



Education
Endowment
Foundation

Creative Futures: Act, Sing, Play

Evaluation report and Executive summary

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The Education Endowment Foundation (EEF)



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- Identifying promising educational innovations that address the needs of disadvantaged children in primary and secondary schools in England;
- Evaluating these innovations to extend and secure the evidence on what works and can be made to work at scale;
- Encouraging schools, government, charities, and others to apply evidence and adopt innovations found to be effective.

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The project was independently evaluated by a team from NatCen Social Research.

The evaluation team at NatCen Social Research was led by Cheryl Lloyd and Amy Skipp. Gemma Lewis and Natasha Reilly were responsible for co-ordinating pre- and post-intervention testing which was carried out by NatCen interviewers. The impact evaluation was designed by Stephen Morris and the analysis was carried out by Zsolt Kiss and Julia Griggs. The process evaluation work was led by Sarah Haywood, assisted by Natasha Reilly.

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Executive summary

The project

Act, Sing, Play (ASP) offered music and drama tuition to Year 2 pupils. The aim of the programme was to evaluate whether music workshops had a bigger impact than drama workshops in terms of pupils' maths and literacy attainment. The evaluation was based on the hypothesis that participation in high-quality music instruction promotes educational attainment over and above instruction in other artistic pursuits (see Schellenberg, 2004).

The ASP programme was developed specifically for this trial and ran from September 2013 to June 2014: 909 pupils participated in 19 schools across London, Essex, Sussex and Coventry. In each participating Year 2 class, pupils were randomly allocated to one of three groups: violin or cello workshops (ASP-strings), singing lessons (ASP-singing), or drama workshops (ASP-drama). The two music groups (strings and singing) represented the treatment arms of the trial. Students in the ASP-drama workshops represented the control. Each workshop had around 10 students. Workshops were held once a week over 32 weeks. The programme was delivered by Creative Futures, funded by the Education Endowment Foundation, and independently evaluated by NatCen.

Key Conclusions

1. This evaluation provides no evidence that ASP-music workshops had a greater impact on maths or literacy attainment than ASP-drama workshops.
2. Analysis of students receiving free school meals similarly found no evidence that ASP-music workshops had a greater impact on maths or literacy than ASP-drama workshops.
3. The process evaluation suggested that some tutors—particularly those with less experience of teaching groups of primary school children—needed more guidance on how to run their sessions.
4. Although not necessarily typical, there were related concerns that some strings workshops struggled to keep students focussed on learning music.
5. Class teachers reported that confidence and social skills had improved for some pupils. Teachers also felt it was important that children from disadvantaged backgrounds had the opportunity to learn a new skill that they might otherwise not be able to access.

Security rating

Security rating awarded as part of the EEF peer review process

Findings from this trial have a high degree of security. The trial was set up as a randomised control trial, with pupil-level randomisation. The trial was classified as an effectiveness trial, meaning that it sought to test whether the intervention can work at scale, and in situations where the developers are no longer the only deliverers. Before the trial started, there was a good balance of pupil characteristics between the group receiving music workshops and those receiving drama workshops (the control group). The attrition was low: in total, results from 814 pupils were assessed compared to 909 pupils who began the project (attrition of 10%). There was no evidence that systematic attrition had biased the results. There were some minor threats reported to the validity of intervention protocol. The security rating of 4 padlocks fits with the overall output of this report.

Results

- This evaluation found no evidence that the ASP-music workshops had a greater impact than the ASP-drama workshops in terms of maths or literacy attainment. Although small effects (positive and negative) were identified during the analysis, it could not be concluded that these effects were anything other than random chance. Each of the two different types of music workshop (strings and singing) was also analysed separately. As was the case with the main analysis, neither strings nor singing workshops showed evidence of out-performing drama workshops in advancing maths or literacy attainment.
- Similarly, there was no evidence that, among pupils eligible for free school meals (FSM), music workshops had an impact on attainment when compared to the control group (ASP-drama). Again, effect sizes were close to zero, indicating that disadvantaged children did not particularly benefit from music instruction relative to drama workshops.
- Interviews with school staff and workshop tutors suggested that there were differences in the way the programme was implemented by different tutors, reflecting the flexible nature of the programme. Tutors valued the ability to choose flexible approaches to music tuition. However, the process evaluation suggested that some tutors—particularly those with less experience of teaching groups of primary school children—needed more guidance on how to run their sessions. This led to related concerns that in some of the strings workshops, it was a struggle to keep students on task.
- In general, the process evaluation suggested that pupils enjoyed participating in the program, and were engaged. Teachers also reported that some pupils' confidence and social-skills improved during the program.
- Last, it is important to reiterate that the design of this trial only allows for comparisons between music and drama workshops. This design was chosen for several reasons, including the fact that a previous study (Schellenberg, 2004) had found that music tuition increased attainment over and above other creative pursuits. This present study, which involved a much larger sample than Schellenberg, was unable to replicate this result.

Cost

The Act, Sing, Play programme had financial costs relating to tutor training, travel, purchase of musical instruments, and other resources associated with delivering the programme. Overall, the total financial cost to schools, for the programme to be delivered for one academic year, was £5,980 per class. This equates to around £219 per pupil per year. Costs in subsequent years will be less as the cost of musical instruments would not be repeated every year. The program imposed a low cost in terms of teacher time. In many instances, when children were at the workshops, teachers gained a period to focus on other responsibilities.

Test domain	Group	Effect size (95% CI)	Progress compared to drama	Security Rating	Cost of music workshops
Maths*	MUSIC workshops compared to drama workshops	0.003 (-0.01 to 0.10)	0 months		££
Literacy*	MUSIC workshops compared to drama workshops	0.03 (-0.07 to 0.13)	0 months		££

*Standardised PIPs score.

Introduction

The Act, Sing, Play programme

Act, Sing, Play was a program that offered music and drama tuition to Year 2 pupils. It was modelled on a similar, although smaller, study by Schellenberg in Toronto in 2004. The programme was delivered by Creative Futures (CF)¹ a multi-arts organisation which uses active participation in creativity and the arts to enhance aspiration, achievement and quality of life for children. It delivers programmes in primary and secondary schools as well as in local communities, early years' settings, and with looked-after children.

The Act, Sing, Play programme was developed specifically for this trial by Creative Futures and ran from September 2013 to June 2014 in primary schools from four areas of England: the London Borough of Hounslow, East Sussex, Coventry, and Essex. In most cases schools were recruited in collaboration with local music education hubs—a nationwide network of 122 schools, music organisations, and arts organisations overseen by Arts Council England on behalf of the Department for Education. Class groups of around 30 pupils were randomly split into three arts workshop groups of approximately 10 pupils each. One group received stringed instrument lessons (violin or cello), the second group received singing lessons based loosely on the 'Kodaly' method (more detail about this method can be found within the intervention section below), and the third was an 'active' control group participating in drama lessons.

All three sessions ran concurrently, within school hours, and lasted for 45 minutes. All sessions were led by freelance tutors provided by Creative Futures or by local music education hubs. Although tutors in each arts group were given a broad curriculum to follow, the specific content and format of each session was left to individual tutors. More description of the curriculum can be found within the 'Curriculum' section below and in the Appendices.

For the strings sessions, violins and cellos were loaned to schools by the local music services for the duration of the programme. The delivery team encouraged schools to allow these instruments to be taken home for practice, although in most cases this did not happen. This is discussed further in the 'Instruments and Practicing' section below.

Background evidence

There is consistent evidence that children from economically disadvantaged backgrounds have less access to music, art, and out of school activities than their more advantaged peers (Etsyn, 2012; Gorard, Huat See and Davies, 2012). Analysis of the Millennium Cohort Study showed that 26% of 11-year-olds from families above the poverty line had private music lessons compared to 4% of children in poverty (Chanfreau and Tanner, 2014).

Related to the issue of access and fairness in receiving music tuition is the question of whether listening to music or playing an instrument can have a positive effect on cognitive ability. A number of observational studies have reported correlations between music and attainment. In particular, a meta-evaluation undertaken by Winner and Cooper (2000) to quantify the results of existing research between 1950 and 1998 found a significant positive relationship between arts education and academic achievement. However, this research examined the effects of arts in general, rather than music specifically. Moreover, it could not conclude that the relationship was necessarily causal since there were no controls for selection bias. It could simply be the case that high achievers were more likely to study arts subjects. The two studies examined by Winner and Cooper that had experimental designs with randomised assignment showed negligible effect sizes.

¹Creative Futures have also engaged the Institute of Education (IoE) to conduct a parallel evaluation of Act Sing Play's impacts on musical progression and participating pupils' self-efficacy and learner identity.

Evaluation research has identified that music interventions have positive impacts on academic attainment, particularly for younger children of primary school age (Sutton Trust–EEF Teaching and Learning Toolkit, 2014). A meta-evaluation by Standley (2008) found that when music and reading activities were combined, the benefits for children in terms of recognising the alphabet and phonetic patterns were substantial. Lonie’s study (2010) also found links between ‘music making’ in the early years and improvements in reading and language skills. Research in the Sutton Trust toolkit also highlights other wide-ranging benefits from participation in music activities including positive attitudes and wellbeing, and, for young children, improved communication and relationships with parents.

One of the most relevant studies to this evaluation was undertaken by Schellenberg (2004) who set out to test the hypothesis that ‘music makes you smarter’. The study looked at the effect of 36 weeks of music tuition on the IQ of six-year-olds: 144 children were randomly assigned to receive keyboard, singing (using Kodály vocal instruction), drama, or no arts lessons. Schellenberg concluded that results indicated there was evidence that music lessons caused increases in IQ. However, Steele (2005) questioned the theoretical basis of the grouping, particularly because the Kodály method was presented as being very different from standard musical instruction. Steele’s reanalysis of Schellenberg’s data, in which singing and music were examined separately, found that neither type of musical intervention was significantly different from the control group’s outcomes. Other limitations of Schellenberg’s (2004) research include the self-selection of children into the study by parents via an opt-in process following an advert in a local newspaper, and the small size for the trial (n = 132 for analysis).

The Act, Sing, Play programme builds on research already undertaken by using a larger sample size and focusing on disadvantaged pupils to assess whether music tuition affects maths and literacy attainment in the short-term for similarly-aged children.

Evaluation objectives

The aim of the impact evaluation was to measure the impact of the music components of the Act, Sing, Play programme, as delivered by Creative Futures, on the maths and literacy attainment of participating pupils, a subgroup of whom were eligible to receive Free School Meals.

The aims of the process evaluation were to provide a detailed understanding of how the intervention programme was delivered in practice, and to identify which elements were perceived as important to its success as well as any barriers schools faced in implementing the programme. This evidence was collected for two main reasons:

- to help understand and explain the impact results; and
- to inform decisions about whether and how to scale-up or roll-out the Creative Futures programme more widely.

Project team

The Act, Sing, Play programme was overseen by Julian Knight and Vanessa Stansall from Creative Futures alongside Jo Saunders from the Institute of Education (IoE).

The programme was delivered in schools by freelance tutors. There were 32 tutors in total who were employed either by Creative Futures directly or by their local music services with whom Creative Futures had a contract. At the start of the programme, 13 strings tutors, 9 vocal tutors and 10 drama tutors were employed. Throughout the programme some tutors taught at more than one school and two of the tutors taught both singing and strings sessions.

There were three additional tutors brought in after the first term to replace two who had gone on maternity leave and one who had left. Although all music tutors had previous instrument teaching experience, their level of classroom teaching experience varied.

The evaluation team at NatCen Social Research was led by Cheryl Lloyd and Amy Skipp. Gemma Lewis and Natasha Reilly were responsible for co-ordinating pre- and post-intervention testing which was carried out by NatCen interviewers. The impact evaluation was designed by Stephen Morris and the analysis was carried out by Zsolt Kiss and Julia Griggs. The process evaluation work was led by Sarah Haywood, assisted by Natasha Reilly.

Ethical review

NatCen Social Research obtained ethical approval for all elements of the evaluation from its internal Research Ethics Committee on 8 April 2013. This approval covered the processes for testing pupils and analysing the results, NPD linkage, communicating with and carrying out interviews with school staff and tutors, as well as carrying out observations of music lessons within schools.

Schools each signed a copy of a Memorandum of Understanding. This outlined what their participation in the study entailed, including information about their involvement in the testing of pupils and interviews and observations. A copy of this can be found in Appendix G and copies of the consent form for parents can be found in Appendix E.

Methodology

Trial design

The Act Sing Play (ASP) evaluation was designed as a three-arm pupil-level randomised controlled trial of the impact of music workshops on the attainment of Year 2 students. Pupil-level randomisation was chosen to increase power and reduce costs. The trial design required students to be randomly allocated to one of three groups within classes: one group were allocated to receive lessons on violin or cello (ASP-strings) while a second were allocated to receive singing lessons (ASP-singing). These two groups represented the treatment arms. A difficult decision then had to be made as to what the pupils in the control arm would do while their classmates had music workshops. Drama workshops (ASP-drama) were ultimately chosen so that all pupils in the control arm were occupied with a known activity that did not have a clear impact on attainment (which would have been the case if the control group had stayed back in their classes and received small-group tuition).

Pupils were assigned to groups on a 1:1:1 basis. Pupil-level randomisation was stratified within class by eligibility for Free School Meals (FSM), sex and date of birth (see randomisation, below). This stratified randomisation took place within classes in participating primary schools. It should be noted that the within class, pupil-level randomisation meant there was potential for ‘contamination’ to occur between pupils belonging to the same class, but assigned to different study arms (meaning that children assigned to different study arms may share the content of their lessons/workshops with classmates and thereby reduce the impact of the intervention).

It was anticipated that this design would help to reduce *some* of the potential consequences of ‘resentful demoralisation’ and ‘compensatory rivalry’ when knowledge of allocation to a ‘non-active’ control group became known, as well as alleviating problems associated with ‘novelty bias’ (Hawthorne Effects).

An active control also makes treatment contrasts explicit through providing the controls with a specified ‘activity’. However, it is important to acknowledge that parents may compensate for allocation to (what is perceived to be) a less-preferred treatment by acquiring preferred treatments independently as a consequence of the study.

Due to the absence of an ‘inactive’ control group, comparisons have been made between two forms of musical tuition relative to drama. The effects of the treatments have been estimated by comparing average outcomes between the three intervention arms at post-test.

School eligibility

Primary schools were recruited for the intervention by the Creative Futures delivery team. Recruitment took place in four areas of the UK: Coventry, East Sussex, Hounslow and Essex. In most cases schools were recruited in collaboration with local music education hubs,² with the aim of including schools with a diverse range of characteristics based on size, urban–rural location, and levels of deprivation. The delivery team also took into account the level of prior involvement in music provision to help with the aim of using the programme to build stronger links between the school and the local Music Education Hub. Only schools with no current music instrument provision for Year 2 pupils, and no musical instrument teaching in Year 1, were eligible to participate.

² Music Education Hubs are funded and overseen by Arts Council England on behalf of the Department for Education, and represent a new way of organising and delivering music education to children and young people. A nationwide network of 122 hubs has been set up and includes schools, professional music organisations and arts organisations. Hubs work in local areas to bring stakeholders together to facilitate co-ordinated music education provision. <http://www.artscouncil.org.uk/news/arts-council-news/we-announce-successful-music-education-hub-applica/>

Five local Music Education Hubs were approached about the study. Nineteen schools originally agreed to participate in the Act, Sing, Play programme, however following the initial recruitment process two schools decided that they no longer wished to participate in the study. The delivery team recruited a further two schools as replacements. This change in participating schools took place before pupil pre-intervention testing and randomisation were carried out, and before any Memoranda of Understanding (MOUs) were signed. Therefore, pre-test data was collected from the replacement schools at the same time as all other schools meaning that the change should not affect results.

