professional development — but it can be very interesting and liberating.

It is also important that timetablers network across schools. This helps to avoid too much time and energy reinventing the wheel. Also, when people get together to discuss particular challenges, it is remarkable how often the adage "two heads are better than one" is proven correct.