Technical Guidance on approaches to Integrated Curriculum and Financial Planning (ICFP) for secondary schools

Introduction

There is no workbook of generic ICFP spreadsheets that will meet the requirement of every school. There is however a set of basic principles that can be applied to suit any school or school group implementing an ICFP approach. The basic principles are outlined in the paper 'Basic Principles of ICFP'. This guidance is written in the form of a manual for a workbook of spreadsheet templates designed to illustrate the key ideas. The bulk of these notes are dedicated to the four linked sheets that are an example of a full ICFP model. All the spreadsheets in the workbook are intended as worked examples that can be adapted for individual school or MAT use. It is not expected that any school will either want or need to use every aspect or approach contained in the workbook.

This guidance supports schools and trusts to generate the metrics necessary for an ICFP approach. Once the metrics have been calculated, the school's leaders, business manager and governors should go through the process of reconciliation as described in the 'Basic Principles of ICFP' paper. This is to make sure that the metrics are used to plan for a structure which is designed to deliver the best possible curriculum in the context of the available human, material and financial resources.

Any data in the workbook is for explanation purpose only and does not represent recommended or benchmark values.

All the sheets in the workbook are locked with the password PASSWORD. User input cells are unlocked and have a blue font on a white background. Any user is free to unlock and modify any of the sheets to suit their own purposes.

It is suggested that the remainder of these notes is read in parallel with an open copy of the workbook.

There are four linked spreadsheets; SUMMARY DATA, DEPLOYMENT BASE YEAR, DEPLOYMENT PLANNED YEAR and DEPLOYMENT PROJECTED YEAR and a set of notes on LINKED SHEET NOTES. These sheets are the worked example to illustrate both strands of the ICFP process shown in the Overview of Key Elements section in the paper "Basic Principles of ICFP". The detail of these sheets is covered in the later section of this paper called 'The Linked Sheets'. The tabs for these five sheets are all coloured red to indicate they belong together.

All other worksheets in the workbook are standalone and written to illustrate specific points. All these sheets have notes on the sheets themselves. Reference to them in this document is limited to a brief description. The headings for each section below match with the names of the spreadsheets in the workbook.

Users intending to work through any of the sheets may find the definition of timetabling terms in the appendix to these notes useful to avoid confusion in the meaning of terms used.

STEPWISE OVERVIEW sheet

As an introductory exercise users could start by completing the Overview Sheet, which shows the detail of every key calculation and piece of input data in a flow from the financial and curriculum situation in an academic year where the data is well known through to a planned year where the data and curriculum are being estimated. This sheet illustrates the main calculations but does not have any sense of financial trend, only covers one planned year and does not refer to Key Performance Indicators or metrics. Users are free to add further functionality to suit their own approach.

The Linked Sheets (SUMMARY DATA, DEPLOYMENT BASE YEAR, DEPLOYMENT PLANNED YEAR, DEPLOYMENT PROJECTED YEAR and LINKED SHEET NOTES)

How any school or MAT chooses to arrive at an estimate for the number of teachers it can afford to employ in any one year and reconciles this with its curriculum plan (and hence timetable) is a matter for the school or MAT itself. Similarly the manner and extent to which this is discussed or explained to any interested party is also a matter for an individual institution to decide. These linked sheets are in no sense a recommended approach; they illustrate one approach and are for information and possible adaptation only.

The SUMMARY DATA sheet is designed to give an overview of the financial situation over a three to five year period with minimal technical detail. The overview allows for simple 'if this then that' assessments of the financial trend and links this to curriculum projections and as such could be a helpful illustration for governors and wider school leadership.

This high level financial approach linked to teacher deployment models will produce a reasonable estimate for the affordable number of FTE teachers for three to five years, which can then be reconciled with the curriculum plans together with a set of key performance indicators (KPIs) and metrics. The result can then be checked in detail using whatever financial systems and timetabling system the school has in place and modified accordingly.

Lines 14 to 18, 67 and 68 on SUMMARY DATA contain information linked from the DEPLOYMENT sheets. Pupil roll data and the number of FTE teachers to be employed are linked in the opposite direction from the SUMMARY DATA to the DEPLOYMENT sheets.

In the form supplied these sheets cover three years including the current year for which the data is known. The current year is referred to as the BASE YEAR. The SUMMARY DATA sheet can be unlocked and extended to cover further years by duplicating columns. Additional DEPLOYMENT sheets can be created by copying the DEPLOYMENT PROJECTED YEAR sheet and updating the links to the new SUMMARY DATA sheet.

Although these notes describe the flow from Finance to Curriculum it is perfectly possible to work the approach from the opposite direction. In that case the critical output will be the in-year balance on the SUMMARY DATA sheet following from an initial policy based curriculum decision. How to deal with any resulting in-year surplus or deficit becomes the key leadership decision.

The pupil roll numbers for the base year and best estimates for future years are shown in this screenshot of the top of the SUMMARY DATA sheet.

	A	B	C	D
1		BASE YEAR	Planned year	Projection year
2	Year in which the academic year starts	2018	2019	2020
3	PUPIL ROLL BY YEAR GROUP ESTIMATES			
4	Year 7	150	151	152
5	Year 8	150	150	151
6	Year 9	150	150	150
7	Year 10	150	150	150
8	Year 11	150	149	147
9	Year 12	90	90	90
10	Year 13	80	80	80
11	(Check for sense line) Totals	920	920	920
12	FTE TEACHERS and CURRICULUM DATA			

The values in the sheet as provided are illustrative and not intended to represent any actual school, or recommended or benchmark value. Notwithstanding that, the values are reasonably close to those in some schools in the country at the time of writing.

