



University of Dundee

'Arts and smarts'

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Evaluating Sistema Scotland

'Arts and smarts' – assessing the impact of arts participation on academic performance during school years: Systematic literature review (Work Package 2)

October 2014



This report has been commissioned by the Glasgow Centre for Population Health (GCPH), and the findings and views expressed herein do not necessarily represent those of the GCPH or its partners.

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Foreword

Social policy in Scotland prioritises the early years as the key life-stage during which future health trajectories are determined. It is during the early years that evidence-based, effective universal services and high-quality interventions which are intensive and sustained can yield the greatest impact on future health.

The impact of the arts on school performance and education attainment has been the subject of much research in recent years. The proposed causal pathway within this body of evidence has been termed by some as ‘arts and smarts’. A number of studies report enhanced academic performance and attainment and greater discipline for children learning musical instruments. The hypothesised implications for future health trajectories are obvious: higher levels of academic attainment are associated with better health outcomes in later life, due, in part, to the increased potential for higher income and better quality employment. However the quality of evidence concerning the causal pathways in arts and smarts has been questioned and the pathways remain unclear.

In recent years research within the broad field of neurological imaging has come to the fore within the arts and smarts literature. Neurological imaging has the potential to illuminate the causal pathway between arts participation and enhanced brain functioning which contributes to higher academic performance.

This systematic literature review is the second of three commissioned by the GCPH designed to inform the GCPH-led evaluation of Sistema Scotland. This review considers the evidence relating to ‘arts and smarts’ over the past ten years and is central to providing an overview of recent evidence directly relating to the delivery of Sistema Scotland’s work. This will inform the methodologies planned in the long-term evaluation of Sistema Scotland. In addition to music-making, the review considers the quality of evidence underpinning the theorised pathways between a variety of art forms, education and health; crucially the review will also identify gaps in the evidence. This is important to ensure that the Sistema evaluation contributes new insights to this evidence base and is utilised in supporting the design and delivery of arts programmes in educational and community settings as social interventions.

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‘Arts and smarts’ – assessing the impact of arts participation on academic performance during school years

Systematic Literature Review (Work Package 2)

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Executive Summary

1. Introduction

Glasgow Centre for Population Health commissioned this systematic literature review. It focuses on the impact of arts participation on academic performance during school years.

1.1 Research Questions

- i. What is the impact of participation in arts on academic achievement?
- ii. What is the impact of arts attendance on academic achievement?
- iii. What is the impact of participation in arts on health and wellbeing of school-aged children?
- iv. What is the impact of arts attendance on health and wellbeing of school-aged children?
- v. What are the differences in impact, if any, based on the child's gender, age, SES, or ethnicity?
- vi. Which theories, if any, underpin the research on arts and academic achievement?
- vii. What outcome measures have been used in the studies examining the impact of arts on academic achievement?

2. Methodology

The approach to conducting the different types of reviews and to forming an evidence synthesis was based on key principles and methodological approaches of EPPI-Centre. It involved the following steps:

1. Scoping the review
2. Searching for studies
3. Screening studies
4. Describing and mapping
5. Quality and relevance appraisal
6. Synthesising study findings
7. Conclusions/recommendations

3. Results

The final number of papers included in this report is 31.

3.1 Impact of participation in arts on academic achievement

Twenty of the selected studies addressed research question 1: the impact of participation in arts on academic achievement.

3.1.1 Pre-school children

- There were two studies and both used experimental design.

- Both studies found positive impact of music, although one study used multiple art forms along with music, such as creative movement and visual arts.
- Although the number of studies in this age group with robust design is limited, findings suggest that music can be effective with pre-school children.

3.1.2 Primary-aged children

- Of the nine studies that looked at the impact on primary pupils of participation in arts, five focused on music (including instrumental), three addressed multiple art forms (visual arts, music, drama and dance) and one concerned arts integration in the curriculum.
- Only seven studies used any specific objective measures of achievement. Of these, six reported evidence of impact, whilst one found no evidence of impact.
- Of these seven studies using clear measures to ascertain impact, in four cases either the research design or measures of significance were not transparent. This led to difficulties in establishing whether a causal relationship was found between participation in arts and improvement in academic achievement, since several other variables such as IQ were not controlled for.
- The review team found only three longitudinal studies amongst those which claimed impact, which suggests that most of the impact claimed by other studies was over relatively short time periods. The other longitudinal study reported that there was no evidence of impact.
- The length of participation in the arts was seen to increase the impact of arts on achievement.

3.1.3 Secondary-age Pupils

- Of the four studies with secondary-age pupils, three focused on music (including DJ-ing, MC-ing and band/orchestra) and one included a range of arts including attendance along with participation.
- Two studies used existing longitudinal datasets with one finding impact and the other no impact. It is worth noting that these datasets were created for purposes other than looking at the impact of arts on achievement.
- One used standardised scales of self-esteem and self-concept as well as results of academic achievement. Another undertook interviews and observations with a small sample.
- Only two studies that met the selection criteria and had a robust methodology found that there is a positive association between arts participation and academic achievement. It is unclear, however, whether these studies controlled for general aptitude since there is a strong suggestion that pupils participating in the arts tend to come from academically-advantaged groups.
- The one study, which claimed to control specifically for ‘general ability’, found no evidence of impact.
- One small-scale study only reported some impact.

3.1.4 Cross-phase Studies (Primary and Secondary, Pre-school, Primary and Secondary-aged pupils)

- Three studies focussed on the impact of music on achievement whereas two reported on multiple art forms.
- There was one longitudinal study that collected data at baseline and approximately six months after the implementation of the music programme.

- As with the findings for primary and secondary pupils, cross-phase studies present a range of strengths of association between arts participation and academic achievement – from strong to none at all.
- The best evidence appears to link prolonged participation in music with certain aspects of mathematics (e.g. geometry) and language proficiency.
- The ‘quality’ of this participation also appears significant, though whether there is universal agreement over what constitutes ‘high quality’ musical instruction is debatable.
- One cross-phase study found that findings were more consistent for secondary school pupils.

3.1.5 Academically-related impacts

Academically-related impacts that could then in turn have impact on attainment were reported by some of the 20 studies above and a few others, such as improvement in verbal and visual memory (Greenberg, 2010; Heyning, 2010), vocabulary (Heyning, 2010); listening and learning skills (Greenberg, 2010; Imms et al., 2011); problem solving and thinking skills (Jeanneret, 2010; Portowitz et al., 2009); commitment to education (Stahl & Dale, 2013); working better as a team and perseverance (Bryce, 2004; Hallam et al., 2011; Imms et al., 2011); improved attitudes towards learning/school and ability to engage with the world of education (Burnard, 2008; Gacherieu, 2004); concentration and ability to organise (Hallam et al., 2011).

3.2 Impact of arts attendance on academic achievement

- Only two studies that met the criteria for inclusion focussed on any link between attending arts events and children’s achievement.
- One study was a longitudinal study conducted over three years and one used an experimental design.
- The first of the above studies shows, somewhat surprisingly, that relatively rare attendance at arts events can indeed have a positive impact upon children’s academic achievement. The second – although not strictly dealing with *attendance* at an event as background music was being played to pupils in the classroom – suggests some benefits and some adverse effects on some children in some contexts of listening to music whilst they undertake other tasks.

3.3 Impact of participation in arts on health and wellbeing of school aged children

- Two studies considered impact on wellbeing (Hallam et al., 2011; Vaughan et al., 2011). Both found positive impact.
- Eighteen studies (including the two above) which were included in the review provided indicators that can be considered to suggest the impact of participation in arts on social and emotional wellbeing.
- No study reported on the impact of arts participation on physical health. This could be due to the review focussing on primarily educational databases.

3.4 Impact of arts attendance on health and wellbeing of school aged children

- One study, by Schiller (2006), reported on the impact of attending two to three theatre performances each year and found that pupils' social skills and behaviour improved, as well as developing more respect for each other.
- No study reported on the impact of arts attendance on physical health.

3.5 Differences in impact based on the child's gender, age, SES, ethnicity

- Eight studies looked at demographic variables such as gender (n=2) and SES (n=6).
- Findings appear to be contradictory, with one study showing positive impact on girls and one suggesting that background music was more disruptive for girls.
- In terms of SES, three found that the achievement levels of children from low SES improved due to participation in arts, two found that achievement improved for both low and high SES groups, and one indicated that overall achievement was higher for children from high SES.

3.6 Theories underpinning the research on arts, academic achievement and wellbeing

- Only seven studies made a reference to theories underpinning either the arts approach or the research approach that had been adopted.
- Only one theory was considered by more than one study, namely Bandura's (1986) Social Cognitive Theory.

3.7 Outcome measures used in studies examining the impact of arts, academic achievement and wellbeing

- Different studies set out to measure different outcomes, as well as finding concurrent outcomes emerging as a result of participation and attendance in arts.
- The outcome measures were varied, with some designed by the researcher for the purposes of the study and some standardised measures.

3.8 Pathways of impact

- Two studies reported immediate pathways of impact.
- One found that due to the arts enrichment programme, preschool children were more prepared to start school.
- One reported that young people with increased involvement in arts had Higher Grade Point Averages, and increased uptake of and better academic outcomes in further education.

4 Discussion and Conclusion

- Although several studies reported impact of participation in arts on achievement; not all evidence was robust and it usually pointed to a positive relationship between arts and achievement rather than a clear causal effect.
- None of the studies that met the inclusion criteria focussed on health. Only two studies focussed on wellbeing but sixteen others included indicators of wellbeing.
- In none of the studies could causal relationship be established. Therefore, it is easier to say that arts, achievement and wellbeing are associated. It is more difficult to say with any confidence at all whether arts participation or attendance leads to better achievement and/or wellbeing.

- It is difficult to compare the impact of attendance and participation due to huge variation in numbers of studies for each aspect.
- The quality of arts programme played a role in impact of arts on achievement. However, what constitutes good quality arts programme is debatable and dependent on individual's preferred learning styles as well as purpose for joining the programme.
- Studies looking at gender and SES had somewhat contradictory findings.
- Two studies in particular mentioned clear pathways.
- The arts practice and research seem to be under-theorised.

4.1 Methodological critique

- Several factors impinged on the robustness of the evidence, namely several uncontrolled variables, lack of clarity of causal relationship, lack of objective measures, lack of delayed follow up after the completion of the arts programme, and mix of arts forms (sometimes with sports and other co-curricular activity). The sample size was also variable in the reviewed studies. This makes some of the research findings difficult to generalise.

4.2 Implications for Future Research

Future research should:

- use objective, validated measures of academic achievement,
- control for confounding variables,
- adopt longitudinal designs to capture longer-term impact,
- build in a baseline and follow up phase,
- employ source and methodological triangulation,
- try to establish cause-effect,
- ascertain generalisation of impact in other contexts and with other people.

4.3 Implications for Policy and Practice

- Provide excellent quality arts programmes with appropriate funding.
- Ensure accessibility of arts programmes for children from low SES.
- Arts programmes and activities should be provided for a sustained period of time as researchers have reported that duration of arts participation is linked to impact on achievement and wellbeing.
- It is important that any theory underpinning the educational rationale for arts practice and associated research is explicit.

1. Introduction

Glasgow Centre for Population Health commissioned this systematic literature review. In the main it focuses on the impact of arts participation and attendance on academic performance, and health and wellbeing during pre-school and school years. With this in mind, we examined the relevant research literature between 2004 and 2014, to respond to seven research questions. Review of this literature revealed that arts, health and wellbeing were not always clearly conceptualised. The same applies to the terms ‘impact’ and ‘significant impact’; there are various nuances in literature from statistically measurable to perceptual. It is important to acknowledge that as this review aims to identify the *evidence* of impact, it is using a particular lens, which the authors of the included literature might not have used. Arts practitioners and researchers have indeed been contesting these issues for some time.

1.1 Research Questions

- i. What is the impact of participation in arts on academic achievement?
- ii. What is the impact of arts attendance on academic achievement?
- iii. What is the impact of participation in arts on health and wellbeing of school-aged children?
- iv. What is the impact of arts attendance on health and wellbeing of school-aged children?
- v. What are the differences in impact, if any, based on the child’s gender, age, SES, ethnicity?
- vi. Which theories, if any, underpin the research on arts and academic achievement?
- vii. What outcome measures have been used in the studies examining the impact of arts on academic achievement?

2. Methodology

The approach to conducting the different types of reviews and to forming an evidence synthesis was based on key principles and methodological approaches that have been identified and adopted by the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) which is part of the Social Science Research Unit at the Institute of Education, University of London (see Figure 1).

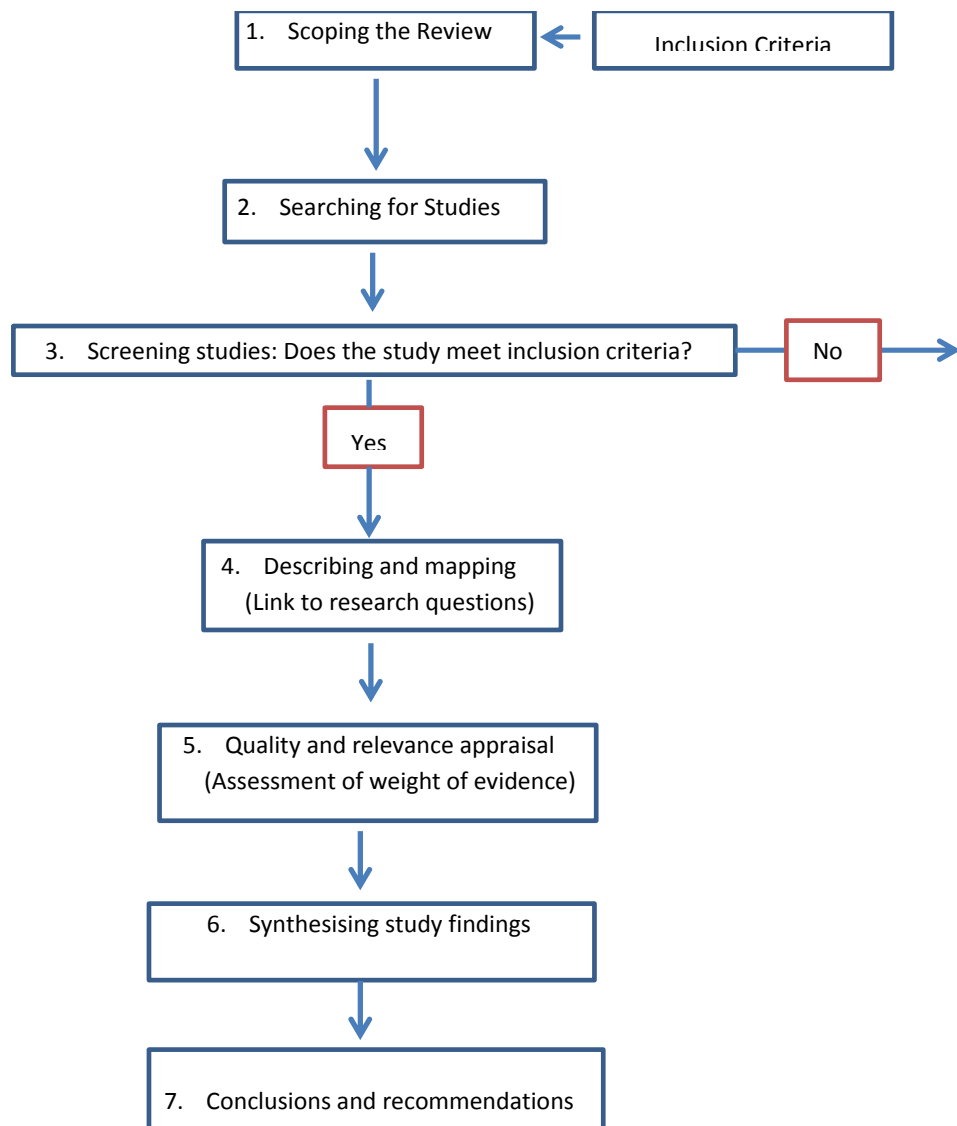


Figure 1: Flow chart illustrating systematic review process

To ensure the review was systematic, we carried out the following steps, as recommended by the EPPI-Centre (2007):

2.1 Scoping the review

An initial scoping review was undertaken to identify the context of the arts and education. This scoping sought only systematic literature reviews that related directly to the research questions. Six databases were searched: Campbell, library, Cochrane library, Pubmed, DARE, ERIC and EPPI Centre, and 21 papers were identified of which eight met the inclusion criteria for *reviewing the reviews* stage (see Appendix 1). Data were extracted on populations, country, methodology, outcomes and effects on outcomes, key terms and

definition. Data were used to inform the search strategy; used to confirm the search terms, populations, and methodology for the subsequent review.

We then developed explicit inclusion and exclusion criteria for specifying which literature will be included in the review. This included:

- a. Topic: literature must relate directly to one of the research questions agreed for each theme as well as our definition of the key terms such as arts and health, participation and attendance, etc.
- b. Recency: literature should have been published since 2004 (the date of a significant systematic review in this area)
- c. Research base: literature must be based upon empirical research (either qualitative or quantitative)
- d. Transparency: the methodology of the research upon which the literature is based must be made explicit (sample sizes, instruments, analysis)
- e. Reliability/validity: as far as can be determined, the findings upon which the literature is based must be valid and reliable, taking into account the type of study (whether small or large scale, qualitative or quantitative).

2.2 Searching for studies

A search strategy was designed based on the review of reviews, research questions, and identification of key search terms and relevant databases. The search terms used in the study and combinations of searches have been presented in Table 1.

Table 1: Search terms

1. Art*	a) Nursery	I. Achiev*
2. Craft	b) Infant school	II. Attain*
3. Danc*	c) Elementary school	III. Impact
4. Design	d) Primary school	IV. Effect*
5. Mak* (Make/Making)	e) Junior school	V. Learn*
6. Sculpt*	f) Middle school	VI. Brain
7. Music	g) Secondary school	VII. Neurolog*
8. Drama	h) Home	
9. Visual Arts	i) Community	
10. Poet*		
11. Theatr*		
12. Creat*		
13. Writ*		
14. Expressive		

Five databases most relevant to the area were systematically searched, namely British Education Index (BEI), Australian Education Index (AEI), Education Resources information Center (ERIC), Applied Social Sciences Index and Abstracts (ASSIA) and Web of

Knowledge (WoK). For details of the search strategy, see Appendix 2. The search and process of inclusion can be seen in Figure 2.

