

## Chapter 6

# Teachers

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As with pupils, teachers' attitudes were assessed using start- and end-of-year questionnaires and two midpoint interviews. Teacher interviews were conducted immediately after classroom observations. This chapter presents the resultant data under three main headings, the first of which provides some information about participating teachers (demographic information, professional development, and confidence in relation to teaching mathematics). The second section describes teachers' accounts of typical mathematics lessons in each programme, including lesson length, materials and strategies used, and grouping practices. The final section describes teacher views on their assigned programme and the evaluation in general.

Given the timing of the questionnaires and interviews, it would be expected that the initial questionnaires would show few differences between teachers in each programme (as they were at that stage aware of their assigned programme, but almost all completed the questionnaire before attending any related training). However, as the second questionnaire was delivered towards the end of the school year, it would be expected to show marked differences between the teaching practices of teachers in each programme.

In five classes, teacher questionnaire and interview information was available for *two* teachers (in situations where a resource teacher spent a significant amount of time jointly teaching the class with the regular class teacher). In such cases, some information was aggregated to the class level. For example, if reported teaching experience was six and 10 years, then the class was assigned a notional aggregate of eight years. Other information (e.g., gender) did not lend itself to aggregation and is reported for all responding teachers.

### Teacher characteristics

The 27 classes were taught by a total of 32 teachers, of whom 28 were female and four male. All classes taught by two teachers had two female teachers. The mean teaching experience for those teaching JUMP classes was 19.4 years, considerably higher than the mean of 11.5 years for IMPACT classes. The difference was largely attributable to three JUMP classes which were taught by teachers with more than 30 years of experience, whereas the most experienced IMPACT teacher had 21 years' experience. Generally, classes in both groups were taught by experienced teachers, and only one (IMPACT) class was taught by a teacher with less than three years of teaching experience.

### Professional development

As part of the Teacher Questionnaire administered in September 2013, teachers were asked how many days of mathematics-related Continuing Professional Development (CPD) they had attended over the previous three years, exclusive of CPD related to the present evaluation. Responses ranged from none to 10 days, with JUMP teachers attending an average of 3.4 days, compared to 2.2 for IMPACT teachers (Table 6.1). The second Teacher Questionnaire, administered in May 2014, asked about experience of CPD (again, other than that related to the evaluation) during the year. IMPACT teachers attended 1.2 such days during the year, compared to 0.6 of a day attended by JUMP teachers. In total, JUMP teachers attended 4 days of CPD up to the end of May 2014, compared to 3.4 days for IMPACT teachers.

Table 6.1: Mean number of days spent on mathematics-related CPD (external to the evaluation), prior to and during the evaluation

	JUMP (N=13)	IMPACT (N=14)
Maths-related CPD, Sept 2010 – 2013	3.4 days	2.2 days
Maths-related CPD, 2013/14 academic year	0.6 days	1.2 days
Total, Sept 2010 – May 2014	4.0 days	3.4 days

## Programme-specific professional development

As already noted in Chapter 1, some programme-specific training was made available to participating teachers. An initial introduction to each programme was conducted in early September 2013, lasting for most of the day. Each session was recorded and made available online to participating teachers. Two subsequent CPD events were organised for each programme: a webinar in November 2013 and a webinar in February 2014. In addition, in early 2014 teachers were given contact details for other teachers in their programme, to facilitate discussion and sharing of practice.

Chapter 1 provides detail on the numbers who attended each CPD session. It is notable that six of 17 JUMP and six of 15 IMPACT teachers (counting both class and resource teachers) did not attend the initial CPD day. Such relatively low attendance levels are partly attributable to very short notice given, in turn partly attributable an unexpected delay in one element of project funding. However, of the non-attenders, five did not watch the online recording of the CPD day, nor did they participate in the November webinar, while one did not participate in the February webinar either. Thus, three IMPACT and two JUMP teachers spent half of the academic year without any training for their assigned programme.

## Teacher confidence and preparation

Teachers were asked about the degree to which they felt confident engaging in certain activities related to teaching mathematics, and how well prepared they felt to teach each of the curriculum strands. Table 6.2 shows the percentages of [all responding] teachers who felt they were *very well prepared* to teach strands,<sup>1</sup> with ratings more positive in the May than the September administration of the Teacher Questionnaire. However, this may not entirely reflect programme effects. Some of those who attended the initial CPD in September 2013 completed the Teacher Questionnaire shortly after they completed the MKTQ-S. As this is a reasonably difficult assessment of teacher knowledge for teaching mathematics, it may have had the unintended consequence of depressing some self-ratings. Also, it is worth repeating that IMPACT manuals did not cover Measures, Data, or Algebra, although the programme's principles are transferable across strands. It is thus less likely that changes in the confidence of IMPACT teachers on Measures, Data, and Algebra were programme-related.

Data was the strand with the lowest initial ratings. In September, only nine of 16 JUMP teachers (56%) and eight of 14 IMPACT teachers (57%) felt *well prepared* to teach Data, although by May 2014 almost all felt well prepared. Measures also had relatively low percentages of teachers who felt *well prepared* to teach it in September (56% of JUMP and 64% of IMPACT teachers). However, while most JUMP teachers felt well prepared for Measures in May 2014, almost one quarter of IMPACT teachers remained less than fully confident. In September, approximately four out of five teachers felt *well prepared* to teach Number, rising to

<sup>1</sup> With the exception of a single (IMPACT) teacher who reported feeling *not well prepared* to teach Algebra, all responses not shown in Table 6.2 are *somewhat prepared*.