It should be noted that the estimate of future pupil roll numbers is a highly significant variable in ICFP work and a small error can have major consequences for financially related decisions. Users should consider running three scenarios in parallel to represent most pessimistic, most likely and most optimistic pupil roll values.

Lines 19 to 47 give a summary of revenue funding and expenditure. The facility to make estimated percentage changes in key values for the planned and projected years is included

in lines 42 to 47. The BASE YEAR of known data is in column B.

	A	B	C	D
19	EXPENDITURE SUMMARY			
20	FTE Teachers employed (or planned to be employed in future years)	58.0	58.0	58.0
21	Total Teacher Cost Including on costs	£2,850,000	£2,850,000	£2,850,000
22	Total Educational Support Staff cost including on Costs	£350,000	£350,000	£350,000
23	FTE Educational Support Staff Employed	14.0	14.0	14.0
24	Total Admin and Clerical Staff cost including on costs	£250,000	£250,000	£250,000
25	FTE Admin and Clerical Staff Employed	10.0	10.0	10.0
26	Total of all other employed staff costs including on costs	£100,000	£100,000	£100,000
27	FTE total of all other staff employed	4.0	4.0	4.0
28	Total of all other revenue expenditure expenditure (i.e. all expenditure not included in the Total Teacher Cost)	£940,000	£940,000	£940,000
29	(Check for sense line) Total In Year Expenditure	£4,490,000	£4,490,000	£4,490,000
30	(Check for sense line) In year expenditure per pupil	£4,880	£4,880	£4,880
31	REVENUE SUMMARY			
32	Total in year revenue (exclude any carry forward or deficit)	£4,500,000	£4,500,000	£4,500,000
33	(Check for sense line) Per pupil revenue	£4,891	£4,891	£4,891
34	(Check for sense line) Average Teacher Cost	£49,138	£49,138	£49,138
35	(Check for sense line) Average Educational Support Staff Cost	£25,000	£25,000	£25,000
36	(Check for sense line) Average Admin Staff Cost	£25,000	£25,000	£25,000
37	(Check for sense line) Average All Other Employed staff cost	£25,000	£25,000	£25,000
38	In Year Balance	£10,000	£10,000	£10,000
39	Carry forward or deficit (enter as negative) from previous years	£0 N/A	N/A	
40	Cumulative Balance	£10,000	£20,000	£30,000
41	PERCENTAGE CHANGES IN REVENUE AND COSTS FROM PREVIOUS YEAR			
42	Percentage change in average teacher cost	N/A	0.0	0.0
43	Percentage change in Educational Support staff cost	N/A	0.0	0.0
44	Percentage change in Admin and lerical staff cost	N/A	0.0	0.0
45	Percentage change in All Other Employed Staff cost	N/A	0.0	0.0
46	Percentage change in all other revenue expenditure	N/A	0.0	0.0
47	Percentage change in per pupil revenue	N/A	0.00%	0.00%

Lines 20, 23, 25 and 27 allow the user to test out FTE values of staff in different categories to see the impact on the financial bottom line. The bottom line is shown on lines 38 and 40 and as bar charts like this.

Balances

Balances as percentage of in-year revenue
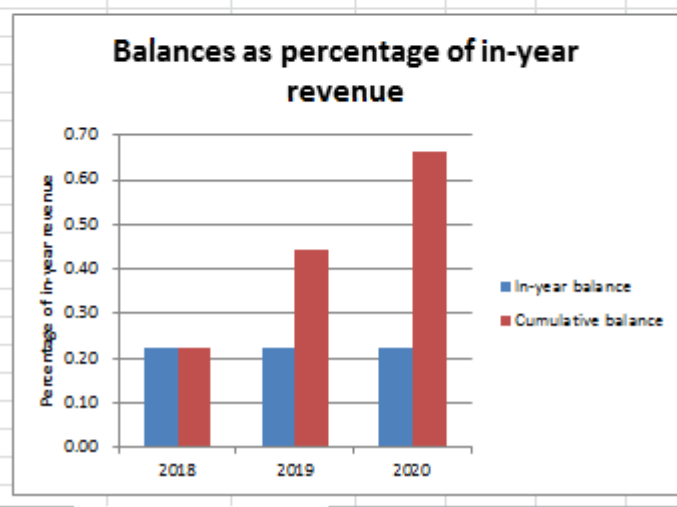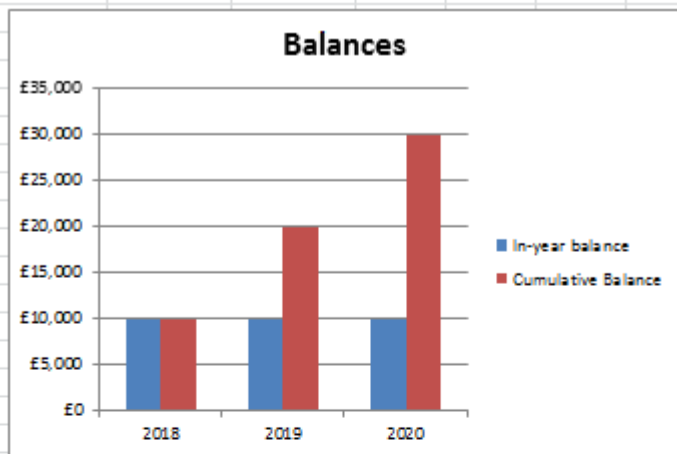
In the planned and projected years the final staffing for any staff line will not be known in final detail so the total cost of each staff line needs to be estimated from what is known and what can be guessed. There are various ways of doing this and some users may well just wish to use their own software and approach and change all the total staff costs on lines 21, 22, 24 and 26 to user input values.