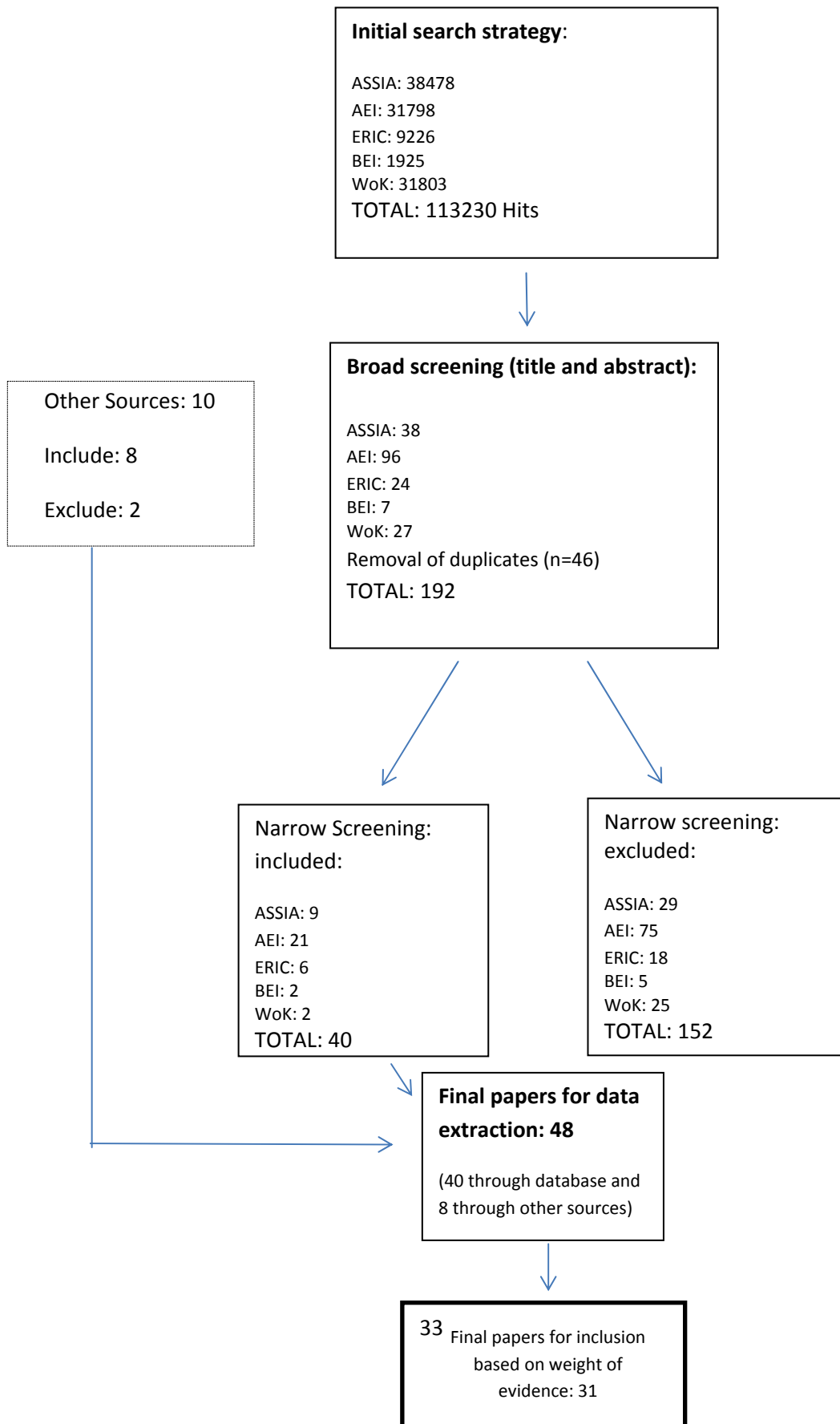


Figure 2: WP2 Search Strategy Flow Chart

2.3 Screening studies

Each piece of literature/report/website was screened against the inclusion criteria developed when scoping the review (see Appendix 3). This was done to avoid hidden bias, by having clear consistent rules about which studies are being used to answer the above research questions. By appraising each study against the same criteria and recording the results, the basis for the review's conclusions has been made transparent. The research team undertook this activity collaboratively.

2.4 Describing and mapping

We described each included study using a standard keywording (coding) strategy such as the EPPI-Centre Education keywording strategy (EPPI-Centre 2007), including variables such as population focus, study design and key characteristics related to the research questions. These were used to draw up a 'descriptive map' providing a systematic description of research activity in each topic area.

2.5 Quality and relevance appraisal

The research team evaluated each study within their descriptive map in terms of:

- a. the trustworthiness of the results judged by the quality of the study within the accepted norms for undertaking the particular type of research design used in the study (methodological quality)
- b. the appropriateness of the use of that study design for addressing their particular research question (methodological relevance)
- c. the appropriateness of focus of the research for answering the review question. (topic relevance)
- d. judgement of overall weight of evidence (WoE) based on the assessments made for each of the above criteria

Data were extracted and added to grids against each research question (see Appendix 4 for studies included in the review).

2.6 Synthesising study findings

We used the approach of Narrative Empirical Synthesis (EPPI-Centre 2007) to bring together the results of the mapping exercise to provide an accessible combination of results from individual studies in structured narratives summary tables. Results from different types of empirical research were synthesised in this way.

2.7 Conclusions/recommendations

A set of recommendations closely linked to the findings of the synthesis has been presented so that readers can see the basis on which each recommendation is made. This includes identification of potential limitations in the generalisability or transferability of findings.

3. Results

Of the 48 documents which met the screening criteria and from which data were extracted, 34 were journal papers, four theses, nine ‘grey’ literature such as research reports and one document was from the Scottish Government website. All were checked against the weight of evidence and only those that were rated as providing ‘excellent’ or ‘very good’ weight of evidence in most of the areas have been included. This took the final number of papers included in this report to 31.

3.1 Impact of participation in arts on academic achievement

Twenty of the selected studies addressed research question 1: the impact of participation in arts on academic achievement. Of these, 12 studies reported evidence of high positive impact on pupils’ achievement (one in secondary school settings, two cross-phase, seven in primary schools and two with pre-school children). A further three studies (one secondary, one primary and one cross-phase) reported limited evidence of impact; whilst one secondary, and one primary and secondary-based studies reported an increase in academic achievement but specifically mentioned that they were not making any causal claims. However, three of the studies reviewed (one secondary, one cross-phase, one primary) found no evidence of impact on academic achievement from participation in arts activities (see Table 2).

Table 2: Numbers of studies reporting different levels of impact on academic achievement from participation in arts activities by age-phase¹

Phase	Studies reporting high impact	Studies reporting limited impact	Studies reporting achievement gains but no causal claim made	Studies reporting no evidence of statistically significant impact
Pre-school	2 (Brown et al., 2010; Neville et al., 2008)			
Primary	7 (Babo, 2004; Heyning, 2010; Kinney, 2008; Metsapelto & Pulkkinen, 2012; Trent & Riley, 2009; Vaughan et al., 2011; Wandell et al., 2008)	1 (Gacherieu, 2004)		1 (Costa-Giomi, 2004)
Secondary	1 (Rosevear, 2007)	1 (Stahl & Dale, 2013)	1 (Catterall et al., 2012)	1 (Hardie et al., 2007)
Primary and Secondary	2 (Sharp & Cooper, 2012; Spelke, 2008)	1 (Rickard Bambrick et al., 2012)	1 (Johnson & Memmott, 2006)	
Pre-school, Primary and Secondary				1 (Bryce, 2004)
Total	12	3	2	3

3.1.1 Pre-school children

As can be seen from Table 2, both studies reporting on pre-school children claimed evidence of impact. Brown et al. (2010) report on two US studies with robust research designs. The first followed a quasi-experimental design and compared children’s attainment at the end of one and two years of attendance at the ‘music-enriched school’ (Kaleidoscope) programme (involving participation in music, creative movement and visual arts). The sample comprised 194 ethnically-diverse children aged 3-4 from socioeconomically disadvantaged backgrounds, together with their carers and teachers. Achievement data were derived from

¹ Please note that this is based on the presence or absence of impact as *reported* by the studies. As these studies were methodologically different, some qualitative studies might have reported impact whereas those undertaking statistical analysis reported no impact on the basis of it not being statistically significant.

pupil assessments and interviews with parents, and were analysed against demographics, developmental stage and pre-intervention academic achievement. The study found a larger effect size for children who had been at the school for two years by comparison with those of the same age who had only participated for one year. Controlling for developmental stage and other factors still suggested an effect for arts participation, which also led to increased preparedness for school. In Brown et al.'s second study (ibid) involving 165 ethnically-diverse, disadvantaged children and their main carers (63 at Kaleidoscope and 102 at a comparison school), they used receptive vocabulary tests to measure attainment. Controlling for demographic factors, the study found that children at Kaleidoscope achieved significantly higher end-of-year receptive vocabulary scores than those in the comparator schools, suggesting that including a greater proportion of arts participation in the curriculum may enhance literacy attainment.

Neville et al. (2008) report on another US study with 88 children from Head Start pre-schools, 2-5 years old and of low socioeconomic status. The experimental group comprised 26 children who participated in music activities – listening, movement, playing music and singing - with a ratio of 2 teachers to 5 children. There were three control-comparison groups: one (n=19) receiving non-musical Head Start teaching with a teacher:child ratio of 2:18; another (n=20) with the same curriculum but a ratio of 2:5; and a third (n=23; teacher:child ratio not given) receiving ‘attention training’. Each group participated in their intervention weekly for 40 minutes, five days per week for eight weeks. Children in all groups were tested before and after intervention using instruments measuring language proficiency, vocabulary, letter identification, IQ, visuospatial intelligence, and developmental numeracy. The study reported significant positive impact on non-verbal IQ, numeracy and spatial understanding for children in both the music and attention groups. However, it is worth noting that the impact may be due to the high ratio of teacher to pupils in both small groups where pupils received a high level of attention. Neville et al. have also suggested that as music teaching is often undertaken in small groups with either individual tuition or high pupil to teacher ratios; it is possible that it is level of attention rather than the music that produces improved outcomes.

Summary:

- Both studies used experimental design.
- Both studies found positive impact of music, although one study used multiple art forms along with music such as creative movement and visual arts.
- Although the number of studies in this age group with robust design is limited, findings suggest that music can be effective with pre-school children.

3.1.2 Primary-aged children

A total of nine studies selected for review focussed on the impact of arts participation on primary school children only (see Table 2). Of these, seven reported evidence of impact on academic achievement (Babo, 2004; Heyning, 2010; Kinney, 2008; Metsapelto & Pulkkinen, 2012; Trent & Riley, 2009; Vaughan et al., 2011; Wandell et al., 2008). For example, Babo (2004) reports on a study conducted in two US schools with 178 pupils (93 of whom were learning a musical instrument). Standardised tests were used to measure attainment and – when controlled for IQ, gender and SES – the study found a positive relationship between engagement in instrument tuition and academic achievement. The largest effect sizes were reported for reading and language arts achievement based on CAT and GEPA scores, whilst the findings for maths achievement were more variable. However, the causality in this study is difficult to establish. Babo (ibid) found that those participating in structured instrumental music programmes scored more highly on IQ tests, though there was an attempt to control for this factor in the analysis.

Kinney (2008) explored the impact on academic achievement of participation in an instrumental performing ensemble (band) and choir in two US middle schools. Standardised tests (State Proficiency Scores in reading, maths, citizenship, writing; and McGraw-Hill Terra Nova CTBS Multiple Assessments for reading, maths, science, language arts and social studies) were used to measure pupil attainment of two cohorts: 6th Grade (N=463) and 8th Grade (N=416) before and after pupils joined the band or choir. For the younger cohort, there were significant differences between band members' scores and those of choir members or those who participated in neither. Interestingly scores for choir and non-participants were broadly similar, suggesting that it is the learning of a musical instrument that is significant rather than joining a group to make music together. However, the study notes that band members tended to come from higher-attaining groups within the school in the first place. A potential challenge to Kinney's findings concerning choirs comes from an Australian study by Heyning (2010), in which 90 primary school children aged between 7 and 12 voluntarily participated in weekly one-hour choral singing sessions, reported positive academic benefits for participants, which Heyning related to the application of learning in these sessions to other areas of the curriculum; improvement in memory through the use of rhyme and vocabulary skills; and improvement in children's vocabulary and listening skills. However, although some findings are based on video analysis and questionnaires, those reported here were mainly based on perceptual data of a very small number of teachers.

Another challenge to Kinney's findings concerning the impact of musical tuition comes from Costa-Giomi (2004). This study had a sample of 117 4th grade (9 year old) pupils from low-income groups in 20 English language schools in Montreal, who had previously not participated in formal music lessons. Of these 63 were selected at random to take piano lessons and the other 54 became a control group. Analysis of results from language and mathematics elements of academic achievement tests, pupil reports and self-esteem

assessments at the beginning and after two and three years of the study found that although the experimental group's marks improved, especially for music, there was no evidence of a statistically significant impact on academic achievement due to participation in formal music instruction. *However, self-esteem of children in the experimental group increased significantly and this was considered to be linked to the continuous participation in the piano lessons (once every week for three years).* This suggests that either the socioeconomic status of Kinney's instrumentalists was more significant in their academic achievement than their musical participation or that playing certain types of instrument in groups is more beneficial than learning solo piano.

Metsapelto and Pulkkinen (2012) undertook a longitudinal study in Finland over three years involving 302 children aged 8-10 at the start. They followed the Integrated School Day (ISD) programme, which aimed to increase involvement in extra-curricular activities such as 'sports, music and arts'. A questionnaire on participation in extracurricular activities (including arts) was jointly completed by parents and children twice every year. School achievement was based on teacher ratings using items developed in a Finnish epidemiological twin study. Pupils' attainment in reading, writing, arithmetic along with academic working skills (perseverance, attentiveness, and attention to detail) was compared with average class performance. They found that pupils who had two or three year's participation in arts and music extracurricular activities had higher academic achievement than those with one year or no involvement. However, since this was a non-experimental study, the potential effect of other factors such as sports participation or other features of ISD should not be overlooked.

Trent and Riley (2009) report on a study that investigated the impact of integrating arts activities across a single primary school curriculum in Denver, Colorado. This was primarily a qualitative study with some quantitative data providing context. Researchers recorded pupil outcomes against course learning objectives using observation, researcher field notes/diaries, samples of pupils' work, teaching plans and materials, focus groups and photographic evidence of activities. Categories based on Denver Public School's benchmark criteria were used to assess pupils' achievement. 'Significant' (though not statistically significant) impact was reported in art, social studies and writing, in which participating pupils frequently exceeded benchmark outcomes. This increase in achievement was much greater than for curricular areas where arts was not integrated.

Vaughan et al. (2011) used a quasi-experimental design to evaluate the impact of the 'Song Room Programme' in 10 Government schools located in areas of socioeconomic disadvantage in Australia. The Song Room is a tailored, long-term music and arts-based programme for children in disadvantaged and high need communities. Three of the study schools provided the six-month and three the 12-18 month programmes. Four similar schools that did not offer either programme were used as a control group. Data were collected from

370 pupils, divided into six-month participation, 12-18 month participation and non-participating groups. These included National Assessment Plan (NAPLAN) scores for literacy and numeracy, Australian Council for Educational Research (ACER) Social-Emotional Wellbeing (SEWB) indicators and case study interviews. The means of the three groups were compared using analysis-of-variance (ANOVA) measures with Benferroni Post Hoc Comparison. The study found that pupils who took part in the Song Room programme had significantly higher academic achievement than those who did not. Participating schools had improved results for all factors when compared with others. Effects were more significant for the 12-18 month programme than for the shorter version.

Somewhat different results were found by Gacherieu (2004), who explored the impact on 58 ethnically diverse pupils' academic performance, attitude to school, social skills, self-esteem, public speaking and school attendance of a 10-week performing arts programme (including music, drama and theatre). Participants responded to questionnaires three times; before and after participation, and at end of the school year, self-reporting on academic progress. Semi-structured interviews were conducted with 10 pupils and two teachers to triangulate these findings, whilst school attendance records were monitored. The study found no evidence of improvement in school attendance, however suggests slight improvement in academic progress through the interviews (not supported by questionnaire data). The results of this study need to be treated with caution given the small sample size and the reliance on perceptual self-assessment; however it also seems likely that the limited impact is directly related to the short duration of the intervention (10 weeks by comparison with between 6 and 18 months for The Song Room).

Wandell et al. (2008) undertook a study over three years, with 49 children aged 7-12 years who were already part of a longitudinal study exploring the relationship between brain development and reading skills. Participants answered a questionnaire on their experiences of arts education (including visual arts, music, dance and drama) together with a 'Child Temperament and Personality' questionnaire, which was designed to provide an indicator of artistic ability. Parents also provided information about the nature of their child's involvement in arts learning, including frequency, type and skill-level, together with an indication of their child's temperament and willingness to engage in new experiences on the 'Openness to Experience Scale'. The study reported a relationship between the amount of music education children had received in the first year and the degree of improvement in their reading in the third year of the study, and between their involvement in visual arts education and mathematical calculation skills.

Summary:

- Of the nine studies that looked at the impact on primary pupils of participation in arts, five focused on music (including instrumental), three addressed multiple art forms (visual arts, music, drama and dance) and one concerned arts integration in the curriculum.
- Only seven studies used any specific objective measures of achievement. Of these six reported evidence of impact (Babo, 2004; Kinney, 2008; Metsapelto & Pulkkinen, 2012; Trent & Riley, 2009; Vaughan et al., 2011; Wandell et al., 2008), whilst one (Costa-Giomi, 2004) found no evidence of significant impact on achievement.
- Of these seven studies using clear measures to ascertain impact, in four cases either the research design or measures of significance were not transparent. This led to difficulties in establishing whether a causal relationship was found between participation in arts and improvement in academic achievement, since several other variables such as IQ were not controlled for.
- The review team found only three longitudinal studies amongst those which claimed impact (Gacherieu, 2004; Metsapelto & Pulkkinen, 2012; Wandell et al., 2008), which suggests that most of the impact claimed by other studies was over relatively short time periods. The other longitudinal study (Costa-Giomi, 2004) reported that there was no evidence of statistically significant impact when compared to the control group.
- The length of participation in the arts was seen to increase the impact of arts on achievement.

3.1.3 Secondary-age Pupils

Four studies focussed on impact of arts on achievement of secondary school pupils only. Two reported strong evidence of impact, one limited evidence and one no evidence (see Table 2).

Rosevear's (2007) study was focussed on 282 pupils from 3 secondary schools in Australia, all studying core subjects (English, Maths, Science, Society and Environment). The questionnaire collected information on their background, level of participation in music, Rosenberg's Self-Esteem Scale and Chan's Perceived Self-Competence Scale. In addition, results of academic achievement were available for each participant. Of these, 124 respondents were music pupils (taking music at school as a subject) and 158 were not. The findings suggest that music pupils had higher test scores for all four core subjects: t-test comparing the means of the music pupils and non-music pupils showed a t value of 2.729, which is significant at the .01 level. However, as with previous examples, it may have been the higher-attaining pupils who were taking music in the first place.