Pupil eligibility

All Year 2 pupils in participating schools were eligible to take part in the programme. Whilst parental consent was sought prior to the pre-test and randomisation, no opt-outs were received (see Pupil Recruitment, below). At the pre-test, outcome measures were collected from each child and demographic information was provided by the child's school. After completion of the pupil Performance Indicators in Primary Schools (PIPS) assessments, pupil test scores were made available to the evaluation team on the Centre for Evaluation and Monitoring's (CEM) PIPS+ secure website (see Outcomes, below).

Pupils with Special Educational Needs

The delivery team worked with schools to identify pupils for whom certain sessions would not be appropriate. These pupils were excluded from the randomisation but took part in the arts workshop session considered to be most appropriate by their teacher, in consultation with the delivery team. Schools were asked that if pupils had Special Needs Assistants (SNAs) assigned to them that they should remain with pupils for the workshops.

Intervention

The Act, Sing, Play Programme took place in 19 primary schools in England between mid-September 2013 and July 2014. Thirty-two workshops took place throughout the school year with Year 2 pupils. The schedule for sessions was developed through a combination of tutor availability and school preference, including the availability of the necessary rooms. All workshops took place during school hours, and most schools opted for the workshops to take place in the afternoons.

The project used a three arm (two treatment groups and an active control group) research design meaning that all Year 2 pupils taking part within each school were assigned to one of three groups:

- Group 1 were taught singing using a curriculum loosely based on the Kodaly Method.³ This curriculum aimed to give pupils a thorough musical grounding through rhythm and singing.
- Group 2 were taught to play a string instrument (violin or cello). The curriculum assumed that all pupils were beginners and took them through the first stages of learning the violin or cello.
- Group 3 were an 'active' control group participating in drama sessions. This curriculum aimed to develop pupils' imaginations through story-telling.

More information on each of the curriculums can be found within the Curriculum section below.

Each arts group was intended to have a maximum of ten pupils, although some were larger (up to 15) due to the large class sizes in some schools. All three sessions ran at the same time and lasted for 45 minutes. For timetabling reasons, there was variation between schools as to what time of day sessions were held.

³ More information about the Kodaly Method can be found at www.britishkodalyacademy.org/kodaly_approach.htm

Class teacher involvement

Class teachers were not required to attend the workshops, however, they were asked to attend the first string instrument workshop to help tutors with the allocation and labelling of instruments. Teachers were also encouraged to participate in or observe any of the workshops if they chose to.

In the event of a tutor absence, in the first instance the programme team tried to find a replacement tutor; if this was not possible, the class teacher was required to take the group whose tutor was absent and the other two groups continued as usual.

Instruments

Violins and cellos were loaned to schools by the local music services for the duration of the Act, Sing, Play programme.

The delivery team encouraged schools to allow the instruments to be taken home for practice, however instruments which were taken home by pupils needed to be underwritten by parents, or the school, in case of loss or damage.

Schools were asked to provide six music stands for the strings group. Some strings and singing tutors also used pianos belonging to the school during workshop sessions.

Training

Prior to the start of the sessions, tutors from all three arts groups (strings, singing and drama) attended a three-hour training session together. The training session included a project overview; a presentation around the key elements of a high quality session and how to set and measure learning objectives; and break-out sessions for the 3 different activities to go through the curriculum objectives for each subject led by the consultant who had devised each curriculum. In addition, vocal tutors attended a further session in December 2014. This was described as more of a 'workshop' than formal training and focused on the new curriculum elements for the forthcoming term, and sharing best practice from the previous term. One drama and one strings tutor who could not attend any sessions were sent resources and training videos by email. The three tutors who started on the programme late did not receive formal training; they had an individual introduction to the project, meeting with the project team, and were offered support throughout the programme from the curriculum lead for their subject area.

The curriculum

Tutors in each arts group were given guidance on the curriculum content and the format of workshop delivery: this guidance was relatively 'loose' and far from prescriptive about either the approach to take in each of the sessions, or how to achieve specified outcomes. The content and format of sessions was very much down to the individual tutors. The following sections outline the curricula for each arts group.

Strings

Given the range of string teaching methods, and taking into account the expertise of individual tutors, it was not considered appropriate to impose a string teaching 'method'. Instead, strings tutors were given a planning document which stated that, although they were free to use their own teaching methods throughout the trial, some elements needed to be consistent. It contained:

- reference to 'Fiddle Time Starters', a beginner's violin book, a copy of which was also provided for every student;
- a set of termly milestones which tutors were expected to work towards—these included specific milestones such as 'by the end of term one, students should be able to use different bow lengths and bow speeds'; and

- reference to some of the common exercise/activity types: for some weeks these activities were specified within the lesson plan, but not all.

The delivery team also provided tutors with a pack of activities as a starting point which tutors were told they may wish to supplement with other activities from the 'Fiddle Time Starters' book or their own materials.

The strings curriculum included a number of milestones that pupils were required to reach each term:

Term 1:

- be able to demonstrate how to take the instrument out of the case and put it back;
- be able to demonstrate good playing posture, and how to hold the instrument;
- be able to demonstrate how to hold the bow;
- be able to recognise the symbols for, and be able to play, up bows and down bows;
- be able to use different bow lengths and bow speeds;
- be able to pluck strings including string crossing;
- be able to recognise and play—
 - crotchets
 - quavers
 - minims
- crotchet rests;
- understand simple double, triple and quadruple time signatures;
- know the names of the open strings and be able to read them on a stave;
- understand the terms 'pizzicato', 'arco', 'col legno and 'tremolo'; and
- be able to play with the first finger.

Term 2:

- Play with fingers 1, 2 and 3 on the D string; Fiddle Time Starters exercises 38, 41, 43 and 46;
- play with fingers 1, 2 and 3 on the A string: Fiddle Time Starters exercises: 52, 54 and 57; and
- play with fingers 1, 2 and 3 on the E and G strings (violin), or C and G strings (cello).

Term 3:

- Bow melodies with string crossing;
- play harmonics;
- read accidental symbols; and
- play Fiddle Time Starters exercises 58, 69, and 70.

Singing

The singing curriculum was loosely based on the Kodály Method as this was the singing method used in the study this trial replicates (Schellenberg, 2004). The Kodály Method is a child-centred, developmental approach to music education developed in the mid-twentieth century.

The core concept is that pupils are slowly introduced to musical skills, firstly through listening, singing or movement, and it is only once they are familiar with such concepts that they learn musical notation. Activities to reinforce the concepts include things such as games, movement, songs and exercises. The singing curriculum was split into two-week workshops (six workshops per term). For each workshop, a learning objective and an assessment criteria were given in the curriculum. For example, during workshop

one, the learning objective was to 'show and feel the beat', and the assessment criterion was to 'experience and learn about the pulse in music and to speak rhythmically and show the beat in various ways'. Tutors were advised to focus on the learning objectives of each workshop but to be flexible in their approach when teaching.

For each lesson plan there was a suggested warm-up activity, several learning activities, and suggested vocal warm-ups. Tutors were also encouraged to review what had been achieved at the end of each lesson and to check learning objectives had been met.

Learning objectives within the singing curriculum were as follows:

Term 1:

- show and feel the beat;
- discover and use a singing voice;
- demonstrate rhythm as a sub-division of the beat;
- explore vocal range and tuning;
- demonstrate musical memory;
- problem solving and composing skills;
- working with a partner;
- distinguish pulse from rhythm;
- perform a rhythmic ostinato;
- recognise duration symbols; and
- sing in tune (most).

Term 2:

- Show and feel the beat whilst singing/chanting;
- use the voice in different ways (timbre);
- consolidate accurate tuning on s, m and l (g, e, a);
- develop awareness of beat and rhythm working together;
- develop confidence in communicating own lyric ideas within a song, improvisation;
- work creatively with timbre and lyrics;
- sing in tune; and
- differentiate between beat and rhythm.

Term 3:

- To be aware of layers of sound (texture);
- to differentiate between beat/pulse and rhythm;
- link symbol to sound in rhythm work;
- chant, sing and play in two parts with an increased vocal range;
- explore rhythm through improvisation; and
- understand the concept of rests as active in music.

Drama

The drama sessions were split into separate 'blocks', each of which covered a different story (one per half term). There were six stories covered in total with the first blocks lasting for 6 weeks each and the final blocks both lasting for 4 weeks (see Appendix B). The schedule for Drama sessions can be seen below:

Block 1	6 workshops: The Crashed Spaceship
Block 2	6 workshops: The Orchid Hunters
Block 3	6 workshops: The Snow Queen
Block 4	6 workshops: Women of the Seas
Block 5	4 workshops: Daedalus and Icarus
Block 6	4 workshops: The Giant's New Coat
Block 7	2 reserve weeks

The curriculum was based on Process drama (inspired by Dorothy Heathcote)⁴ with some influences from Vivian Gussin Paley's 'helicopter technique'.⁵ The curriculum aimed to incorporate extra-curricular learning into all stories, and to be interesting and educationally relevant to all pupils. The curriculum suggested that tutors needed to do background research and reading in order to confidently explore the story in each block. The delivery team suggested sources of additional information to supplement the curriculum.

The drama curriculum was designed to:

- build pupils' confidence;
- build pupils' communication skills;
- encourage pupils to focus; and
- encourage imagination and thinking.

Activities within the lesson plans included a mixture of improvisation, tutor narration, discussion and physical activities such as 'pass the invisible ball'.

Tutors were encouraged to be flexible and use their professional experience to adapt activities to different ability ranges and confidence levels, for example by simplifying or reducing the number of activities in a workshop if necessary. If one exercise was either proving very beneficial or was not going well within the session, tutors were encouraged to be flexible with the lesson plans as long as the overall story was being covered within the block.

Curriculum flexibility

As outlined above, the curriculum for all three arts groups provided suggested activities, learning objectives (or termly milestones), and suggested content (music to learn within the singing and strings sessions and stories within drama). However, there was a strong emphasis on flexibility and freedom for the tutor in terms of delivery style and technique, with the ethos that as long as the learning objectives were worked towards, tutors should be able use their own professional judgement and experience to achieve them. This meant that tutors chose different techniques, materials and activities within each session. There was also variation in the order, and pace in delivery, of the suggested content. These factors are very likely to have led to variation of delivery between tutors. This is further discussed within the process evaluation section.

Outcomes

This evaluation was designed to test whether pupils who received a music intervention (strings or singing) made more progress in maths and literacy than pupils in the 'active' control group (drama). Therefore, the two primary outcomes used in the analysis were maths and literacy attainment. The specific outcome

⁴ 'Drama as a learning medium' (<http://eric.ed.gov/?id=ED130362>), or Dorothy Heathcote on 'Education and Drama: Essential writings', (Cecily O'Neill, 2014).

⁵ 'The Boy Who Would be a Helicopter: Uses of Storytelling in the Classroom', by Vivian Gussin (Paley, 1991).

measures were agreed in consultation with the EEF and the Creative Futures delivery team, with the independent evaluators leading discussions. The two primary outcome measures were:

1. post-test standardised maths PIPS score; and
2. post-test standardised literacy PIPS score.

The paper-based Performance Indicators in Primary Schools (PIPS) assessments were used to measure pre- and post-intervention maths and literacy ability. PIPS educational assessment has been developed by the Centre for Evaluation and Monitoring (CEM) at Durham University and is used in schools worldwide. PIPS has been shown to have high reliability using test and re-test at the beginning and end of the school year, as well as an accurate predictor of later educational achievement.⁶

Administration of PIPS tests

Year 1 pupils in participating schools who would be eligible to take part in the Act, Sing, Play programme when they moved into Year 2, undertook the pre-test between June and July 2013. A small number of pupils completed their pre-tests in September 2013 if they were new to the school, or unable to be tested for another reason during the summer term. Pupils were divided into groups of 5 to 6 to complete paper PIPS maths and literacy tests at the pre-test stage. Each test took approximately 30 minutes to complete (including instruction time) with each group of pupils. Tests took place during the school day and were administered by NatCen interviewers who supervised the completion process. All interviewers were subject to full CRB/DBS checks and received project-specific training prior to administering the tests. They were also responsible for making appointments with participating schools and collecting administrative (demographic) data from those schools. Pre-intervention PIPS tests were conducted with 920 primary school pupils in total.

Completed tests were returned to the CEM for marking, and the scores uploaded to secure internet files. The datasets were then downloaded from the PIPS+ website and converted to SPSS files for analysis by NatCen.

Post-intervention maths and literacy tests were collected using the same procedure as employed for the pre-test. Once again, PIPS maths and literacy tests were administered in schools by NatCen interviewers during the school day and returned to CEM for scoring. Post intervention testing took place between June and July 2014. Interviewers and markers were blind to allocations throughout.

Sample size

Nineteen primary schools took part in the Creative Futures evaluation. Maths and literacy PIPS tests were completed by 920 pupils belonging to Years 1 and 2 within these schools. Pupils in the pre-test sample were randomised by statisticians at NatCen using stratified randomisation. This process began by removing those without a valid outcome code (that is, a code to indicate that their maths and literacy tests had been completed) and those deemed to be ineligible. The remaining 909 pupils were stratified within class by eligibility for Free School Meals (FSM), sex, and date of birth before being assigned to the intervention or control groups. All 909 of the pupils who were randomised were eligible for the post-intervention PIPS test.

When designing the study a minimum detectable effect size of 0.2 was assumed.⁷ This is the smallest effect size that, if true, would yield an estimate of impact statistically significant at the 5% level, based on the following assumptions:

⁶ See <http://www.cem.org/primary>

⁷ By effect size we refer to the standardised mean difference (Cohen's *d*).

- probability—statistical significance of 95% to detect effects with a probability of <0.05 ;
- power—80% power; and
- randomisation—a 1:1:1 ratio of pupils (stratified within class by FSM eligibility, sex, and date of birth).

Provisional calculations suggested that it would be necessary to include approximately 850 cases in the final analysis sample (570 in comparisons of one intervention arm against the control arm). Estimates were based on a comparison of outcomes between the treatment groups and the 'active' control group. A loss to follow-up rate of 5% was assumed, and 909 cases were included at randomisation. In practice loss to follow-up was somewhat higher at around 9% ($N = 84$). The tables below illustrate the detectable effect sizes at randomisation (recruited sample) and at the analysis stage (analysis sample). The computation of both sets of effect size includes an empirical school-level ICC of 0.2.

Table 1a: Minimum detectable effect sizes—recruited sample

	Comparison of one study arm with another	Comparison of intervention groups 1 and 2 with the active control group
Total sample size	605	909
Unadjusted	0.22	0.19
0.20*	0.19	0.17
0.40*	0.17	0.15
0.60*	0.14	0.12

* Proportion of residual variance explained by covariates.

Table 1b: Minimum detectable effect sizes—analysed sample

	Comparison of treatment arm 1 with control arm	Comparison of treatment arm 2 with control arm	Comparison of treatment arms 1 and 2 with the control arm
Total sample size	542	545	814
Unadjusted	0.22	0.22	0.20
0.20*	0.20	0.20	0.18
0.40*	0.17	0.17	0.15
0.60*	0.14	0.14	0.12

* Proportion of residual variance explained by covariates.

Randomisation

The randomisation of pupils for this study was undertaken by statisticians within NatCen Social Research (the independent evaluation team) in September 2013 (the first week of the new term). Constrained randomisation was conducted within each class. With average class sizes of approximately 30 pupils this resulted in three groups of around ten children. Within classes, pupils were ordered by whether or not they were eligible for Free School Meals (FSM), by sex, and finally by date of birth. Within each class, blocks of three pupils were created from this ordered list, and within each block one pupil was randomly allocated to each of the three treatments (using random numbers generated by SPSS). The overall allocations were then checked by FSM, age and gender, plus other variables including ethnicity, SEN and English as an additional language (EAL). Pupil characteristics data was initially provided by schools and supplemented with information from the National Pupil Database at the analysis stage.