The sheet uses an estimate of the average staff salary in the BASE year as a basis for calculation in the planned year. Similarly the expected cost in the PLANNED year is used to make an estimate of the expected cost in the projected year. The user will need to consider any pay awards and changes in the pay profile of the staff on the line in question to arrive at a final estimate of any percentage change of the average staff cost on any particular line.

The expected FTE value multiplied by the average cost gives the estimated expenditure for that line.

FTE values for support staff with a mix of full-, term-time only and part-time working patterns can be complicated to calculate. Because this workbook is not linked to the financial systems used in the school this can be simplified by using FTE values that are internally consistent to the workbook itself. For example, using the term time FTE value for

Educational Support staff will work just as well as using a totally accurate value and possibly be simpler. Where such a notional value is used it is important to remember to convert this back to an actual value when moving back to the accurate financial system.

The revenue funding available for any one year is summarised on line 32 as an overall total. It is a user input for each year. It may be useful to extend that section to show elements of funding such as schools block, pupil premium, post 16, etc. The percentage change in the overall per pupil amount is shown on line 47 as a check for sense. The user will need to be able to estimate future funding levels from the school's current financial software unless this sheet is modified to include an estimate of percentage change in various funding streams.

The two sections on the SUMMARY DATA that link to the curriculum are the CURRICULUM DATA and SUMMARY STATISTICS sections.

The CURRICULUM DATA section is shown here.

	A	B	C	D
12	CURRICULUM DATA			
13	FTE Teachers employed (or planned to be employed in future years) COPIED FROM LINE 20 below	58.0	58.0	58.0
14	FTE Teachers Required in future years (Copied from the DEPLOYMENT SHEETS)	N/A	57.8	57.8
15	Contact ratio from DEPLOYMENT SHEETS (Shown to 2 decimal places)	0.78	0.78	0.78
16	Length of timetable cycle (Copied from the DEPLOYMENT SHEETS)	25	25	25
17	Average teaching load (Copied from the DEPLOYMENT SHEETS) Shown to 2 decimal places	19.41	19.50	19.50
18	Average class size i.e. pupil to teacher ratio in the curriculum (Copied from DEPLOYMENT SHEETS) shown to 2 decimal places	20.43	20.43	20.43

Line 13 has a copy of the number of FTE teachers employed in the BASE YEAR and the proposed number to be employed from the financial perspective in the PLANNED and PROJECTED years.

The values for FTE Teachers required shown on line 14 are the outputs from the planning sheets DEPLOYMENT PLANNED YEAR and DEPLOYMENT PROJECTED YEAR.

The cells in C14 and D15 are conditionally formatted to draw attention to the relationship with the total of FTE teachers from the finance perspective. The red flag in the upper right corner of cell A14 indicates a comment on this which can be read by placing the cursor over that cell.

Reconciliation between the finance and curriculum FTE teacher values is achieved by adjusting values on the finance sheets or on the deployment sheets or on both.

This workbook produces a wide range of statistics and KPIs that schools could measure – but schools and trusts should instead choose the metrics that are most pertinent to their circumstances. For example, displaying relative curriculum bonus and average class size gives some duplicated information, so it is suggested that schools and MATs restrict themselves to those statistics and displays that are valid, useful and necessary. This and other possible redundancies have been included to illustrate various statistics in common use across a range of schools rather than present a recommended set for any one school.

The statistical section summarises a list of possible targets, benchmark values and KPIs and looks like this.

	A	B	C	D	E	F	G	H
48	SUMMARY STATISTICS (Example potential KPI and benchmark values)							
49	Per Pupil Revenue (in Year)	£4,891	£4,891	£4,891				
50	Average Teacher Cost	£49,138	£49,138	£49,138				
51	In year balance as a percentage of in year revenue	0.22	0.22	0.22				
52	Cumulative balance as a percentage of the in year revenue	0.22	0.44	0.67				
53	Pupil to teacher ratio (This is the number of pupils on roll divided by the number of teachers employed)	15.86207	15.86207	15.86207				
54	Teacher contact ratio	0.78	0.78	0.78	The product of these two quantities equals the Pupil			
55	Average Class Size for PTR and Contact ratio on previous two lines	20.43	20.34	20.34	to Teacher Ratio in the school			
56	Average Class Size on DEPLOYMENT SHEETS (see comment attached to cell)	20.43	20.43	20.34				
57	Proportion of in year revenue spent on teaching staff	63%	63%	63%				
58	Proportion of in year revenue available for teaching in a balanced budget if all other costs are fixed	63.6%	63.6%	63.6%				
59	PTR value in a balanced budget based on in year revenue	15.8	15.8	15.8				
60	AFFORDABLE FTE TEACHERS in a balanced budget (Shown to 1 decimal place)	58.2	58.2	58.2				
61	FTE TEEACHERS EMPLOYED	58.0	58.0	58.0				
62	Teachers employed to Ed support staff ratio	4.1	4.1	4.1				
63	All staff to admin staff ratio	8.6	8.6	8.6				
64	Pupil to Ed support staff ratio	65.7	65.7	65.7				
65	Pupil to adult ratio	10.7	10.7	10.7				
66	Proportion of revenue spent on staff costs	78.9%	78.9%	78.9%				
67	Curriculum BONUS as a percentage of BASIC for 11 to 16 section of curriculum only (Relative Curriculum Bonus)	15.3%	15.3%	15.3%	Includes whole school teacher periods			
68	Curriculum BONUS as a percentage of BASIC for 11 to 16 section of curriculum only (Relative Curriculum Bonus)	8.9%	8.9%	8.9%	Excludes whole school teacher periods			

