Enquiry Proposal for the Research Question:

Can teaching Primary Ones music have a positive effect on phonics?

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Introduction

In recent years, Scottish education has been dominated by the ambition to close the 'poverty-related attainment gap' which exists in literacy, numeracy and health and wellbeing (Scottish government, 2017).

It is the professional responsibility of all teachers in Scotland to 'improve teaching and learning' by engaging 'in enquiry, research and evaluation' (GTCS, 2012). This is extremely pertinent, as while the need for a 'holistic' approach to beat poverty is recognised (Perry and Francis, 2010: 3, see also, Pirrie and Hockings, 2012), it is also widely agreed that professional learning is 'a powerful lever for getting the kinds of change that enhance student learning' (Timperley, Wilson, Barrar, Fung, 2007: ix, see also, Sosu and Ellis, 2014). Even those researchers, such as Bulterman, who are slightly more hesitant for teacher-researchers to 'aim to solve the problem', remind us that it is possible for teacher-researcher data to 'help [us] understand [the problem] more fully' (2008: 413).

As a Primary One teacher in one of Scotland's most historically deprived inner-city communities, Perry and Francis' description of areas where 'up to 50% of children begin school without the necessary language and communication skills' (2010: 5) accurately reflects my experience in the classroom. Similarly, Sosu and Ellis' delineation of a 5-year old from a low-income family, whose vocabulary and

problem solving skills are around 10 months behind their more affluent peers (2014: 8), matches the profile of many of my learners. This is crucial because 'the foundations of learning to read are set down from the moment a child first hears the sounds of people talking, the tunes of songs and the rhythms and repetitions of rhymes and stories' (Fox, 2001: 15). Simply, the foundations of reading extend beyond phonics alone.

Statistics do show that an attainment gap present in early schooling will often 'widen' and 'persist throughout the life-course' (Pirrie and Hockings, 2012: 9). Feinstein agrees in the general 'persistence of scores between 42 months and 10 years', but, crucially, reminds us that 'plenty of scope remains for children to catch up' (2003: 83). In other words, an attainment gap can be closed. This is the space in which it is necessary for school staff to 'implement research-information interventions to raise achievement' (Sosu and Ellis, 2014: 6).

In this paper, I will present a proposal for a case study on an intervention designed to enhance children's vocabularies, listening skills and general phonological awareness. The impact of this shall be measured through the children's attainment in reading.

Rationale

The idea for this research began when the school's local authority began to offer Phonological Awareness training and resources. In autumn 2016, the new intake of Primary Ones (hereafter referred to as Class 1) were tested on their ability to rhyme. By spring 2017, staff noticed there was a clear correlation between the children who had scored well in the rhyming assessment and the children who were now beginning to read simple sentences and stories. It also became clear that the children who had struggled to identify rhyming words were now struggling with phonics.

Thus, in autumn 2017, a new programme of phonics teaching was devised within the school. For the first term (August- October), the children would work on phonological awareness through music lessons. In the second term (October- December), children would begin traditional phonics teaching, following the Jolly Phonics programme. This class will be referred to as Class 2.

Why Music?

The school already had a strong musical ethos in First and Second level, and staff had noticed a correlation between achievement and participation in small group instrumental tuition. Furthermore, research has shown that music has 'extra-musical effects' (Goopy, 2013) - that is, a positive effect on 'general perception… language skills… [and] verbal memory' (Hallam, 2010: 10). Simply practising 'listening' is an important aspect of children's music lessons (Geoghegan, N., and Mitchelmore M., 1996: 61), especially for children who struggle with concentrating.

These skills are also vital for emergent readers and, as discussed, children living in poverty tend to struggle more with these skills than their peers in more affluent areas (Perry and Francis, 2010). Music offers a route into all of these concepts for learners of any stage: even babies have been shown to respond 'significantly more' to rhythmical music than to speech (Zentner and Eorola, 2010). Crucially, music is fun! The children would have the opportunity to improve their communication and focus in a manner which is 'playful, soothing and joyful' (Humpal and Wolf, 2003: 103). It is the very definition of a 'relevant, challenging and enjoyable' learning experience 'outside subject boundaries' for four and five year olds (Education Scotland, 2008: 24).

Thus, the aims of the intervention were to teach music for at least half an hour every day in Primary One, in order to enhance skills such as rhyming and syllabification and, ultimately, to improve reading attainment. The aims of this case study are to use a 'critical case' (Cohen et al, 2007: 176), such as a class in an area where the extent of poverty is well documented, to investigate if teaching music can have a positive effect on early reading achievement.

Search Strategy

The first step on following up my 'hunch' (Baumfield, 2008: 15) that music may be an effective companion to phonics was to begin establishing a 'conceptual and research' base (Anderson and Arsenault, 1998: 86). Four databases were searched for the key words 'primary literacy' 'Kodály' and 'literacy and music'. The four databases were chosen to provide global evidence (Google, University of Glasgow Library) and more local evidence (Strathprints and Enlighten). This produced a workable selection of sources of research. As I investigated both theory and methodologies, I chose to follow many authors' claims back to the primary sources through scrutiny of their reading lists and bibliographies. This enabled me to engage critically with their understanding of the concept of the benefits of music.