Stahl and Dale's (2013) study was conducted with 12 white working class boys, 14-16 years old, from a school in North of England in an area of high deprivation and long-term unemployment. Semi-structured interviews and observations in classroom and during extracurricular activities were undertaken. Questions explored how the boys perceived their skills in making music by 'DJ-ing' and 'MC-ing'. There were some signs that involvement in these areas of music had positive benefits for academic achievement and that participants developed more self-discipline and ability to work harder. However, these findings arose as an additional finding from interview data and were not the main focus of this small scale study.

Catterall et al. (2012) undertook secondary analysis of longitudinal data from four national US databases: the National Education Longitudinal Study of 1988 (NELS:88); the Early Childhood Longitudinal Study: Kindergarten Class of 1998-1999 (ECLS-K); the Education Longitudinal Study of 2002 (ELS:2002) and the National Longitudinal Survey of Youth of 1997 (NLSY97). They found a positive impact on academic outcomes for young people who had a significant involvement in the arts (range of art forms) in or outside school when compared with those who had less, with Higher Grade Point Averages and increased uptake of and academic outcomes in further education – even for pupils with high SES. Young people who had significant engagement in arts were more likely to engage in wider public community activities (such as volunteering) than those who had not. They reported that extra-curricular or school arts programmes which offer significant involvement may help to bring more parity in academic achievement between young people with high and low SES. However, they caution against making any causal claims.

As with the primary-age studies reported above, there are research findings that appear to contradict the positive associations found between arts participation and academic achievement. Hardie et al. (2007) analysed longitudinal dataset of extracurricular activity participation, school grades, academic self-concept and general intellectual aptitude from 1257 adolescents of the Michigan Study of Adolescent Life Transitions. School results at Grades 7, 9, 10, 11 and 12 were compared for pupils in school band or orchestra in Grade 10, in school sports clubs, and those who took part in no extracurricular activities. Using ANCOVA, the authors concluded that once gender and general ability were controlled, there was no evidence of band or orchestra participation or other extracurricular involvement having positive effects on academic performance. One interesting finding though was that those involved in some form of extracurricular activity, whether music, sports or other, were offered some protection against the general dip in academic achievement usually seen during the move from primary to secondary school.

Summary:

- Of the four studies, three focused on music (including DJ-ing, MC-ing and band/orchestra) and one included a range of arts including attendance along with participation.
- Two studies used existing longitudinal datasets with one finding impact and the other no impact. It is worth noting that these datasets were created for purposes other than looking at the impact of arts on achievement.
- One used standardised scales of self-esteem and self-concept as well as results of academic achievement. Another undertook interviews and observations with a small sample.
- Only two studies that met the selection criteria and had a robust methodology found that there is a positive association between arts participation and academic achievement. It is unclear, however, whether these studies controlled for general aptitude since there is a strong suggestion that pupils participating in the arts tend to come from academically-advantaged groups.
- The one study, which claimed to control specifically for ‘general ability’, found no evidence of impact.
- One small-scale study only reported some impact.

3.1.4 Cross-phase Studies (Primary and Secondary, Pre-school, Primary and Secondary-aged pupils)

Of the research studies undertaken with children spanning more than one phase of education, two claim significant impact, one limited impact, one association without causality and one no impact (see Table 2).

Sharp and Cooper (2012) report a series of evaluations of Creative Partnerships (CPs) that were undertaken in England between 2003 and 2011. Approximately 400 schools and 61,000 pupils were involved in a series of studies to evaluate the longer-term impact of CPs in primary and secondary schools. Statistical models were created to take account of the factors which might have had an impact on outcomes such as special education needs, gender and economic disadvantage. Multilevel modelling was undertaken to take account of different levels of data such as individual pupil and school. School-level findings indicated that CP schools had higher attainment levels at Key stage 3 and 4 from 2003-2010. Pupil-level findings indicated that those taking part in CP activities had improved attainment with improved progress at Key stages 1, 2, 3 and 4 (ages 7, 11, 14 and 16 respectively) in national tests in comparison to non-participants. Attainment improvement were more consistent in pupils in secondary schools.

Spelke (2008) reports on three experimental studies with children and young people. Experiment 1 was with 85 children and young people, 5-17 years of age from a prosperous

area with moderate levels of music or sports education. Experiment 2 involved 32 pupils aged 8-13 years old with a high level of music education recruited from music schools, compared with 29 children in the same age group with low level of music education. Experiment 3 involved 80 pupils aged 13-18 from a private school for the arts. Participants undertook 12 tests in all. The author reported that pupils involved in short periods of low or medium-level of music education appear to derive no mathematical benefits. When compared with pupils who had little if any music instruction, pupils with significant experience of music education over a sustained period had improved test scores relating to geometry. However, it is unclear whether these studies controlled for prior attainment and socioeconomic status.

Somewhat more tentative claims are made by Rickard, Bambrick et al. (2012), who attempted to measure the impact of an increase in school-based music training on a range of cognitive and psychosocial measures for 10–13-year-olds in two studies. In the first study, with 127 secondary school pupils, the benefits of increased frequency of classroom-based music classes were compared with classroom-based drama and art lessons. The second study compared the effects of introducing a new classroom-based music programme with a new drama programme for 100 primary school pupils. Assessments were made at baseline and approximately six months after implementation of each programme. Outcomes were measured through scales such as Children’s Memory Scale word pairs sub-test, Kauffman Brief Intelligence Test, Culture-Free Self-Esteem Inventory, The School Life Questionnaire and Motivation Engagement Scale for music, drama and arts. The authors report that there was only weak evidence of the impact of school music (the focus of the study) as distinct from that associated with drama and art lessons, but that there was some overall effect from pupil participation more generally.

In a quantitative study analysing anonymous standardised test scores from 4,739 3rd, 4th, 8th and 9th grade pupils from 8 US elementary and 11 middle schools, Johnson and Memmott (2006) found that pupils undertaking ‘high quality’ music instruction had higher standardised test scores than those whose musical experience was of lower quality. These differences were significant; however the effect size was small. Although there was a relationship between good quality music instruction and high scores in English and Maths, it is not clear whether this was due to music or other factors; although SES did not seem to have any impact on the results. The classification of music instruction into ‘high’ and ‘low’ quality also needs questioning.

The weakest associations in cross-phase studies were found by Bryce (2004), who evaluated four arts programmes based in schools in Australia, exploring the impact of each programme on academic achievement, school attendance and engagement. None of the evaluations produced empirical evidence that engagement in the arts contributed to academic improvement with no significant difference in results for literacy, numeracy and writing when compared with pupils not participating in the programmes. However, as this report was

brief and not all aspects of the research design were clear, it is difficult to judge the robustness of the findings.

Summary:

- Three studies focussed on the impact of music on achievement whereas two reported on multiple art forms.
- There was one longitudinal study which collected data at baseline and approximately six months after the implementation of the music programme.
- As with the findings for primary and secondary pupils, cross-phase studies present a range of strengths of association between arts participation and academic achievement – from strong to none at all.
- The best evidence appears to link prolonged participation in music with certain aspects of mathematics (e.g. geometry) and language proficiency.
- The ‘quality’ of this participation also appears significant, though whether there is universal agreement over what constitutes ‘high quality’ musical instruction is debatable.
- One cross-phase study found that findings were more consistent for secondary school pupils.

3.1.5 Academically-related impacts

Although not necessarily claiming direct associations between arts participation and attainment, several studies (including some of the 20 above and others) report on academically-related impacts that could then in turn have impact on attainment, such as improvement in verbal and visual memory (Greenberg, 2010; Heyning, 2010), vocabulary (Heyning, 2010); listening and learning skills (Greenberg, 2010; Imms et al., 2011); problem solving and thinking skills (Jeanneret, 2010; Portowitz et al., 2009); commitment to education (Stahl & Dale, 2013); working better as a team and perseverance (Bryce, 2004; Hallam et al., 2011; Imms et al., 2011); improved attitudes towards learning/school and ability to engage with the world of education (Burnard, 2008; Gacherieu, 2004); concentration and ability to organise (Hallam et al., 2011).

For example, Greenberg (2010) conducted a study with participants in an after-school theatre programme in an ethnically diverse and disadvantaged public middle school in the US. There were 52 participants, 26 in the theatre programme (nineteen weekly rehearsals and four performances at the end of the year) and 26 in the control group. Participants were required to maintain an acceptable academic level to take part and continue on the programme. A questionnaire was administered twice, once at the beginning and again at the end of the school year as well as interviews with 17 pupils who carried on with the programme.

Participation in the theatre programme was seen to have positive benefits on disadvantaged pupils' perceptions of their social and academic development, including teamwork and commitment to study. In Stahl and Dale's (2013) study, despite being almost illiterate and with very poor attainment, some of the boys who were involved in making music by DJ-ing and MC-ing, showed a growing commitment to education. Involvement in creating rap music enabled boys who were previously reluctant and poor communicators to enjoy performing to peers.

3.2 Impact of arts attendance on academic achievement

Only two studies that met the criteria for inclusion focussed on any link between attending arts events and children's achievement. In a three-year study conducted in Australia, Schiller (2006) looked at the impact of attending two to three theatre performances each year on 140, 5-12 year old pupils from four public schools. Participants were randomly selected, and boys and girls were almost equally represented. Individual interviews and focus groups were undertaken with children before and after each performance. Case studies were also undertaken with a number of pupils from each school. The researcher also assessed impact through monitoring of pupils' drawing, writing and play by teachers and parents. Findings demonstrated impact on learning and literacy; motivation to read and improvement was seen over three years in vocabulary, reading, oral and written language skills. Teachers also noted that the arts had a positive impact on children with behaviour problems. However, it is not clear what measures were used to ascertain gains in literacy, vocabulary, reading, oral and written language skills.

The other study used an Experimental-Control design to look at the impact of background music on performance in reading and maths tests for children who were classified as either 'musicians' or 'non-musicians' (Bloor, 2009). This study was conducted in London with three classes in three socio-economically diverse primary schools with 47 ten years old children. During the tests with background music, the researcher also observed children's behaviour to look at signs of being distracted such as fidgeting or being off-task. For determining musicality, the author asked children if they sang or played a musical instrument. Background music was seen to have a positive impact on the outcomes of reading tests whereas it was seen to have an adverse impact on the outcomes of maths tests. It seemed that the "Mozart effect" may be dependent on the subject being studied. More than 50% of the children were observed at some point to be affected by the music and showed behaviour not related to their task such as pretending to conduct the music/play an instrument. However, the author's hypothesis that children distracted by background music being played during tests are 'musicians' was not supported. However, the results of this study should be treated with caution due to the small sample size spread across three schools. There were also marked

differences in the range of children's musical experience, which were not factored into the analysis.

Summary:

- One study was a longitudinal study conducted over three years and one used an experimental design.
- The first of the above studies shows, somewhat surprisingly, that relatively rare attendance at arts events can indeed have a positive impact upon children's academic achievement. The second – although not strictly dealing with *attendance* at an event as background music was being played to pupils in the classroom – suggests some benefits and some adverse effects on some children in some contexts of listening to music whilst they undertake other tasks.

3.3 Impact of participation in arts on health and wellbeing of school aged children

Two studies considered impact on wellbeing (Hallam et al., 2011; Vaughan et al., 2011). Hallam et al. found that both music and non-music teachers found that music had an impact on pupils' wellbeing. However, wellbeing was not defined in this study and was at times put together with self-esteem. Vaughan et al. (2011) used ACER's (2010) Social Emotional Wellbeing Survey (SEWB). The seven components of the SEWB construct include three external components of School Life, Home Life and Community Life; and four internal components of Resilience, Positive Social Skills, Positive Work Management and Engagement Skills. The authors reported that pupils participating in The Song Room had higher SEWB scores and showed greater resilience than non-participants. Participating pupils also showed improved behaviour and communication and less anxiety. Finally, they reported that the longer the exposure, the greater was the effect.

Eighteen studies (including the two above) that were included in the review provided indicators that can be considered to suggest the impact of participation in arts on social and emotional wellbeing. These include:

- a) Enjoyment (Vaughan et al., 2011)
- b) More integrated, acceptance of diversity and less stress/anxiety (Heyning, 2010; Imms et al., 2011; Vaughan et al., 2011; Wright et al., 2006)
- c) Improved self-esteem, self-worth (Bryce, 2004; Burnard, 2008; Costa-Giomi, 2004; Gacherieu, 2004; Hallam et al., 2011). Conversely, Portowitz et al. (2009) found no evidence for increase in self-esteem. Rickard, Appelman et al. (2012) found some impact on self-esteem but it was not sustained in year 2.

- d) Increased confidence (Hallam et al., 2011; Wright et al., 2006)
- e) Improvement in social skills and interaction (Gacherieu, 2004; Jeanneret, 2010; Joronen et al., 2012; Wright et al., 2006)
- f) Increase in emotional skills (Wright et al., 2006)
- g) Motivation (Hallam et al., 2011; Jeanneret, 2010)
- h) Empowerment and voice (Imms et al., 2011)
- i) Greater resilience (Vaughan et al., 2011)
- j) Wellbeing (Hallam et al., 2011), Higher Social Emotional Wellbeing Scores (Vaughan et al., 2011)

It is worth noting that there was variability in the research design of these papers and robustness of the outcome measures. Most studies provided perceptual data. However, with subjective aspects such as emotional and social wellbeing, the perceptual data of the children themselves would be important as long as they are able to present their views without feeling any pressure of giving the ‘right’ response to an adult researcher.

No study reported on the impact of arts participation on physical health. This could be the result of our selection of educational research databases. However, please see WP1 report for consideration of the evidence linking arts participation to physical health benefits; though largely with an adult sample.

3.4 Impact of arts attendance on health and wellbeing of school aged children

One study, by Schiller (2006) reported on the impact of attending 2 to 3 theatre performances each year on 140, 5-12 year old children. Through individual interviews and focus groups with children before and after performances, Schiller found that pupils’ social skills and behaviour improved, as well as developing more respect for each other. Again, no study reported on the impact of arts attendance on physical health.

3.5 Differences in impact based on the child’s gender, age, SES, ethnicity

Eight studies focussing on achievement looked at demographic variables such as gender (n=2) and SES (n=6) (see Table 3). As mentioned in Table 2, different authors focussed on different age groups, with some including a wide range from early years to late teens, and one made reference to working with a particular ethnic group. However, none of the authors referred to age or ethnicity as a factor when discussing impact. Some did highlight the importance of the duration of exposure to arts or length of participation as a significant factor in producing impact (e.g., Vaughan et al., 2011; Wandell, 2008) and one reported that impact was consistent for secondary school pupils (Sharp & Cooper, 2012).

Table 3: Findings from studies reporting on gender and SES

Author/s	Results
Gender	
1. Bloor (2009)	<ul style="list-style-type: none"> ▪ Girls performed less favourably on tests than boys when background music was played
2. Rosevear (2007)	<ul style="list-style-type: none"> • Female pupils had higher scores on four core subjects (English, Maths, Science, Society and Environment) than boys who studied music
SES	
1. Brown et al. (2010)	<ul style="list-style-type: none"> ▪ Involvement improved educational outcomes for at-risk children
2. Catterall et al. (2012)	<ul style="list-style-type: none"> ▪ Higher Grade Point Averages and increased uptake of further education for young people from low <i>and</i> high SES
3. Greenberg (2010)	<ul style="list-style-type: none"> ▪ Participation in the theatre programme had positive benefits on disadvantaged pupils' social and academic development
4. Johnson & Memmott (2006)	<ul style="list-style-type: none"> • Pupils involved in music had much higher standardised test scores than those who were not, irrespective of SES
5. Kinney (2008)	<ul style="list-style-type: none"> • Pupils with high SES scored more highly compared to pupils from low SES on all test scores except 4th, 6th, 8th grade reading
6. Neville et al. (2008)	<ul style="list-style-type: none"> • Significant positive impact on non-verbal IQ, numeracy and spatial understanding for children in both the music and attention groups of children from low SES

As can be seen from Table 3, the findings for the impact on achievement for gender and SES were mixed. In terms of gender, there was a split of one showing positive impact on girls and one suggesting that background music was more disruptive for girls. However, it is worth highlighting that the study that found positive impact on girls was looking at participation, whereas the other involved listening to background music during tests.

In terms of SES, three found that children from low SES achieved high due to participation in arts, two found that achievement improved for both low and high SES groups, and one indicated that overall achievement was higher for children from high SES. Again, it is worth remembering that there was variability in the quality of the research design of these studies.

Costa-Giomi (2004) highlighted that continuous piano lessons over three years increased the self-esteem of children regardless of their gender, family background and income. The findings also suggested that dropping out was not linked to academic ability.

3.6 Theories underpinning the research on arts, academic achievement and wellbeing

Only seven studies made a reference to theories underpinning either the arts approach or the research approach that had been adopted (Table 4). This suggests the need for better understanding and expression of theories on which authors' research and/or arts practice is based. Only one theory was considered by more than one study, namely Bandura's (1986) Social Cognitive Theory, which works on the assumption that learning and behaviour (cognition) have a reciprocal relationship with environment (in this case the social context of arts participation). This suggests an eclectic rather than cumulative approach to theorisation in this field, particularly with regard to the mechanisms by which arts participation may influence cognition.

Table 4: Theories underpinning Arts and Research Approach

Author	Theory Underpinning Arts Approach	Theory Underpinning Research Approach
Babo (2004)	<ul style="list-style-type: none"> • Neurological Theory (Leng & Shaw, 1991) 	
Brown et al. (2010)	<ul style="list-style-type: none"> • Cultural Relevance Theory • Accessibility Theory 	
Burnard (2008)	<ul style="list-style-type: none"> • Inclusive Pedagogical Practices (based on Fraser, 1997 work on injustice) 	<ul style="list-style-type: none"> • Phenomenological Study • Constructionism
Joronen et al. (2012)	<ul style="list-style-type: none"> • Drama theories (Owens and Barber, 1998; Heikkinen, 2002) • Social Cognitive Theory (Bandura, 1986) 	
Porowitz et al. (2009)	<ul style="list-style-type: none"> • Social Cognitive Theory (Bandura, 1986) • References to theories of García & Pintrich, 1994; Linnenbrink & Pintrich, 2001; Pintrich & Schunk, 2002; Vygotsky, 1978 • Feuerstein's Theory of Structural Cognitive Modifiability (SCM) and Mediated Learning Experiences (MLE) (Feuerstein, Feuerstein, Falik & Rand, 2006; Feuerstein, Rand & Rynders, 1988) 	
Stahl & Dale (2013)	<ul style="list-style-type: none"> • References to Masculine Identity, Feminism 	<ul style="list-style-type: none"> • Grounded Theory Approach (Corbin and Strauss 2008)
Trent & Riley (2009)	<ul style="list-style-type: none"> • Co-equal Arts Integration • Theory of multiple intelligences • Constructivist learning and teaching 	

3.7 Outcome measures used in studies examining the impact of arts, academic achievement and wellbeing

Different studies set out to measure different outcomes, as well as finding concurrent outcomes emerging as a result of participation and attendance in arts. Most studies reviewed here focussed on academic and wellbeing outcomes, which is not surprising as this review was focussing on those two aspects. A summary of these outcomes and examples of measures used are presented in Table 5. As can be seen, the outcome measures have been varied, with some designed by the researcher for the purposes of the study and some standardised measures.