There is a significant difference between the DEPLOYMENT BASE YEAR sheet and the deployment sheets for the planned year and projected year even though the sheets themselves look very similar.

In the DEPLOYMENT BASE YEAR SHEET the average teaching load and hence the teacher contact ratio is the result or output of the sheet.

In the DEPLOYMENT PLANNED YEAR and DEPLOYMENT PROJECTED YEAR sheets the output of the sheet is a total number of teacher periods required for the desired curriculum. The teacher contact ratio is now a user input for those sheets that converts the teacher period total to a number of FTE teachers that the school would need to employ to staff the curriculum in question.

This screenshot shows the DEPLOYMENT BASE YEAR sheet.

	A	B	C	D	E	F
1	TEACHER DEPLOYMENT PLAN FOR THE BASE YEAR					
2	Year	2018	This section records the actual teacher period allocations and brief curriculum descriptions of the actual timetable in use in			
3	Timetable cycle length in periods	25	the base year.			
4	National Curriculum Year	Pupil Roll	tp Allocation	Average Class Size	FTE teachers employed	NOTES
5	Year 7	150	133	28.20	6.85	5 groups for 21 periods, 6 groups for 2 periods,8 groups for 2 periods
6	Year 8	150	133	28.20	6.85	5 groups for 21 periods, 6 groups for 2 periods,8 groups for 2 periods
7	Year 9	150	154	24.35	7.93	6 groups for 23 periods, 8 groups for 2 periods
8	Year 10	150	168	22.32	8.65	7 groups for 16 periods, 8 option subjects per block in 3 x 3period blocks
9	Year 11	150	168	22.32	8.65	7 groups for 16 periods, 8 option subjects per block in 3 x 3period blocks
10	Year 12	90	175	12.86	9.01	5 x 5 period option blocks, 7 subjects per block includes retakes and enrichment
11	Year 13	80	150	13.33	7.73	5 x 5 period option blocks, 6 subjects per block includes and enrichment
12	Whole School Areas (i.e. all other teacher contact time not allocated in year group sections above)					
13	Learning Support	n/a	25	n/a	1.29	25 teacher periods per week used for pupil extraction work in a learning support base
14	Intervention activity	n/a	10	n/a	0.52	10 teacher periods per week for one to one activity
15	Other teacher contact time	n/a	10	n/a	0.52	10 teacher periods allocated to inclusion unit
16	Overall totals					
17		Roll	tp Allocation	The average teaching load and hence the contact ratio are the key OUTPUTS for this section. The AVERAGE LOAD is simply the total number of tp allocated divided by the FTE number of teachers employed. The contact ratio is then given by dividing the average load by the number of periods in the cycle. Average Load and Contact ratio are shown to two places of decimals. The value for contact rsatio should be used to inform the view of the value to be used on sheets for future years.		
18	Totals	920	1126			
19	TEACHER IMPLICATIONS					
20	Average Class Size (PTR in the curriculum)		20.43			
21	Contact Ratio		0.78			
22	Average teaching load		19.41			

The year (cell B2) is copied from the SUMMARY DATA sheet. The timetable cycle length (cell B3) is a user input on this sheet and is copied to the SUMMARY DATA sheet. The pupil roll numbers in column B are copied from the SUMMARY DATA sheet.

The deployment of all teacher contact time in teacher periods is shown in column C on lines 5 to 11 and lines 13 to 15. The teacher periods are those actually allocated to the different year groups and Whole School Areas that support the year groups in some manner. The figures are at a typical point in the school year, corresponding to the point taken in the SUMMARY DATA sheet for the number of FTE teachers employed in the BASE year.

In the version of deployment analysis shown above, teacher periods used for small-group or individual intervention are classed as 'Whole School Areas' and recorded separately from the year groups. These periods could be distributed in a notional manner adding to the totals already shown for each year group. This would remove the need for lines 12 to 15 and allow the statistic Average Class Size to be used for all teacher period allocations.

Column F shows brief notes summarising the curriculum structure that produces the teacher period total on that line.

The Average Class Size statistic has been included for each year group to give a feel for the pupil to teacher ratio in that area There is a single sheet in this workbook explaining this statistic in more detail and in particular showing the difference between the average class size and the average size of a teaching group. It should be noted that the average class size statistic is comparable between schools with different timetable cycles or between years in the same school where the number of periods in the timetable cycle is changed. As a check for sense the average class size in Key stage 3 usually varies between 24 and 29 depending upon how close the year group roll is to a multiple of 30. The average class size is usually smaller in key stage 4 as a result of extra nurture groups and option schemes and typically is in the low twenties. These are not recommended benchmark ranges; they are just indicators of possible errors in year group allocations.