Analysis

The impact analysis set out to test whether the pupils who received a music intervention (strings or singing) made more progress in maths and literacy than children in the control group (drama). The primary outcome measures were post-intervention standardised PIPS test scores in maths and literacy.

Analysis was conducted in STATA version 13 (Stata Corporation, College Station, Texas, USA) and impacts estimated in accordance with the intention-to-treat (ITT) principle. This preserves the effect of the initial randomisation by providing conservative and unbiased estimates of the effect of the intervention on pupils, regardless of whether they went on to receive the intervention. All 909 pupils who were randomly allocated to the treatment or control groups were eligible for post-intervention testing.

Initially, descriptive analysis was run to look only at pupils with primary outcome scores in maths and literacy. This used standardised PIPS scores to compare the intervention and control groups.

Hierarchical linear regression modelling (known as multilevel modelling—MLM) was employed to compute the effect sizes on the two primary outcome measures using standardised scores which provide an indication of pupils' ability in maths and literacy. This involved fitting a multi-level linear regression model with random intercepts; the pupil being level one in the model, and the school level two.⁸ Multilevel modelling accounts for clustering at the school level.

⁸ Tests were performed to explore whether pupils were clustered by class. Multilevel models were implemented with class as a second level (along with fixed effects for schools). However, the decision was taken to exclude class from the second level when the analyses showed that pupils were not clustered by class. Both the ICC (intra-class correlation coefficient) and the second level variance term were practically equal to zero. This indicates that the class-level means at post-test do not differ

The following covariates were included in the adjusted analysis:

- Pupil level: allocation (whether the pupil was assigned to the strings, singing or drama group),⁹ pre-test PIPS scores in maths / literacy, FSM eligibility, EAL status, ethnic group, sex, and month of birth.
- School level: no covariates were specified at level two.

All models were re-estimated in a separate analysis including only those who qualified for free school meals. Interaction tests were also conducted in order to confirm findings produced by these models.¹⁰

Effect sizes and their respective 95% confidence intervals were calculated following the procedure set out in Tymms (2004):

$$ES = \frac{\beta}{\sigma}$$

Where β represents the adjusted difference in outcomes between intervention and control groups obtained from the adjusted multi-level model, and σ the square root of the pupil-level variance obtained from fitting an unadjusted multi-level model.¹¹ The unadjusted model contains a constant, and an intervention dummy variable, but no further covariates. The standard error of the effect size was computed according to Schagen and Elliot (2004). Finally, summary descriptive statistics are produced along with estimates of intra-class correlation coefficients (ICCs) for each regression model estimated.

Process evaluation methodology

The process evaluation was designed to explore how the class teachers and arts group tutors viewed the delivery and implementation of the programme, and what they perceived the impact to be. A qualitative case-study approach was used to meet these objectives and involved in-depth interviews conducted in five schools. Each case study visit included observations of strings sessions and interviews with:

- strings tutors;
- singing tutors;
- drama tutors; and
- class teachers.
- Feedback was gathered from the perspectives of both the deliverer (the tutors) and the host school.
- Observations of the string sessions took place first, followed by interviews with teachers and tutors. Observations focused on three themes (see Appendix D for proforma):
- pupil engagement and behaviour within the session;
- fidelity to the programme; and

from the grand mean. This is theoretically justified as primary school pupils are not assigned to classes based on ability.

⁹ Dummy variables were created to indicate which of the intervention groups the pupil had been allocated to. The analysis was disaggregated into three sets: intervention 1 (strings) versus the control group (drama); intervention 2 (singing) versus the control group; and intervention 1 and 2 versus (music) the control group.

¹⁰ The interaction models were implemented using a random intercept and random slope hierarchical regression model (multilevel model). However, an interaction on level one (pupil level) was also specified between FSM eligibility and allocation (being in an intervention group versus the control group). This analysis indicates whether the effect of being in a treatment group or a control group (in other words, being exposed to music or drama) differs for FSM pupils as a sub-group.

¹¹ The pupil-level variance is the variance of the level 1 error term indicating how a pupil's level on the post-test deviates from the mean level of the post-test for the school the pupil belongs to.

- resources and equipment available.

Sampling and recruitment

In order to carry out case study visits in a diverse range of participating schools, the following information was used to select the case study sample:

- levels of FSM take-up amongst pupils;
- levels of EAL and SEN pupils within the participating year group;
- levels of disruptive behaviour in sessions (as reported by teachers);
- whether teachers had reported that they would like to continue with the programme; and
- whether or not pupils were encouraged to take their instruments home and practice.

In-depth interviews

The content of each interview was based on a topic guide to ensure systematic coverage of key issues. It was intended to be flexible and interactive, allowing issues of relevance for individual respondents to be covered through detailed follow-up questioning. For teachers, the interviews covered questions on:

- the profile of the school and background information about the teacher, including their role within the programme;
- the programme, and any recommendations they had about how it could be improved;
- the format of the lesson and any differences they could observe during the lesson between different subgroups;
- the pupils' attitudes towards the programme, and any perceived impacts they felt the programme was having; and
- the barriers to the implementation of the programme and to sustaining it within their school beyond the research period.

For the tutors, the interview covered questions on:

- the tutors' background and experience of teaching;
- the nature and the effectiveness of the training sessions (including how prepared tutors felt to deliver the programme);
- whether the programme met its aims, and any recommendations they had about how it could be improved;
- the lesson itself—including the content each tutor covered within their lesson, and the support they received from others (such as teachers and the programme team); and
- pupils' attitudes towards the programme, and any perceived impacts tutors thought the programme was having on pupils.

Interviews were digitally recorded and subsequently analysed using Framework, a systematic approach to qualitative data management developed by NatCen Social Research and now widely used in social policy research. All participants were told that everything discussed in the interview would remain confidential and would be treated in accordance with the Data Protection Act. Additionally, it was made clear, both in recruitment materials and during the interview, that teacher and tutor views or opinions would only be reported anonymously.

Impact evaluation

Timeline

Date	Activity
January–May 2013	Schools recruited and MOUs signed
June–July 2013	Baseline testing in schools (maths and literacy tests)
July 2013	Training session for tutors (East Sussex)
September 2013	Remaining baseline testing completed in schools
September 2013	Randomisation
Early September 2013	Training session for tutors (Essex, Coventry and Hounslow)
Mid-September 2013–July 2014	Intervention delivered in schools
December 2013	Training session 2 (for singing tutors only)
June–July 2014	Post-testing in schools (maths and literacy tests)

Participants

School recruitment was undertaken by the Creative Futures delivery team from January to May 2013. The recruitment process differed across the four areas included in the study, although in all cases schools who offered music instrument teaching in Years 1 and 2 were excluded on the basis of eligibility criteria.

In Coventry, schools were selected by the Coventry Performing Arts Service (Coventry’s Music Education Hub). Staff at the Service were guided by their own knowledge about local schools and how likely they believed schools would be to engage with the intervention. Of the eight schools approached about participating in the project, six accepted, however one of the schools later withdrew from the study due to the scale of pupil testing. This school was replaced by an additional school based in Essex prior to pre-test and randomisation.

In East Sussex, a letter was sent by the Creative Futures team, in conjunction with the Music Education Hub, to all primary schools in the area informing them about the intervention and inviting them to take part. Schools were selected from all those willing to participate on the basis of the core eligibility criteria and whether they had sufficient physical space to accommodate the project.¹² Schools with two-form entry were prioritised, although the East Sussex school group did include two single-form entry schools. Twenty-nine schools were approached in total in this area. Although four schools accepted the invitation

¹² Three rooms were required so that the activities could take place simultaneously.

initially, one of the schools withdrew from the study due to insufficient flexibility in terms of timetabling. This school was also replaced by an additional school based in Essex prior to pre-test and randomisation.

In Essex, eligible schools were assessed and selected by the Creative Futures team with assistance from the Essex Music Service, with the delivery team making initial contact with the schools. In this case, selected institutions included small, single-form entry schools based in rural locations and larger, two-form entry urban schools. The schools were clustered in certain geographical locations for ease of delivery. Of the ten schools in this area approached to take part in the study, seven agreed to participate in the programme. One additional school was held in reserve, but was not included in the study.

In Hounslow, four schools were selected by the Hounslow Music Service based on the core eligibility criteria. All four schools approached to take part in the study accepted the offer and became part of the intervention.

All schools invited to take part in the study were sent an information pack and a school agreement form (the Memorandum of Understanding) by the Creative Futures team. Headteachers were asked to return the signed agreement to the Creative Futures team to confirm their place in the intervention.

A total of 51 schools were approached to consider taking part in the intervention, 30 of these schools declined to participate in the study. Two schools withdrew prior to the pre-testing period, but were replaced by additional schools recruited in another area. In all, out of 51 schools approached, 19 were taken though into the final randomised sample.

Pupil recruitment

Opt-out letters were sent to parents of all children in participating classes. These were produced in collaboration with the delivery and independent evaluation teams, and distributed by the delivery team to all participating schools. Participating schools were asked to distribute letters to the parents of every child in classes included in the intervention. The letter explained to parents what the Creative Futures programme involved, and offered them the opportunity to opt out of the intervention. Parents were asked to let their school know if they did not wish their child to take part. The opt-out applied to the intervention and evaluation process, and not the separate components. By consenting to the intervention, parents also consented to the PIPS testing. No opt-outs were received from parents.

Participant flow

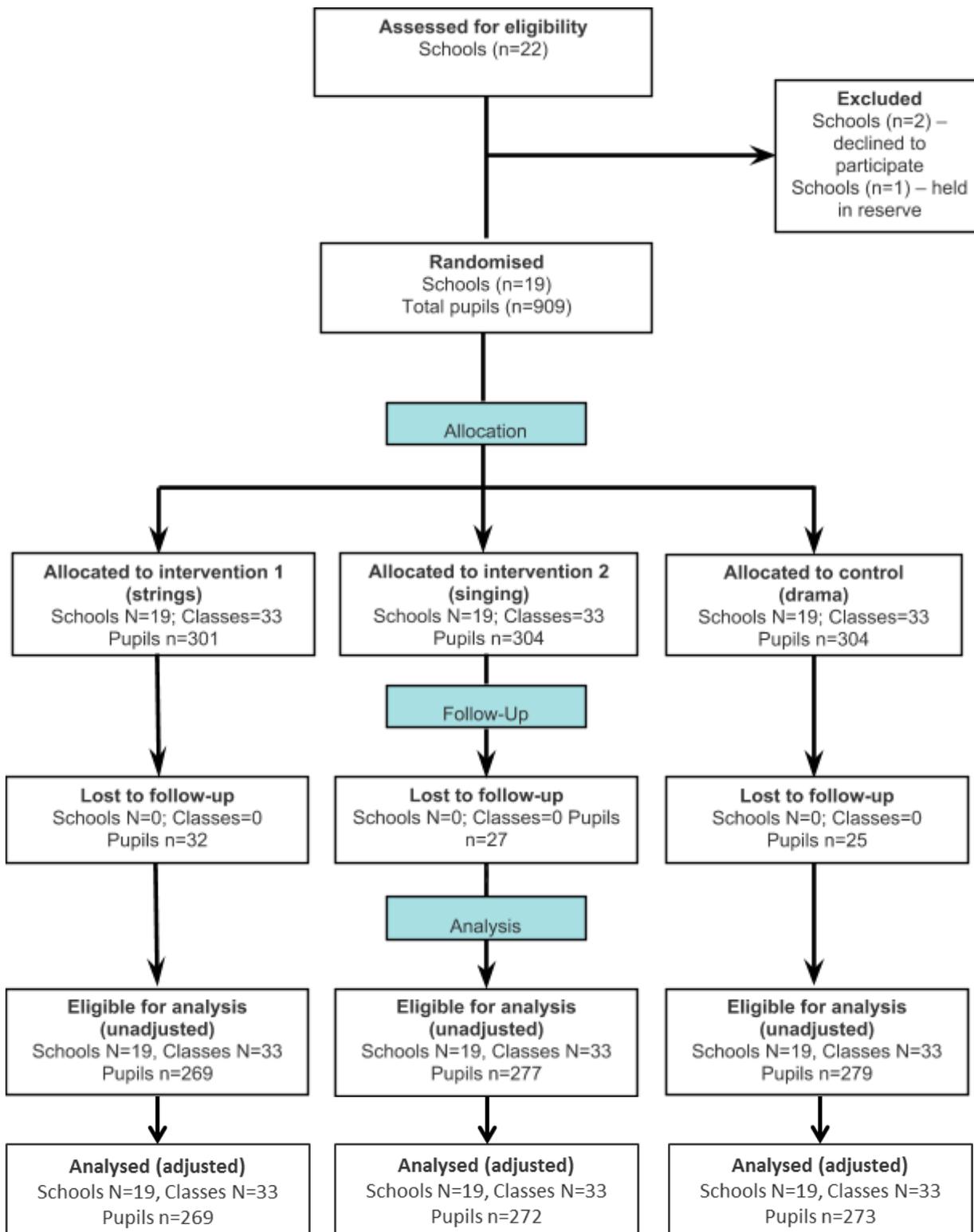
Figure 1 shows the flow of participants through the study. A total of 909 pupils were in the study at the point of randomisation.¹³

In September 2013, 909 pupils belonging to 33 classes in 19 schools were randomised—301 to the first intervention group (strings), 304 to the second intervention group (singing), and 304 to the control condition (drama).

The final number of pupils who had post-test data and were eligible for unadjusted primary analysis was 269 in the first intervention arm (strings), 277 in the second intervention arm (singing), and 279 in the control arm (drama); a total of 825 pupils. The adjusted analysis includes only those cases with a complete set of pre- and post-test data; this reduces the total number of pupils to 814: 269 in the first intervention arm, 272 in the second intervention arm, and 273 in the control group. This meant an attrition rate of approximately 10%.

¹³ Eleven pupils were removed from the sample file prior to randomisation; ten of these pupils were missing pre-test scores, and one was removed on instruction from test administrators.

Figure 1: CONSORT diagram



School characteristics

Nineteen primary schools participated in the Act, Sing, Play Programme. The mean capacity of schools taking part in the intervention was 326 pupils (Table 2). The majority of schools were 'community schools', with 11% classed as 'foundation schools', 11% as 'voluntary aided' and 11% as 'voluntary controlled'. The nature of the programme meant that only infant and primary schools were included in the study—the majority of these (95%) having an upper age limit of 11. In terms of FSM eligibility, the schools were slightly above average, at 19%, compared to an average of 17% of pupils in primary schools in England being eligible for and claiming FSM (DfE 2014).

Table 2: School-level characteristics

Schools		
Characteristics	Number of schools	19
	Type of School	68% Community Schools
		11% Foundation Schools
		11% Voluntary Aided School
		11% Voluntary Controlled School
	Highest age	95%, 11 years old (18 schools)
		5%, 7 years old (1 school)
	Mean Capacity (SD)	326 (124)
	Number of pupils	332 (134)
	Number of boys	170 (71)
	Mean % of FSM pupils (SD)	19% (16)
	Pupils as randomised	Mean number of pupils per school (SD)
Median number of pupils per school (Min; Max)		55 (19; 77)
Mean number of pupils in total who are eligible for FSM (SD)		11 (9.1)
Median number of pupils in total who are eligible for FSM (Min; Max)		12 (1; 29)
Mean number of pupils in the Intervention—Strings group (SD)		16 (5.7)
Median number of pupils in the Intervention—Strings group (Min; Max)		18 (7; 25)
Mean number of pupils in the Intervention—Singing group (SD)		16 (6.1)
Median number of pupils in the Intervention—Singing group (Min; Max)		18 (6; 27)
Mean number of pupils in the Control—Drama group (SD)		16 (5.9)
Median number of pupils in the Control - Drama group (Min; Max)		18 (6; 25)

Note: Percentages may not sum to 100% due to rounding.