87% of JUMP and 92% of IMPACT teachers in May. Separate ratings for Algebra were not requested in September, as it was expected that most teachers would treat Algebra as part of Number. However, as described in Chapter 3, our subsequent analysis of JUMP materials suggested that Algebra was more heavily represented in JUMP than in either the PSMC or Irish textbooks. Therefore, the May questionnaire was modified to include a separate rating for this strand, but JUMP and IMPACT teachers reported fairly similar levels of confidence (81% and 77%, respectively, felt *well prepared* to teach Algebra). The percentage of IMPACT teachers *well prepared* to teach Shape and Space was largely unchanged (from 86% to 85%), but the percentage of JUMP teachers who felt *well prepared* to teach it increased from 75% to 87%.

Table 6.2: Percentages of teachers indicating they felt *very well prepared* to teach various PSMC strands

	September 2013		May 2014	
Number	JUMP (N=16)	81.3	JUMP (N=16)	87.5
	IMPACT (N=14)	78.6	IMPACT (N=13)	92.3
Shape & Space	JUMP (N=16)	75.0	JUMP (N=16)	87.5
	IMPACT (N=14)	85.7	IMPACT (N=13)	84.6
Measures	JUMP (N=16)	56.3	JUMP (N=16)	87.5
	IMPACT (N=14)	64.3	IMPACT (N=13)	76.9
Data	JUMP (N=16)	56.3	JUMP (N=16)	87.5
	IMPACT (N=14)	57.1	IMPACT (N=13)	92.3
Algebra			JUMP (N=16)	81.3
			IMPACT (N=13)	76.9

In relation to specific teaching skills, most teachers initially expressed only medium confidence levels. Based on responses supplied in September 2013, a minority felt *very confident* in most of the six instructional activities listed (Table 6.3), and almost none indicated that they were *not confident* on any aspect.<sup>2</sup> Less than half of teachers in each programme initially felt *very confident* of their ability to provide challenging tasks for capable pupils, to adapt their teaching to engage pupils' interest, or to work with lower-achieving pupils. Further, less than half of JUMP teachers (and slightly more than half of IMPACT teachers) felt *very confident* connecting different mathematics topics, showing a variety of methods for doing calculations, and teaching real-life problem-solving.

By the second administration of the questionnaire in May 2014, self-ratings had increased for five of the six skills. There were increases in the number of JUMP teachers who were *very confident* in connecting mathematics topics, and in JUMP and IMPACT teachers who were *very confident* showing a variety of methods for doing calculations. For JUMP, the number of teachers who felt *very confident* working with lower-achieving pupils rose from five to nine. The exception was on ability to adapt teaching to engage pupils' interest. By May, only two JUMP teachers (down from six initially) reported being *very confident*.

<sup>2</sup> As with Table 6.2, only the most positive response option (*very confident*) is shown. The vast majority of responses not shown are in the middle (*somewhat*) response category.

Table 6.3: Percentages of teachers that felt *very confident* on various aspects of mathematics instruction

	September 2013		May 2014	
	Connecting one mathematics topic to another	JUMP (N=16) IMPACT (N=15)	37.5 66.7	JUMP (N=16) IMPACT (N=14)
Showing pupils a variety of methods for doing calculations	JUMP (N=16) IMPACT (N=15)	37.5 53.3	JUMP (N=16) IMPACT (N=14)	68.8 78.6
Providing challenging tasks for capable pupils	JUMP (N=16) IMPACT (N=15)	37.5 33.3	JUMP (N=16) IMPACT (N=14)	43.8 42.9
Adapting my teaching to engage pupils' interest	JUMP (N=16) IMPACT (N=15)	37.5 40.0	JUMP (N=16) IMPACT (N=14)	13.3 57.1
Working with lower-achieving pupils	JUMP (N=16) IMPACT (N=15)	43.8 33.3	JUMP (N=16) IMPACT (N=14)	50.0 64.3
Teaching real-life problem-solving	JUMP (N=16) IMPACT (N=15)	43.8 60.0	JUMP (N=16) IMPACT (N=14)	56.3 71.4

## Collaboration with other teachers

Teachers were asked how often they discussed how to teach a particular topic with other teachers, and how often they worked with other teachers to try out new ideas. At the start of the year, the most common response from teachers in both groups (50% in JUMP and 60% in IMPACT) was that they discussed how to teach a particular topic with other teachers about two to three times a month (Table 6.4). However, 13% of JUMP and 27% of IMPACT teachers reported never or almost never discussing how to teach a topic.

There was a slight decrease in discussions with colleagues over the duration of the evaluation. May responses show that one quarter of teachers in the JUMP programme and over one third of those in IMPACT reported never or almost never discussing the teaching of particular topics with other teachers. Further, none of the IMPACT teachers had daily or almost daily discussions with colleagues, although the number of JUMP teachers engaging in daily discussions with colleagues increased by 6% (i.e., one teacher).

Table 6.4: Percentages of teachers indicating how often they discussed the teaching of particular topics with other teachers

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=14)
Daily or almost daily	18.8	6.7	25.0	0.0
1-3 times a week	18.8	6.7	12.5	14.3
2-3 times a month	50.0	60.0	37.5	50.0
Never or almost never	12.5	26.7	25.0	35.7

Table 6.5 shows the frequency with which teachers worked with other teachers to try out new ideas. As can be seen, responses from teachers in the JUMP programme varied little across the two time periods, while there was a very slight increase in frequency of working together amongst teachers in IMPACT. Generally, though, less than half of teachers in either programme or at either time point worked together with other teachers to try out new idea on a very regular basis.