Table 5: Outcomes and measures used in the studies

Outcome	Measures
Academic/Educational	
Creative and arts-related skills	Teacher rating, Pupil response, Grade Point Average/School Report Cards, Social and Academic Status (SAS) scores, California Achievement Test (CAT), Normal Curve Equivalent (NCE) scores for maths, reading and language, arts, Grade Eight Proficiency assessment (GEPA) in maths and language, arts, Differential Aptitude Test, Maths and English tests that meet the No Child Left Behind assessment requirements, State proficiency scores, McGraw-Hill Terra Nova CTBS Multiple assessment (five subtests; reading, maths, science, language arts, social studies), NAPLAN scores for literacy and numeracy, Cognition using the Raven Standard and Raven Coloured Matrices, The Complex Figure Test, The Fitts Tennessee, Children’s Memory Scale word pairs sub-test, Kauffman Brief Intelligence Test, Multiple Object Tracking (MOT) task, vocabulary sub-test of the Wechsler Intelligence Scale for Children.
Developmental numeracy	
Language	
Letter identification	
Mathematics	
Reading	
Vocabulary	
Writing	
Improved Memory	
School attendance	
Visuo-spatial intelligence	
Planning	
Goal setting	
Level of involvement in arts education	
Further education uptake and achievement	
Social	
Community/Public engagement	Teacher rating, Pupil response, Parent response, Scale of social relationships covering pupil to pupil and pupil to teacher relationships.
Public speaking	
Pupil engagement	
Social learning	
Social Skills	
Social Wellbeing	
Team-working	
Psychological/Emotional	
Academic self-concept	Teacher rating, Pupil response, ACER Social and Emotional Wellbeing indicators, Child Temperament and Personality scale, Openness to Experience Scale, Culture-Free Self-Esteem Inventory, The School Life Questionnaire and Motivation Engagement Scale for music, drama and arts, Self Concept scale questionnaire Rosenberg’s Self-Esteem Scale. Chan’s Perceived Self-Competence Scale, School wellbeing profile.
Emotional Wellbeing	
Enjoyment	
Motivation	
Perseverance	
Resilience	
Self-Confidence	
Self-Control	
Self-Esteem/Self-Worth	

Voice/Empowerment	
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3.8 Pathways of impact

Two studies reported immediate pathways of impact. Brown et al. (2010) found that due to the arts enrichment programme, the preschool children were more prepared to start school. Catterall et al. (2012) from their longitudinal analysis reported that young people with increased involvement in arts had Higher Grade Point Averages. They also had increased uptake of and academic outcomes in further education.

4. Discussion and Conclusion

It is important to highlight the limitations of the current review. Due to the inclusion and exclusion criteria (e.g., time period of 2004-2014, English language publications), key terms, databases, it is possible that some useful and high quality studies have been missed that could have provided further evidence to support or refute the findings of this literature review. However, every effort was made to avoid this through quality assurance and sharing of papers between and across the three WP teams. In this literature review we also considered the literature that came to us from other sources and grey literature to ensure nothing important was missed. It is also important to remind the reader that the lens used to review and evaluate the studies included here is based on the EPPI-Centre steps and requirements, our frame of reference is likely to be different from that of the authors. Due to the difference in types of studies reviewed by all WPs, the studies include in this review have been evaluated as far as possible keeping in mind what the authors had set out to do. However, the discussion and conclusion should be read with these limitations in mind.

Although several studies reported impact of participation in arts on achievement; not all evidence was robust and it usually pointed to a positive relationship between arts and achievement rather than a clear causal effect. Several factors impinged on the robustness of the evidence, namely several uncontrolled variables, lack of clarity of causal relationship, lack of objective measures, lack of delayed follow up after the completion of the arts programme, and mix of arts forms (sometimes with sports and other co-curricular activity). The two robust studies that found positive impact were conducted with pre-school children. One of the studies that used a secondary longitudinal dataset found no impact on achievement. Similarly one of the other studies that found no evidence of impact used a robust experimental design. Several studies reported on academic related skill development due to participation. Overall, there is a vast variance in evidence of causal impact of arts on achievement and more robust research needs to be undertaken.

In terms of impact of attendance on achievement, only two studies met the criteria for inclusion. One found that there was clear impact on achievement whereas the other, which

used background music, found that girls were distracted by it and performed less well on tests. The findings of the study that looked at going to theatre two to three times a year are interesting as they suggest that such occasional attendance can have a positive impact. This is in direct contrast to the findings related to participation where long term participation is seen to lead to higher impact. Two studies found that longer the participation in arts, the higher the impact is. One found that the impact of a 12-18 month art programme was more than that of a six-month programme. Another reported that significant exposure to music education over a sustained period was more effective.

None of the studies that met the inclusion criteria focussed on health. Only two studies focussed on wellbeing but sixteen others included indicators of wellbeing. It is to be noted that this is the report authors' interpretation of wellbeing based on components listed by Vaughan et al. (2011). All studies reported positive impact on wellbeing and its indicators. However, the robustness of some of the data is debatable.

In none of the studies, causal relationship could be established. Therefore, it is easier to say that arts, achievement and wellbeing co-exist. It is more difficult to say with any confidence at all whether art leads to better achievement and/or wellbeing.

As mentioned earlier, only two studies looked at attendance compared to 20 that studied impact of participation on achievement, and the ratio of studies looking at attendance or participation for impact on health and wellbeing was one to 18. Therefore, it is difficult to compare the impact of attendance and participation.

One of the studies highlighted that the quality of arts programme, in their case music, played a role in impact of arts on achievement. This is perhaps not surprising based on other studies looking at the quality of pupil learning experience. However, what constitutes good quality arts programme is debatable and dependent on individual's preferred learning styles as well as purpose for joining the programme. The purpose behind running an arts programme might be different for teachers, arts practitioners, families and children.

From the studies reviewed, in terms of impact on academic achievement, it was clear that although there was variation in evidence of impact for other school phases, it was clear for pre-school children. However, from these studies it is not possible to establish whether there is a variation based on school phase. Even the cross-phase studies did not seem to consider the relationship between school phase or child's age with the nature of the impact. One study

(Sharp & Cooper, 2012) did report that attainment gains were more consistent for secondary school pupils as compared to primary school pupils.

Two studies looked at gender and had somewhat contradictory findings- one found that participation in arts raised girls' achievement more than that of the boys. The other found that listening to background music when taking tests had an adverse impact on girls. Similarly, five studies focussing on SES had contradictory findings. What is interesting is that, some studies seemed to assume that children from low SES will show better achievement gains due to participation in arts, with some explaining the lack of impact in their study in comparison to others by saying it might be due to the children not being from low SES.

Two studies in particular mentioned about clear pathways with one indicating readiness to start primary school and another in the context of starting further education and achieving well in it. It is worth noting that the latter study analysed longitudinal secondary dataset. Therefore, although the pathway and destination data are robust, it is difficult to determine a causal relationship between arts participation and pathways to further education. Other studies indicated engagement and motivation to learn which might lead to positive pathways. However, due to lack of longitudinal data collection, it is not clear whether children did carry on with learning and higher education.

The authors considered it important to look at the theoretical underpinnings of the reviewed studies, both in terms of arts practice and research. Only two studies referred to arts and research theories, and five studies made reference to theories underpinning arts practice. This suggests that either arts practice is under-theorised or the researchers were not aware of the theories underpinning the artwork of others that they were researching.

4.1 Methodological critique

Before critiquing the methodology of the reviewed studies, it is worth commending the researchers for undertaking this research as this has been a generally under-researched area with a lot of anecdotal 'evidence' of impact. It is also important to acknowledge that there are constraints on researchers working in a dynamic school context. Further, whether research in the area of arts should be conducted in a scientific manner with a focus on outcomes rather than processes has also been debated.

Of the 31 studies included in the review, two studies undertook secondary data analysis of existing longitudinal datasets. Five studies used a longitudinal research design; four over

three years and one with a baseline and six month follow up. Of these five studies, four studied impact of participation on achievement and one impact of attendance. One of the longitudinal studies reported no evidence of impact. It is important to remember that it can take a long time before impact might be visible and therefore a longitudinal study design is important. However, with some of the longitudinal studies reviewed here, although it was easy to capture the learners' journey; it was not always clear whether the impact maintained after the child stopped participating in arts activities, i.e. there was no follow up phase some time after the programme stopped. Perhaps this is a difficult aspect to look at even in a follow up study, as even though the programme might have come to an end, one desired outcome of participating in arts would be that children continue to engage with arts regularly within other contexts.

Only three studies used an experimental design (one reported on three experiments) and two quasi-experimental. The low numbers of experimental designs also cast a bit of doubt about the reliability of some of the claims of impact. Especially, when put together with low numbers of longitudinal study, focus on self-reporting and perceptual data, it indicates the need to ensure that future research designs are more robust and have clearly thought through how they are going to ascertain what they have tried to ascertain. It is worth highlighting that standardised scales do not necessarily mean that the data are objective as most involve self-reporting. Also, it is to be acknowledged that there can be treatment fidelity issues when using experimental design in a school context.

The sample size was also variable in the reviewed studies. This makes some of the research findings difficult to generalise. Of course in some cases, especially where primary data were collected, this was a reflection of the size of the group receiving an arts programme. In those cases it would have been worth mentioning the response rate in relation to those who had participated in or attended arts activities and events.

Most studies did not control for confounding variables. In a real world of schools, controlling for confounding variables can be very difficult. However, with appropriate measures in place, it is possible to control for the impact of other variables when analysing data. Only three studies reported that they had controlled variables during analysis. These included controlling for development stage, demographics and IQ.

4.2 Implications for Future Research

It goes without saying that to be able to see impact or change, it is important to be clear about the starting point of the learner (baseline) as well as mapping their journey over time (longitudinal study). Also, it is important to see whether that impact has maintained over time

(follow up), and whether the impact has transferred to other aspects of the person's life (generalisation across settings and individuals). This might involve data collection from not only the child, music practitioner/teacher but also significant others in the child's environment, such as parents, other non-music programme related professionals, siblings etc. (multiple perspectives and source triangulation), as well as using a range of measures (methodological triangulation).

To be able to say with confidence that the impact is due to a particular programme or intervention, again it is important to have a research design that can separate all other variables or potential factors involved. In real life research this controlling for other factors and variables can be tricky. However, researchers need to be mindful of this when designing their research project and the limitations of the claims they are making.

Although perceptual data are important, it is useful to have some objective measures to determine impact, such as change in academic scores and any standardised scales that require more than self-reporting. Self-reporting is again measuring perceptions despite the use of standardised scales. However, as mentioned earlier, for some of the aspects such as wellbeing, self-reporting or perceptual data might be more important than objective measures as long as the child is responding honestly without any pressure of 'what the adult researcher wants to hear from him/her'. Also, it is important that data are collected in ways that are meaningful to the child, and are age and stage appropriate.

Therefore, future research should use objective measures of academic achievement, control for confounding variables, adopt longitudinal designs to capture longer-term impact, build in a baseline and follow up phase, and employ source and methodological triangulation. Similarly, researchers should try to establish cause-effect if possible and look at the generalisation of impact in other contexts and with other people.

4.3 Implications for Policy and Practice

As the quality of arts programme was seen to have a role in the degree of impact on achievement and wellbeing, it is imperative that excellent quality arts programmes are provided to children in schools (and also community settings). This might not be possible without appropriate funding from the government, especially if they are to be run over a period of time and accessible to children from low SES. Again, it is important that the arts programmes and activities can be provided for a longer period of time as researchers have reported that duration of arts participation is linked to impact on achievement and wellbeing.

Although perhaps all arts practitioners have a theory underpinning their arts practice, it is important that it is explicit so that the readers (and researchers) are aware of why the arts programme has been designed in a particular way. It will also make explicit their beliefs about arts provision and lead to more reflexivity in their practice and related research.

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Appendix 1: Review of Reviews

WP: 2		Database: Cochrane								
Review Authors	Title	Populations	Settings/Country	Interventions/Methodology	Review Comparisons	Outcomes	Effects on outcomes	Key terms	Definitions	Notes
Cogo-Moreira, H., Andriolo Régis B., Yazigi, L., Ploubidis, G. B., Brandão de Ávila, C.R. (2012)	Music education for improving reading skills in children and adolescents with dyslexia	Dyslexic children, adolescents	Private and state schools	Systematic review The impact of music education on children's reading		Reading - aloud, and ease of doing so, understanding what is read, awareness of sound structure and spelling, self esteem, educational performance.	No existing empirical evidence to suggest that learning music does or does not influence any of the outcomes.	Music; Reading; Comprehension; Dyslexia[rehabilitation]; Music Therapy [education]; Adolescent [checkword]; Child [checkword]; Humans [checkword]	None	

Database: DARE										
Review Authors	Title	Populations	Settings/Country	Interventions/Methodology	Review Comparisons	Outcomes	Effects on outcomes	Key terms	Definitions	Notes
Daykin N, Orme J, Evans D, Salmon D, McEachran M, Brain S (2008)	The impact of participation in performing arts on adolescent health and behavior: a systematic review of the literature	Young people 11-18 years	Community and extra curricular activities in schools	Systematic Review Performing Arts (drama, dance and music) interventions with children and young people.		Engagement with peers; social skills; Empowerment; Risky behaviours ; understanding and attitudes relating to HIV and AIDS; Sexual health; Use of alcohol, tobacco and illegal drugs.	Findings suggest performing arts interventions had an impact on most outcomes. Some recognise It some young people find it difficult to engage with drama.	Systematic review; Performing Arts; Participation; Health; Young people;		

Database: EPPI Centre										
Review Authors	Title	Populations	Settings/Country	Interventions/Methodology	Review Comparisons	Outcomes	Effects on outcomes	Key terms	Definitions	Notes
Newman, M., Bird, K., Tripney, J., Kalra, N., Kwan, I., Bangpan., M., Vigurs, C.(2010)	Understanding the impact of engagement in culture and sport. A systematic review of the learning impacts for young people	Young people under 19 years	Arts and Sport Museums, Art Galleries and Heritage sites USA, Canada, Korea, Hong Kong, Germany, UK	Systematic Review Outcomes for young people from engaging with the arts.		Pupil achievement; Transferable skills; reasoning ability; behaviour issues; attendance at school; personal development; attitude and motivation for learning; capacity for learning/development; interest and creativity	Participation in organised arts activities improves attainment in secondary school pupils by 1-2%. Also improves reasoning by 16%-19% and increases transferrable skills by 10%-17%. For pre and primary school pupils participation increased literacy	Young people; Learning outcomes	Young people; Learning outcomes	

							skills.			
Database: ERIC										
Review Authors	Title	Populations	Settings/Country	Interventions/Methodology	Review Comparisons	Outcomes	Effects on outcomes	Key terms	Definitions	Notes
Boyes, L.C., Reid, I. (2005)	What Are the Benefits for Pupils Participating in Arts Activities? The View from the Research Literature	School pupils	UK and USA	Literature Review (methods not clear)		Benefits of participation in the arts Methods for measuring these	Studies reviewed of varying size and robustness. Inclusion of non empirical studies.			
Bungay, H., Vella-Burrows, T. (2013)	The effectiveness of participating in creative activity on the health of children and young people: A rapid review of the literature	Children and Young people 11-18 Mainstream schools.	UK, USA, Canada, Australia, Tanzania. Community setting or extracurricular activities in schools	Systematic review		Sexual health, obesity, mental health, emotional wellbeing.	Taking part in creative activities can have benefits for improved behaviour, confidence, self-esteem, knowledge and physical activity.			
Melnick, S. A.; Witmer,	Cognition and Student	8,048 Grade 5	Public and Private	Conference Proceeding	Comparisons of Children	Impact of arts	Out of school arts		Learning process	

J. T.; Strickland, M. J. (2011)	Learning through the Arts	students	Schools and home USA	Analysis of fifth grade secondary data from The Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999.	with exposure to the arts outwith school with those who only experience arts in school.	experience d out of school in reading and maths Teacher perceptions of impact on reading and match by: race, gender, and size of community . Difference between pupils with arts and with no arts involveme nt in school.	(involving families) improve reading and maths abilities. Difference found between pupil abilities involved in out of school arts programm es when compared with those who are not. Difficult to prove that school arts programm es result in improved achieveme nt.		Cognition – complexity of defining	
Schiller, W. (2005)	Children's Perceptions of Live Arts Performances:	132 Children 5-12	South Australia Public Schools	Longditudinal Study (2002-2005)		How live arts performan ces impact on 5-12	Children made links between performan ces and	Young children's perceptions, Arts performance;		

						<p>year olds. Relationships between schools, communities and the live arts performances.</p>	<p>their creative work. Children developed a better understanding of stories and life values. Children were keen to engage in arts projects that helped them to understand themselves and their world. Brought stronger sense of cultures community in the school.</p>	<p>Research with children</p>		
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Other Sources										
Review Authors	Title	Populations	Settings/Country	Interventions/Methodology	Review Comparisons	Outcomes	Effects on outcomes	Key terms	Definitions	Notes
Creech, A et al. (2013)	Review of literature relating to El-Sistema programmes looking at findings on the impact on achievement, wellbeing and social change.	Children and young people	International	Review of Literature		Academic achievement, wellbeing, attitudes to school behaviour and risk taking.	Participants showed ongoing increasing academic achievement in maths, reading and writing. Positive impact on wellbeing, social, emotional intellectual skills and personal development, attitudes to school, reduction in risky behaviour.			

Appendix 2: Work Package 2 Search Strategies

Searches were undertaken as follows:

Art* AND Nursery AND Achiev*, Art* AND “Infant school” AND Achiev* and continued in this way until Terms 1-5 had been searched in combination with all terms a) to i) and I – V11 on the following on all databases.

Additional terms used are outlined below for each database.