If teacher periods intended for small group extraction or intervention are shown separately as in a Whole School section rather than allocated notionally across the actual year groups there will be no pupil roll for those periods because the pupils they will be dealing with have already been counted somewhere in the year group totals. Furthermore the pupils in question may be a fluid cohort extracted from the various year groups on the basis of changing need. In this case the roll number for these periods is shown as 'n/a' (not applicable) and hence a calculation of average class size for those individual lines is mathematically equal to zero and is meaningless and hence shown as 'n/a'. Nevertheless the teacher periods allocated have the effect in the complete timetable of reducing the overall average class size and therefore must be included in the global total at the foot of the table. Showing Whole School Periods on separate lines has a value in that the number of FTE teachers being employed in the school to deliver those lines can be seen. The same line

of argument applies in a school which uses the BASIC/BONUS/Relative bonus approach (see below); there is no 'Basic' reference level of teacher time for zero pupils. Hence showing relative bonus on an individual line that has a teacher period allocation but no pupil allocation is not possible as any attempt produces a divide by zero error.

The overall average class size is a key variable in the fundamental equation which governs ICFP and must include all allocations for teacher time such as the Whole School Periods referred to in the previous paragraph. The overall average class size is in cell C20 and is one way of assessing the impact of teacher time in the curriculum which can be benchmarked between schools with different timetable cycles.

Some schools prefer to use an approach which uses the terms BONUS and BASIC to benchmark teacher time in the curriculum. It is only applicable to years 7 to 11 in its original form. The approach is outlined in a standalone spreadsheet BASIC AND BONUS in the workbook. For the sake of completeness it is referenced at the foot of each of the deployment sheets in the following manner and shown in the KPI section of the SUMMARY DATA sheet. Using both the Average Class Size statistic and Relative Curriculum Bonus creates duplication as they express the same thing (the allocation of teacher time) but in different ways.

	A	B	C	D	E
26	The following data is shown for users who wish to reference their 11 to 16 curriculum				
27	to the BASIC/BONUS model of T.I.Davies with the BASIC reference line being the				
28	teacher periods required for an average class size of 27 in years 7 to 11. Note that				
29	these calculations both exclude any post 16 curriculum teacher periods				
30	Calculation excluding whole school tp				
31	Total tp allocated in years 7 to11				756
32	BASIC reference level of Teacher Periods for Average Class Size =27				694.4
33	BONUS number of teacher periods				61.6
34	Relative Curriculum Bonus (BONUS as % of BASIC)				8.86%
35	Calculation including whole school tp				
36	Total tp allocated in years 7 to11				801
37	BASIC reference level of Teacher Periods for Average Class Size =27				694.4
38	BONUS number of teacher periods				106.6
39	Relative Curriculum Bonus (BONUS as % of BASIC)				15.34%

The drawback with Relative Curriculum Bonus in its original form is that it only applies to years 7 to 11 in a secondary school. Some schools interpret the BONUS/BASIC ideas in their own way and find that useful. The use of BONUS in benchmarking is impossible where the same technical term means different things in different schools.

Cell C21 on the DEPLOYMENT BASE YEAR sheet gives the teacher contact ratio as the result of the BASE year deployment analysis. This is the second of the five variables in the

fundamental equation governing ICFP. For reference the Average Class Size and the contact ratio multiplied together gives the Pupil to Teacher Ratio in the school.

The deployment sheets for the planned year and the projected year work in exactly the same way. The key point is that the teacher contact ratio for these two sheets is a user input in cell C21.

	A	B	C	D	E	F
1					TEACHER DEPLOYMENT PLAN FOR THE PLANNED YEAR	
2	Year	2020	This section records the intended teacher period allocations and brief curriculum descriptions for timetable planning in the year following the PLANNED			
3	Timetable cycle length in periods	25	YEAR called the PROJECTED YEAR.			
4	National Curriculum Year	Pupil Roll	tp Allocation	Average Class Size	FTE teachers required	NOTES
5	Year 7	152	133	28.57	6.82	5 groups for 21 periods, 6 groups for 2 periods,8 groups for 2 periods
6	Year 8	151	133	28.38	6.82	5 groups for 21 periods, 6 groups for 2 periods,8 groups for 2 periods
7	Year 9	150	154	24.35	7.90	6 groups for 23 periods, 8 groups for 2 periods
8	Year 10	150	168	22.32	8.62	7 groups for 16 periods, 8 option subjects per block in three 3 period blocks
9	Year 11	147	168	21.88	8.62	7 groups for 16 periods, 8 option subjects per block in three 3 period blocks
10	Year 12	90	175	12.86	8.97	5 x 5 period option blocks, 7 subjects per block including retakes and enrichment
11	Year 13	80	150	13.33	7.69	5 x 5 period option blocks, 6 subjects per block including enrichment
12				Whole School Areas (i.e. all other teacher contact time not allocated in year group sections above)		
13	Learning Support	n/a	25	n/a	1.28	25 teacher periods per week for support work with extracted pupils
14	Intervention activity	n/a	10	n/a	0.51	10 teacher periods per week for targeted 1:1 work and team teaching
15	Other teacher contact time	n/a	10	n/a	0.51	10 teacher periods initially unallocated for timetable flexibility but eventually for use in intervention
16				Overall totals		
17		Roll	tp Allocation	The contact ratio is the key input for this section. It determines the average teaching load and hence the number of FTE teachers required to deliver the number of teacher periods outlined in the deployment above. The value for the FTE required must either equal or be lower than value for the FTE teachers to be employed if the deployment is going to fit within the financial plan on the summary sheet. The FTE value required by the deployment can be reduced by increasing the contact ratio or increasing the average class size which is achieved by reducing the number of teacher periods allocated in the plan. Alternatively the financial plan can be modified to increase the FTE value available. N.B. the FTE teacher value requred by the deployment is rounded up to one decimal place.		
18	Totals	920	1126			
19	TEACHER IMPLICATIONS					
20	Average Class Size (PTR in the curriculum)		20.43			
21	Contact Ratio		0.78			
22	Average teaching load		19.5			
23	FTE TEACHERS REQUIRED BY THIS DEPLOYMENT		57.8			
24				This value copies from the Summary sheet. Either the deployment plan or the employed value on the SUMMARY DATA sheet should be adjusted until this cell shows green or yellow.Red = insufficient employed staff. Green = employed and deployment match. Yellow = Employed greater than deployment		
25	FTE TEACHERS EMPLOYED	58.00				
26						