Table 6.5: Percentages of teachers indicating how often they worked together with other teachers to try out new ideas

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=14)
Daily or almost daily	12.5	6.7	12.5	0.0
1-3 times a week	25.0	6.7	31.3	21.4
2-3 times a month	25.0	46.7	18.8	42.9
Never or almost never	37.5	40.0	37.5	35.7

## Typical mathematics lessons

Teachers were asked a number of questions to establish what happened during mathematics lessons, including lesson duration, materials used, grouping practices, and general class activities.

### Lesson length

In September, the mean time spent on mathematics by JUMP classes was 286 minutes per week, slightly higher than the mean of 277 in IMPACT classes (Table 6.6). By May 2014, the difference was reversed and pupils in IMPACT classes were spending slightly more time in mathematics lessons than were JUMP pupils (291 versus 282 minutes per week). Thus, in May the average IMPACT lesson lasted almost an hour (58 minutes) while the average JUMP lesson was 56 minutes.

Table 6.6: Mean number of minutes spent teaching mathematics in participating classes, per week

	JUMP (N=13)	IMPACT (N=14)
September 2013	286.1	276.9
May 2014	282.0	291.5

### Materials Used

Teachers were asked about the frequency (*most or all lessons, once or twice a week, once or twice a month, and rarely or never*) with which they used various materials in their mathematics lessons. Tables 6.7 summarises some responses, showing the percentages of teachers indicating that they used materials at least once or twice a week (i.e., combining the two most frequent options). As might be expected, real-life materials were a common feature of IMPACT lessons, featuring at least weekly in lessons at the start and towards the end of the school year. However, all but two of the 16 JUMP teachers also reported at least weekly use of real-life materials.

Weekly use of manipulatives was slightly more common in IMPACT classes, especially in May, when 75% of JUMP and 100% of IMPACT teachers reported their use. Regular use of games was common across both programmes, while tablebooks were a more frequent feature of IMPACT than JUMP lessons. In September, slightly less than half of JUMP teachers used tablebooks (compared to almost all IMPACT teachers), rising to just over half (56%) by May.

In sum, with the exception of two additional teachers regularly using tablebooks, there was little change in the use of these materials by teachers in the JUMP programme over the course of the year.

Table 6.7: Percentages of teachers reporting that they used various materials at least once or twice a week in mathematics lessons

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=15)
Real-life materials	87.5	100.0	87.5	100.0
Manipulatives	81.3	92.9	75.0	100.0
Games	87.5	80.0	87.5	92.3
Tablebooks	43.8	93.3	56.3	66.7

As regular use of the pupil workbook, along with supplementary pupil materials if appropriate, might be considered an important aspect of adherence to JUMP, Table 6.8 shows the detail of teacher responses about using such materials. At the start of the year, almost every teacher indicated that they would normally use textbooks in most or all lessons with Third class pupils. However, by May, almost one-third of JUMP teachers (and almost one half of IMPACT teachers) indicated that they were using textbooks<sup>3</sup> only once or twice a week.

There was also a noticeable change in the frequency of use of workbooks/worksheets. In September, 25% of JUMP teachers indicated that they generally used worksheets in most or all lessons (at that stage the JUMP pupil materials had not been delivered to schools). By May, 69% reported using workbooks/worksheets in most or all lessons, yet a sizeable minority of teachers (31%) still did not use them in most lessons. In contrast, the percentage of IMPACT teachers who regularly used workbooks/worksheets dropped slightly.

Table 6.8: Frequency with which teachers reported using any type of textbooks and workbooks/worksheets

		September 2013		May 2014	
		JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=15)
Textbooks	Most or all lessons	93.8	93.3	68.8	53.8
	Once or twice a week	6.3	6.7	31.3	46.2
	Once or twice a month	0.0	0.0	0.0	0.0
	Rarely or never	0.0	0.0	0.0	0.0
Workbooks/ worksheets	Most or all lessons	25.0	46.7	68.8	33.3
	Once or twice a week	62.5	46.7	25.0	41.7
	Once or twice a month	6.3	6.7	0.0	16.7
	Rarely or never	6.3	0.0	6.3	8.3

## Teaching strategies

Teachers were asked how often they used a variety of teaching strategies during their mathematics lessons, including breaking ideas down into very simple steps, asking pupils what they learned, relating lessons to everyday life, bringing interesting materials to class, and teaching how to solve a problem by using multiple similar problems.

In September 2013, 94% of JUMP and 67% of IMPACT teachers said that they broke ideas down into very small steps in every or almost every lesson (Table 6.9). This approach is a key component of JUMP, but the difference is not attributable to JUMP itself, as the questionnaires were largely completed before teachers attended initial training. When Teacher

<sup>3</sup> Generally, textbooks were understood to mean Irish textbooks, not the JUMP workbooks. However, some teachers may have counted the JUMP workbooks in the “textbook” category at the end of the year.

Questionnaires were next administered in May, breaking down ideas into smaller steps was a more common feature of IMPACT than of JUMP lessons, despite the importance of sequential, scaffolded steps featuring very prominently in JUMP materials.

Table 6.9: Percentages of teachers reporting the frequency with which they break ideas down into very small steps during mathematics lessons

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=13)
Every/almost every lesson	93.8	66.7	81.3	92.3
About half the lessons	0.0	33.3	18.8	7.7
Some lessons	6.3	0.0	0.0	0.0
Never	0.0	0.0	0.0	0.0

At the start of the year, only two teachers in each programme (12% and 14%) asked pupils what they had learned in most or all classes (Table 6.10). However, May responses indicate that teachers in both programmes, but particularly in IMPACT, increased the frequency with which they checked pupil understanding of lessons. As a corollary, the number of JUMP teachers who only checked intermittently, if at all, fell from 37% to 19%, while the number of such IMPACT teachers fell from 57% to 14% (i.e., from eight to only two teachers).