British Education Index

Terms 1-15 AND a)-i) AND I-VII) AND

(at.exact("Dissertation/Thesis" OR "Article" OR "Conference Proceeding" OR "Review" OR "Book" OR "Statistics/Data Report" OR "Government & Official Document" OR "Case Study" OR "Conference Paper" OR "Technical Report" OR "Report" OR "Literature Review") AND la.exact("English") AND fsu(infants OR "young children" OR children OR adolescents OR "preschool children") AND lv("early childhood education" OR "further education" OR "middle school education" OR "sixth form education" OR "preschool education" OR "primary secondary education" OR "infant school education" OR "secondary education" OR "primary education" OR "Nursery school education" OR "sixteen to nineteen education")) AND pd(>20040101)

Australian Education Index

Terms 1-15 AND a)-i) AND I-VII) AND

rtype.exact("Policy- statements" OR "Theses- overseas" OR "Book/Product- reviews" OR "Directories/Catalogues" OR "Research-reports" OR "Guides" OR "Book-chapters" OR "Journal-articles-overseas" OR "Theses" OR "Statistical- documents" OR "Government- reports" OR "Books" OR "Conference-papers" OR "Discussion-papers" OR "Conference-proceedings" OR "Legal/Legislative/Regulatory- materials" OR "Journal-articles" OR "Information-analyses" OR "Bibliographies" OR "Curriculum-materials") AND pd(>20040101)

Apart form

Art* AND “Primary school” AND Learn* AND Children

Mak* AND Community AND Learn* AND Children AND Adolescents AND

rtype.exact("Policy- statements" OR "Theses- overseas" OR "Book/Product- reviews"

OR "Directories/Catalogues" OR "Research-reports" OR "Guides" OR "Book-chapters" OR "Journal-articles-overseas" OR "Theses" OR "Statistical- documents" OR "Government- reports" OR "Books" OR "Conference-papers" OR "Discussion-papers" OR "Conference-proceedings" OR "Legal/Legislative/Regulatory- materials" OR "Journal-articles" OR "Information-analyses" OR "Bibliographies" OR "Curriculum-materials") AND pd(>20040101)

ERIC

Terms 1-15 AND a)-i) AND I-VII) AND

(Design AND Community AND Achiev*) AND rtype.exact("070 Information Analyses" OR "071 Eric Publications" OR "040 Dissertations/theses" OR "Review" OR "042 Dissertations/theses - Masters Theses" OR "072 Book/product Reviews" OR "041 Dissertations/theses - Doctoral Dissertations" OR "043 Dissertations/theses - Practicum Papers" OR "110 Numerical/quantitative Data" OR "142 Reports - Evaluative" OR "010 Books" OR "073 Eric Digests In Full Text" OR "Journal Article" OR "143 Reports - Research" OR "080 Journal Articles" OR "Conference Paper") AND la.exact("English") AND lv("grade 4" OR "grade 6" OR "junior high schools" OR "postsecondary education" OR "grade 8" OR "preschool education" OR "grade 2" OR "elementary secondary education" OR "two year colleges" OR "grade 12" OR "secondary education" OR "grade 10" OR "grade 9" OR "grade 3" OR "grade 1" OR "elementary education" OR "grade 7" OR "high schools" OR "primary education" OR "grade 5" OR "early childhood education" OR "kindergarten" OR "grade 11" OR "middle schools" OR "high school equivalency programs" OR "intermediate grades") AND pd(>20040101)

ASSIA

Terms 1-15 AND a)-i) AND I-VII) throughout apart from:

Design AND Home AND Impact AND Children AND Adolescents
Design AND Home AND Effect* AND Children AND Adolescents
Design AND Home AND Learn* AND Children AND Adolescents
Design AND Community AND Impact AND Children AND Adolescents
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AND Community AND Learn* AND Children AND Adolescents

Mak* AND Community AND Achiev* AND Children AND Adolescents
Mak* AND Community AND Impact AND Children AND Adolescents
Mak* AND Community AND Effect* AND Children AND Adolescents
Mak* AND Community AND Learn* AND Children AND Adolescents

Web of Knowledge

Terms 1-15 AND a)-i) AND I-VII) throughout but searches refined by:

Research areas: Education, Educational Research

Language: English.

Appendix 3: Scoping and screening literature on arts and achievement

Brief Reference*	Topic/Curricular area	Recency (Year)	Age group of children	Country	Type of publication (e.g., Paper, Report, Book)	Empirical Research (Yes/No)	Transparency of methodology	Weight of evidence (e.g., Sample size)	Include/ Exclude (any comments)	Research Questions (1-7)
Annear, K.	Benefits for pupils of participation extracurricular activities such as music, dance, drama also sports and cadets both in and out of school. Gender and SES differences considered.	2010	High school pupils No further definition of age group given.	Australia (Western Australia)	Very brief overview report of a big project	Report of some quantitative data	Explicit but too brief	Large sample size of the overall study. Study provides brief evidence against research questions.. Robustness of evidence is unclear.	Exclude Brief overview report	1, 3, 5, 7
Babo, G.	The relationship between participation in instrumental music participation and	2004	Middle school pupils –Eighth grade	USA	Paper	Yes Quantitative	Explicit and detailed	Significant sample size modified for a	Include Robust study relevant to several	1, 7

	academic achievement. Gender and SES differences considered.							range of variables.	research questions.	
Bloor, A. J.	Background music and comparing the achievement in maths and reading tests with children who sing/play music and who don't. Gender differences looked at.	2009	Year 5 – Age 10	UK - England	Paper	Yes Qualitative	Explicit Clear rationale for choice of year group and choice of tests	Has a clear hypothesis. Study is broadly in line with one of key review objectives and provides useful evidence.	Include	2,5
Brock, J.	Exploring how Theatre arts may be incorporated into classes and whether this has a positive impact on student achievement.	2011	Elementary school Kindergarten	USA	Masters Thesis	Yes Qualitative	Reasonably clear	RQs not matched by design. Interview with one 'expert' in field of teaching. Observations.	Exclude	1

Brown, E. D., Benedett, B., & Armistead, M. E.	Two studies : 1.Exploring the impact of an arts enrichment pre- school on achievement of low income children 2. Comparison of predictors of school success for pupils from 2 pre- schools –one an arts enrichment school and one not	2010	Pre- school 36-90 months	USA	Paper	Yes Qualitative and Quantitative	Explicit for both studies.		Include	2,5,7
Bryce, J.	Evaluation of four arts programmes based in schools.	2004	Range of ages from pre- school, junior primary, primary, middle primary, secondary.	Australia	Paper	Yes Qualitative	Unclear Description of methodology is very broad and lacks detail. No information on age groups of participants, sample size. General description of data		Include	1,3,5

							sources.			
Burnard, P.	Explorations of music teachers views of how to re-engage disadvantaged and disengaged young people through inclusive music pedagogical practice. SES considered.	2008	Comprehensive Secondary schools	England	Paper	Yes Qualitative	Explicit		Include	3,6
Catterall, J. S., Dumais, S.A., Hampden-Thompson, G.	Study explores the impact on academic outcomes and community behaviour in later life for young people who have had significant early involvement in the arts either in or outwith school through analysis of longitudinal data.	2012	Teenagers and young adults – Tracking from Kindergarten-26 years of age.	USA	Research Report	Yes Quantitative	Explicit		Include	1,5
Costa-Giomi, E.	Study of the impact on children of participating in 3 years of piano instruction.	2004	Forth grade children – 9 years of age.	Canada: Montreal	Paper	Yes Quantitative	Explicit		Include	1,3,5,7

Creech, A et al.	Review of literature relating to El-Sistema programmes looking at findings on the impact on achievement, wellbeing and social change.	2013	Children and young people	International	Report	No Literature review	NA		Exclude Literature review	1,3
Davies, D., Jindal-Snape, D., Collier, C., Digby, R., Hay, P., Howe, A.	Systematic literature review exploring creative learning environments in schools.	2012	Early years, primary and secondary schools.	International (with focus on Scotland /countries with similar system)	Paper	No Systematic Literature Review	NA		Exclude Literature review	1
Education Scotland	Exploring the development of creativity in children between 3 and 18 years.	2013	3-18 years	Scotland	Impact Report	No	General but research design not explicit		Exclude Does not answer the RQs	None
Ewing, R.	Review of research on the impact of arts on learning across UK, USA, Europe and Canada. Reviews literature and research	2010	All ages	UK, USA, Europe and Canada	Report	No	None	NA	Exclude <i>Note: Much of the research reviewed is included here.</i>	1,3,4,5

Ewing, R., Hristofski, H., Gibson, R., Campbell, V., & Robertson, A.	Report of the findings of the first two years of the School Drama project. Focus on enhancing teacher's skills in using drama with literature to improve children's literacy.	2011	Primary pupils Stage 1-3 plus 1 class of 18 year olds.	Australia	Paper	Yes Qualitative	Explicit	The findings relate to teachers but there is some impact on pupils from improved teacher confidence and capability which is not directly relevant.	Exclude	None
Figliano, S.	Exploration of school choirs programmes as distinctive learning environments.	2008	Preparatory classes to year 7	Australia	Paper	Yes Qualitative	Explicit	Most findings relate to music outcomes and empirical evidence regarding learning outcomes is limited and based on three teacher views	Exclude	1
Gacherieu, D. R.	Explores the impact on involvement of ethnically diverse pupils in a 10 week	2004	Fourth and fifth grade students	USA	Masters Thesis	Yes Qualitative	Explicit	Research design clearly states but not believe it	Include	1,3

	music programme on academic performance, attitude to school, social skills, self esteem, public speaking and school attendance.							could have been improved to yield more conclusive findings.		
Grant, A., Hutchinson, K., Hornsby, D., & Brooke, S.	A small scale enquiry that aims to support teachers to integrate arts to bring about improvements in literacy. Gender, ethnicity and SES considered.	2008	Preparatory years 5 and 6	Australia	Paper	Yes Qualitative	Explicit	Findings focus on outcomes for teachers rather than academic achievement of pupils.	Exclude	None
Greenberg, H.	Exploring the relationship between participation in an after-school theatre programme and improvements in social and academic skills of ethnically diverse and disadvantaged middle school pupils. Ethnicity and SES considered.	2010	Grade 6,7,8	USA	Paper	Yes Qualitative and Quantitative	Explicit		Include	1,3,5,7

Hallam, R., Creech, A., McQueen, H.	Longitudinal study evaluating the Musical Futures initiative and how the processes involved could improve outcomes for Music Futures and also in the wider school context.	2011	Years 7-11 Ages 11-19	England	Research Report	Yes Qualitative and Quantitative	Explicit		Include	1,3
Hardie, D., Davies, H., & Barber, B. (2007)	Longitudinal study considering the relationship between secondary school pupils' participation in a school band or orchestra and impact on self-identity. Also explores whether bright pupils are more likely to take part and if there is any impact on academic achievement..	2007	Secondary school. 10 th Grade	Australia	Paper	Yes Quantitative	Explicit		Include	1,7
Harris, D. J.	Small-scale study exploring the impact of music on language, communication and literacy	2011	Pre-school 9 months – 4 years.	UK - England	Paper	Yes Qualitative	Explicit	As there is no breakdown of findings by age it is difficult to	Exclude	None

	development in pre-school children.							determine findings that meet the age group inclusion criteria.		
Heyning, L.	Small scale-study exploring the impact of participation classroom singing sessions on pupils' music and other areas of learning.	2010	Primary school Years 3-6 (7-12 year olds)	Australia	Paper	Yes Qualitative	Explicit	Main focus is on outcomes for teachers and singing but there is some evidence for wider wellbeing and academic development	Include	1,3
Imms, W., Jeanneret, N., & Stevens-Ballenger, J.	Evaluation exploring the impact of arts partnerships on pupil involvement, sense of control over their learning, working with others and development of creativity. Also explores pupil's development of	2011	10-16 year olds. Majority -11 years old	Australia	Research Report	Yes Qualitative and Quantitative	Explicit		Include	1,3,7

	arts knowledge and skills and impact on teachers and arts professionals.									
Jeanneret, N.	Review of research on the impact of the Musical Futures programme in Victoria Australia.	2010	Secondary schools Years 7 -10	Australia	Paper	Yes Qualitative and Quantitative	Explicit		Include	1,3
Johnson, C. M., Memmott, J. E.	Study compares the impact on pupils of participation in school music programmes rated as excellent with those considered to be lacking.	2006	3 rd , 4 th , 8 th and 9 th grade pupils	USA	Paper	Yes Quantitative	Explicit		Include	1,7
Joronen, K., Konu, A., Rankin, H. S., & Astedt-Kurki, P.	Evaluation of a school drama project which considers the impact of drama on reducing bullying and social interaction.	2012	Grades 4 and 5 9-12 year olds	Finland	Paper	Yes Quantitative	Explicit		Include	3
Kinney, D.W.	Study exploring the impact on pupil academic achievement of participation in music ensemble.	2008	Grades 6, 8	USA	Paper	Yes Quantitative	Reasonably clear		Include	1,5,7
Metsapelto, R., &	Study exploring the relationship	2012	Ages 9-10	Finland	Paper	Yes	Explicit		Include	1,7

Pulkkinen, L.	between participation in school extracurricular activity and socio-economic behaviour and academic achievement.					Quantitative				
Neville, H et al.	Study exploring the theory that music instruction improves cognition in a number of areas by improving the child's concentration.	2008	Ages 3-5	USA	Research Report (Part of the DANA Report)	Yes Quantitative	Explicit		Include	1,6,7
Pietsch, H. M.	Evaluation exploring the effectiveness of a well established state wide school choral programme.	2009	Upper primary school pupils	Australia	PhD Thesis	Yes Qualitative	Explicit	Focus is on stakeholder perceptions rather than academic achievement.	Exclude	None
Portowitz, A., Lichtenstein, O., Egorova, L., & Brand, E.	Study on the impact of learning music on the cognitive development of pupils at risk. Comparison is made between pupils with and	2009	Elementary school children Ages 7-9 years old	Israel	Paper	Yes	Explicit		Include	1,3

	with and without engagement in music.									
Rickard, N. S., Appelman, P., James, R., Murphy, F., Gill, A., & Bambrick, C.	Longitudinal study exploring the relationship between pupils engaging in additional music classes and the impact on self-esteem and social skills.	2012	Primary school Preparatory/ Grade 1 and Grade 3	Australia	Paper	Yes Quantitative	Explicit		Include	3, 5
Rickard, N. S., Bambrick, C. J., & Gill, A.	Two studies: 1. Exploring the impact of increased participation in school music classes on young adolescent boys. 2. Exploring the impact of an excellent music programme on upper primary school classes.	2012	10-13 year olds	Australia	Paper	Yes Quantitative	Explicit		Include	3, 5

Rickard, N. S., Vasquez, J. T., Murphy, F., Gill, A., & Toukhsati, S. R.	This study explores the impact of music instruction on verbal and visual memory in primary school children.	2010	Primary school Mean age 8.79 years of age.	Australia	Paper	Yes Quantitative	Explicit	Focus is on the impact of music instruction on memory rather than academic achievement and findings do not answer the research questions.	Exclude	None
Rosevear, J.	Paper describes part of a larger study which explored the impact of studying music on academic achievement of secondary school pupils, Gender differences considered.	2007	Year 9 and 10	Australia	Conference Paper	Yes Quantitative	Explicit		Include	1,5
Rosevear, J. C.	Paper exploring pupils perceptions of why they are successful in academic subjects and other activities	2010	Year 9 and 10 14 to 15 year olds	Australia	Paper	Yes Qualitative	Explicit	None of the findings address the RQs	Exclude	None

Rosevear, J. C.	Study exploring attitudes of adolescents to learning music. The study considers their level and type of music involvement.	2008	Year 9 and 10	Australia	PhD Thesis	Yes Quantitative and Qualitative	Explicit	A small part of the study relates to academic achievement.	Exclude The academic achievement element of the study and resultant findings were given in Rosevear, J. (2007) as discussed above.	1,5
Schiller, W.	Longitudinal study looking at the impact of attendance at live music performances on children, teachers, families and school communities.	2006	5 to 12 year olds	Australia	Paper	Yes Qualitative	Explicit		Include	2,4
Sharp, C., Cooper, L.	Large study of primary and secondary school pupils evaluating the impact of Creative Partnerships over a number of years and considering the relationship between creative learning and	2012	Primary and Secondary school pupils	England	Paper	Yes Quantitative	Explicit		Include	1,7

	academic attainment and school attendance.									
Spelke, E.	Exploring the relationship between cognitive processes and music and maths	2008	Ages 5-17 years	USA	Research report (Part of the DANA report)	Yes	Explicit	Findings have implications for academic achievement specifically in maths. Still feel it may be of relevance.	Include	1
Stahl, G., & Dale, P.	Study exploring the involvement of disadvantaged, disengaged boys in a particular type of music activity: DJ-ing or MC-ing (rapping in hiphop)	2013	Boys aged 14-16	England	Paper	Yes Qualitative	Explicit	Only one aspect of the study related to one RQ.	Include	1
Trent, A., & Riley, J.	An action research project exploring the impact of an integrated arts approach to an aspect of the curriculum.	2009	4 th Grade	USA	Paper	Yes Mainly qualitative with statistics used to give context to findings.	Clear	Only one aspect of the study related to one RQ.	Include	1,6

Vaughan, T., Harris, J., & Caldwell, B. J.	A summary of research exploring the impact of participation in The Song Room music project and the impact on pupil outcomes. Focus on academic achievement, wellbeing and attendance. SES considered.	2011	Grade 5 and 6	Australia	Research Report	Yes	Explicit		Include	1,3,7
Vicarsa, M., & Senior, K.	Small scale study exploring the effects of using visual arts with boys with literacy problems.	2013	Primary school	Australia	Paper	No Qualitative	Not clear	Study does not address RQs	Exclude	None
Wandell et al.	Study explores the impact of artistic ability and arts education on children's reading ability.	2008	Ages 7-12	USA	Research Report (part of the DANA report)	Yes Quantitative	Explicit		Include	2
Wright, R., John, L., Alaggia, R., & Sheel, J.	Multi-method study exploring the impact of an extra-curricular community arts programme on	2006	9-15 years old	Canada	Paper	Yes Multi-method	Explicit	Study addresses 1 RQ	Include	3

	disadvantaged young people.									
Yasar, M. C., & Aral, N.	Study comparing the impact on six year old children of participation in drama education and the effects on their creative skills. Comparison with children who did not participate.	2012	Pre-school 6 year olds	Turkey	Paper	Yes Quantitative	Explicit	Study does not address any RQs	Exclude	None
Young, S.	Exploring perceptions of mothers from ethnic communities of music involvement and play in early years education .	2009		England	Paper	No	Some information	Study does not answer RQs and has significant discussion of author opinion. Seems to be small part study and large part discursive.	Exclude	None

Appendix 4: Summary of papers for each research question

Literature to inform Research Question 1: What is the impact of participation in arts on academic achievement?