Class characteristics

A total of 33 classes were involved in the intervention across the 19 schools (see Table 3). Each class included an average of nine pupils assigned to each of the three arms of the intervention (ranging from a minimum of 6 to a maximum of 13). When looking only at FSM pupils, the number of classes varied a little across the intervention arms, with 20 classes with FSM pupils in the first intervention group (strings), 24 with FSM pupils in the second intervention group (singing) and 22 classes with FSM pupils in the control group (drama). The number of FSM pupils in each class showed little variation across the different intervention arms.

Table 3: Class-level characteristics (as randomised)

		Intervention class – Strings	Intervention class - Singing	Control class - Drama
All pupils	Number of pupils in trial	301	304	304
	Number of classes	33	33	33
	Mean (SD)	9.1 (1.4)	9.2 (1.4)	9.2 (1.4)
	Median (Min; Max)	9 (7; 13)	9 (6; 13)	10 (6; 13)
FSM pupils only	Number of pupils in trial	61	62	57
	Number of classes	20	24	22
	Mean (SD)	3.1 (1.7)	2.6 (1.5)	2.6 (1.6)
	Median (Min, Max)	3 (1; 6)	2 (1; 6)	2 (1; 7)

Pupil characteristics

Tables 4 and 5 present a summary of pupils' characteristics in control and intervention groups as randomised (Table 4) and as analysed (Table 5). At randomisation, 909 pupils from 19 schools were in range of the trial. Restricting analysis to just the pupils with post-test scores (as analysed) reduces the total number to 825 (269 and 277 in the two intervention arms, and 279 in the control group).

The baseline characteristics of pupils across the intervention and control groups were similar at randomisation and again at analysis, suggesting that the loss of pupils between randomisation and analysis is unlikely to have introduced bias into the sample. There are slight differences in distributions of scores at Key Stage 1: for example, the singing intervention group shows a higher proportion of pupils with KS1 Reading L2b at randomisation, and the drama control group, with KS1 Reading L3 at randomisation and analysis (both reach conventional levels of statistical significance).

Table 4: Pupil characteristics as randomised

All pupils in the 19 participating schools (as randomised)					
	Intervention 1 (strings)	Intervention 2 (singing)	Control (drama)	Difference (Cohen's D) Strings and drama	Difference (Cohen's D) Singing and drama
Mean pre-test score: maths	46.9	45.6	46.8	0.1 (0.02)	-1.2 (-0.14)
Mean pre-test score: literacy	49.3	48.2	48.9	0.4 (0.04)	-0.7 (-0.09)
KS1 Maths: L1	5.7%	3.0%	4.3%	1.4	-1.3
KS1 Maths: L2a	34.0%	32.6%	35.9%	-1.9	-3.3
KS1 Maths: L2b	27.7%	31.6%	23.4%	4.3	8.2
KS1 Maths: L2c	10.0%	11.8%	10.2%	-0.2	1.6
KS1 Maths: L3	20.3%	19.4%	24.7%	-4.4	-5.3
KS1 Maths: Missing	2.3%	2.0%	1.3%	1.0	0.7
KS1 Reading: L1	7.3%	5.3%	6.3%	1.0	-1.0
KS1 Reading: L2a	32.0%	30.3%	29.3%	2.7	1.0
KS1 Reading: L2b*	21.7%	30.9%	21.7%	0.0	9.2*
KS1 Reading: L2c	8.3%	7.9%	8.6%	-0.3	-0.7
KS1 Reading: L3*	28.3%	23.7%	32.6%	-4.3	-8.9*
KS1 Reading: Missing	2.3%	2.0%	1.6%	0.7	0.4
Female	47.3%	49.0%	45.7%	1.6	3.3
EAL	26.7%	33.2%	31.3 %	-4.6	1.9
FSM	20.3%	20.4%	18.8%	1.5	1.6
Ever FSM	22.0%	27.3%	23.7%	-1.7	3.6
SEN	21.7%	21.7%	21.4%	0.3	0.3
White	64.0%	62.2%	65.1%	-1.1	-2.9
Asian	17.7%	17.8%	17.1%	0.6	0.7
Black	9.7%	8.9%	8.2%	1.5	0.7
Chinese	0.3%	0.7%	0.3%	0.0	0.4

Mixed	5.0%	7.2%	3.0%	2.0	4.2
Other	3.0%	2.6%	4.9%	-1.9	-2.3
Number of pupils (all)	301	304	304	-	

Note:* p < 0.05

Table 5: Pupil characteristics as analysed

All pupils in the 19 participating schools (as analysed)					
	Intervention 1 (strings)	Intervention 2 (singing)	Control (drama)	Difference (Cohen's D) Strings and drama	Difference (Cohen's D) Singing and drama
Mean pre-test score: maths	47.0	45.7	46.8	0.2 (0.02)	-1.1 (-0.14)
Mean pre-test score: literacy	49.4	48.2	49.0	0.4 (0.05)	-0.8 (-0.09)
KS1 Maths: L1	6.3%	3.2%	4.3%	2.0	-1.1
KS1 Maths: L2a	36.8%	33.6%	37.3%	-0.5	-3.7
KS1 Maths: L2b	27.1%	30.7%	23.7%	3.4	7.0
KS1 Maths: L2c	8.9%	12.3%	10.8%	-1.9	1.5
KS1 Maths: L3	20.4%	19.9%	23.7%	-3.3	-3.8
KS1 Maths: Missing	0.4%	0.4%	0.0%	0.4	0.4
KS1 Reading: L1	6.7%	5.4%	6.5%	0.2	-1.1
KS1 Reading: L2a	33.5%	31.0%	30.5%	3.0	0.5
KS1 Reading: L2b	21.9%	30.3%	23.3%	-1.4	7.0
KS1 Reading: L2c	8.2%	7.6%	7.2%	1.0	0.4
KS1 Reading: L3*	29.4%	24.9%	32.3%	-2.9	-7.4
KS1 Reading: Missing	0.4%	0.7%	0.4%	0.0	0.3
Female	48.0%	50.2%	45.2%	2.8	5.0
EAL	24.5%	32.1%	31.2%	-6.7	0.9
FSM	19.3%	19.5%	17.9%	1.4	1.6

Ever FSM	20.4%	26.7%	22.6%	-2.2	4.1
SEN	21.6%	22.0%	21.5%	0.1	0.5
White	65.1%	62.5%	65.6%	-0.5	-3.1
Asian	17.1%	18.1%	17.9%	-0.8	0.2
Black	8.9%	8.7%	7.2%	1.7	1.5
Chinese	0.4%	0.7%	0.4%	0.0	0.3
Mixed	5.6%	7.6%	3.2%	2.4	4.4
Other	3.0%	2.2%	4.7%	-1.7	-2.5
Number of pupils (all)	269	277	279	-	-

Outcomes and analysis

Initial analysis is based only on the post-test scores for the primary outcome measures (standardised maths and literacy PIPS scores), without taking into account pupils' pre-test scores or characteristics. As shown in the summary statistics for the post-test score on the first primary outcome—the PIPS maths score (Table 6)—the standardised scores for the first and second intervention arms (strings, 50.1; singing, 49.5) as well as from the control arm (drama, 50.4) are very similar. As analysed, the sample of pupils consists of 825 pupils in 19 schools. Post-test scores in maths were missing for approximately 11% of pupils in the first intervention group (strings), 9% of pupils in the second intervention arm (singing), and 8% of pupils in the control arm (drama).

Table 6: Unadjusted average scores—PIPS maths score

	Intervention 1 (strings)	Intervention 2 (singing)	Control (drama)	Total
Sample as analysed pupils	n=269	n=277	n=279	n=825
Primary outcome	Standardised post-test PIPS maths score			
Primary outcome mean (SD)	50.1 (10.5)	49.5 (9.8)	50.4 (10.7)	50.0 (10.4)
Median (Min; Max)	49.5 (22.0; 78.6)	49.5 (24.3; 74.5)	50.8 (22.0; 78.6)	49.5 (22.0; 78.6)
Missing (% of those randomised)	10.6%	8.9%	8.2%	9.2%

Table 7: Unadjusted average scores—PIPS literacy score

	Intervention 1 (strings)	Intervention 2 (singing)	Control (drama)	Total
Sample as analysed pupils	n=269	n=277	n=279	n=825
Primary outcome	Standardised post-test PIPS literacy score			
Primary outcome mean (SD)	50.1 (8.7)	49.4 (8.0)	49.7 (8.5)	49.7 (8.4)
Median (Min; Max)	50.7 (19.5; 74.0)	49.8 (22.7; 78.3)	50.1 (27.6; 71.3)	50.1 (19.5; 78.3)
Missing (% of those randomised)	10.6%	8.9%	8.2%	9.2%

Table 7 shows the results of the second primary outcome—the standardised literacy score. Again, the difference between the two intervention groups (strings, 50.1 and singing, 49.4) and the control group (drama, 49.7) is negligible. Approximately 11% of pupils in the strings intervention group are missing post-test literacy scores, compared to 9% of the singing intervention group and 8% of the drama control group.

Impact of music tuition on PIPS maths scores

Analysis of the primary outcome was undertaken using a multilevel regression model. Results of both the unadjusted and adjusted analyses are presented. The adjusted analysis included the baseline measures as covariates: these covariates were students' pre-test PIPS scores (maths/literacy), FSM eligibility, EAL status, ethnic group, sex, and month of birth.

Table 8 shows the difference between two of the allocated groups (strings and drama) on pupils' post-test standardised maths scores. In both the adjusted and unadjusted analyses, differences were very small and did not reach conventional levels of statistical significance, indicating that there is no evidence that participating in the strings workshops (compared to the drama workshops) had an impact on pupils' standardised maths scores.

The adjusted analysis was conducted on a final sample of 542 pupils across 19 schools. It reveals a difference of -0.30 (95% CI: -1.37 to 0.79) in the standardised PIPS maths score at post-test. This is equivalent to an effect size of -0.03 (95% CI: -0.13 to 0.07).

Table 8: Analysis of primary outcome, maths—intervention (strings) versus control (drama)

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	-0.03 (-0.13 to 0.07)
Regression coefficients (95% CI)	-0.18 (-1.80 to 1.44)	-0.30 (-1.37 to 0.79)
P-value	0.830	0.597
ICC (SE)	0.155 (0.051)	0.221 (0.065)
Variance school level (SE)	17.05	11.37

	(6.53)	(4.23)
Variance pupil level (SE)	92.69 (5.73)	39.98 (2.47)
Total sample size (Schools)	542 (19)	542 (19)

Note: all effect sizes are calculated as adjusted regression coefficient, divided by the unadjusted standard deviation of pupil-level outcomes (see methods section for more detail).

The impact analysis was repeated for pupils in the second intervention group (singing) compared to the 'active' control group (drama). Results are presented in Table 9. As with the first intervention group, the difference between pupils' post-test maths scores in both the unadjusted and adjusted analyses was very small and did not reach conventional levels of statistical significance. Therefore, there was no evidence that singing tuition (when compared to tuition in drama) had an impact on pupils' PIPS maths scores.

The adjusted analysis was conducted on a final sample of 545 pupils across 19 schools. It reveals a difference of 0.34 (95% CI: -0.72 to 1.40) in the standardised maths PIPS score at post-test. This is equivalent to an effect size of 0.04 (95% CI: -0.08 to 0.16).

Table 9: Analysis of primary outcome, maths—intervention (singing) versus control (drama)

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	0.04 (-0.08 to 0.16)
Regression coefficients (95% CI)	-0.98 (-2.55 to 0.59)	0.34 (-0.72 to 1.40)
P-value	0.223	0.529
ICC (SE)	0.153 (0.051)	0.197 (0.061)
Variance school level (SE)	15.69 (6.07)	9.34 (3.54)
Variance pupil level (SE)	87.11 (5.37)	38.08 (2.35)
Total sample size (schools)	545 (19)	545 (19)

The third model considered pupils from the two intervention arms as a single group (music) for comparison against the control group (drama). Results of the third model are presented in Table 10. In this case, the adjusted analysis was conducted on a final sample of 814 pupils across 19 schools. It revealed a difference of 0.03 (95% CI: -0.87 to 0.95) in the standardised maths score at post-test. This is equivalent to an effect size of 0.003 (95% CI: -0.097 to 0.103).

Once again the difference between pupil's post-test maths scores in both the unadjusted and adjusted analyses was very small and did not reach conventional levels of statistical significance. We can therefore conclude that there is no evidence that music tuition had had an impact on pupils' PIPS maths scores compared to tuition in drama.

Table 10: Analysis of primary outcome, maths—music versus control (drama)

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	0.003 (-0.097 to 0.103)
Regression coefficients (95% CI)	-0.57 (-1.94 to 0.80)	0.03 (-0.87 to 0.95)
P-value	0.417	0.946
ICC (SE)	0.153 (0.048)	0.207 (0.060)
Variance school level (SE)	15.99 (5.83)	10.19 (3.66)
Variance pupil level (SE)	88.35 (4.43)	38.94 (1.95)
Total sample size (schools)	814 (19)	814 (19)

Impact of music tuition on PIPS literacy scores

Analysis of the second primary outcome—standardised PIPS literacy score—was undertaken using the same multi-level regression model. Again, results of both the unadjusted and adjusted analysis are presented.

Table 11 displays results of the first 'literacy' model: this compares the first intervention group (strings) with the control group (drama). The adjusted analysis, conducted on a final sample of 542 pupils, reveals a difference of 0.21 (95% CI: -0.68 to 1.10) in the standardised post-test PIPS literacy score at post-test. This is equivalent to an effect size of -0.03 (95% CI: -0.08 to 0.14).

As with the post-test maths score, in both the adjusted and unadjusted analyses, differences in the standardised literacy score were very small and did not reach conventional levels of statistical significance. Therefore, results indicate that there is no impact from the strings intervention on pupils' literacy scores when compared to the drama control group.

Table 11: Analysis of primary outcome, literacy—intervention (strings) versus control (drama)

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	0.03 (-0.08 to 0.14)
Regression coefficients (95% CI)	0.30 (-1.07 to 1.68)	0.21 (-0.68 to 1.10)
P-value	0.664	0.645
ICC (SE)	0.081 (0.033)	0.069 (0.032)
Variance school level (SE)	5.86 (2.57)	2.01 (1.00)

Variance pupil level (SE)	66.33 (4.09)	27.26 (1.69)
Total sample size (pupils)	542 (19)	542 (19)

As with the post-test maths score, the impact analysis was repeated for pupils in the second intervention group (singing) and control group (drama). Results of both the unadjusted and adjusted analysis are presented in Table 12. The adjusted analysis was conducted on a final sample of 545 pupils and shows a difference of 0.22 (95% CI: -0.71 to 1.14) in the standardised PIPS literacy score at post-test. This is equivalent to an effect size of 0.03 (95% CI: -0.09 to 0.15).

Once again, the difference between pupils' post-test literacy scores in both the unadjusted and adjusted analyses was very small and did not reach conventional levels of statistical significance; therefore results showed no evidence of an impact on pupils' PIPS literacy scores, compared to drama.