Table 6.10: Percentages of teachers reporting the frequency with which they asked pupils what they had learned after mathematics lessons

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=14)
Every/almost every lesson	12.5	14.3	31.3	50.0
About half the lessons	50.0	28.6	50.0	35.7
Some lessons	37.5	35.7	18.8	14.3
Never	0.0	21.4	0.0	0.0

There was also an increase over the school year in the frequency with which mathematics lessons were related to everyday life. In September, a little less than half of teachers in each programme related mathematics lessons to daily life on a daily or almost daily basis (Table 6.11). By May, the percentages doing so had risen to 63% of JUMP and 71% of IMPACT teachers. Nonetheless, two JUMP teachers (13%) linked real life to less than half of their lessons.

Table 6.11: Percentages of teachers reporting the frequency with which they related mathematics lessons to daily life

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=14)
Every/almost every lesson	43.8	40.0	62.5	71.4
About half the lessons	37.5	26.7	25.0	28.6
Some lessons	18.8	33.3	12.5	0.0
Never	0.0	0.0	0.0	0.0

In September, a large minority of teachers in each programme (31% in JUMP and 43% in IMPACT) indicated that teaching problem-solving by using multiple similar problems was a feature of all or almost all their lessons (Table 6.12). However, a large minority also indicated that they only did so in some lessons. Amongst JUMP teachers, the numbers using multiple

similar problems in most/all lessons doubled between September and May, while the number who did so in only some lessons almost halved. IMPACT teachers also showed an increase in use of teaching problem-solving by using multiple similar problems, but not to the same extent as JUMP.

Table 6.12: Percentages of teachers reporting the frequency with which they taught problem-solving using multiple similar problems

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=14)
Every/almost every lesson	31.3	42.9	62.5	42.9
About half the lessons	25.0	21.4	12.5	42.9
Some lessons	43.8	35.7	25.0	14.3
Never	0.0	0.0	0.0	0.0

In most cases, teachers reported an increase in the use of a particular strategy over the period of the evaluation. An exception was JUMP teachers bringing “interesting materials” to class. In September, almost one third of JUMP teachers brought interesting materials to class for most or all lessons, but this fell to 6% (one teacher) by May (Table 6.13). In contrast, IMPACT teachers increased the frequency with which they brought materials into lessons, although one teacher did indicate that interesting materials were *never* a feature of their mathematics classes.

Table 6.13: Percentages of teachers reporting the frequency with which they brought interesting materials to class

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=14)
Every/almost every lesson	31.3	6.7	6.3	14.3
About half the lessons	37.5	26.7	43.8	57.1
Some lessons	31.3	66.7	50.0	21.4
Never	0.0	0.0	0.0	7.1

## Grouping practices

The most common grouping practice at the start of the year was whole class teaching (used in *most lessons* in 93% of IMPACT and 60% of JUMP classes) (Table 6.14). Among teachers in the JUMP programme, the extent to which whole class teaching was used changed little from September to May. Similarly, at both the start and end of the year, about one third of JUMP teachers and one fifth of IMPACT teachers reported that pair work was used in most lessons. In contrast, the extent of small group work changed during the year. In JUMP classes, small group work was slightly less frequently used at the end of the year (12% rarely or never used it), while the percentage of IMPACT teachers using small group work in most lessons increased from 7% to 43%.

In September, 53% of JUMP and 80% of IMPACT classes featured individual work in most lessons. However, by May, the extent to which individual work was used in lessons was almost identical across both programmes (69% of teachers in each case used individual work in most lessons). Thus, individual work was slightly less common than might be expected in JUMP classes and slightly more common in IMPACT classes.



Table 6.14: Percentages of teachers reporting the frequency with which they used various grouping practices

		September 2013		May 2014	
		JUMP (N=15)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=15)
Whole class	Most lessons	60.0	93.3	62.5	76.9
	Some lessons	40.0	6.7	31.5	23.1
	Rarely or never	0.0	0.0	6.3	0.0
Small groups	Most lessons	60.0	6.7	50.0	42.9
	Some lessons	40.0	93.3	37.5	57.1
	Rarely or never	0.0	0.0	12.5	0.0
Pairs	Most lessons	33.3	20.0	31.3	21.4
	Some lessons	66.7	73.3	62.5	78.6
	Rarely or never	0.0	6.7	0.0	0.0
Individual	Most lessons	53.3	80.0	68.8	69.2
	Some lessons	46.7	13.3	31.3	30.8
	Rarely or never	0.0	6.7	0.0	0.0

## Pupil activities

Teachers were asked how often they asked pupils to do the following: listen to the teacher explain how to solve problems; memorise rules, procedures and facts; work problems individually or with peers, with the teacher's guidance; work problems together as a class, with the teacher's guidance; explain their answers; and self-assess their mathematical performance.

Response options were *every/almost every lesson, about half the lessons, some lessons and never*. For ease of presentation, Table 6.15 shows the percentages of teachers who got pupils to engage in an activity in most or at least half of their lessons. Differences by programme are not any more pronounced in the May responses than in the initial responses in September. For example, May responses show that 100% of teachers in each programme asked pupils to explain their answers in at least half of lessons, and over four in five got pupils to work problems in small groups.