Brief Reference*	Bullet point description of methodology (study design)	Bullet point summary of findings against the above research question	1 = excellent, 4 = inadequate			
			Appropriateness of study design	Trustworthiness of results	Appropriateness of focus	Weight of evidence for each finding
1. Babo, G. (2004)	<ul style="list-style-type: none"> ▪ Statistical design that enabled control of gender, IQ and SES variables ▪ Students drawn from two New Jersey middle schools ▪ 178 pupils (93 instrumental -35 male and 58 female and 85 non-instrumental pupils (32 male and 53 female) ▪ Analysis of data from California Achievement Test (CAT) Normal Curve Equivalent (NCE) scores for maths, reading and language arts; Grade Eight Proficiency assessment (GEPA) in maths and language arts , IQ scores, gender, SES and participation/non participation in instrumental music. 	<ul style="list-style-type: none"> ▪ When controlled for IQ, gender and SES there is a positive relationship between engagement in instrumental music and academic achievement. ▪ Range of varied results across the sets of test scores ▪ Most significant link between students engaged in the instrumental music programme and impact on reading and language arts achievement based on CAT and GEPA scores. ▪ Variable findings for relationship between engagement in music and maths achievement when variables are controlled. ▪ Students who engage in 	1	1	1	1 1 1 2

		<p>structured instrumental music programmes are likely to have a higher IQ</p> <ul style="list-style-type: none">▪ IQ of the child may dominate the independent effect of participation in music.				1
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<p>2. Brown, E. D., Bennett, B., & Armistead, M. E. (2010)</p>	<p>Two studies :</p> <p>Study1</p> <ul style="list-style-type: none"> ▪ Quasi-experimental design comparing achievement for children at the end of one and two years of attendance at the music enriched school (Kaleidoscope) programme using age as a predictor of outcomes. ▪ Explores pre-academic achievement for children attending an arts enrichment programme. ▪ Pupil assessments and interviews with parents both used ▪ 194 ethnically diverse disadvantaged, children, their carers and teachers. 44% boys ▪ Analysis of demographics, developmental stage and pre-academic achievement <p>Study 2</p> <ul style="list-style-type: none"> ▪ 165 ethnically diverse, disadvantaged children and their main carers (63 at Kaleidoscope and 102 at comparison school, 43% girls) ▪ Analysis of demographics and receptive vocabulary tests 	<ul style="list-style-type: none"> ▪ Higher impact on pupil achievement was seen in children who been at the school for two years rather than one ▪ Achievement is not solely down to development-exposure is important. ▪ Children showed increased preparedness for school ▪ Achievement was unaffected by ethnicity or stage of development <p>Study2</p> <ul style="list-style-type: none"> ▪ Children at Kaleidoscope showed improved end of year receptive vocabulary over those at the comparator school ▪ Involvement in the arts may improve educational outcomes for at-risk children 	<p>1</p>	<p>1</p>	<p>1</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p>
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<p>3. Bryce, J. (2004)</p>	<ul style="list-style-type: none"> ▪ Evaluation of four arts programmes based in schools exploring: ▪ Impact of each programme on academic achievement, school attendance and engagement. ▪ The characteristics of the programmes which benefit children most 	<ul style="list-style-type: none"> ▪ None of the evaluations produced empirical evidence that engagement in the arts ▪ contributed to academic improvement – no significant difference in results for literacy, numeracy and writing when compared with pupils outwith the programmes. ▪ “Low-achieving’ pupils participating in a music programme enjoyed being able to communicate without the requirement to read or write 	<p>3</p>	<p>2</p> <p>2</p>	<p>2</p> <p>2</p>	<p>2</p> <p>2</p>
<p>4. Catterall, J. S., Dumais, S.A., Hampden-Thompson, G. (2012)</p>	<ul style="list-style-type: none"> ▪ Analysis of longitudinal data from four national US databases: National Education Longitudinal Study of 1988 (NELS:88), the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K), and the Education Longitudinal Study of 2002 (ELS:2002), the National Longitudinal Survey of Youth of 1997 (NLSY97). 	<p>Positive impact on academic outcomes for young people who had a significant involvement in the arts when compared with those who had less as follows:</p> <ul style="list-style-type: none"> ▪ Higher Grade Point Averages and increased uptake of and academic outcomes in further education – even for pupils with high SES ▪ Young people who had significant engagement in arts were more likely to engage in wider public community activities than those who had not. 	<p>1</p>	<p>1</p>	<p>1</p>	<p>1</p> <p>1</p> <p>1</p>

		<ul style="list-style-type: none"> ▪ Extra-curricula or school arts programmes which offer significant involvement may help to bring more parity in academic achievement between young people with high and low SES. 				1
5. Costa-Giomi, E. (2004)	<ul style="list-style-type: none"> • Sample of 117 (of which 81 took part) 4th grade (9 year old) pupils from 20 English language schools in Montreal who had previously not participated in formal music lessons • Comparison with control group of pupils who did not participate in the piano instruction • Programme • Analysis of results from language and maths elements of academic achievement tests and of self- esteem assessments prior to and at the end of year 2 and 3 of the study • Review of pupil reports throughout the period of the study 	<ul style="list-style-type: none"> ▪ No evidence of relationship between academic achievement as a result of participation formal music instruction from analysis of language and maths results. 	1	1	1	1
6. Gacheri eu, D. R. (2004)	<ul style="list-style-type: none"> • Explores the impact on involvement of ethnically diverse pupils in a 10 week performing arts programme (music, drama, theatre) on academic performance, attitude 	<ul style="list-style-type: none"> ▪ No evidence of improvement in school attendance ▪ Small amount of evidence to suggest slight improvement in academic progress 	2	2	2	2 2

	<p>to school, social skills, self esteem, public speaking and school attendance.</p> <ul style="list-style-type: none"> • 58 ethnically school pupils in a K5 public elementary school (17 4th grade and 41 in 5th, 40 females and 18 males) • questionnaire applied to pupils 3 times- before and after participation and at end of school year • semi-structured interviews with 10 students and 2 teachers • analysis of findings from questionnaires, interviews and school attendance records. 	<ul style="list-style-type: none"> ▪ Questionnaires findings do not fully support those of the interviews showing little or no progression in all areas measured. 				2
7. Hardie, D., Davies, H., & Barber, B. (2007)	<ul style="list-style-type: none"> • Part of the Michigan Study of Adolescent Life Transitions (This study-Wave 5 of 9) • Analysis of longitudinal data to identify evidence of sustained impact on academic outcomes for pupils involved in secondary school band or orchestra • Survey questionnaire of 1257 10th grade respondents (49% female, 51% male, largely white working-middle class families, from 10 schools) • 213(17%) 10th grade respondents took part in band or orchestra, 235 (19%) in sports club, 24 (2%) in both music and sports, 833 (66%) in neither and 	<ul style="list-style-type: none"> ▪ Evidence suggests there is little significant relationship between participating in orchestra or band and greater academic performance ▪ Engagement in music activities may perhaps prevent a decline in grades between primary and secondary school. ▪ Pupils who do not have a positive belief in their academic abilities in primary school are less likely to participate in secondary school extra-curricular activities. This 	1	1	1	1 1 2

	<p>of which 56 identified who took part in no extra-curricular activity in or out of school.</p> <ul style="list-style-type: none"> • Of 1257 respondents -684 enough data to analyse grade points for 7th, 9th and 10th grades -550 for 11th and 12th grades, Data from standard aptitude tests for 334 respondents. • Areas measured: activity participation, general academic achievement, overall ability, individual belief about academic performance in maths and English. • Analysis of covariance comparing those who participate in music activities with those do no extra-curricular activity. 	is regardless of ability.				
8. Heyning, L. (2010)	<ul style="list-style-type: none"> • 90 primary school children aged between 7 and 12 - almost equal numbers of boys and girls voluntarily participating in weekly one hour choir sessions. • 3 teachers • Data analysis of: questionnaires, semi-structured interviews with teachers, video recordings of singing sessions, individual and collective video interviews with the teachers. 	<ul style="list-style-type: none"> • Findings suggest positive academic benefits for participants in the choir sessions resulting from the application of learning in these sessions to other areas. • Improvement in memory through the use of rhyme and vocabulary skills ▪ Children's vocabulary and listening skills improved 	2	2	2	2 2 2

<p>9. Johnson, C. M., Memmott, J. E.</p>	<ul style="list-style-type: none"> • Quantitative study analysing anonymous standardised test scores from 4,739 3rd, 4th, 8th and 9th grade pupils Of which 1119 elementary pupils and 3,620 middle school. ▪ 8 elementary and 11 middle schools ▪ School selection based on quality of music provision: excellent vs poor ▪ Analysis of 6 different English and 5 maths test scores at each level to meet No Child Left Behind assessment requirements. ▪ All scores standardised ▪ 2 different groups of children 1- where school music provision excellent, 2 where music provision poor 	<ul style="list-style-type: none"> • Pupils involved on music had much higher standardised test scores than those who were not. This was irrespective of SES. • There are significant differences in the test scores of students involved in the high quality music programmes when compared with pupils in the poorer ones – no causal relationship is claimed. • Choir pupils participating in poor quality choirs performed less well than non musicians. 	2	2	2	2
<p>10. Kinney, D.W. (2008)</p>	<ul style="list-style-type: none"> • Analysis of test scores for 2 groups of pupils in 6th and 8th grade at 2 poorly performing urban middle schools with similar demographic and academic achievement characteristics. • Also analysis of control group of pupils not involved. • Test scores analysed before (using 4th grade test scores) and after (using test scores for both 	<ul style="list-style-type: none"> • Band participation had a significant positive impact on academic achievement. • Choir involvement does not show this. In some situations choir participant performed less well than non-musicians. • Must be considered that band participation may attract 	2	2	2	2 2 2

	<p>6th and 8th grade groups) involvement in band or choir.</p> <ul style="list-style-type: none"> • Home environment and SES variables considered. • Analysis of raw State proficiency scores used for 4th and 6th grade-reading, maths, citizenship, writing. • For 8th grade – analysis of percentiles from McGraw-Hill Terra Nova CTBS Multiple assessment (reading, maths, science, language arts, social studies). 	<p>brighter pupils.</p> <p>6th grade findings :</p> <ul style="list-style-type: none"> • Significant differences between pupils participating in band choir and neither. • Band participants scores were significantly higher than those of choir or none. • Choir and non-participants scores were broadly similar. <p>8th grade findings:</p> <ul style="list-style-type: none"> • Band participants scores were much higher than no participation. • No significant difference between scores of choir and band participants or choir and no involvement. • Pupils with high SES scored more highly on all test scores except 4th 6th 8th grade reading. 				2	2	2	2	2
11. Metsapelto, R., & Pulkkinen, L.	<ul style="list-style-type: none"> • Longitudinal study (3 years) including 281 3rd and 4th grade pupils at start of the programme who were in 5th and 6th grade when it ended (138 boys and 143 	<ul style="list-style-type: none"> • Pupils who had two or three years participation in arts and music had higher academic achievement than those with I 	1	1	1	1				

(2012)	<ul style="list-style-type: none"> girls) Analysis of questionnaire on participation in extracurricular activities (including arts) jointly completed by parents and children. Questionnaire administered twice – once before the programme began and at the end of the school year. School achievement were also analysed from teacher scores using elements of the Finnish epidemiological twin study Pupils’ attainment in reading, writing , arithmetic along with academic working skills (perseverance, attentiveness, and attention to detail) were compared with average class performance. 	<p>year or no involvement.</p> <ul style="list-style-type: none"> They also had improved behaviour when compared to those with no participation. Girls had a higher preference for involvement in arts, crafts, music and performing arts than boys. 				<p>1</p> <p>2</p>
12. Neville, H. et al. (2008)	<ul style="list-style-type: none"> 88 children from Head Start pre-schools, 2-5 years old, low SES. Four groups Group 1 26 children music activities – listening, movement, playing music and singing - small numbers 5 pupils to 2 teachers. 3 groups “Control-comparison” 1 large group (19 children) receiving Head Start teaching 18 pupils to 2 teachers, 1 small group taking part in Head Start 	<ul style="list-style-type: none"> Significant positive impacts on non-verbal IQ, numeracy and spacial understanding for children in both the music and attention groups. The impacts may be due to the high ratio of teacher to pupils in both small groups where pupils received a high level of attention. Music teaching is often 	1	1	1	<p>1</p> <p>1</p>

	<p>activities (20 children) 5 pupils to 2 teachers and 1 small group (23 children) receiving attention training.</p> <ul style="list-style-type: none"> • Each intervention weekly for 40 minutes, 5 day per week for eight weeks. • Children in all groups tested before and after involvement in activities on: basics of language, vocabulary, letter identification, IQ, visuospatial intelligence, developmental numeracy. 	<p>undertaken in small groups with either individual tuition or high pupil to teacher ratios and it the level of attention rather than the music that produces improved outcomes.</p>				
13. Rickard, N. S., Bambri ck, C. J., & Gill, A. (2012)	<p>Study1</p> <ul style="list-style-type: none"> • 127 year 7 pupils from a private boys only school (mean age 12.67) • Comparison between pupils who participated in double the number of music classed when compared with pupils who took part in double the number of arts lessons • Participants completed form with age, informal/formal music experience, leisure activities and level of enjoyment of arts lessons. • They also completed Children’s Memory Scale word pairs sub-test, Kauffman Brief Intelligence Test, Culture-Free Self-Esteem Inventory, The School Life Questionnaire and Motivation 	<ul style="list-style-type: none"> • Findings for both groups did not show any significant impact on a range of cognitive and psychosocial factors. • Benefits of such programmes may only be evident in more intense individual or small group tuition settings. • It is possible that beneficial effects from participation in the arts is more prevalent in disadvantaged pupil groups. 	2	2	2	2 2 3

	<p>Engagement Scale for music, drama and arts.</p> <ul style="list-style-type: none"> • Tests applied at the beginning of the academic year and then 6.5 months in. 					
14. Rosevear, J. (2007)	<ul style="list-style-type: none"> ▪ 282 participants from 3 high schools, all studying core subjects: English, Maths, Science, Society and Environment. ▪ Four section survey: 1 questions on: background information, 2.level of participation in music 3. Rosenberg’s Self-Esteem Scale and 4. Results of academic achievement for each pupil taking part. 	<ul style="list-style-type: none"> • 124 respondents were music students (taking music at school as a subject) 158 were not. • Music pupils had higher test scores for all four core subjects • Female pupils taking music scored had higher scores than boys who studied music • Enjoyment of a subject was a significant factor in success. 	2	2	2	2 2 2 3
15. Sharp, C., Cooper, L. (2012)	<ul style="list-style-type: none"> ▪ Series of evaluations of Creative Partnerships between 2003 and 2011 ▪ Approximately 400 schools and 61,000 pupils involved in a series of studies. ▪ ‘Virtual control group’ design. ▪ Statistical models created to take affect of factors which affect outcomes such as ASN, gender and economic disadvantage. 	<p>Schools</p> <ul style="list-style-type: none"> • Findings indicated that CP schools had higher attainment levels at Key stage 3 and 4 from 2003-2010. Account taken of prior attainment and factors such as deprivation levels. ▪ Only small improvement in attendance seen – more in primaries which had had an involvement over several years. 	1	1	1	1

	<ul style="list-style-type: none"> ▪ Multi level modelling to take account of different levels of data –eg individual pupil and school. ▪ Analysis of National Pupil database . ▪ Comparison of CP schools with others ▪ Comparison of pupils participating in CP activities with those who do not. 	<p>Pupils</p> <ul style="list-style-type: none"> ▪ Pupils taking part in CP activities had improved attainment. ▪ CP pupils showed improved progress at Key stages 1,2,3,4 in national tests. • Attainment improvement more consistent in pupils in secondary schools 				<p>1</p> <p>1</p> <p>1</p>
16. Spelke, E. (2008)	<ul style="list-style-type: none"> ▪ Three experiments children and young people. ▪ Experiment 1- 85 children and young people 5-17 years of age with a reasonable level of music or sports education from a prosperous area. ▪ Experiment 2- 32 children 8-13 years old with a high level of music education recruited from music schools compared with those who had little if any. Also comparing 29 children in the same age group with low level of music education. ▪ Experiment 3 – 80 pupils 13-18 years of age from a private school for the arts. ▪ Participants undertook 12 tests in 	<ul style="list-style-type: none"> • Pupils involved in short periods of low or medium level of music education appear to derive no mathematical benefits. • When compared with pupils who had little if any music instruction, pupils with experience of music education had improved test scores relating to geometry. • This finding only occurs when involvement in music is significant and over a lengthy period. 	1	1	2	<p>1</p> <p>1</p>

	all.					
17. Stahl, G., & Dale, P. (2013)	<ul style="list-style-type: none"> ▪ Qualitative study using some aspects of phenomenology and using grounded theory. ▪ 12 white working class boys 14-16 years old from school in North of England in an area of high deprivation and long-term unemployment ▪ Semi-structured interviews and observations in classroom and extracurricularly ▪ Questions explored how the boys perceived their skills in making music by DJ-ing and MC-ing 	<ul style="list-style-type: none"> • Some signs that involvement in these areas of music had a positive benefits for academic achievement. • Through DJ-ing and MC-ing disaffected and disengaged boys developed more self-discipline and ability to work harder. • Involvement in rap enabled boys with previously poor literacy, previously reluctant and poor communicators enjoyed performing to peers • Despite being almost illiterate and with very poor attainment some of the boys showed a 	1	1	1	2 2 2 2 2

		commitment to education.				
18. Trent, A., & Riley, J. (2009)	<ul style="list-style-type: none"> ▪ Qualitative study using quantitative data to give context and added information. ▪ Analysis of impact of including visual art (in addition to language arts and social studies) as part of curriculum module on “Privacy: Foundations of Democracy” ▪ Assessments before and after of outcomes against course learning objectives using observation, researcher field notes/diaries, samples of pupils’ work, teaching plans and materials, focus groups, photographic evidence of activities.³ ▪ Categories based on Denver Public School’s benchmark criteria used to assess pupil’s achievement. 	<ul style="list-style-type: none"> • Significant impact was evident in art, social studies and writing with pupils meeting and surpassing benchmark outcomes. • Much greater than for curricular areas where arts is not integrated. 	2	2	2	2
19. Vaughan, T., Harris, J., & Caldwell, B. J. (2011)	<ul style="list-style-type: none"> ▪ Quasi-experimental design ▪ 10 Government run schools located in areas of some disadvantage. ▪ 3 schools providing the 6 month Song Room Programme ▪ 2 schools providing the 12-18 month programme ▪ 4 similar schools not offering either programme used as a control group 	<ul style="list-style-type: none"> • Pupils who took part in the Song Room programme had significantly higher academic achievement than those who did not. • Pupils who took part in the Song Room programme had significantly higher school attendance than those who did not. 	1	1	1	1

	<ul style="list-style-type: none"> ▪ Analysis of data from 370 pupils (over 100 in each group) broken into 6 month programme group, 18 month programme group and no involvement. ▪ Analysis of NAPLAN Scores for literacy and numeracy, and in ACER Social Emotional Wellbeing indicators and Case study interviews. 	<ul style="list-style-type: none"> • Participating schools had improved results for all factors when compared with others. Effects were more significant for the 12-18 month programme. 				1
20. Wandel l et al. (2008)	<ul style="list-style-type: none"> ▪ Study over 3 years - 49 children aged 7-12 who were already part of a longitudinal study exploring the brain and the development of reading skills. ▪ Questionnaire on arts education looking at visual arts, music, dance and drama used in addition to Child Temperament and Personality questionnaire measuring artistic ability . ▪ Parents gave data child's type of involvement in arts learning, frequency, type, skill level. ▪ Parent's also gave data on children's temperament and willingness to engage in new experiences on the Openness to Experience Scale. 	<ul style="list-style-type: none"> • There was a relationship between the amount of music education and the level of improvement in children's reading • There was a relationship between visual arts education and ability in maths calculation. 	2	2	2	2 2

Literature to inform Research Question 2: What is the impact of arts attendance on academic achievement?