The planned curriculum is outlined in words in column F and teacher period totals in column C. The teacher contact ratio value in C21 converts the teacher period total to an FTE number of teachers shown on line 23. The section shown in yellow above is copied from the finance information on the SUMMARY DATA sheet. This section is conditionally formatted as described in the note in the box from columns C to F.

WHAT IS CONTACT RATIO sheet
This sheet gives a detailed example of the contact ratio idea for users who are not already familiar with it.

MODELLING CONTACT sheet
This sheet allows the contact ratio value to be modelled for future years where the teaching staff structure is reasonably well known but the individual teachers are not known. It also allows the user to investigate the extent to which management time changes can modify the contact ratio value once all staff have the appropriate allocation of PPA time.

WHAT IS AVERAGE CLASS SIZE sheet
This sheet provides a stepwise explanation of Average Class Size and illustrates the difference between that and Average Teaching Group size.

BONUS AND BASIC sheet

This sheet explains and illustrates the use of the terms BASIC and BONUS as defined in timetable literature.

AT COST REFERENCING sheet

This sheet shows a way of referencing a teacher deployment analysis to the number of teacher periods a school can afford in a balanced budget.

METRICS sheet

This sheet shows a range of metrics attached to a deployment analysis.

APPENDIX.

Technical timetabling terms used in this document and in the Excel workbook

There are some essential ideas from timetable theory that may be useful for any school leader not closely acquainted with timetabling to understand. These are outlined here at a level which is hoped is appropriate for ICFP but not necessarily in the detail required for timetabling.

PERIOD

Time in the curriculum is usually measured in a unit called the **period**. The length of a period is usually the length of a single lesson. Some subjects may be allocated multiple periods to allow for longer teaching time for example in Technology or Games.

CYCLE

The timetable **cycle** is the number of periods after which the timetable and hence the curriculum structure repeats. A common secondary school timetable cycle consists of twenty five one hour periods spread over five days of a calendar week. Colloquially this is often referred to as a 'twenty five period week'. There are many different timetable cycles in use in secondary schools some operating over two calendar weeks to allow for a curriculum plan with a higher number of different subjects than can be accommodated in a 25 period cycle. It is not usual to include registration periods, lunch periods or twilight periods as part of the timetable cycle even though they may need to be part of the cycle as it is used in timetable software. Where schools use unequal length periods in their cycle this can be accommodated by considering the cycle as a multiple of the size of the smallest time unit used for a period.

CURRICULUM PLAN

A **curriculum plan** is a detailed blueprint for timetable construction containing detail of time required for different subjects and the number of teachers to be allocated, the organisation patterns used such as setting and option blocks, pupil roll numbers and an indication of how they can be subdivided into classes, and an overview of how all this works within the timetable cycle. Timetable software has its own way of recording a curriculum plan. An Excel workbook can also be used to do this. Reading a curriculum plan is not an essential aspect of ICFP for leaders outside the timetable team but it is certainly desirable. Making the plan an open document can promote a wider understanding of staffing and cost implications of decisions affecting curriculum structure. The most common timetable software in secondary schools is NOVA-T6 and this displays its curriculum plans on the MODEL window. The structure of a curriculum plan can have significant cost implications for the number of specialist teachers a school needs to employ and the cost effectiveness of their use in the timetable.

TEACHER PERIOD

Teacher time on the timetable is measured in **teacher periods**. One teacher period is one teacher working in a planned teaching situation on the timetable for one period. In most cases the teaching situation will be a single teacher teaching a class of pupils. There are also many other situations where teachers teach pupils as part of the timetable such as team teaching, intervention, and learning support.

CONTACT TIME and NON-CONTACT TIME

The teacher periods supplied by a teacher on the timetable are **contact time** and referred to as contact periods. Care must be taken when using timetable software to calculate the number of contact periods on a timetable. Firstly, some schools record learning support and intervention periods in a way which appears in the software total as non-contact time. Secondly in NOVA-T6 in particular the totals on the Analysis page are shown in 'class periods' and not 'teacher periods'. Whether or not these two things are the same or different depends upon the way in which the software has been used by the scheduler.

Teachers have two types of time on their timetables which form part of the timetable cycle. (Note this usually excludes registration, assembly and similar activity) The time can be classified as either **contact time** or **non-contact time**.