Table 6.15: Percentages of teachers indicating that they asked pupils to engage in various activities in at least half of their mathematics lessons

	September 2013		May 2014	
	JUMP (N=16)	IMPACT (N=15)	JUMP (N=16)	IMPACT (N=14)
Listen to the teacher explain how to solve problems	56.3	75.0	62.5	57.1
Memorise rules, procedures and facts	62.5	40.0	60.0	50.0
Work problems alone			87.5	78.6
Work problems in a small group			87.5	85.7
Work problems together as a whole class	75.0	73.3	87.5	78.6
Explain their answers	81.3	66.7	100.0	100.0
Self-assess their performance	56.3	26.7	75.0	42.9

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Asking pupils to work alone on problems in at least half of lessons was very common in both programmes (79% in IMPACT and 87% in JUMP) but universal in neither. Regular memorisation of rules, procedures and facts was a feature of only 60% of JUMP classes in May, largely unchanged since September, and not markedly different from IMPACT (50% of classes). Asking pupils to self-assess their performance was one of the few areas in which there were differences by programme. Three-quarters of JUMP teachers did so in at least half of classes, compared to 43% of IMPACT teachers. However, the September responses show a pre-existing difference (56% in JUMP versus 27% in IMPACT), suggesting it may be unrelated to programme effects.

## Teacher views on programme/evaluation

All teachers were interviewed at two points during the year, coinciding with the first and second set of classroom observations. Interviews took place immediately after the observations and covered topics such as level of comfort in using the assigned programme in classes, views on the efficacy of the programme, and views on the evaluation itself. This section summarises teacher views on the CPD provided to participants, their degree of comfort in using the respective programmes, and their views on the general efficacy of the programme and the implementation of the evaluation.

Much of the preceding chapters compares JUMP and IMPACT, to establish initial similarities, and identify any eventual differences. The following sections have a much stronger focus on JUMP itself, as the focus is on aspects of the assigned programme that teachers perceived as helpful or problematic, and on the extent to which they felt that programme practices and methodology were a feature of their classrooms.

### Satisfaction with and uptake of CPD

As noted in Chapter 1, teachers received very little notice for the initial training day for their respective programmes (partly due to a delay in release of some project funding, which in turn contributed to difficulty in scheduling Dr Mighton's availability). This led to poor attendance levels. Of those that did attend, satisfaction was higher among IMPACT than JUMP teachers. Of the nine class teachers who attended the initial JUMP CPD, only three expressed wholly positive views on the quality of the training, four expressed mixed views, and two were generally negative. For IMPACT, seven of the eight class teachers who attended were wholly positive and the remaining teacher expressed ambivalent views. IMPACT was commended for the practical nature of the session. The main criticisms of the JUMP session were that the training was not practical and that there was too much material.

*"I thought it was very good. I liked the comparison of Canadian test results, the methods, the visual approach."*

*"It was not what I thought. It wasn't training – it was research oriented."*

*"It was very academic – not very practical. Like, by the end of training, we still hadn't looked at the programme books."*

*"It was good – teachers have discretion about how to use it. Lot of material though."*

Attendance was also relatively poor for the November 2013 webinars. Six of the eight JUMP attendees were positive and two were negative in their comments. Three IMPACT attendees expressed positive comments, three expressed negative comments and two offered no opinion. A few complaints related to the format and organisation of the training (face-to-face,

and more notice preferred), while positives included being able to raise questions, and talking to other teachers.

Attendance at the February webinar was slightly improved due to a longer notice period. While none of the attendees at either session expressed wholly negative views on the webinars, many were unhappy with the format and with some technical problems that arose during the sessions. Seven JUMP and five IMPACT attendees specifically criticised the webinar format. For example:

*“John Mighton’s enthusiasm was infectious but the technology was not satisfactory.”*

*“We signed up but there was some sort of system overload and we were asked to sign out.”<sup>4</sup>*

As a number of teachers had referred to communicating with other teachers about the programmes as a major advantage of CPD, in early 2014 a teacher email network was offered to those interested, as was access to a discussion website for teachers. Five JUMP and two IMPACT teachers availed of the opportunity to contact other teachers directly while six JUMP and two IMPACT teachers had looked at the websites by May 2014.

Generally, the extent of engagement in CPD by teachers in each programme was lower than might be hoped for, and many teachers expressed dissatisfaction that short notice and poor communication had prevented them from attending.

*“We needed more notice for the [initial] training [which she could not attend]. It’s very daunting when you are in the school and the books arrived without the manual.”*

*“You need more training and support. You can be isolated and get worried that you are not covering the course properly or won’t get it finished”*

That aside, relatively few availed of chances to look at the programme websites, view the training videos, or contact other teachers.

## **Extent to which programme was used**

To gauge how much the programme featured in day-to-day classes, teachers were asked to rate their own level of comfort with using their respective programme, to indicate if they used the programme in conjunction with any other programmes, and how much of each PSMC strand they covered using their assigned programme. Specific to JUMP, teachers were asked about their use of the JUMP Confidence Building Unit.

### **Confidence-building unit (CBU)**

As noted in Chapter 3, the CBU is a feature of JUMP that is meant to be used for up to two weeks, at the start of the school year. It covers fractions and aims to promote confidence by helping pupils master *procedures* usually tackled by pupils at more advanced grade levels, but does not aim to teach the topic in conceptual depth. Of the seven JUMP classes that used the CBU, six used it at the start of the year and one used it around Christmas. Three teachers indicated that they did not use it at all while three gave it to colleagues for use with older classes.

The length of time for which the CBU was used varied considerably – ranging from one week to *“nearly until Christmas”*. Most of the teachers interviewed seemed unsure for how long

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<sup>4</sup> The number of teachers who attempted to login to the webinar exceeded the number who had formally signed up to take part, resulting in access difficulties for some.