Brief Reference*	Bullet point description of methodology (study design)	Bullet point summary of findings against the above research question	1 = excellent, 4 = inadequate			
			Appropriateness of study design	Trustworthiness of results	Appropriateness of focus	Weight of evidence for each finding
1. Bloor, A.J. (2009)	<ul style="list-style-type: none"> ▪ Experimental-Control design ▪ Three diverse schools – socio-economically. ▪ Two tests of music/two maths- one each with background music and one each without ▪ Sample size: 47 children (47 x 4 tests- 188 separate tests). ▪ Observation of behaviour during tests undertaken by the author ▪ Interviews 	<ul style="list-style-type: none"> ▪ Findings would appear not to support the author’s hypothesis that a number of children were distracted by background music being played during tests and that a small number of these children are ‘musicians’ ▪ Music had a positive impact on the outcomes of reading tests ▪ Music had an adverse impact on the outcomes of maths tests ▪ The “Mozart effect” may be dependent on the subject being studied ▪ More than 50% of the children were observed to be affected by the music and showed behaviour not related to their 	2	2	3 (this does not fit exactly with the notion of attendance but think the study still has relevance)	2 2 2

		test work such as pretending to conduct the music/play an instrument.				
2. Schiller, W. (2006)	<ul style="list-style-type: none"> ▪ 3 year study of 140 5-12 year old pupils from 4 public schools attending 2-3 theatre performances each year. ▪ Participants randomly selected, boys and girls almost equally represented. ▪ Individual interviews and focus groups with children before and after each performance. ▪ Case studies were undertaken with a number of pupils from each school ▪ Assessment of impact also undertaken through monitoring pupils' drawing, writing and play by teachers and parents. 	<ul style="list-style-type: none"> ▪ Findings demonstrated significant impact on literacy ▪ Improvement was seen over three years in vocabulary, reading, oral and written language ▪ Teacher's noted that the arts had a positive impact on children with behaviour problems. 	2	2	2	2 2 2

Literature to inform Research Question 3: What is the impact of participation in arts on health and wellbeing of school aged children?

Brief Reference*	Bullet point description of methodology (study design)	Bullet point summary of findings against the above research question	1 = excellent, 4 = inadequate			
			Appropriateness of study design	Trustworthiness of results	Appropriateness of focus	Weight of evidence for each finding
1. Bryce, J. (2004)	<p>Evaluation of four arts programmes based in schools exploring:</p> <ul style="list-style-type: none"> ▪ Impact of each programme on academic achievement, school attendance and engagement. ▪ The characteristics of the programmes which benefit children most 	<p>Pupils involved in the arts programme:</p> <ul style="list-style-type: none"> ▪ Had improved self-esteem and were more positive about learning – particularly significant in disadvantaged pupils. ▪ Worked better with others as part of a team and learned the importance perseverance in bringing reward 	2	2	2	2
2. Burnard, P. (2008)	<ul style="list-style-type: none"> • Phenomenological study using semi-structured interviews • 2 in depth semi-structured interviews and with three teachers each one from one of three different schools in disadvantaged areas (East and SE England), schools in and out 	<ul style="list-style-type: none"> • Appropriately structured Music participation can provide disaffected young people with opportunities to develop self-worth, identify and the ability to engage with the world of education 	1	1	1	2 (Might have been strengthened by the addition of young people’s voice)

	<ul style="list-style-type: none"> of 'special measures' Explorations of music teachers views of how they re-engage disadvantaged and disengaged young people through inclusive music pedagogical practice. 	<ul style="list-style-type: none"> There needs to be flexible and adaptable frameworks that enable negative energy to be redirected in positive directions 'High status' creative projects impact positively on badly discontented young people Inclusive teaching methods can re-engage disaffected young people with learning. 				2 2 2
3. Costa-Giomi, E. (2004)	<ul style="list-style-type: none"> Sample of 117 (of which 81 took part) 4th grade (9 year old) pupils from 20 English language schools in Montreal who had previously not participated in formal music lessons Comparison with control group of pupils who did not participate in the piano instruction Programme Analysis of results from language and maths elements of academic achievement tests and of self-esteem assessments prior to and at the end of year 2 and 3 of the study Review of pupil reports throughout the period of the study 	<ul style="list-style-type: none"> Pupils who had undertaken 3 years of piano instruction had significantly greater levels of self-esteem than those not involved in the programme or who dropped out. This impact was seen regardless of gender, parental employment, family income and make up Development of self-esteem from participation in music is not restricted to advantaged children 	1	1	1	1 1 1
4. Gacherie u, D. R.	<ul style="list-style-type: none"> Explores the impact on involvement of ethnically 	<ul style="list-style-type: none"> Improvement in pupils attitudes to school, social skills, 	2	2	2	2

(2004)	<p>diverse pupils in a 10 week performing arts programme (music, drama, theatre) on academic performance, attitude to school, social skills, self esteem, public speaking and school attendance.</p> <ul style="list-style-type: none"> • 58 ethnically school pupils in a K5 public elementary school (17 4th grade and 41 in 5th, 40 females and 18 males) • questionnaire applied to pupils 3 times- before and after participation and at end of school year • semi-structured interviews with 10 students and 2 teachers analysis of findings from questionnaires, interviews and school attendance records. 	<p>self esteem and ability to speak in public.</p> <ul style="list-style-type: none"> ▪ No evidence of improvement in school attendance ▪ Questionnaires findings do not fully support those of the interviews showing little or no progression in all areas measured. 				
5. Greenberg, H. (2010)	<ul style="list-style-type: none"> • Ethnically diverse and disadvantaged public middle school in “Spanish Harlem” • 52 participants 26 in programme and 26 in control group, 85% of Hispanic and 15% of African-American origin from Grades 6,7 and 8 • Participants required to maintain an acceptable academic level to take part and continue in programme. • Questionnaire administered twice once at the beginning and 	<ul style="list-style-type: none"> ▪ No statistically significant evidence to suggest link with length of exposure and increase in Social and Academic Status (SAS) scores ▪ Clear benefits found: self esteem, social skills, confidence 	1	1	1	1

	<ul style="list-style-type: none"> again at the end of school year 17 pupils interviewed 					
6. Hallam, R., Creech, A., McQueen, H. (2011)	<ul style="list-style-type: none"> Longitudinal study over three years – 3 phases of data collection 1- 2008-9, 2 2009-2010 and 3 2010-2011. 8 different types of schools took part, 733 pupils (41% girls, 59% boys). 6% of pupils from non-UK nationalities. Phase 1 – 3 questionnaires completed by pupils, music and non-music teachers, Phase 2- Same staff and pupils completed questionnaires again as far as was possible. Phase 3 –As for 1 and 2 with 2 additional questionnaires 1 for pupils still studying music and 1 for those who had given up. Also additional questionnaire for non music teachers. For Phase1 and 2- focus groups with pupils from 6 case study schools also undertaken. Also interviews with Senior Management Team. Phase 3 individual interviews with pupils and interviews with pupils and music teachers in 7th case study school. Phase 1,2 and 3 in-depth interviews with Heads of music and music teachers in each of the 	<ul style="list-style-type: none"> Pupils developed higher levels of confidence and self-esteem Non-music teachers perceived improvement in pupil's motivation, wellbeing, self-esteem, confidence, working as a team, concentration, and ability to organise. 	1	1	1	1

	<ul style="list-style-type: none"> 6 case study schools. Music lessons observed throughout. 					
7. Heyning, L. (2010)	<ul style="list-style-type: none"> 90 primary school children aged between 7 and 12 - almost equal numbers of boys and girls voluntarily participating in weekly one hour choir sessions. 	<ul style="list-style-type: none"> Improved skills in communication, working as a team, acceptance of diversity 	2	2	2	2
8. Imms, W., Jeanneret, N., & Stevens-Ballenger, J. (2011)	<ul style="list-style-type: none"> More than 410 students (10-16 years), 50 teaching professionals, 34 artists Settings included 'Artist in residence' and 'Exposure to arts' programmes. Use of before and after quantitative and qualitative questionnaires of attitudes, Analysis of trends and qualitative themes from survey, interviews, observations and project documents. 	<ul style="list-style-type: none"> Findings indicate that participation improved acceptance and recognition of the skills of others Empowered pupils to engage in discussion and offer their views Enables pupils to work co-operatively together and to take direction from others 	2	2	2	2 2 2
9. Jeanneret, N. (2010)	<ul style="list-style-type: none"> 10 government schools, questionnaires for teachers in each school. 10 teachers responded. 2 case study schools –interviews with music teachers, focus group with pupils, observation of two classes. Assessment of case study schools against success factors for school music programmes (National Review of School 	<ul style="list-style-type: none"> Some teachers noted improvement in behaviour, motivation, learning independently, music and social skills and pupil involvement. 	2	2	1	2

	Music).					
10. Joronen, K., Konu, A., Rankin, H. S., & Astedt-Kurki, P. (2012)	<ul style="list-style-type: none"> • Quasi-experimental longitudinal design. • 2 schools – 1 with drama intervention and 1 control school without • Analysis (using SPSS Statistics) of 134 questionnaires completed before and after the intervention. • 50% boys in sample. • No statistically significant difference in age, gender, family composition (including parental education) between the two groups. • 4-9 drama sessions and 1-4 follow up activities at home, 3 parents evenings. 	<ul style="list-style-type: none"> ▪ Drama interventions may improve pupil interaction and relationships in I=class and also those with the teacher. Outcomes are improved in the higher intensity drama classes. ▪ No statistically significant impact on bullying was found, however, there were fewer bullying victims. 	2	1	2	2
11. Portowitz, A., Lichtenstein, O., Egorova, L., & Brand, E. (2009)	<ul style="list-style-type: none"> • Study of high SES elementary school children attending 4 day centres for at risk and low achieving pupils – 7-9 year olds • 4 groups – 3 participating groups participating in music instruction (45 children) and 1 control (36 children) who did not. • Tests used before and after intervention: Raven Standard and Raven Coloured Matrices, The Complex Figure Test, The Fitts Tennessee Self Concept scale questionnaire. 	<ul style="list-style-type: none"> • Participating in music education improved problem solving skills. ▪ Little evidence to suggest that participation improved self-esteem. This may be that increase in self-esteem experienced during music performance does not extend beyond the musical event.. 	2	1	2	2

<p>12. Rickard, N. S., Appelman, P., James, R., Murphy, F., Gill, A., & Bambrick, C. (2012)</p>	<ul style="list-style-type: none"> • Longitudinal study of two different age groups of children from 10 primary schools who participated in music lessons additional to the normal curriculum and a control group who continued with the normal curriculum only. • Group 1 210 Preparatory/Grade 1 pupils (117 girls and 93 boys) and 149 Group 2 –Grade 3 &5 girls and 74 boys) • Analysis of personal detail information on age, sex and informal or formal music training. • Analysis of self-esteem outcomes from Culture-Free Self-Esteem Inventory (completed by teachers for the younger group) • Analysis of outcomes from SSRS Social Skills Rating System. (completed by teachers for the younger group) • Both questionnaires applied three times – prior to engagement in the music programme, at the end 1 and again at the end of 2 years in the programme. • In the older group the questionnaire was applied additionally at 2.5 years to 	<ul style="list-style-type: none"> ▪ Pupils involved in the music programme in both groups had improved self-esteem scores. ▪ These increases were small and not sustained in year 2. ▪ No apparent benefits on participants’ social skills. ▪ Participation in the music programme appeared to prevent the loss of self-esteem which was evident in year 1 in the control group. ▪ Pupils participating in the music programme from the older group were found to experience a positive impact on verbal memory which was not found in the juggling group. 	<p>2</p>	<p>2</p>	<p>2</p>	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>
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	analyse the outcomes of involvement in a non-music arts based project -juggling.					
13. Vaughan, T., Harris, J., & Caldwell, B. J. (2011)	<ul style="list-style-type: none"> ▪ Quasi-experimental design ▪ 10 Government run schools located in areas of some disadvantage. ▪ 3 schools providing the 6 month Song Room Programme ▪ 2 schools providing the 12-18 month programme ▪ 4 similar schools not offering either programme used as a control group ▪ Analysis of data from 370 pupils (over 100 in each group) broken into 6 month programme group, 18 month programme group and no involvement. • Analysis of NAPLAN Scores for literacy and numeracy, and in ACER Social Emotional Wellbeing indicators and Case study interviews. 	<ul style="list-style-type: none"> • Participating pupils also had higher SEWB scores and showed greater resilience than non-participants. • Participating pupils showed improved behaviour and communication and less anxiety. • The longer the exposure – the greater the effect. 	1	1	1	1 1 1
14. Wright, R., John, L., Alaggia, R., & Sheel, J. (2006)	<ul style="list-style-type: none"> ▪ Longitudinal multi-methods evaluation of a national community arts programme. ▪ 5 sites, urban and rural, deprived areas ▪ 183 young people, 9-15 years of age taking part in 9 month arts project including theatre and visual arts. 	<ul style="list-style-type: none"> • Significant positive benefit for participating young people on social and emotional skills. • Participating young people and parents perceived improved confidence, arts ability, and ability to manage 	1	1	1	1 1

	<ul style="list-style-type: none"> ▪ 1.5 hr sessions after school 2x weekly for 74 sessions. ▪ Analysis of :behaviour checklists completed by young people, parents and researchers; attendance records; young questionnaires on behaviour and emotion completed by young people and parents (given every 3 months and 6 months after the end of the programme) and of data from observations undertaken 6 times (2x each term) ▪ Observational factors take from National Longitudinal Study of Children and Youth (NLSCY) ▪ In addition 30 interviews with 15 young people and 15 parents on completion of the study to help explain quantitative data. 	disagreements.				
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Literature to inform Research Question 4: What is the impact of arts attendance in arts on health and wellbeing of school aged children?

Brief Reference*	Bullet point description of methodology (study design)	Bullet point summary of findings against the above research question	1 = excellent, 4 = inadequate			
			Appropriateness of study design	Trustworthiness of results	Appropriateness of focus	Weight of evidence for each finding
1. Schiller, W. (2006)	<ul style="list-style-type: none"> ▪ 3 year study of 140 5-12 year old pupils from 4 public schools attending 2-3 theatre performances each year. ▪ Participants randomly selected, boys and girls almost equally represented. ▪ Individual interviews and focus groups with children before and after each performance. ▪ Case studies were undertaken with a number of pupils from each school ▪ Impact on pupils was also assessed by monitoring pupils' drawing, writing and play by teachers and parents. 	<ul style="list-style-type: none"> ▪ Pupils' social skills improved-, particularly noted in pupils who previously had no exposure to arts or performances. ▪ Pupils developed more respect for each other. ▪ Teacher's noted that the arts had a positive impact on children with behaviour problems. 	2	2	2	2 2 2

Literature to inform Research Question 5: What are the differences in impact if any, based on the child’s gender, age, SES, ethnicity?