Contact time, as indicated above is planned teaching contact with pupils as part of the curriculum plan. Non-contact time is PPA (Preparation, Planning and Assessment) time allocated to all teachers who have a teaching load of contact periods, management time, headship time and Newly Qualified Teacher (NQT) time. Regulations covering PPA, management time and headship are set out in the 'School Teachers Pay and Conditions Document' [1](STPCD) in paragraphs 52.5, 52.6 and 47.2 respectively. The reduction of teaching load for NQTs is covered by the document 'Induction for newly qualified teachers' in paragraph 2.19[2]. School leaders are strongly recommended to check the current version of these documents. A school may also decide to allocate additional non-contact time to teachers for reasons specific to the school.

CONTACT RATIO

The **contact ratio** is a critical variable used in ICFP and is also one of the five variables in the fundamental equation referred to on the landing page for these notes. Aspects of contact ratio are illustrated in the Excel workbook that accompanies these notes. The contact ratio is the proportion of the cycle teachers spend in teaching contact taken as an average across all teachers. The contact ratio can be used as a comparison metric between schools as it is independent of the number of periods in the timetable cycle in a school. It is false to assume that there is a fixed value of contact ratio that is suitable for all types of school. Once all teachers have a minimum allocation of PPA time the key driver of contact ratio is the level

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[1] Paragraph references are to the 2018 edition
[2] April 2018 edition

of Management and Headship time allocated to staff entitled to it. Paragraph 52.4 in STPCD covers the need to have regard to work/life balance.

AVERAGE TEACHING LOAD

The **average teaching load** or **average load** is the number of periods of contact time teachers have as an average across all staff employed as teachers. Some staff such as a headteacher may have an actual teaching load of zero whilst others may have one close to 90% of the timetable cycle. There will be a range of teaching loads between these limits and the average of all of them is the average teaching load. As with any average, care must be exercised in interpreting its meaning. Because the average teaching load relates to the timetable cycle in the school it is not directly comparable with a teaching load in a different timetable cycle. The average teaching load can be calculated by dividing the total number of contact periods on the timetable by the FTE number of teachers.

The contact ratio mentioned above is calculated by dividing the average load by the length of the timetable cycle in periods. This result can be compared in different timetable cycles.

DEPLOYMENT ANALYSIS

This is also called '**Staff Deployment**' or '**Staff Deployment Analysis'** for historic reasons. It usually only applies to teachers although in some secondary schools and certainly in most primary schools it applies to teachers and staff acting in a teacher role such as HLTA staff.

It is usually drawn up in the form of a table listing the different areas of the school such as year groups and alongside those listing the pupil roll and the teacher time allocated on the timetable.

It comes in two forms. The first form is an analysis of an existing timetable. In this case the FTE total for teachers is a known quantity as are all the teacher period (tp) allocations to different curriculum areas such as year groups. The analysis allows the extraction of many metrics particularly if financial information such as the average cost of a teacher is included. There are several examples in the workbook accompanying these notes. Readers are also referred to Keith Johnson's Timetabling text [3]Chapter 5 and in particular section 5.8.

The second form is more in keeping with the original idea from T I Davies which he referred to as the schools 'longitudinal matrix'. See chapter 10 of School Organisation [4]and in particular pages 123 onwards. This is a planning version where a desired teacher time allocation is distributed across the different areas of the school to either arrive at a total level of teacher time or to work to a predetermined teacher time limit. The teacher time total in teacher periods is then used with a target value for teacher contact ratio to determine the total number of FTE teachers required. Where the number of FTE teachers

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[3] Johnson,K., *Timetabling, A Timetabler's Cookbook*, October ReSolutions Limited, 2009 ,ISBN 978-0-9561161-0-9

[4] Davies, T.I., School Organisation, Pergamon 1969, ISBN 08-013419-X

the school intends to employ has already been decided a contact ratio value determines the total teacher period budget for the deployment analysis. This second approach mirrors the activity in schools before 1988. In School Organisation Davies illustrates this approach using his Bonus and Basic system for 11 to 16 schools. This is covered in the following section on BONUS, BASIC and RELATIVE BONUS

Whatever approach is used, the deployment analysis in its planning form provides a series of cost envelopes within which curriculum plans for the different areas of the school must be constructed.

BONUS, BASIC and RELATIVE BONUS

This system of planning a curriculum was devised by T I Davies in the 1960's when analysing curricula in Welsh secondary schools and published in his 1969 book School Organisation[5]. It was intended as a method of sketching out a curriculum framework, common to all secondary schools, using small simple numbers which could be benchmarked and also support dialogue with a Local Education Authority about the allocation of teachers through a PTR based formula.

The common planning basis for all schools was a nine period timetable cycle and the introduction of the ideas of **basic** and **bonus** was to produce small numbers for calculations. In 1969 calculations had to be carried out on paper using basic arithmetic as calculators and computers were not available. Small numbers were therefore an advantage. This is no longer relevant given the availability of spreadsheets and pocket calculators. Once a planning framework had been established it could be converted into the timetable cycle used in any individual school. For benchmarking purposes Davies includes over 30 pages of data called 'norms' derived from activity in Welsh schools in 1966 in his text.

Some of the original ideas from Davies were developed in curriculum and timetable courses between 1970 and 1980 and Keith Johnson uses some of these developments in his Timetabling[6] text.

Some schools and most notably the Outwood Grange Academies Trust [7]have used interpretations and aspects of this approach in the recent past.