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they were supposed to use the CBU, and those who used it for a longer time period expressed dissatisfaction.<sup>5</sup>

*“We did it ’til Halloween. It was too long. I wouldn’t make that mistake again and we’re now playing catch-up.”*

*“We didn’t finish it as we had to start the first book. I thought the pacing and time guidelines were poor.”*

Views on the benefits of the CBU were mixed, with some (non-users) expressing the view that it was too difficult for the target grade. Three teachers thought it was worthwhile, and another noted that while the children enjoyed it, she was unsure of the benefits. One teacher (who used the CBU as instructed for 10 days at the start of the year) commented that *“It became quite complicated after a while. I don’t understand the theory of having something so difficult as a confidence-building exercise.”*

### Combining with other programmes

As part of the first interview, teachers were asked if their school was involved in any other mathematics projects, and if they used methods or materials from other sources. Just over half (54%) of JUMP teachers said that they tended to just use JUMP. The remainder (46%) were using JUMP in combination with another programme or resource – either the Maths Recovery programme or with their regular textbooks.

*“I mix and match with Maths Recovery. I prefer the Maths Recovery training. It’s three hours a week for five weeks.”*

Four (31%) IMPACT teachers said that they were only using IMPACT,<sup>6</sup> seven (54%) were using it in combination with another programme or resource, while two said that they were not using IMPACT at all.

### Comfort level

Teachers were asked to assess their own skill or comfort level in using their assigned programme (choosing from *skilled, fairly comfortable, novice, non-user, and former user*). During the first set of interviews in December 2013/January 2014, all JUMP teachers described themselves as fairly comfortable using the programme (somewhat surprisingly, including one teacher interviewed in January 2014 who had not used the programme at all in 2013). Seven of the 13 IMPACT teachers also said they were fairly comfortable using IMPACT, three felt they were novice level users and one described herself as a skilled user. Two teachers indicated that they were not using IMPACT.

By the next set of interviews in May, eight JUMP teachers continued to describe themselves as fairly comfortable using JUMP, while four felt they were now skilled users. Four IMPACT teachers described themselves as skilled IMPACT users, seven as fairly comfortable users, while two continued to feel they were novice users. None of the teachers interviewed in May indicated that they were non-users.

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<sup>5</sup> The teacher manual for the CBU *does* advise that teachers should spend no more than two weeks on the CBU, but the advice is somewhat buried in the text.

<sup>6</sup> As IMPACT manuals addressed only two PSMC strands, this presumably referred to using IMPACT *principles*, not materials, to cover Third class lesson content.

## Strand coverage by programme

In the May interviews, teachers were asked how much of each of the strands they had covered during the year using their assigned programme. IMPACT responses were heavily skewed by the materials they had received, which focussed only on Shape and Space and on aspects of Number. Thus, a minority used IMPACT (principles) to teach Data, Algebra or Measures, while 92% used IMPACT to teach most or all of Shape and Space, with 54% using it to teach most or all of Number.

Table 6.16 shows the extent to which JUMP materials were used by teachers. For Number and Algebra, one teacher (different for each strand) did not use JUMP to cover the strand at all, while a sizeable minority (six teachers for Measures and five for Data) only used JUMP for some strand content. Algebra was the strand area most likely to be covered using JUMP, with 10 of the 13 JUMP teachers indicating that JUMP was used to cover most or all of the strand. This may be related to the finding reported in Chapter 3 that JUMP devotes slightly more attention to Algebra than does the PSMC. In sum, while used fairly widely, many teachers were selective in how and when they used JUMP, and many used it in a modified form.

*“I’d usually read the JUMP unit then decide what to do. Measures didn’t have enough on capacity and length, for example.”*

*“I’d use it but I adapted many sections. Money for example.”*

Table 6.16: Number of JUMP teachers reporting how much of each strand was covered using JUMP materials or methods, May 2014

	None/almost none	Some of it	Most/all of it
Number	1	3	9
Shape and Space*	0	4	8
Measures	0	6	7
Data	0	5	8
Algebra	1	2	10

\*One teacher (not included in this row) had not yet covered Shape and Space.

## Programme efficacy

Views on programme efficacy were sought through questions about alignment with the PSMC, pupils’ perceptions, how effective the programmes were for different types of pupils, and general thoughts on programme benefits and weaknesses.

### Curriculum alignment

Teachers were twice asked to rate how well their assigned programme matched the PSMC on a scale of 1 (“not at all”) to 6 (“perfect match”). Initial ratings for JUMP group ranged from 1 to 5, averaging 4.1 (equivalent to a reasonably good match to the curriculum) (Table 6.17). IMPACT ratings ranged from 2 to 6, averaging 4.0. This may be considered surprising for a programme designed explicitly to meet the objectives of the PSMC, but it is likely that some teachers lowered their ratings to account for the fact that IMPACT materials had not been developed for all strands. Five JUMP teachers criticised the “pitch” of JUMP materials – although some felt they were pitched too high and others too low. Another five critical comments related to the need to adapt some parts of the materials to the Irish context. The suitability of units about Canadian currency was cited as an issue.

In the second set of interviews, ratings for both programmes improved, with JUMP averaging 4.4 and IMPACT 4.9. Pitch of JUMP materials was raised as an issue by only one

teacher, but differences in strands/topics covered were raised as an issue by five teachers. JUMP was criticised for over-emphasis on patterns, and insufficient emphasis on Number and problem-solving. Americanised spellings and terminology for money were also flagged as problems.