Brief Reference*	Bullet point description of methodology (study design)	Bullet point summary of findings against the above research question	1 = excellent, 4 = inadequate			
			Appropriateness of study design	Trustworthiness of results	Appropriateness of focus	Weight of evidence for each finding
1. Babo, G. (2004)	<ul style="list-style-type: none"> ▪ Statistical design that enabled control of gender, IQ and SES variables ▪ Students drawn from two New Jersey middle schools ▪ 178 pupils (93 instrumental - 35 male and 58 female and 85 non-instrumental pupils (32male and 53 female) ▪ Analysis of data from California Achievement Test (CAT)Normal Curve Equivalent (NCE) scores for maths, reading and language arts; Grade Eight Proficiency assessment (GEPA) in maths and language arts ,IQ scores, gender, SES and participation/non participation in instrumental music. 	<ul style="list-style-type: none"> ▪ Possible that engaging in instrumental music may have positive impact on academic achievement. ▪ IQ of the child may dominate the independent effect of participation in music. ▪ (SES and gender variables controlled and very little specific data for gender or SES.) 	1	1	1	2 1 1
2. Bloor, A.J. (2009)	<ul style="list-style-type: none"> ▪ Experimental-Control design ▪ Three diverse schools – socio-economically. ▪ Two tests of music/two maths-one each with background music 	<ul style="list-style-type: none"> ▪ Girls performed less well in the testes than the boys across all the schools involved 	2	2	2	3

	<ul style="list-style-type: none"> and one each without ▪ Sample size: 47 children (47 x 4 tests- 188 separate tests). ▪ Observation of behaviour during tests undertaken by the author ▪ Interviews 					
3. Brown, E. D., Benedett, B., & Armistead, M. E. (2010)	<p>Two studies :</p> <p>Study1</p> <ul style="list-style-type: none"> ▪ Quasi-experimental design comparing achievement for children at the end of one and two years of attendance at the music enriched school (Kaleidoscope) programme using age as a predictor of outcomes. ▪ Explores pre-academic achievement for children attending an arte enrichment programme. ▪ Pupil assessments and interviews with parents both used ▪ 194 ethnically diverse disadvantaged, children, their carers and teachers. 44% boys ▪ Analysis of demographics, developmental stage and pre-academic achievement <p>Study 2</p> <ul style="list-style-type: none"> ▪ 165 ethnically diverse, disadvantaged children and their main carers (63 at Kaleidoscope and 102 at comparison school, 	<ul style="list-style-type: none"> ▪ Involvement in the arts may improve educational outcomes for at-risk children 	1	1	1	2

	43% girls)					
	<ul style="list-style-type: none"> ▪ Analysis of demographics and receptive vocabulary tests 					
4. Catterall, J. S., Dumais, S.A., Hampden-Thompson, G. (2012)	<ul style="list-style-type: none"> ▪ Analysis of longitudinal data from four national US databases: National Education Longitudinal Study of 1988 (NELS:88), the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K), and the Education Longitudinal Study of 2002 (ELS:2002), the National Longitudinal Survey of Youth of 1997 (NLSY97). 	<ul style="list-style-type: none"> ▪ Higher Grade Point Averages and increased uptake of and academic outcomes in further education – even for pupils with high SES ▪ Extra-curricula or school arts programmes which offer significant involvement may help to bring more parity in academic achievement between young people with high and low SES. 	1	1	1	1
5. Costa-Giomi, E. (2004)	<ul style="list-style-type: none"> • Sample of 117 (of which 81 took part) 4th grade (9 year old) pupils from 20 English language schools in Montreal who had previously not participated in formal music lessons • Comparison with control group of pupils who did not participate in the piano instruction • Programme • Analysis of results from language and maths elements of academic achievement tests and of self-esteem assessments prior to and at the end of year 2 and 3 	<ul style="list-style-type: none"> ▪ Development of self-esteem from participation in music is not restricted to advantaged children 	1	1	1	1

	<p>of the study</p> <ul style="list-style-type: none"> Review of pupil reports throughout the period of the study 					
6. Greenberg, H. (2010)	<ul style="list-style-type: none"> Ethnically diverse and disadvantaged public middle school in “Spanish Harlem” 52 participants 26 in programme and 26 in control group, 85% of Hispanic and 15% of African-American origin from Grades 6,7 and 8 Participants required to maintain an acceptable academic level to take part and continue in programme. Questionnaire administered twice once at the beginning and again at the end of school year 17 pupils interviewed 	<ul style="list-style-type: none"> Participation in the theatre programme had positive benefits on disadvantaged pupils social and academic development 	1	1	1	1
7. Johnson, C. M., Memmott, J. E. (2006)	<ul style="list-style-type: none"> Quantitative study analysing anonymous standardised test scores from 4,739 3rd, 4th, 8th and 9th grade pupils Of which 1119 elementary pupils and 3,620 middle school. 8 elementary and 11 middle schools School selection based on quality of music provision: excellent vs poor Analysis of 6 different English and 5 maths test scores at each level to meet No Child Left 	<ul style="list-style-type: none"> Pupils involved in music had much higher standardised test scores than those who were not. This was irrespective of SES. 	2	2	2	2

	<ul style="list-style-type: none"> ▪ Behind assessment requirements. ▪ All scores standardised • 2 different groups of children 1- where school music provision excellent, 2 where music provision poor 					
8. Kinney, D.W. (2008)	<ul style="list-style-type: none"> • Analysis of test scores for 2 groups of pupils in 6th and 8th grade at 2 poorly performing urban middle schools with similar demographic and academic achievement characteristics. • Also analysis of control group of pupils not involved. • Test scores analysed before (using 4th grade test scores) and after (using test scores for both 6th and 8th grade groups) involvement in band or choir. • Home environment and SES variables considered. • Analysis of raw State proficiency scores used for 4th and 6th grade-reading, maths, citizenship, writing. • For 8th grade – analysis of percentiles from McGraw-Hill Terra Nova CTBS Multiple assessment (reading, maths, science, language arts, social studies). 	<ul style="list-style-type: none"> • .Pupils with high SES scored more highly on all test scores except 4th 6th 8th grade reading. 	2	2	2	2
9. Rickard, N. S.,	<p>Study1</p> <ul style="list-style-type: none"> • 127 year 7 pupils from a private 	<ul style="list-style-type: none"> • It is possible that beneficial effects from participation in the 	2	2	2	3

<p>Bambrick, C. J., & Gill, A. (2012)</p>	<p>boys only school (mean age 12.67)</p> <ul style="list-style-type: none"> • Comparison between pupils who participated in double the number of music classes when compared with pupils who took part in double the number of arts lessons • Participants completed form with age, informal/formal music experience, leisure activities and level of enjoyment of arts lessons. • They also completed Children's Memory Scale word pairs sub-test, Kauffman Brief Intelligence Test, Culture-Free Self-Esteem Inventory, The School Life Questionnaire and Motivation Engagement Scale for music, drama and arts. • Tests applied at the beginning of the academic year and then 6.5 months in. 	<p>arts is more prevalent in disadvantaged pupil groups.</p>				
<p>10. Rosevear, J. (2007)</p>	<ul style="list-style-type: none"> ▪ 282 participants from 3 high schools, all studying core subjects: English, Maths, Science, Society and Environment. ▪ Four section survey: 1 questions on: background information, 2.level of participation in music 3. Rosenberg's Self-Esteem Scale and 4. Results of academic 	<ul style="list-style-type: none"> • Female pupils taking music scored had higher scores than boys who studied music 	<p>2</p>	<p>2</p>	<p>2</p>	<p>2</p>

	achievement for each pupil taking part.					
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Literature to inform Research Question 6: Which theories, if any, underpin the research on arts and academic achievement?

Brief Reference*	Bullet point theories underpinning methodology	Bullet point theories underpinning arts approach
1. Babo (2004)		<ul style="list-style-type: none"> Neurological Theory (Leng & Shaw, 1991)
2. Brown et al. (2010)		<ul style="list-style-type: none"> Cultural Relevance Theory Accessibility Theory
3. Burnard (2008)	<ul style="list-style-type: none"> Phenomenological Study Constructionism 	<ul style="list-style-type: none"> Inclusive Pedagogical Practices (based on Fraser, 1997 work on injustice)
4. Joronen et al. (2012)		<ul style="list-style-type: none"> Drama theories (Owens and Barber, 1998; Heikkinen, 2002) Social Cognitive Theory (Bandura, 1986)
5. Porowitz et al. (2009)		<ul style="list-style-type: none"> Social Cognitive Theory (Bandura, 1986) References to theories of García & Pintrich, 1994; Linnenbrink & Pintrich, 2001; Pintrich & Schunk, 2002; Vygotsky, 1978 Feuerstein’s Theory of Structural Cognitive Modifiability (SCM) and Mediated Learning Experiences (MLE) (Feuerstein, Feuerstein, Falik & Rand, 2006; Feuerstein, Rand & Rynders, 1988)
6. Stahl & Dale	<ul style="list-style-type: none"> Grounded Theory Approach (Corbin and Strauss 2008) 	<ul style="list-style-type: none"> References to Masculine Identity, Feminism

(2013)		
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7. **Trent &
Riley
(2009)**

- Co-equal Arts Integration
- Theory of multiple intelligences
- Constructivist learning and teaching

Literature to inform Research Question 7: What outcome measures have been used in the studies examining the impact of arts and academic achievement?

Brief Reference*	Bullet point description of methodology (study design)	Bullet point summary of findings against the above research question	1 = excellent, 4 = inadequate			
			Appropriateness of study design	Trustworthiness of results	Appropriateness of focus	Weight of evidence for each finding
1. Babo, G. (2004)	<ul style="list-style-type: none"> ▪ Analysis of data from California Achievement Test (CAT) Normal Curve Equivalent (NCE) scores for maths, reading and language arts; Grade Eight Proficiency assessment (GEPA) in maths and language arts ,IQ scores, gender, SES and participation/non participation in instrumental music. 	<ul style="list-style-type: none"> ▪ Measurement of scores in maths, reading, language arts and IQ. 	1	1	1	1
2. Bryce, J. (2004)	<ul style="list-style-type: none"> ▪ Evaluation of four arts programmes based in schools exploring: ▪ Impact of each programme on academic achievement, school attendance and engagement. ▪ The characteristics of the programmes which benefit children most 	<ul style="list-style-type: none"> ▪ Self-esteem, team-working, self-control. planning, goal setting, perseverance ▪ Literacy, numeracy and writing 	2	2	2	2
3. Catterall, J. S., Dumais,	<ul style="list-style-type: none"> ▪ Analysis of longitudinal data from four national US databases: National Education Longitudinal 	<ul style="list-style-type: none"> ▪ Grade Point Averages ▪ Further education uptake and 	1	1	1	1

S.A., Hampden-Thompson, G. (2012)	Study of 1988 (NELS:88), the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K), and the Education Longitudinal Study of 2002 (ELS:2002), the National Longitudinal Survey of Youth of 1997 (NLSY97).	<ul style="list-style-type: none"> achievement Community/Public engagement 				1 1
4. Costa-Giomi, E. (2004)	<ul style="list-style-type: none"> Sample of 117 (of which 81 took part) 4th grade (9 year old) pupils from 20 English language schools in Montreal who had previously not participated in formal music lessons Comparison with control group of pupils who did not participate in the piano instruction Programme Analysis of results from language and maths elements of academic achievement tests and of self-esteem assessments prior to and at the end of year 2 and 3 of the study Review of pupil reports throughout the period of the study 	<ul style="list-style-type: none"> Self-esteem, language, maths and music achievement tests. School report cards 	1	1	1	1
5. Greenberg, H. (2010)	<ul style="list-style-type: none"> Ethnically diverse and disadvantaged public middle school in "Spanish Harlem" 52 participants 26 in programme 	<ul style="list-style-type: none"> Social and Academic Status (SAS) scores Clear benefits found: self 	1	1	1	1

	<p>and 26 in control group, 85% of Hispanic and 15% of African-American origin from Grades 6,7 and 8</p> <ul style="list-style-type: none"> ▪ Participants required to maintain an acceptable academic level to take part and continue in programme. ▪ Questionnaire administered twice once at the beginning and again at the end of school year ▪ 17 pupils interviewed 	<p>esteem, social skills, confidence</p> <ul style="list-style-type: none"> ▪ Benefits also to academic skills: improved memory, public speaking and teamwork 				1
6. Hardie, D., Davies, H., & Barber, B. (2007)	<ul style="list-style-type: none"> ▪ Analysis of longitudinal data to identify evidence of sustained impact on academic outcomes for pupils involved in secondary school band or orchestra ▪ Survey questionnaire of 1257 10th grade respondents (49% female, 51% male, largely white working-middle class families, from 10 schools) ▪ 213(17%) 10th grade respondents took part in band or orchestra, 235 (19%) in sports club, 24 (2%) in both music and sports, 833 (66%) in neither and of which 56 identified who took part in no extra-curricular activity in or out of school. ▪ Of 1257 respondents -684 enough data to analyse grade points for 7th, 9th and 10th grades 	<ul style="list-style-type: none"> • Grade point averages – academic achievement • Differential Aptitude Test – general ability • Academic self-concept 	1	1	1	1 1 1

	<ul style="list-style-type: none"> ▪ -550 for 11th and 12th grades, ▪ Data from standard aptitude tests for 334 respondents. ▪ Areas measured: activity participation, general academic achievement, overall ability, individual belief about academic performance in maths and English. ▪ Analysis of covariance comparing those who participate in music activities with those do no extra-curricular activity. 					
7. Imms, W., Jeanneret, N., & Stevens - Ballenger, J. (2011)	<ul style="list-style-type: none"> • More than 410 students (10-16 years), 50 teaching professionals, 34 artists • Settings included ‘Artist in residence’ and ‘Exposure to arts’ programmes. • Use of before and after quantitative and qualitative questionnaires of attitudes, ▪ Analysis of trends and qualitative themes from survey, interviews, observations and project documents. 	<ul style="list-style-type: none"> • Pupil engagement, voice, social learning, creative and arts-related skills. 	2	2	2	2
8. Johnson, C. M., Memmott, J. E. (2006)	<ul style="list-style-type: none"> • Quantitative study analysing anonymous standardised test scores from 4,739 3rd, 4th, 8th and 9th grade pupils Of which 1119 elementary pupils and 3,620 middle school. 	<ul style="list-style-type: none"> • Maths and English tests that meet the No Child Left Behind assessment requirements. 	2	2	2	1

	<ul style="list-style-type: none"> ▪ 8 elementary and 11 middle schools ▪ School selection based on quality of music provision: excellent vs poor ▪ Analysis of 6 different English and 5 maths test scores at each level to meet No Child Left Behind assessment requirements. ▪ All scores standardised • 2 different groups of children 1- where school music provision excellent, 2 where music provision poor 					
9. Joronen, K., Konu, A., Rankin, H. S., & Astedt-Kurki, P. (2012)	<ul style="list-style-type: none"> • Quasi-experimental longitudinal design. • 2 schools – 1 with drama intervention and 1 control school without • Analysis (using SPSS Statistics) of 134 questionnaires completed before and after the intervention. • 50% boys in sample. • No statistically significant difference in age, gender, family composition (including parental education) between the two groups. • 4-9 drama sessions and 1-4 follow up activities at home, 3 parents evenings. 	<ul style="list-style-type: none"> • School wellbeing profile • Scale of social relationships covering pupil to pupil and pupil to teacher relationships 	2	1	2	2
10. Kinney, D.W.	<ul style="list-style-type: none"> • Analysis of test scores for 2 groups of pupils in 6th and 8th grade at 2 poorly performing 	<ul style="list-style-type: none"> • State proficiency scores used for 4th and 6th grade- reading, maths, citizenship, writing. 	2	2	2	2

(2008)	<p>urban middle schools with similar demographic and academic achievement characteristics.</p> <ul style="list-style-type: none"> • Also analysis of control group of pupils not involved. • Test scores analysed before (using 4th grade test scores) and after (using test scores for both 6th and 8th grade groups) involvement in band or choir. • Home environment and SES variables considered. • Analysis of raw State proficiency scores used for 4th and 6th grade-reading, maths, citizenship, writing. • For 8th grade – analysis of percentiles from McGraw-Hill Terra Nova CTBS Multiple assessment (reading, maths, science, language arts, social studies). 	<ul style="list-style-type: none"> • McGraw-Hill Terra Nova CTBS Multiple assessment (reading, maths, science, language arts, social studies). 				2
11. Metsapeltto, R., & Pulkkinen, L. (2012)	<ul style="list-style-type: none"> • Longitudinal study (3 years) including 281 3rd and 4th grade pupils at start of the programme who were in 5th and 6th grade when it ended (138 boys and 143 girls) • Analysis of questionnaire on participation in extracurricular activities (including arts) jointly completed by parents and children. 	<ul style="list-style-type: none"> • Teacher scores on academic attainments: reading, writing, arithmetic • Also academic working skills: persistence, concentration and carefulness. 	1	1	1	1 1

	<ul style="list-style-type: none"> • Questionnaire administered twice – once before the programme began and at the end of the school year. • School achievement were also analysed from teacher scores using elements of the Finnish epidemiological twin study • Pupils’ attainment in reading, writing , arithmetic along with academic working skills (perseverance, attentiveness, and attention to detail) were compared with average class performance. 					
12. Neville, H. et al. (2008)	<ul style="list-style-type: none"> • 88 children from Head Start pre-schools, 2-5 years old, low SES. • Four groups • Group 1 26 children music activities – listening, movement, playing music and singing - small numbers 5 pupils to 2 teachers. • 3 groups “Control-comparison” 1 large group (19 children) receiving Head Start teaching 18 pupils to 2 teachers, 1 small group taking part in Head Start activities (20 children) 5 pupils to 2 teachers and 1 small group (23 children) receiving attention training. • Each intervention weekly for 40 minutes, 5 day per week for 	<ul style="list-style-type: none"> • Basic language, vocabulary, letter identification, IQ, visuo-spatial intelligence, developmental numeracy. 	1	1	1	1

	<p>eight weeks.</p> <ul style="list-style-type: none"> Children in all groups tested before and after involvement in activities on: basics of language, vocabulary, letter identification, IQ, visuospatial intelligence, developmental numeracy. 					
13. Portowitz, A., Lichtenstein, O., Egorova, L., & Brand, E. (2009)	<ul style="list-style-type: none"> Study of high SES elementary school children attending 4 day centres for at risk and low achieving pupils – 7-9 year olds 4 groups – 3 participating groups participating in music instruction (45 children) and 1 control (36 children) who did not. Tests used before and after intervention: Raven Standard and Raven Coloured Matrices, The Complex Figure Test, The Fitts Tennessee Self Concept scale questionnaire. 	<ul style="list-style-type: none"> Cognition using the Raven Standard and Raven Coloured Matrices, Overall understanding using the The Complex Figure Test, Social evaluation using The Fitts Tennessee Self Concept scale questionnaire. 	2	1	2	2 2 2
14. Spelke, E. (2008)	<ul style="list-style-type: none"> Longitudinal study over 3 years - 49 children aged 7-12 who were already part of a longitudinal study exploring the brain and the development of reading skills. Questionnaire on arts education looking at visual arts, music, dance and drama used in addition to Child Temperament and Personality questionnaire measuring artistic ability . 	<ul style="list-style-type: none"> There was a relationship between the amount of music education and the level of improvement in children's reading There was a relationship between visual arts education and ability in maths calculation. 	1	1	2	2 3

	<ul style="list-style-type: none"> ▪ Parents gave data child's type of involvement in arts learning, frequency, type, skill level. • Parent's also gave data on children's temperament and willingness to engage in new experiences on the Openness to Experience Scale. 					
15. Vaughan, T., Harris, J., & Caldwell, B. J. (2011)	<ul style="list-style-type: none"> ▪ Quasi-experimental design ▪ 10 Government run schools located in areas of some disadvantage. ▪ 3 schools providing the 6 month Song Room Programme ▪ 2 schools providing the 12-18 month programme ▪ 4 similar schools not offering either programme used as a control group ▪ Analysis of data from 370 pupils (over 100 in each group) broken into 6 month programme group, 18 month programme group and no involvement. • Analysis of NAPLAN Scores for literacy and numeracy, and in ACER Social Emotional Wellbeing indicators and Case study interviews. 	<ul style="list-style-type: none"> • NAPLAN scores for literacy and numeracy • ACER Social and Emotional Wellbeing indicators • School attendance 	1	1	1	1 1 1
16. Wandell et al. (2008)	<ul style="list-style-type: none"> ▪ Study over 3 years - 49 children aged 7-12 who were already part of a longitudinal study exploring the brain and the development of reading skills. 	<ul style="list-style-type: none"> • Child Temperament and Personality scale • Level of involvement in arts 	2	2	2	2 2

	<ul style="list-style-type: none"> ▪ Questionnaire on arts education looking at visual arts, music, dance and drama used in addition to Child Temperament and Personality questionnaire measuring artistic ability . ▪ Parents gave data child's type of involvement in arts learning, frequency, type, skill level. ▪ Parents also gave data on children's temperament and willingness to engage in new experiences on the Openness to Experience Scale. 	<p>education</p> <ul style="list-style-type: none"> • Openness to Experience Scale 				2
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