Table 12: Analysis of primary outcome, literacy—intervention (singing) versus control (drama)

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	0.03 (-0.09 to 0.15)
Regression coefficients (95% CI)	-0.43 (-1.74 to 0.89)	0.22 (-0.71 to 1.14)
P-value	0.525	0.649
ICC (SE)	0.071 (0.031)	0.005 (0.013)
Variance school level (SE)	4.70 (2.15)	0.16 (0.41)
Variance pupil level (SE)	61.09 (3.76)	29.64 (1.83)
Total sample size (pupils)	545 (19)	545 (19)

The final 'literacy' model brought together the two intervention arms (strings and singing) into a single group (music) for comparison against the control group (drama). Results are presented in Table 13. As with the equivalent model for standardised maths scores, the adjusted analysis was conducted on a final sample of 814 pupils. Results showed a difference of 0.23 (95% CI: -0.55 to 1.01) in the standardised literacy score at post-test. This is equivalent to an effect size of 0.03 (95% CI: -0.07 to 0.13).

As in the previous models, the difference between pupil's post-test literacy scores in both the unadjusted and adjusted analyses was very small and did not reach conventional levels of statistical significance. We can therefore conclude that there is no evidence that music tuition had an impact on either pupils' standardised literacy or maths scores. There is no evidence of an impact of strings or singing tuition on pupils' PIPS scores.

Table 13: Analysis of primary outcome, literacy—music versus control (drama)

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)		0.03 (-0.07 to 0.13)
Regression coefficients (95% CI)	-0.06 (-1.22 to 1.10)	0.23 (-0.55 to 1.01)
P-value	0.922	0.561
ICC (SE)	0.075 (0.288)	0.026 (.016)
Variance school level (SE)	5.15 (2.11)	0.76 (0.45)
Variance pupil level (SE)	63.35 (3.17)	28.04 (1.41)
Total sample size (schools)	814 (19)	814 (19)

Impact of the Act, Sing, Play intervention on subgroups

Subgroup analyses were performed to examine whether there was evidence that the Act, Sing, Play intervention (strings or singing tuition) had an impact on the primary outcomes for FSM pupils as a subgroup (results are displayed in Appendix F). This analysis was carried out for both standardised PIPS maths scores and standardised PIPS literacy scores separately. Adjusted multilevel regression models were estimated for FSM pupils.

Amongst the 100 pupils eligible for FSM there is no evidence of an impact of the strings intervention on the first primary outcome—standardised PIPS maths score: results reveal very little difference between allocated groups, equivalent to an effect size of 0.005. This did not reach conventional levels of statistical significance (95% CI: -0.255 to 0.265). The equivalent result for the second primary outcome—standardised PIPs literacy score, which comprised 99 pupils eligible for FSM—was an effect size of -0.02 (95% CI: -0.32 to 0.28) and again did not reach conventional levels of statistical significance.

Similarly, no evidence was found that the singing intervention had an effect on either the first primary measure (standardised PIPS maths score), or the second primary measure (standardised PIPS literacy score), when compared to the control group (drama). Here the effect sizes were 0.01 (95% CI: -0.25 to 0.27) and -0.03 (95% CI: -0.31 to 0.25) for maths and literacy respectively. Neither result reached conventional levels of statistical significance.

The third set of results shows no evidence of an impact of music tuition (strings or singing) on standardised maths PIPS scores, when compared to the control group (drama). The effect size was 0.02 (CI: -0.20 to 0.24)—below conventional levels of statistical significance ($n = 151$). The second model, which looked at standardised literacy scores, did not converge.

Full results from these analyses are presented in Appendix F (see Tables F1a to F6b).

Cost

Cost information for the programme was provided by the delivery team and represents the costs of the programme as it was actually delivered—in this case, to a school with 2 classes in year 2, where each class was split into 3 groups (strings, singing and drama). The programme ran for 32 weeks. Creative Futures provided 3 days of monitoring and management.

The costs are split between the ‘treatment’ (i.e. ASP-strings and ASP-singing) and ‘control’ (ASP-drama). Fixed costs that apply to both music and drama (e.g. curriculum design) have been split on a pro-rata basis. Costs assume that a school has a piano.

	Strings	Singing	Music Total (for music intervention)	Drama (control)
Number of students	20	20	40	20
Tutor costs	£2,560	£2,560	£5,120	£2,560
Instruments (4x cellos; 16x violins)	£2,160	NA	£2,160	NA
Curriculum design and resources	£185	£185	£370	£185
Strings resource books	£160	NA	£160	NA
Management and monitoring	£470	£470	£940	£470
School total	£5,535	£3,215	£8,750	£3,215
Total per pupil, for year 1	£277	£161	£219	£161

The total cost of the music elements of the programme was £8,750, which equated to **£219 per pupil** per year.

A programme with similar aims to encourage more pupils to try music lessons could be delivered for lower cost to schools. Local Authorities have Music Education Hubs whose funding would allow them to offer the same or a similar programme without the same level of salary and instrument costs, however the exact cost would depend on the level of funding in particular areas, and the level of resource they have available.

Process evaluation

In this chapter, findings from workshop observations and in-depth interviews are summarised in four themes:

- implementation—covering training and school preparation for the Act, Sing, Play programme;
- fidelity—how closely to intended the programme was delivered (focusing on classroom behaviour, pupil engagement, practicing and the curriculum);
- perceived impacts—covering subject and soft skills; and
- sustainability and future rollout.

Implementation

This section considers aspects of setting up the programme in schools. It covers:

- training of tutors;
- school preparation; and
- lesson preparation.

The main issue identified regarding implementation was that teachers and tutors believed that some tutors—particularly those with less experience of teaching primary children in schools—needed more guidance on how to run their sessions and how to manage pupil behaviour. This was predominantly an issue with strings tutors, who generally had less experience with teaching larger groups. Relatedly, it is worth emphasising that only strings sessions were observed, although in-depth interviews were conducted with strings, singing and drama tutors (as per the description in the methodology section).

Tutor training

The tutors for all three strands of the trial were either Creative Futures contractors (freelance tutors who were employed directly by Creative Futures), or tutors employed by their local Music Services and sub-contracted to Creative Futures for their time spent on this study.

All tutors attended a three-hour training session prior to the start of delivery which was delivered by the Creative Futures at a venue closest to them (in Sussex, Coventry or London). This means that tutors who would be responsible for teaching the three different arts groups were all trained together.

Tutors reported that the training was positive in the following ways:

- It gave them a good understanding of what to expect when delivering the programme, and an understanding of its overall aims:
'It was good to get an idea of what to expect, what to look out for, how to get prepared for it, and know the content and exactly what we were aiming for.' (Strings Tutor)
- It provided them with advice about how to convey information to younger pupils.
- It suggested a 'hands-on' approach whereby tutors could take forward the curriculum in their own way.
- It initiated peer support which provided tutors with an ongoing sense of support in addition to that provided by the trainers (such as sharing curriculum tips and best practice).

However, the session was also seen as more of a 'strategy' session than formal training about how the programme should be delivered. Trainers discussed flexible ways that the curriculum could be approached rather than a prescribed way to deliver the sessions. The flexible approach was daunting for less experienced tutors: they would have preferred more guidance on exactly what to deliver and how. It was also too short, with insufficient detail on strategies for dealing with classroom behaviour. These

issues were considered more problematic for tutors with less experience of school-based teaching or experience of working with primary-aged pupils.

Some class teachers reported that behavioural issues occurred in the Act, Sing, Play lessons and attributed this to the lack of training tutors had received. Those tutors who described themselves as less experienced in classroom teaching echoed this view and felt they were insufficiently equipped to deal with behaviour issues and managing a class of primary pupils despite some feeling confident and experienced in one to one instrument teaching.

Tutors suggested that two aspects of the training in particular, would benefit from more development:

- teaching the techniques required for the later parts of the strings curriculum; and
- training in behaviour management.

School preparation

The impacts on the school during the time of the programme were minimal. For some teachers, having tutors come in and teach during one of their lessons meant that they gained time for other tasks. For others, however, the behaviour management issues experienced by tutors meant that they needed to sit in on sessions or help to manage behaviour during sessions.

In some schools, changes to the daily routine needed to be made in order to allow for the programme to take place. The programme team worked with individual schools to find a suitable time and room for lessons to take place. This meant that pupils missed different lessons in different schools. For example, in one school the Act, Sing, Play session was held at the end of the day which meant that they moved their whole school assembly to the morning instead. It was considered much easier to adjust the timetabling in smaller schools as fewer pupils and classes needed to be considered.

Teachers generally thought that the programme fitted well into their school structure, and that additional work for school staff was minimal. They did not report that timetabling the programme was an issue despite needing to arrange times for the sessions. Where additional work was required this included:

- dealing with queries from parents about the programme (in particular, parents were keen that their child had the opportunity to learn an instrument and, during the trial, this was not possible for all pupils);
- supporting and advising tutors about behaviour management, or discussing individual pupil's progress with tutors;
- finding suitable storage for the instruments; and
- investigating the possibility of pupils taking their instruments home to practice and, where this was not possible, finding solutions to allow pupils to practice in school.

Some class teachers would have liked more information about the Act, Sing, Play curriculum, so that they could be more informed about the content of the sessions. Also, this would mean that if a tutor was absent they would be able to continue the session where possible.

Having enough space was cited as an important factor for the effective delivery of the singing and strings sessions, however finding suitable space for these sessions was generally not an issue. Sessions generally took place simultaneously and in three different spaces within the school, such as the school hall and in the pupils' main classroom. An additional consideration was space to store the musical instruments which was a challenge for some schools.

There were mixed views from music tutors about the importance of having a piano available in the allocated room: some tutors considered this to be very important so that pupils could be accompanied

whilst playing or singing; others felt this was not necessary for a successful session as pupils could sing unaccompanied. During the trial, pianos were already available in the schools for tutors who required them.

Violin rests (provided along with the instruments) were also seen as an important resource by strings tutors who felt that they helped pupils learn to hold the violin in the correct manner and made the activity less tiring for pupils. This meant that pupils could focus more on playing, rather than holding their violin.

Session preparation

Due to the flexibility of the curriculum and delivery of the programme, tutors' preparation for sessions varied in both length and style. Some tutors planned for each session, drafting session plans and creating bespoke materials for pupils to use; other tutors planned just one or two activities for the session as they felt that pupils would struggle to engage with, and retain, more information. This difference in preparation style also meant that the length of time tutors spent preparing varied from less than an hour to two hours for each session. Tutors reported that they were happy to create extra resources and materials as they felt this was part of tailoring their own curriculum. They did not think that more resources needed to be provided by the Act, Sing, Play delivery team.

Fidelity

This section looks at how the sessions were delivered in schools in relation to what was intended. As detailed above, the programme was not set out in particular detail in terms of what should be covered in each session. This section, therefore, describes how delivery varied, and the reasons for this, under four themes based on workshop observations and interviews with teachers and tutors:

- classroom behaviour;
- pupil engagement;
- curriculum content; and
- instruments and practicing.

Classroom behaviour

The most common cause for loss of fidelity and progress within the arts Act, Sing, Play curriculum was the lack of behaviour control in the classroom. Some class teachers highlighted how unprepared tutors were for this, and how much of an issue it became for them in sessions. There were cases where tutors themselves thought that the lack of behaviour management was the biggest barrier for them in successfully implementing the programme.

The types of behaviour issues which were encountered included:

- pupils being over-excited;
- pupils not staying on task;
- pupils not listening; and
- SEN and shyer pupils not engaging in the lesson.

In some cases, school teachers recommended behaviour management techniques and advice to tutors, or attended the Act, Sing, Play sessions in order to help manage behaviour. Teachers felt that their presence should not have been necessary, and that the tutors coming into schools to provide tuition should have been prepared for this. In some cases, teachers attended sessions just for the first term until pupils got used to a new tutor.

Some teachers recognised that their class was difficult to manage and that any new tutor would struggle to manage them. However, in other schools teachers felt that the inability of the tutors to manage classroom behaviour was due to their lack of experience and training with pupils of this age:

'...[one tutor] particularly...he has asked before in the past, for me to go in and to sit in there because he said he can't control them when they're off-task. But actually, they are the best behaved class in the school, to be honest, and they aren't difficult to control at all, they're just not, but he's found it difficult. It's to do with the way he presents his activities and getting them over-hyped. So I've had to go in... [Tutors] need to know more about very young children...teaching young children isn't quite as easy as some people might think. It is a skill and there are differences of approach' (class teacher).

Tutors whose previous experience of teaching was only in one to one sessions felt that the programme was a 'learning curve' for them in terms of developing behaviour management techniques. They described the pupils taking part in the programme as more 'wild' than those encountered previously. The issues with pupils misbehaving or losing engagement in the sessions affected the whole class and prevented tutors from delivering all of the content they needed to:

'There is one very naughty [child]: I tend to tell them just to be quiet and listen. I find the ones who are very naughty need more attention because of problems at school or at home, and it's hard because I feel I give all my attention to them rather than the good ones' (Strings tutor).

Tutors cited three main sources of support when dealing with behaviour management and support with the programme more generally:

- Classroom teachers provided tips and advice about individual pupils or whole class behaviour. They were aware of the school context, had knowledge of their students, and were the main source of support for tutors. Teaching Assistants were a valuable help within the Act, Sing, Play sessions, especially if tutors lacked confidence in managing classroom behaviour, however teachers saw this as unnecessary for working with small groups.
- Support provided by peers and the delivery team was also valued by tutors: this was mostly through email communication.

Behaviour was generally thought to improve over time with most pupils 'settling down' and getting used to the tutors and to the Act, Sing, Play programme as it progressed.

Not all tutors felt that behavioural issues interrupted the flow of the programme—that with ground rules and clear expectations quickly outlined, behaviour was manageable. However, this view was at times contrary to that held by form teachers within the same school.

Pupil engagement

Generally, teachers and Act, Sing, Play tutors agreed that pupils enjoyed taking part in all of the sessions, and were excited to be taking part in a new activity.

'[Pupils] are excited and eager to get on and look forward to [their lesson].' (Form Teacher)

There were a number of reasons suggested as to what kept pupils engaged with, and learning from, the Act, Sing, Play sessions. These included:

- the novelty of having a new tutor who did not normally teach them;
- doing something 'active' and 'different' at school that was not academically based yet occurred weekly within structured sessions;
- small group teaching helped with managing behaviour and setting up instruments, so reduced the amount of disruption and kept pupils engaged—having a small group of between five and eight pupils meant that tutors were more easily able to keep all pupils engaged;
- having instruments that were new and their own made pupils excited to learn to play—

'They enjoyed having something new and shiny... they liked it from the beginning, it was totally new, they just wanted to pick up and play their instruments' (Form teacher); and

- certain topics covered in the drama curriculum such as the 'snow queen' topic and the 'ship' topic particularly engaged pupils.

Conversely, there were reasons why pupils were disengaged with sessions, no doubt reducing the amount of learning they were exposed to—and the overall impact of the programme:

- Tutors struggled to manage behaviour effectively:

'I think that sometimes the [tutors] who've come in have not had the best behaviour management skills and that, especially at the beginning, sort of impacted on how much the children were joining in. For example, I know that [one tutor] at first would say 'oh you can choose whether to join in', so they had a lot of children who would just wander round the room' (form teacher).

- Tuning, setting up string instruments, and giving practical individual support reduced the amount of 'teaching time' in each session and distracted pupils:
'...for example, if I teach bow hold...I have to come off teaching half way to go to each student to correct their bow hold, and when I do that with one student, the other one gets distracted...' (strings tutor).

In addition, some of the curriculum content was considered to be too advanced for the age group and not tailored to different ability levels. Strings tutors in particular found teaching different ability-level pupils difficult to manage, which led to some pupils disengaging with the programme.

Programme and Curriculum

Tutors were encouraged to be flexible in how they chose to meet the learning objectives provided by the delivery team. This meant that the suggested activities were not always followed, or were used in a different order or pace to that recommended by the delivery team. This led to varying levels of fidelity to the prescribed programme.