*“Money, rivers, even the language is very Canadian.”*

*“Our system has more Number and more word problems. JUMP has an awful lot on patterns (it’s too slow).”*

Table 6.17: Teacher ratings of the degree of match (scale 1 to 6) between programme and PSMC

	Dec/Jan		May	
	JUMP (N=13)	IMPACT (N=13)	JUMP (N=13)	IMPACT (N=13)
Mean	4.1	4.0	4.4	4.9
Range	1 – 5	2 – 6	3 – 5.5	4 – 6

## Pupil engagement

Teachers were asked to rate their pupils’ response to the assigned programme on a scale of 1 (extremely negative) to 6 (extremely positive). In December 2013/January 2014, teacher ratings were generally high across both groups, ranging from 3 – 6 for JUMP and from 4 – 6 for IMPACT. The mean rating in JUMP was 4.9, while in IMPACT it was 5.1. By May, IMPACT was rated slightly less positively (4.8) while JUMP retained an average rating of 4.9. Thus, teachers in both groups felt that their pupils were responding well to the programmes.

Particular aspects of JUMP to which teachers felt that pupils responded well were the hands-on approach (cited by three teachers in the second interviews) and the quality or quantity of JUMP materials (cited by five). While the lack of colour was raised as a criticism of JUMP workbooks, most teachers felt that the amount of content and the variety of activities for pupils were very positive aspects of the programme. In contrast, IMPACT was generally praised for allowing more talking about maths and less use of textbooks.

*“They liked the hands-on bits, kept them going. It’s [JUMP] a very busy programme – lots to be covered in each topic.”*

*“Without a doubt [pupils liked JUMP] – puzzles, Sudoku, Hanji very enjoyable.”*

## Target group

When first asked if they thought the programme was more beneficial for some pupils than others, seven JUMP teachers felt it was more effective for weaker pupils, five felt it worked for all ability levels and one was unsure of the target level. Of 11 teachers using IMPACT, six thought it worked best for weaker pupils and five viewed it as an all-ability programme.

*“It’s [JUMP] good for all. Brighter children can move quickly – extension exercises are good for these. The repetition is good for the weaker child. So it’s well suited to all levels (and well written).”*

By the second interviews, seven IMPACT teachers thought it worked well for all pupils, four thought it best for weaker and two for stronger pupils. Eight JUMP teachers thought JUMP was effective for all ability levels, three thought it best for weaker pupils, and one for stronger. In one JUMP class the two teachers involved disagreed – one believed JUMP worked best for weaker pupils while one believed it was most effective with stronger pupils.

*“It challenged the ‘bonus questions’ group, but with weaker students there was no overall change” [teacher 1]. “The breaking things down into small steps was very good for the weak student but it didn’t challenge the stronger ones.” [teacher 2]*

Generally, most teachers felt that all pupils gained from participation in their programmes.

*“I thought it [JUMP] was good for all. You can extend stronger pupils AND it definitely works for weaker pupils as it is so hands-on.”*

### Strengths and weaknesses

In December 2013/January 2014, 12 of 13 JUMP teachers agreed that there were some major benefits to their programme, with the remaining teacher undecided as to the merits of the programme at that stage. All 11 IMPACT teachers using the programme by January also identified programme benefits. In both groups, 10 teachers also identified major drawbacks to their assigned programme. By the May interviews, 12 JUMP teachers identified major benefits to using JUMP, while one felt it a somewhat useful programme, but not a major advance on normal classroom procedures.

Broadly, the number of aspects identified by JUMP teachers as major programme benefits decreased over the course of the two interviews while the number of IMPACT benefits identified increased. The benefits identified most often by JUMP teachers were that the programme helped build pupil confidence and positive attitudes to mathematics, and that the step-by-step approach was very good (seven teachers cited each in the first interviews, as did four in the second interviews).

*“It breaks everything down, which is important. That builds up confidence in weaker pupils.”*

The quality and content of the JUMP pupil and/or teacher materials were praised by four teachers in the first interviews, rising to seven by May (when five IMPACT teachers also cited quality of materials as a major benefit).

*“It [JUMP] is well organised, planned, resourced. I like the way they introduce topics gradually – lots of examples, a confidence boost with simple examples. It covers a wide range of abilities, and has detailed teacher books.”*

*“The teacher book is great. Great to have an explanation and breakdown of how to teach a topic. That’s not available with Irish textbooks. I like the focus on maths vocab too.”*

Other positive aspects of JUMP identified by teachers included the repetition of language and procedures (five teachers in the first, and two in the second interviews) and the hands-on or practical nature of the programme (mentioned by two in the second interviews).

Almost all (all JUMP and 11 IMPACT teachers) also identified drawbacks to their assigned programme. For IMPACT, the main criticisms were related to pitch (with some feeling they had to revert to Second class material to get pupils up to speed) and specificity (the manual was perceived as a bit “waffly” and without enough practical lesson plans). For JUMP, the initial interviews revealed two major issues – the need for cultural adaptation and problems with the organisation of the project (each cited by eight teachers in the first interview and four in the second).

*“Canadian language and money.”*

*“You have to study the manual – some of the terminology is a bit strange. Things like multiples and digits.”*

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*“There were organisational mess-ups – the workbooks arrived without manuals. It made it daunting. I expected more hands-on resources as well as textbooks.”*

*“The timeframe for covering the programme was unclear. We got the idea at the webinar, but not before then. The training needed more notice. It was very isolating – a lot of reading on your own that made it huge pressure at the start.”*

The nature of JUMP materials were criticised by six teachers in each set of interviews. Typical comments referred to the lack of colour and pictures in pupil materials or to the overall volume of teacher and pupil materials.

*“The workbook is off-putting for children: lack of colour, lot of content on some pages. It suits some children and not others.”*

*“I’d like to have had more resources, and for the manual to be better adapted to the curriculum.”*

*“The manual is awkward (one massive folder) and wordy.”*

Some JUMP teachers criticised the amount of work expected from the teacher, but this was a more common complaint from IMPACT teachers (eight initially complained about the amount of extra work). Other complaints related to the relative coverage of strands and strand units. For example, one teacher complained that there was not enough emphasis on Measures in JUMP, one cited insufficient attention to the mechanics of subtraction and division, and another felt Number was not given in-depth treatment. In contrast, one teacher felt that too much time was spent covering money.