Basic is a reference point from which teacher time is measured. In the Davies model this was the number of teacher periods numerically equal to the pupil roll divided by three in a nine period cycle. That is exactly the same thing in today's schools as the teacher periods needed to give an average class size of 27. It must be emphasised that **basic** was never intended as the defining line for a standard and adequate curriculum although it has been interpreted as that by some users since 1970. It is simply a reference line for measurement

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[5] Davies, T.I. op cit
[6] Johnson.K., op cit
[7] Outwood Grange Academies Trust Annual Report and Financial Statements for yearend August 2016 See 'Teaching and Support Staff Cost page 21

like sea level is used for measuring height or depth in Geography. Keith Johnson also explains **basic** in a similar manner to this on page 69 of his Timetabling text. Davies starts his original definition on page 90 of School Organisation with the statement, "From the viewpoint necessary to this sketching technique, every actual school curriculum is a deviant from a hypothetical, basic curriculum, and the extent of its deviation depends on the size of the curriculum's bonus" He then goes on to state that he is trying to "….set up a basic curriculum model such that the actual curricula wherever they are found will deviate from the basic model by only a small margin of bonus classes" To simplify the arithmetic in a nine period cycle Davies settles on an average class size of 27 being his 'basic' curriculum model.

The actual teacher time allocated in a school is a matter for the school to decide. The difference between the actual time in teacher periods and the **basic** reference line is called **bonus**.

The advantage in using this method is that the numbers for the teacher periods used to describe the curriculum in terms of bonus are a lot smaller than the actual total teacher periods used. The disadvantages of this approach are that the basic reference line is only appropriate to 11 to 16 school; when the actual teacher period allocation is lower than the basic reference level the bonus is negative, which can be confusing to some users; and the misunderstandings caused when users apply their own meanings to the terms bonus and basic. This last point is not an issue if the school operates its system alone but if it is shared across other schools without adequate definition of terms it leads to potential difficulties.

An additional dimension described in Keith Johnson's text[8] is the idea of **relative bonus** (Outwood Grange Accounts cite this as "8% curriculum bonus"). Bonus is specific to the timetable cycle in the school unless one goes back to the Davies nine period common timetable cycle. Relative bonus can be used no matter what the timetable cycle is. Like contact ratio and average class size it is independent of the number of periods in the cycle. **The relative bonus is the bonus as a percentage of the basic.**

The reference line of an average class size of 27 is not relevant to a post 16 curriculum. In fact Davies proposed a post 16 method based on an average class size of 15 but no one uses it as it gets too complex to be useful. Further complexities can arise in post 16 because of private study time on student timetables. Hence the common approach is that this method does not apply to post 16. Davies did not consider Primary Schools and neither does Johnson. It is also questionable how appropriate the approach is for primary schools without some modification. There is a similar approach which can be used using the terms bonus and basic and this is included in the Technical Notes (Primary Schools) but not developed further here.

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[8] Johnson, K. op cit page pages 69 and 70

As a final point it should be noted that the idea outlined below, Average Class Size, which also comes from Davies[9] can be used in place of the bonus and basic ideas and is also one which applies across primary schools and post 16. It is also more intuitive and simpler to apply than the basic/bonus method.

AVERAGE CLASS SIZE

Average Class Size is the traditional term for the pupil to teacher ratio in the timetable. Where teacher periods are allocated to activities that do not have a roll specifically allocated to them such as Learning Support or Intervention an average class size cannot be calculated for the specific teacher period allocation unless those periods are notionally distributed across the year groups where the time will be used. The average class size can always be calculated for the whole school where all the teacher periods are included.

The overall average class size for a school is given by

$$Average\ Class\ Size = \frac{Pupil\ roll \times periods\ in\ the\ cycle}{teacher\ periods\ on\ the\ timetable}$$

In post 16 where pupils do not necessarily attend all periods the statistic is still valid but it is larger than the average size of a teaching group. Davies draws this distinction on page 94 of School Organisation by reference to 'classes as organised' (i.e. the timetable) and 'classes as taught' (i.e. the actual attendees at each class.) For example if the average class size in post 16 is 20 but pupils only attend four out of five lessons then the average size of a teaching group is 16. Average class size is one of the values in the fundamental equation.

Average class size can be converted to a relative curriculum bonus and vice versa using the relationship

$$\boldsymbol{Average\ Class\ Size = \frac{2700}{(100 + Relative\ Bonus)}}$$

For example a relative bonus of 8% means the same thing as an average class size in 11 to 16 (a.k.a. 'the main school' in secondary) of 25.

THE FUNDAMENTAL EQUATION

There is a more detailed paper with worked examples on this which can be downloaded from the original landing page.

In short if the average teacher cost is divided by the product of the per pupil revenue and the proportion of that revenue available for teacher cost the result is the pupil to teacher ratio in a balanced budget.

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[9] Davies, T.I. op cit

The pupil to teacher ratio equals the teacher contact ratio multiplied by the Average class size in the timetable.

Eliminating the pupil to teacher ratio from these two statements gives the fundamental relationship that governs all schools in terms of finance and curriculum.

This in effect makes the pupil to teacher ratio the key summary metric in any school. Caution must be exercised in the view of such a metric as schools with identical overall roll numbers may not be strictly similar for the purpose of comparing PTR values unless the distribution of the pupil roll across year groups is taken into account.