Singing sessions

The singing curriculum provided tutors with a number of suggested activities and objectives, however tutors were encouraged to add their own ideas, games and songs in order to reinforce the learning. The curriculum stated that tutors should focus on achieving the learning objectives, but that how they achieved these was up to them.

Singing tutors were generally positive about the curriculum. They felt that it included enough detail to guide them, yet was flexible. This flexibility was valued as it enabled them to alter the content of their sessions, such as the songs they taught, to what would work better with a particular group or school.

'The kids absolutely love the songs they do and are so excited for singing lessons' (singing tutor).

Having a flexible curriculum also meant that tutors could vary the pace of the sessions. This was valued as differences in pace were needed for different classes of pupils.

Whilst the delivery team initially provided a pack of activity resources, tutors were responsible for designing the majority of individual session plans. Tutors provided most of the session materials themselves (although a bank of activities were provided by the programme team initially) and so tutors were providing these as well as creating individual session plans.

Strings sessions

The strings curriculum was designed in order to provide tutors with the freedom to use their own learning approach. However, for consistency the curriculum referenced *Fiddle Time Starters*, a beginner's violin book, and also provided tutors with termly milestones and some suggested exercise/activity types.

The strings curriculum was seen by some tutors as too ambitious for children of this age. This meant that in some cases pupils were struggling to meet the expectations set out in the curriculum. Of those who mentioned this issue, there was not a consensus about whether this was the case for lower ability pupils only, or for all pupils.

The curriculum was **too fast paced** and was 'too much to take in' for pupils. This feeling was exacerbated by the fact that pupils were mostly not able to take their instruments home to practice. Tutors felt this meant that progress week-to-week was slower than anticipated. In addition, it was felt that the **technical expectations** of pupils were too high.

Much like the singing tutors, strings tutors also valued the flexibility offered in the curriculum as this allowed them to slow down the **pace** of the sessions, focus on certain aspects of the curriculum in **more detail**, or **change the content** if it failed to engage pupils. For instance, one tutor focused on pupils playing their instruments within the sessions rather than learning to read music, swapping crotchets and quavers for numbers to simplify the task.

There were a number of different barriers to effective delivery cited by strings tutors:

- The start of the session was quite chaotic, as the instruments needed to be set up and tuned. Some form tutors were helping with this task to try and minimise the disruption.
- *'Something that's worth considering is the time it takes to tune nine instruments'* (form teacher).
- Some tutors felt that they needed two teachers within the classrooms to help them physically manage getting around the classroom to help each pupil with their instrument, to help with behaviour management, and to keep pupils on-task.
- Some tutors would have liked more lead-in time to the sessions, including information about who the pupils were and whether they had any special educational needs or language difficulties. It was also felt that the string sessions, more than other sessions, were outside of the context of everyday life and so pupils needed more time to be introduced to the instrument and to the format of the sessions.
- *'[The violin] is such a hard thing to learn, it's so different and not in every family context. It would have been nice to have more time to introduce it to them, and more time to play around with it, instead of listening and doing what the teacher says all the time. I think they've missed out on that bit'* (strings tutor).
- The lack of pupil practice was cited as a major barrier to progress within the sessions, however some tutors thought this was less important for this age range and that one session per week was adequate.

Drama sessions

As with the strings and singing curricula, tutors were encouraged to be flexible and use their professional experience to adapt activities to different pupil ability ranges and confidence levels within the Drama curriculum. Lesson plans included suggested activities which were a mixture of improvisation, tutor narration, discussion and physical activities.

Drama tutors were positive about the curriculum. In particular they felt that the first block worked well, however some tutors felt that some lesson plans were too fast paced with **too many activities** to fit in, and this, at times, made the sessions feel rushed and over full.

Some of the **content (two or three blocks in particular) was very popular** with pupils and appropriate for use with them. However, certain aspects were felt to be **too advanced** for pupils of this age. In particular, it was felt that pupils needed to have a broader understanding of some of the topics before they

were able to dramatize them. One example given was that pupils were asked to consider whether they should remove a plant from the Amazon Rainforest that held medicinal properties at the risk of harming the indigenous people who lived there. It was felt that topics such as these were too advanced for pupils in Year 2. More generally, tutors felt that more story-based work, rather than that based on issues, worked better with young pupils.

In contrast to the singing and strings sessions, drama tutors mentioned behavioural issues less frequently. Where these were mentioned, the issue tended to be that some pupils became too excited during the sessions (particularly when split into groups).

There were a couple of barriers to successful implementation mentioned by drama tutors:

- The pupils would have benefitted from a better introduction to the sessions, to the format, and to the new tutors. This would help (particularly shy) pupils feel more confident expressing ideas and sharing work.
- School staff were not always aware of the aims of the drama group, and some tutors felt their presence was a 'bit of an imposition' to school staff. The full endorsement of the programme by all school staff was needed. Clearer information about the project aims and the tutors' roles would have helped with this.

Instruments and practicing

Whether pupils were allowed to take violins and cellos home with them to practice was decided by individual schools, and so varied across participants.

Reasons for encouraging pupils to take home their instruments included:

- To allow them to **practice**. Although some teachers felt that most pupils were realistically not practicing routinely, taking home their instruments gave them this opportunity.
- To overcome the lack of **space** to store the instruments in school. Due to lack of space elsewhere in the school, instruments were being stored in unsuitable places, including the disabled toilets, so it made more sense for pupils to take them home.

Pupils in most schools were not allowed to take instruments home with them due to concerns about care of the instrument, pupils sharing one instrument, and school insurance policies not covering instruments off-site.

Tutors—and some teachers—felt that opportunity to practice was a priority, so, if it was impossible for pupils to take instruments home, a few schools tried to incorporate practice time into the school day by for example, organising lunchtime clubs where pupils could practice informally. These sessions did not need to be run by music teachers; tutors thought that any practice would lead to quicker progress during sessions:

'Repetition is very important for that age, and doing it twice a week would make it more beneficial...not everyone does take [the instrument home], but the ones who have taken it home are the ones that have improved the most' (strings tutor).

Perceived Impacts

There was an almost unanimous view that the programme gave participating pupils access to opportunities not normally available to them at this age. In particular, the opportunity to play an instrument was valued very highly by the tutors and school staff—particularly for pupils from more disadvantaged circumstances for whom the cost of lessons and instruments was normally prohibitive. Teachers saw the

programme as offering opportunities to receive more specialist music tuition and a more specialist music curriculum for pupils. In particular, the opportunity to learn to read music was highly valued by teachers who felt that this was a skill these pupils would have no other chance to access.

In terms of other impacts, teachers perceived the programme as having an impact on pupils in one of three ways:

1. developing skills related to the programme as well as other areas of the curriculum—
'The class as a whole are better at clapping in time...I couldn't know for sure but I think that things like being able to clap, being able to hear the beat is also going to help with things like hearing individual sounds in phonics [and] hearing the rhythm in a rhyme or in a poem';
2. developing skills related to the programme, but having no wider impact across other areas of the curriculum; or
3. not developing any skills related to the programme or the wider curriculum:
'I can see the intention of it... I haven't got a musical background, but they don't seem to have got very far with their violins...and the drama pupils seem to have a nice time [but] I just don't see how it can [raise attainment]' (form teacher).

Teachers reported how they thought the programme could impact positively on pupils in other areas of the curriculum, including pupils' core subject skills and soft skills. There were, however, very few cases in which they had actually seen this impact.

The main benefits of the programme were thought to be:

- Increase in pupils' confidence. While some felt that this was just in the Act, Sing, Play sessions, others considered this to spill over into mainstream lessons.
- Pupils were given the opportunity to use their creativity and exercise self-expression within a structured environment. Tutors considered this to be important as it taught pupils to use their creativity in constructive ways.
- The music sessions helped in the development of pupils' social skills. Some felt that the impact of this could be seen in mainstream lessons through increased peer-to-peer interaction, and improved listening skills of pupils.
- As a result of practicing listening skills (particularly during singing sessions), pupils were more likely to listen to the teacher more carefully rather than rushing into a task in class.
- The Act, Sing, Play programme taught pupils about the importance of perseverance with a task.
- There were links made by both teachers and tutors between the exercises within the music sessions and core subjects such as maths and English. Such links included using addition to count the beats in a bar, and learning pitch and rhythm impacting positively on pupils' poetry and phonics work.

Music tutors thought that music generally, and the Act, Sing, Play programme specifically, was an activity which was 'inclusive' in the sense that all pupils—including those with social, emotional or behavioural issues, and those with lower abilities—could engage with the content and be included in the activities. Having inclusive sessions such as these were considered to be vital for such pupils, particularly within a context where creative activities are regarded as increasingly 'sidelined in the curriculum'.

Sustainability

Teachers had different views about the sustainability of the programme. Some teachers described how the aspirations they held for continuing the programme were constrained by practical and financial considerations. The decisions about the sustainability of the programme were discussed by class teachers but the ultimate decision about further delivery of the Act, Sing, Play programme would be made at a school level by headteachers.

The main reason given for wanting to sustain the programme was that it gave pupils the opportunity to do something they would not otherwise have the chance to do. In some schools, teachers were already continuing some activities from the programme. For instance, in one school teachers were providing a lunchtime club so pupils could continue to play their instruments.

Generally, teachers spoke about continuing the strings sessions. Some teachers explained how they would prefer pupils to have the opportunity to learn an instrument despite feeling that they would also benefit from drama and singing. Other teachers wanted pupils to be able to try all three arts activities.

In order to continue with the programme, schools expressed a preference for some aspects of the programme to be reviewed or developed further. These suggestions included:

- employing tutors with experience of working with this age group, or to offer training to develop this;
- training tutors in how to manage classroom behaviour; and
- committing to, and making provision for, pupils being able to practice at home.

Other considerations influencing decisions about continuing with the Act, Sing, Play programme included:

- Changes to the National Curriculum (from September 2014) would mean less time available within the school day for music lessons.
- Teachers were of the opinion that the cost of purchasing instruments and paying tutors would be a challenge should the programme be continued in their school. Some teachers described this as 'having the aspirations but maybe not the money' to continue the programme. Related to this was a concern that the programme would need to be extended to cover Years 2 and 3 so that pupils did not have to stop lessons after Year 2.
- Some teachers had concerns about the motor skills and coordination of some pupils in their current year groups. This raised questions for them about whether all pupils would be able to join in with playing an instrument should the intervention be rolled out more widely.

Formative findings

The process evaluation findings suggest that the Act, Sing, Play programme may benefit further from refinements in the following areas:

- Better communication between both tutors and teachers prior to the start of the programme. A meeting or briefing would:
 - o help teachers and other school staff to understand the aims and broad content of the programme, and help to bring all staff on-board;
 - o provide more information about pupils, including any potential barriers to participation such as SEN or EAL so more targeted resources and activities could be developed; and
 - o detail the curriculum for each session so teachers would know the content of the sessions and what stage the pupils were at.
- More lead-in time for pupils so they get used to their instrument before learning begins fully, or develop group cohesion so they feel comfortable 'performing' in the sessions.
- Facilitating practice sessions during the day at school.
- Review the level of training given about behaviour management. For example by teaching tutors specific behavioural techniques for controlling classes of this age range.
- Consider having two teachers deliver strings sessions to enable them to help pupils to tune their instruments, set up, and hold their instruments, and help deal with behaviour management. This would, in turn, make it easier to deliver the sessions.
- Review the level of the strings curriculum, including technical expectations of pupils, the pace of the programme [sessions?], and how to cater for higher and lower ability pupils.
- The flexibility in how to deliver the curriculum was highly valued by tutors. This flexibility should be retained as far as possible.

Conclusion

Key Conclusions

1. This evaluation provides no evidence that ASP-music workshops had a greater impact on maths or literacy attainment than ASP-drama workshops.
2. Analysis of students receiving free school meals similarly found no evidence that ASP-music workshops had a greater impact on maths or literacy than ASP-drama workshops.
3. The process evaluation suggested that some tutors—particularly those with less experience of teaching groups of primary school children—needed more guidance on how to run their sessions.
4. Although not necessarily typical, there were related concerns that some strings workshops struggled to keep students focussed on learning music.
5. Class teachers reported that confidence and social skills had improved for some pupils. Teachers also felt it was important that children from disadvantaged backgrounds had the opportunity to learn a new skill that they might otherwise not be able to access.

Limitations

The number of pupils included in the randomisation ($n = 909$) was above the required number set out in the sample size calculations ($n = 850$), however, in practice the rate of attrition was around 10% ($n = 95$), resulting in a sample size of approximately 814 (around 543 for each of the two study arm comparisons). The sample characteristics in terms of observable variables were similar for the randomised and the analysed sample, and assuming a robust randomisation process, the differences between the groups are due to chance. Furthermore, the level of attrition was similar in all three trial arms, which increases confidence that there is no bias.

Interpretation

The results of this randomised controlled trial do not provide any evidence that music tuition (either in strings or singing) relative to drama had an impact on attainment in maths or literacy. These results fail to corroborate Schellenberg's evidence that music tuition causes increases in the IQ of young children (2004).

The use of an active control group means that it is not possible to assess whether a music intervention would have had a significant impact relative to a standard (non-active) control.

From the process evaluation results, the key challenge for the programme in the intervention schools—particularly in the strings sessions—was the behaviour of some pupils. Due to them being disengaged or overexcited in the sessions they became disruptive and this is likely to have impacted upon the learning of all pupils in the group. Not all tutors were able to manage this behaviour and so struggled to deliver the programme fully or in the depth they would have liked.

Furthermore, the flexibility given to tutors within the curricula (particularly the strings and singing curricula) meant that their learning approach, and the content of their lessons, varied considerably. The extent of this remains unclear but means that fidelity to the programme content was difficult to measure.

Future research and publications

As indicated, there is a body of literature showing the positive effects of music tuition on academic attainment, particularly in literacy. Given the lack of evidence of impact identified by this evaluation, a priority for future research would be to explore the effectiveness of the programme against an inactive control group.

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Appendix 1: Strings curriculum (Week 1 example)



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Act, Sing, Play:

***Investigating the impact of arts provision on
achievement***

String Curriculum

Introduction: We understand that there are as many different string teaching methods as there are tutors. With this in mind we have designed this planning document which provides the freedom for tutors to use their own approach but that which also has, for reasons of consistency for research purposes, three key features:

- Reference to Fiddle Time Starters pieces, a copy of which will be provided for every student
- A set of termly milestones
- Reference to some of the common exercise/activity types. Some weeks these activities are specified on the lesson plan, some weeks these are left to the tutor to complete. We have also provided a bank of activities as a starting point although tutors may wish to supplement these with other activities from Fiddle Time Starters as well as their own materials.

WEEK	ACTIVITY	FIDDLE TIME STARTERS EXERCISE
1	<p><u>Warm up</u></p> <ul style="list-style-type: none"> ● Introduction: parts of the instrument, materials used. <p><u>Posture</u></p> <ul style="list-style-type: none"> ● How to hold the instrument in rest position and playing position. How to take out and put away. <p><u>Rhythm</u></p> <p><u>Pitch/singing</u></p> <p><u>Notation</u></p> <ul style="list-style-type: none"> ● Introduce names of open strings <p><u>Other</u></p>	

Appendix 2: Drama curriculum (Example weeks 3 and 4)



Creative Futures (UK) Ltd and the Education Endowment Foundation ***Act Sing Play - Investigating the impact of arts provision on achievement***

Introduction to KS1 Year 2 Drama Programme of Study

Type of Drama:

Based on Dorothy Heathcote inspired **Process drama** with some influences from Vivian Gussin Paley's helicopter technique. **Emphasis is on being present in the drama and understanding situation, character journeys and emotions through lived experience, rather than preparing a pre-written entertainment piece for an audience.**

The principle is based on the idea that the pupils have ownership of the stories and are an integral part of the telling of them, and therefore are strongly motivated to communicate as clearly as possible. The aim of all the activities is to build the pupils' confidence, communication skills and focus, as well as encouraging imagination and thinking. It is very important to set expectations clearly and make sure there are ground rules that are adhered to, as without this there is a danger that it can become a threatening and embarrassing experience for some pupils.