As a conclusion to the interview, 10 JUMP and eight IMPACT teachers offered general comments on their respective programmes. Four IMPACT teachers expressed an unqualified positive comment (e.g., *“It’s wonderful for getting children to think and it has improved my own questioning”*), two wanted it to cover all strands, one wanted it more aligned to standardised tests, and one noted that it aligned closely with their (recent) college studies. For JUMP, five teachers provided unqualified positive comments, four made qualified positive comments, and one commented negatively. Positive aspects included raised expectations for pupils, good targeting of weaker pupils, and pupils’ attitudes to having a different set of materials to the rest of the school. The qualification comments typically related to the need to adapt materials to an Irish context, or to spend more than a single year using JUMP in order to see real benefits. The sole negative comment related to a perceived lack of repetition of number facts and insufficient problem-solving activities.

*“There is a lot of revision so it takes a long time to cover the course, but the kids liked having the book that ‘nobody else had’. The second book was billed as ‘the hard book’ so they felt they were progressing when they did it!”*

*“It’s an interesting programme and it’d be great to see it directly linked with the curriculum.”*

## **Suggestions for improving the evaluation**

In the second set of interviews, teachers were asked to suggest changes in how the evaluation was organised. All had suggestions for improving the organisation of the evaluation. The majority related to lack of initial training on the programme, the limited amount of ongoing support and guidance provided, and organisational difficulties. Face-to-face contact with trainers and informal contact with other teachers were cited as important to counter teacher isolation.



Nine JUMP (and eight IMPACT) teachers said that all participating teachers needed to attend the initial CPD session, while 10 JUMP and nine IMPACT teachers felt that more ongoing support and contact was needed. Specific to programme, three JUMP teachers wanted more advice on pacing and how to cover the large volume of material, while three IMPACT teachers wanted less theoretical, and more practical, advice.

*“It was too long at the beginning without any support – that’s a huge negative for a new programme [JUMP]. Pacing was an issue. We needed to liaise with other teachers much sooner.”*

*“You need a liaison person for the programme – an expert on JUMP. John Mighton is too far away and not familiar with the Irish system.”*

*“We need more contact and support in general and more practical, hands-on help at the start.”*

As might be expected, a few teachers believed that the very short notice for the initial training sessions was an indicator that the entire evaluation was planned with little notice.

*“It was too last-minute. They didn’t have it planned out.”*

Others complained that they were given insufficient detail about what participation in the evaluation involved, either in terms of general supports to be provided<sup>7</sup> or in terms of an indicative timetable of how to progress through the programmes.

*“I’d like an outline schedule at the start of the year, indicating what is going to happen, when.”*

*“They need a suggested overview plan for the year – to use as a guide for when to do specific bits of the programme. Say month-by-month or half-term by half-term.”*

## Summary

In many ways, teacher descriptions of typical lesson activities did not vary too much by programme. Materials such as manipulatives, games, and real-life materials were ubiquitous. Textbooks were the basis for almost all lessons at the start of the year, and for a large proportion of lessons in May, although JUMP teachers were more likely to use workbooks in most or all lessons. Some of the lesson strategies that might be considered key JUMP principles – breaking ideas down into small steps, regular individual work, checking pupil understanding, pupil memorisation of rules and procedures – did not differ noticeably by programme, or differences at the end of the year were no more pronounced than pre-existing differences.

For most teachers in each programme, their self-rated preparedness for teaching PSMC strands, and the extent to which they felt confident about various aspects of mathematics instruction, increased over the year. This may be due to programme effects, to a greater concentration of effort on mathematics during the year, or simply because the initial ratings were depressed because they were given shortly after completing the MKTQ-S. However, a somewhat unexpected finding was the drop in the number of JUMP teachers expressing confidence in their ability to adapt their teaching to engage pupils’ interest (dropping from 38% to only 13% indicating they were *very confident*).

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<sup>7</sup> In fact, the initial training day began with an explanation of the overall evaluation structure, and a description of the supports to be provided to teachers. However, the sizeable number who did not attend the initial day did not receive this information, and it may not have been remembered by all who did attend.

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Nonetheless, most teachers were positive about many aspects of their assigned programme. The quality and depth of JUMP materials were cited as a positive, as was the hands-on approach, and the emphasis on building pupil confidence. Criticisms of JUMP typically centred on the need for adaptation to an Irish context, and organisational problems in the pilot study (especially in relation to CPD). Nearly half of teachers in each programme did not attend the initial CPD day that introduced teachers to the main features of the programme they were to implement during the year. Of these non-attending teachers, five did not take part in the November webinar. Thus, three IMPACT and two JUMP teachers spent half of the academic year without any training for their assigned programme. In sum, initial delays regarding elements of project funding contributed to very short notice for CPD, which contributed to poor uptake of CPD, and probably to poorer programme implementation within the classroom.

In addition, dissatisfaction was expressed with the amount of CPD provided and with webinar formats generally. Unlike issues around poor attendance, the amount and nature of CPD provided was unrelated to administrative problems. The training design (an initial training day supplemented by webinars) was based on advice from JUMP staff, but was perceived as insufficient by many Irish teachers. Perhaps due to initial lack of clarity about programme aims and methodologies, only a minority of JUMP teachers used the Confidence Building Unit as intended. About half of JUMP teachers used JUMP in conjunction with other programmes. In particular, a significant minority of teachers used other materials when teaching much of the Measures and Data strands.