The Stories

The stories are planned with a strong structure, but the pupils often create the details; this process is modelled by the practitioner when narrating parts of the story or in role. Questioning pupils and asking them for contributions to the story happens as part of this process, so the story will never be taught exactly the same way.

There is a strong incorporation of **extra-curricular learning** in all of the stories. The reason for this is not in order to justify the place of Drama on the curriculum, but because the drama needs to be *about something* for it to have purpose and dramatic tension. The subject matter was chosen to (hopefully!) be of interest and educational relevance to the pupils and the practitioner needs to make sure they have done some background research and reading necessary to be able to confidently explore the topic. There are suggestions for where to look for information for each block or workshops.

The importance of **dramatic tension** is key as this gives intention to all the drama and it means that you avoid the problem of a child being expected to improvise a scene, not knowing what to do and getting embarrassed. The **framing** of the stories is also very important as it means that the participants are in situations that place them in relation to the unfolding action. Sometimes they are very much present in the action, sometimes looking at it from a distance (either temporally, or

physically/emotionally). This variety is important to ensure that the intensity of the experience is not too overwhelming, but it also helps the pupils develop reflective thinking skills.

Delivering the Workshops

TIR –Teacher in Role

Many exercises require the practitioner to be in role, but this doesn't mean you have to be good at acting and it is not something to worry about if you are not an experienced performer, it just needs preparation. Sometimes it is more effective to down-play the characters, not putting on funny voices etc. which can startle some pupils and possibly cause disruption. Explaining that you will be playing characters is important to establish at the start, and you often indicate when you are going to do it verbally and using a symbolic piece of costume (eg a scarf).

Playing roles and narrating:

I have indicated suggested things to say here in italics, none of it should be seen as lines that have to be learned, they are just a guide to help you and pupils improvise. I have included quite a bit of imaginative detail in places as an indication of how you can approach each role or bit of narration in a way that might engage the pupils, but it really is up to you how you do it. It is a good idea to focus on the aspects of the story or characters that capture your own imagination and make the scheme unique to you and appropriate to your class.

Behaviour management/space:

If you have a carpet space, pushing a few desks away should be sufficient but you will need more space than just the carpet. Using your normal classroom clapping signals is a good idea, but you will also need to establish some rules about Drama – making sure that we do not laugh or mock people when they are acting is the most important one, but keeping all the behaviour management linked to the story is very effective. For example, keeping them on task can be linked to the story, eg. *you need to collect all the orchids quickly or it will be dark*. Most of the activities have behaviour management in mind so they are all contained to a certain degree but they can be further simplified or restricted with children with more challenging behaviour. Choosing pupils who are focussing well first when doing a story square, or giving out roles is a good positive behaviour incentive. Pupils can always have roles taken away from them and be given different things to do if they are finding something too challenging.

Simplification/being flexible:

Depending on the ability range and confidence of your pupils (and any other factors that might affect how sessions run), you may need to simplify or even cut down on the number of activities you do with the class. For example, whole class improvisations can be turned into large frozen images, or small group frozen images. In a story square, you can ask pupils to make frozen images rather than role plays. A frozen image can then come to life when they are more confident. If one exercise is proving very beneficial and engaging for all the pupils, then you can be flexible with the plans, as long as the overall story has been covered in the whole block. Similarly, if something is going really badly, it would be much better to adapt and change what you are doing than try to push on with something that isn't working.

Remember, you can always narrate parts of the story quickly yourself if you have not got time to for one of the activities.

w/s 3 & 4	<p>Objectives: To take part in a group improvisation, understand basics of photosynthesis and imaginatively explore the possibilities of the story.</p> <ol style="list-style-type: none"> 1) Start with a simple circle game like Chinese whispers. 2) Teacher narrates: <i>Zeepob2 makes another call to the mission control to update them on what she has learned. Using the story square, choose a few pupils to take turns in making a radio call telling them what she has discovered from the last lesson. TIR as Mission control, you can reveal some things about her planet/story in your responses.</i> <i>What, you mean you are actually on that tiny blue and green planet 3rd nearest the sun in the nine-planet spindle?... Well I never, We had no idea they had intelligent life forms. So what is this 'speaking'?... Oh, communicating through oral sound-making and visual symbols... Gosh, so they don't use (you can reaffirm whatever method of communicating the pupils decided on earlier here, eg brainwave pulses) then? How strange...</i> 3) Teacher narrates: <i>The humans invite the alien to a banquet as they are also a bit worried as they haven't seen her eat anything yet. What would be the best things to serve to show off earthly cuisine? Pupils to suggest ideas and other pupils to act out making them in pairs using story square method.</i> 4) Whole class improvisation. We are all at the banquet – set out the physical parameters of where all the food is clearly. TIR as alien, looks very strangely at the food, picks it up and doesn't know what to do with it. 5) Discussion: <i>How do you think the Alien would eat?</i> 6) Teacher narrates: <i>The Alien tried to communicate this by picking up a plant and pointing at the sun and a watering can. Discussion: What do you think she means? Take discussion further to discuss what plants need to live. What would it mean if we only needed water and sunlight to live? How would the world be different?</i> 	<p>Establish focus.</p> <p>Recall the events in the story from previous lesson.</p> <p>Participate in whole group improvisation</p> <p>Use imagination and verbal describing skills to describe knowledge of plant and animal life</p> <p>Contribute to story square</p> <p>Participate in whole group improvisation Develop miming skills</p> <p>Use imagination and verbal describing skills to think about possibilities of alternative ways of existing.</p>
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Appendix 3: Singing curriculum (Example weeks 1 and 2)

Please add your own ideas, games and songs as you wish to reinforce the learning. Anything work particularly well? Please share with the other tutors via the email list.

If there is anything in these plans you don't understand, please contact me direct. Focus on the learning objectives – how you get there is up to you; the activities are a guide so don't worry if you add things or miss bits out or deliver things in a different order. When a song/activity has a long list of learning attached, please take two or more lessons to cover the sequence. I suggest g and e might be a more effective tonal centre than A and F# in the two note songs.

Term 1 6 workshops

Overall aim/theme: To experience the beat or pulse in music; to begin to discriminate between beat and rhythm; to discover different voices, including the singing voice

Weeks 1 & 2

	Learning Objectives: we are learning to...	Assessment Criteria: what I'm looking for...
w/s 1 & 2	Show and feel the beat Discover and use a singing voice	Experience and learn about the pulse in music; Speak rhythmically and show the beat in various ways; Explore different voices – Sirening (running voice up and down entire range and extending this range), speaking/whispering/singing/funny voices etc; Sing songs with limited note range using (s-m-l)

Engage: have a variety of ice breaker/ warms up your sleeve. Start with a welcome song of your choice and/or a rhythmic greeting (e.g. tap, tap, say your name). If appropriate, try 'A Monster came to visit you and he roared' (to the tune of 'The animals came in two by two') Try also 'Owl warm up' for vocal placement

Learning (split the learning sequence over the two lessons, with plenty of chances to redo, refine, and consolidate):

1. **Rep No. 16: Pease Pudding Hot** - T speaks it to pupils adding a clap on each crotchet rest; T asks pupils how many claps they heard (three!); T takes speaking part and pupils provide the claps;
2. Replace claps with expressive sounds: a blowing sound after "hot", a shivering sound after "cold" and a vomiting sound ("blah!") after "old"; again T takes speaking part and pupils make the three sounds;
3. Change jobs: pupils now take speaking part and T makes the sounds or divide class into 2

4. Change jobs again: split class into four groups - (1) first phrase; (2) second phrase; (3) third phrase; (4) sounds, and perform the chant again.
5. Teach the children to sing the song, starting on d
6. Stand in a space and pass a bean bag/picture etc around the room on the phrases. Extn: Able pupils may be able to pass the object exactly on the rest!
7. Tap the beat (two hands on knees) whilst singing the song
8. Now T speaks the chant and taps the rhythm while pupils provide three sounds
9. Now T taps the rhythm without speaking and pupils provide the three sounds;
10. Change jobs as above
11. Now T performs the chant in the thinking voice, without tapping the rhythm but showing the pulse by tapping her/his foot on the floor and have pupils provide the three sounds;
12. T asks pupils what they noticed: explain idea/concept of pulse and beat in music
13. Try using 'traffic lights' for singing voice (green), clapping and singing in your head (amber) and singing in your head – teacher not indicating pulse)- (red). NB – change the light on the phrase with enough time for pupils to process
14. Pupils invent other ways of showing the pulse – play the game 'clockwork soldiers'

Vocal warm up: 'Have you got your...voice?' Also – 'Hippos and Mice'

1. Now teach Song 1 (l, l, me oh my). Pass around a 'pie' on the beat (beanbag – show the children how to do this first and hold up the flow of the song if a child passes too slowly – speed up if too quickly etc). When the song gets to 'cherry' the child who has the 'pie' speaks their idea for a new pie. NB ask children to think and decide what they will say before the song starts! Next, ask some children to try to sing their response. Pupils can suggest other kinds of pie - apple/strawberry/chicken/etc...
 2. Teach 'Bounce high, bounce low' ('Songs for Y2 '). Use a large ball; pupil pushes the ball across the circle as they sing a child's name on the final two notes. Gently correct this to enable children to find accurate tuning
- Extra material 'Jack in the box' (songs for Y2)

Review: Review what has been achieved and celebrate/perform at the end of each lesson.
Where do we/you need to go next?

Appendix 4: Pro forma used by researchers in observations of strings classes

School Ref:
Pupil behaviour:
Pupil engagement:
Fidelity to the programme:
Classroom setting:
Resources/equipment:
Other observations:

Appendix 5: Consent letter for parents



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FREE music and drama tuition for Year 2 pupils next year

“Act Sing Play: Investigating the impact of arts provision on achievement”

Dear Parent,

Your child’s school is going to be part of an exciting national project next year involving free weekly music or drama workshops for all Year 2 pupils. In addition to offering a great introduction to playing an instrument, singing or drama, the project will give us a chance to look at the impact of these activities on literacy and maths skills.

Here are some key facts about the project:

- All activities will take place during normal school hours
- Musical instruments will be provided free of charge
- There is no charge for any aspect of the project: it is completely free
- Some literacy and maths tests will be completed by children at the end of this summer term as well as at the end of the project next summer – these will be short and will be done during the school day as normal
- Pupils will be randomly allocated to one of the three activities: some will learn a string instrument, some will do singing, some will do drama
- No pupils or schools will be named in any published reports about the project, or on the internet
- All tutors delivering the programme are experienced, professional, CRB-checked individuals
- The project is being run and managed by a charity called Creative Futures (UK) Limited, with funding from the Education Endowment Foundation.

More information about the project is attached. If you want to discuss any aspect of the project, or you have concerns about your child taking part, please contact your school.

Thank you

A handwritten signature in black ink that reads 'Julian Knight'.

Julian Knight, Creative Futures (UK) Limited

Appendix 6: Subgroup analysis of primary outcomes

Table F1a: Analysis of primary outcome, maths—intervention (strings) versus control (drama), FSM pupils only

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	0.005 (-0.255 to 0.265)
Regression coefficients (95% CI)	2.01 (-1.83 to 05.86)	0.05 (-2.42 to 2.51)
P-value	0.305	0.971
ICC (SE)	0.131 (0.101)	0.322 (.124)
Variance school level (SE)	13.81 (11.67)	14.35 (7.66)
Variance pupil level (SE)	92.28 (14.05)	30.24 (4.58)
Total sample size (schools)	100 (14)	100 (14)

Table F1b: Analysis of primary outcome, maths—intervention (strings) versus control (drama), FSM interaction model

	Adjusted analysis
Regression coefficient of the interaction between FSM status and experimental cell (95% CI)	-0.90 (-1.91 to 3.71)
P-value	0.529
ICC (SE)	0.222 (0.065)
Variance school level (SE)	11.43 (4.24)
Variance pupil level (SE)	39.94 (2.47)
Total sample size (schools)	542 (19)

Table F2a: Analysis of primary outcome, literacy—intervention (strings) versus control (drama), FSM pupils only

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	-0.02 (-0.32 to 0.28)
Regression coefficients (95% CI)	1.74 (-1.49 to 4.97)	-0.15 (-2.51 to 2.20)
P-value	0.292	0.899
ICC (SE)	0.018 (0.059)	0.001 (0.052)
Variance school level (SE)	1.25 (4.05)	0.04 (1.53)
Variance pupil level (SE)	67.14 (10.10)	29.27 (4.41)
Total sample size (schools)	100 (14)	100 (14)

Table F2b: Analysis of primary outcome, literacy—intervention (strings) versus control (drama), FSM interaction model

	Adjusted analysis
Regression coefficient of the interaction between FSM status and experimental cell (95% CI)	-0.54 (-2.85 to 1.78)
P-value	0.650
ICC (SE)	0.069 (0.033)
Variance school level (SE)	2.02 (1.01)
Variance pupil level (SE)	27.24 (1.68)
Total sample size (schools)	542 (19)

Table F3a: Analysis of primary outcome, maths—intervention (singing) versus control (drama), FSM pupils only

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	0.01 (-0.25 to 0.27)
Regression coefficients (95% CI)	-1.52 (-5.25 to 2.20)	0.11 (-2.30 to 2.52)
P-value	0.424	0.929
ICC (SE)	0.000 (0.000)	0.056 (0.107)
Variance school level (SE)	0.00 (0.00)	1.89 (3.67)
Variance pupil level (SE)	89.30 (12.69)	31.64 (5.11)
Total sample size (schools)	99 (15)	99 (15)

Table F3b: Analysis of primary outcome, maths—intervention (singing) versus control (drama), FSM interaction model

	Adjusted analysis
Regression coefficient of the interaction between FSM status and experimental cell (95% CI)	0.91 (-1.84 to 3.67)
P-value	0.516
ICC (SE)	0.197 (0.061)
Variance school level (SE)	9.34 (3.54)
Variance pupil level (SE)	38.05 (2.35)
Total sample size (schools)	545 (19)

Table F4a: Analysis of primary outcome, literacy—intervention (singing) versus control (drama), FSM pupils only

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	-0.03 (-0.31 to 0.25)
Regression coefficients (95% CI)	-1.41 (-4.91 to 2.10)	-0.31 (-2.67 to 2.06)
P-value	0.431	0.799
ICC (SE)	0.027 (0.047)	0.000 (0.000)
Variance school level (SE)	2.15 (3.77)	0.00 (0.00)
Variance pupil level (SE)	77.90 (11.48)	31.31 (4.45)
Total sample size (schools)	99 (15)	99 (15)

Table F4b: Analysis of primary outcome, literacy—intervention (singing) versus control (drama), FSM interaction model

	Adjusted analysis
Regression coefficient of the interaction between FSM status and experimental cell (95% CI)	1.73 (-0.68 to 4.13)
P-value	0.160
ICC (SE)	0.006 (0.014)
Variance school level (SE)	0.18 (0.41)
Variance pupil level (SE)	29.52 (1.82)
Total sample size (schools)	545 (19)

Table F5a: Analysis of primary outcome, maths—intervention (music) versus control (drama), FSM pupils only

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	0.02 (-0.20 to 0.24)
Regression coefficients (95% CI)	0.32 (-3.10 to 3.75)	0.22 (-1.91 to 2.35)
P-value	0.853	0.836
ICC (SE)	0.118 (0.081)	0.194 (0.090)
Variance school level (SE)	12.92 (9.68)	8.34 (4.62)
Variance pupil level (SE)	96.28 (11.66)	34.61 (4.62)
Total sample size (schools)	151 (15)	151 (15)

Table F5b: Analysis of primary outcome, maths—intervention (music) versus control (drama), FSM interaction model

	Adjusted analysis
Regression coefficient of the interaction between FSM status and experimental cell (95% CI)	0.16 (-2.32 to 2.56)
P-value	0.894
ICC (SE)	0.208 (0.060)
Variance school level (SE)	10.20 (3.66)
Variance pupil level (SE)	38.95 (1.95)
Total sample size (schools)	814 (19)

Table F6a: Analysis of primary outcome, literacy—intervention (music) versus control (drama), FSM pupils only

	Unadjusted analysis	Adjusted analysis
Effect Size (CI)	-	Cannot estimate. Model does not converge
Regression coefficients (95% CI)	0.24 (-2.73 to 3.20)	
P-value	0.875	
ICC (SE)	0.007 (0.034)	
Variance school level (SE)	0.54 (2.53)	
Variance pupil level (SE)	74.51 (8.87)	
Total sample size (schools)	151 (15)	

Table F6b: Analysis of primary outcome, literacy—intervention (music) versus control (drama), FSM interaction model

	Adjusted analysis
Regression coefficient of the interaction between FSM status and experimental cell (95% CI)	-1.10 (-3.12 to 0.93)
P-value	0.288
ICC (SE)	0.027 (0.016)
Variance school level (SE)	0.78 (0.48)
Variance pupil level (SE)	28.00 (1.40)
Total sample size (schools)	814 (19)

Appendix 7: Memorandum of understanding with schools



NatCen
Social Research that works for society



Leading education
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Institute of Education
University of London



Act Sing Play: Investigating the impact of arts provision on achievement

INFORMATION PACK

Thank you for your interest in taking part in our study to see if arts provision has an effect on children's achievement. This letter explains more about the project, including what you can expect to happen once you have confirmed your school's participation.

Creative Futures, with funding from the Education Endowment Foundation (EEF), is conducting a year-long study to assess the impact of a structured music and drama programme on the achievements of Year 2 pupils. We will be working with research teams from NatCen Social Research (NatCen) and the Institute of Education (IoE) to evaluate the programme.

The study is a randomised control trial so we will put Year 2 pupils into either musical instrument, singing or drama classes by a random method and once they are in a group, they cannot change. Children will take part in the assigned workshops for one academic year starting in September 2013, and finishing in June 2014. To evaluate the programme, it is important that we test the educational attainment of all participating pupils before and afterwards. This will allow researchers to assess the impact of the various activities on children's achievements and is a vital part of the programme. Members of the research team will also visit a small number of schools to observe the workshops and talk to staff about how the programme is being delivered in their school.

If you agree for your school to take part in the programme, we will provide letters for you to send to parents explaining what the study involves. This will give the parents an opportunity to opt their child out of the programme – although we hope that with your help no parents will decide to do this.

There is more detailed information about what to expect from taking part in this programme in the following pages of this letter. We very much hope that your school is able to take part in this important study which will help provide a valuable insight into how high quality music tuition may help children do better at school.

Please sign and return the attached form to me as soon as you can and no later than by **Friday 10 May** giving permission for your school to take part. You need only send p.6 of this form to me – the page with your signature – and this can be sent to me as a scanned file by email, or by post. We really hope you will confirm your involvement in this exciting project.

Meanwhile, if you have any questions about any aspect of the project please contact me.

Yours sincerely,

Julian Knight
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⑦ *How will pupils be allocated to the three different activities?*

Each Year 2 class involved will be randomly split into three equal groups of up to ten pupils. One group will learn a string instrument (predominantly violin, with some violas and cellos offered too); the second group will take part in a singing and vocal programme; and the third group will have drama lessons. Each group will do their activities weekly during the school day and will receive around 32 workshops over the academic year. The workshops will last for 45-50 minutes.

⑦ *Is it possible for pupils to choose which activity they are allocated to?*

No, because pupils will be randomly allocated to the different activities. This study is a randomised control trial which means that children can't choose what they want to study. We will put children into either musical instrument, singing or drama classes by a random method and once they are in the group, they can't change - this is critical to the design of the study to make sure that the approach is scientific and not biased by the choices of children or their parents.

⑦ *Why is it important for pupils to be randomly allocated to workshops?*

Random allocation is essential to the evaluation as it is the only way that we can say for sure what the effect of the intervention is on children's attainment. We hope that schools involved will support this and urge all parents of pupils in Year 2 to agree to the terms of this project.

⑦ *When will the project start and end?*

Workshops will take place during the school day, starting in September 2013 and finishing in June 2014.

⑦ *Who will be delivering the workshops?*

Creative Futures will be working closely with the Schools Music Service in each area, and many of the vocal and strings tutors for this project will be drawn from the pool of tutors already engaged by your local Music Service. Drama tutors are likely to be engaged directly by Creative Futures. All tutors will hold a valid CRB/DBS disclosure.

⑦ *How will the workshops be organised?*

Julian Knight from Creative Futures will liaise with your school to organise the workshops. All three activities will probably need to occur simultaneously in different rooms, so this may have implications on space and timetabling in your school. Tutor availability will be a factor too, and we will be grateful for any flexibility schools can bring to the timetabling. Once the timetable is set, we would ask that it be maintained for the whole year, and that any known events, trips or exams (etc.) that may cause disruption to planned workshops are identified as early as possible, so that alternative workshop times can be arranged if necessary.

⑦ *What will children learn in the workshops?*

We have devised a programme of study for each of the three groups (string instrument, vocal, drama), in order to ensure consistency across all 19 schools taking part in this study. The workshops will be instructive as well as fun, and are tailored to the needs and requirements of Year 2 pupils. The string instrument lessons will assume that all the pupils are beginners and will take them through the first stages of learning the violin, viola or cello; the vocal curriculum is based on the Kodaly Method and will give a thorough musical grounding through rhythm and singing; and the drama curriculum will develop the imagination through story-telling.

② ***Will musical instruments be provided?***

We will provide string instruments for all pupils allocated to the string lesson group. It may be possible to choose between violin, viola and cello, although the majority of pupils will be learning to play the violin.

② ***Can pupils take the instruments home?***

Yes, we encourage this so that they can practice if they want to – as long as they bring them back to school each week for the workshop.

② ***Will pupils be able to keep the musical instruments after the project has ended?***

The string instruments will be provided on loan, so we will want them back eventually. As the instruments are likely to be less than full-size, they will not last the pupils for ever. If pupils want to hold on to their instrument for a period of up to one year after the project finishes in order to continue learning (eg through the Music Service), we will extend the instrument loan accordingly. Most of the instruments will be transferred to your local Music Service after the project, so that other pupils in your area can use them in future.

② ***Will all children be able to take part in the programme?***

This is an inclusive programme, and we would like all Year 2 pupils, including those with Special Educational Needs (SEN), to take part. In the case of some statemented pupils only, where their specific situation means that they are unable to participate in particular activities, we will consult with you and allocate them to the activity that is most suitable for them. This is the only situation in which a pupil would be allocated to an activity outside the random allocation.

② ***What sort of research activities will children and school staff be taking part in, in addition to the workshops?***

NatCen and the IoE will carry out two rounds of pupil testing - one round before the music programme starts and one round after it ends. Tests will be administered to all pupils taking part in the programme.

Researchers will also monitor how the project is working in schools, including through: profiling and monitoring the attendance of participating pupils; a short online school survey; and carrying out case studies of some of the participating schools which will consist of short interviews with key members of staff and observations of some workshops.

② ***Why do you need to carry out pupil testing?***

As this project is primarily a research project, we need to test children before they start the programme of workshops and at the end of the programme. We will combine results from the 19 schools taking part in this study in the analysis and will compare how well children in the three groups (string instrument, singing and drama) did at the end of the programme in terms of their numerical and literacy skills.

② ***When will testing be done?***

Tests of numerical and literacy skills will be carried out by NatCen in June-July 2013, when pupils are in Year 1. Any new pupils who join the school in September 2013 will take the tests at the beginning of that term. All participating pupils will then be tested again at the end of the programme in June-July 2014.

Researchers from the Institute of Education will carry out tests around musical skills and self-efficacy. These will take place once the pupils have been allocated to their respective activities in September 2013, and in May/June 2014.

① ***How will the tests be administered?***

NatCen interviewers will administer the paper and pencil tests in small groups of 5 or 6 children. The interviewers will be fully trained in how to administer the tests to children. They will liaise with your school to arrange a convenient time to visit and carry out the tests. NatCen interviewers working on this project are all CRB checked.

Researchers from the IoE will work alongside class teachers to complete a simple 'smiley face' questionnaire. All pupils will complete this element of the research, working individually (with support where needed) within the classroom setting. In addition, researchers from the IoE will assess the singing competency of those pupils allocated to the singing programme. Working in groups of 4 or 5, the pupils will work with the researcher to complete a series of simple vocal tasks such as singing a well-known melody and copying short extracts sung by the researcher. The researchers are specialists in music education research who will work with schools to create an enjoyable experience for pupils. All researchers are CRB/DBS cleared. Finally, the tutors for those pupils allocated to the string programme will complete simple end of term records of achievement.

① ***What tests will you be using?***

NatCen will be using the reading and maths modules of the Performance Indicators in Primary Schools (PIPS) which are produced by Durham University's Centre for Evaluation and Monitoring (CEM). Each of these two modules will be administered on different days and take up to 30 minutes to complete with pupils.

The IoE will use a pupil questionnaire and singing assessment based on research tools established in the research evaluation of the National Singing Programme (see imerc.org for further details). The pupil questionnaire will take up to 30 minutes to complete. The singing assessment will take up to 12 minutes to complete (as part of a group of 4-5 pupils).

① ***What is involved in the observations of workshops and case studies:***

NatCen and the Institute of Education researchers will be observing some workshops over the course of the year and developing qualitative case studies based on some of the schools. 5 schools will be selected by NatCen and 5 schools by the IoE.

NatCen's researchers will observe two sessions (one of a stringed instrument and one of a singing lesson) and carry out four 30-45 minute interviews in each of the case study schools with key members of staff involved in the delivery of the music workshops as well as a member of staff who has oversight of music tuition in the school. IoE researchers will also attend two sessions (one stringed instrument and one of a singing lesson) in order to observe best practice in the teaching of these subjects.

If your school has been chosen for these observations or case studies, we will liaise with you about this separately to arrange a convenient time to visit.

① ***What will parents be told about the music programme?***

Parental permission will be sought for all pupils involved in the project, and we very much hope that, with the school's help, all parents will agree to their children taking part in this programme.

We will give you letters to send to parents in participating classes explaining what the programme involves. Parents will be given an opportunity to 'opt out' of the music programme by letting your school know if they do not wish their child to take part. However, it will not be possible for parents to opt out of the testing and still receive the workshops. In other words, if children want to take part in the project, they will also need to take part in the testing phases of the programme too.

⑦ ***How will teachers be involved in the programme?***

NatCen interviewers will ask class teachers to provide some background information about the participating pupils to help provide some context to the analysis we do. This information will be the child's Unique Pupil Reference Number, gender, date of birth, eligibility for Free School Meals, ethnicity and SEN status for each pupil involved in the music programme. This will be explained in the letter to parents.

⑦ ***What about data and confidentiality?***

Pupil's test responses, and other data requested from the school, will be collected and accessed by the research teams at NatCen Social Research and the IoE, and will be treated in the strictest confidence and in line with the Data Protection Act. With the permission of the Department for Education, named data will be matched with the National Pupil Database and shared with NatCen Social Research and the EEF for research purposes only.

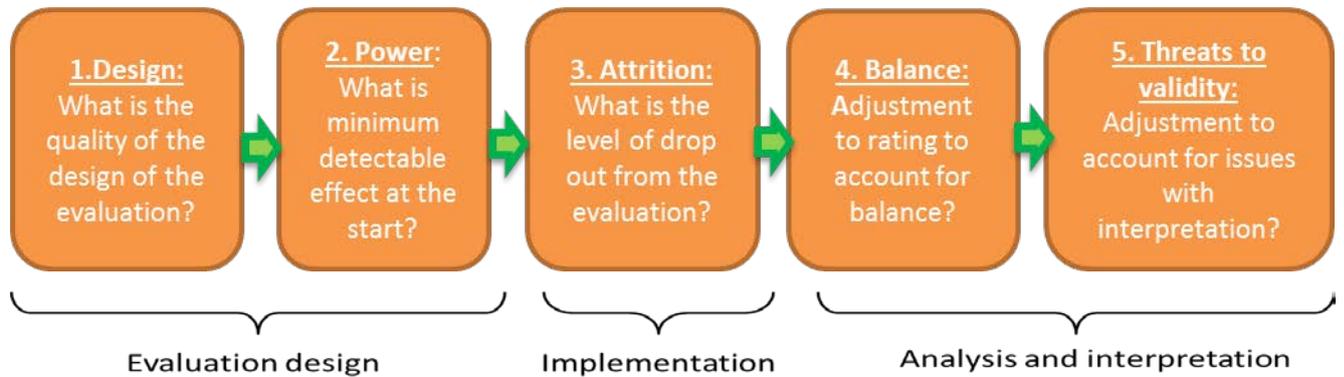
⑦ ***How will the data be used?***

The data from this study will be used to prepare research reports for publication. No individual schools or pupils will be identified in any reports arising from this research. Data from each of the 19 schools involved in the project will be analysed anonymously, and findings will be reported anonymously, for example "x % of children had numerical skills at x level or above", so it will not be possible to identify individual pupils or schools.

⑦ ***Will there be a report on the project's findings?***

Published reports with research findings are due to be available at the end of 2014, and we will be very happy to share our findings with the schools involved.

Appendix 8: Security classification of trial findings



Rating	1. Design	2. Power (MDES)	3. Attrition	4. Balance	5. Threats to validity
5	Fair and clear experimental design (RCT)	< 0.2	< 10%	Well-balanced on observables	No threats to validity
4	Fair and clear experimental design (RCT, RDD)	< 0.3	< 20%		
3	Well-matched comparison (quasi-experiment)	< 0.4	< 30%		
2	Matched comparison (quasi-experiment)	< 0.5	< 40%		
1	Comparison group with poor or no matching	< 0.6	< 50%	↓	↓
0	No comparator	> 0.6	> 50%	Imbalanced on observables	Significant threats

The final security rating for this trial is 4 . This means that the conclusions have moderate to high security.

This evaluation was designed as a randomised controlled trial, and the sample size was designed to detect a minimum effect size of less than 0.2. There was low to moderate attrition (11%), reducing the number of padlocks to 4 . There was no indication of imbalance at baseline. The post-tests were administered by the evaluators and marked by an independent testing company. Therefore, there were no substantial threats to validity and the final security rating is 4 .

Appendix 9: Cost rating

Cost ratings are based on the approximate cost per pupil per year of implementing the intervention over three years. More information about the EEF's approach to cost evaluation can be found on the EEF website. Cost ratings are awarded as follows:

Cost rating	Description
£	<i>Very low:</i> less than £80 per pupil per year.
£ £	<i>Low:</i> up to about £200 per pupil per year.
£ £ £	<i>Moderate:</i> up to about £700 per pupil per year.
£ £ £ £	<i>High:</i> up to £1,200 per pupil per year.
£ £ £ £ £	<i>Very high:</i> over £1,200 per pupil per year.

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