Literature Review

Any review of the history of teaching music to young children must begin with the Kodály method. Zoltán Kodály was a Hungarian composer whose experimental music programme for children had such a profound effect on 'the learning of subjects in other areas' that the approach was disseminated across Hungary in the 1950s (Goopy: 2013: 72). Worldwide interest began to spread: English language studies began to appear in the 1960s and 70s (see Friss, 1966, Kokas, 1969, Hurtwitz, I. and Wolff, P.H., 1975). From the Scottish perspective, there remains a relative lack of research into the impact of music on education in

general. Sheridan and Byrne acknowledge that the use of musical pedagogies is varied (from Kodály to Orff and Dalcroze) but is largely confined to 'individual classrooms' (2003: 7).

One of the key factors in the spread of Kodály-style methods was the impact on 'reading' (Goopy: 2013: 73). Much of the literature on the extra-musical effects of music focuses on reading and literacy, through the lens of phonemic awareness (see Anvari, Trainor, Woodside and Levy, 2002, Butzlaff, 2000, Gromko, 2005, Magne, Schon and Besson, 2006).

Research Methodologies

While using the search strategy detailed above, and following Anderson and Arsenault's advice to keep a summary of all literature researched (1998: 88), a table was constructed which listed reference information, number of participants in the research enquiry and the methodology used. A column was also added if any further explanatory comments were required, for example, noting Humpal and Wolf's use of small, detailed case studies to report their findings (2003). This was of interest as all other studies strongly focused on quantitative data.

The table kept a record of studies whose core intervention was musical in nature. Widening the scope here allowed a greater analysis of common methodologies across the field in general (Cohen, 2007: 262, Anderson and Arsenault, 1998: 83). These studies varied in size, from over 12,000 participants in Southgate and Roscigno's analysis of national data (2009) to thirty-four pre-schoolers (Gromko and Poorman, 1998). This variation shows the potential for research at any level.

Above all, it was striking that over half of the studies sampled, for example Bilhartz et al (1999), Gardiner (1996), Geoghehan and Mitchelmore, (1996), Slater

et al, (2014) used an experimental design in order to 'make inferential links between variables' (Boudah, 2011: 94). The experimental design can be characterised by the use of a control group. The control group 'is crucially important' in this design (Fraenkel, Wallen and Hyun, 2012: 266), as it is used to 'truly indicate that A, not some other variable, caused B' (Boudah: 2011: 98). For example, in Rauscher and Zupan's study, one group of children studied keyboard, and one group had 'no music' (2000: 215). Therefore, when the children who studied keyboard scored higher on a spatial-temporal assessment after several months of music instruction, the results had 'strong implications' (Rauscher and Zupan, 2000: 215). For a teacher-researcher, at the bottom of the 'outsider-insider' scale (Cohen et al, 2007: 179), the widespread use of control groups in the research seems daunting, as control groups are 'rarely (if ever) possible' in teacher-led enquiries (Taber, 2007: 66), due to ethical considerations and practicalities.

The range of researchers on the 'outsider-insider spectrum' (Cohen et al, 2007: 179) was reflected in the wide variety of techniques used in the research literature. Strategies ranged from brain imaging (Moreno et al, 2009), to individual testing (for example, Zafranas, 2004) and interviews (Geist, Geist and Kuznik, 2004). It was significant to note that all types of researchers on the spectrum are represented more than once, apart from the 'complete participants' i.e. teacher-researchers (Cohen et al, 2007: 179).

The one 'complete participant' (Cohen et al, 2007: 179) teacher-researcher was a music teacher who visited different classes and taught different programmes (Nelson, 2006). As mentioned previously, this approach cannot be taken by the vast majority of teachers. It is therefore important that more class teachers are represented in the research literature by carrying out musical interventions and disseminating their own methods of running, recording and analysing results.

Ethics

It is the duty of the researcher to ensure that their work fulfils ethical and moral criteria. Using the University of Glasgow's guidelines, in accordance with the UNCRC, and with the consent of the Head Teacher and Local Education Authority, all of the children's parents or carers and the children themselves were asked permission to use their attainment data and assessment pieces to be used in this study (University of Glasgow, no date; Baumfield et al, 2008: 33). This was done by following Anderson and Arsenault's six basic elements of gaining 'informed consent' (2005: 19).

All parents and carers consented to their children's statistics being used.

Context and Participants

The context for the proposed case study is a denominational primary school with a roll of around three hundred children. The 2016 Scottish Index of Multiple Deprivation showed that the school's entire catchment area was part of one of the most deprived vigintiles in Scotland. All children at the school, therefore, are at risk of socio-economic barriers to learning and are a good example of a 'critical case' (Cohen et al 2007: 176).

The Intervention

All P1 children in Class 2 will be led in music tuition for at least thirty minutes every day, from August to September. To ensure that the provision is high-quality, Houlahan and Tacka's series of lessons will used (2015). The core skills in these lessons form the basis of phonological awareness, as well as requiring concentration and problem solving: the children will be taught to 'tap… clap… [and] perform beat and rhythm, aurally identify how many sounds occur on each

beat and create a visual representation of sounds on the beat' (Houlahan and Tacka, 2015: 123).

Baumfield asks 'by improved learning, do you mean better understanding or higher attainment?'' (2008: 15). The answer to this is both. After taking part in eight weeks of musical input, the children began traditional phonics lessons in October. By the following Spring term (2018) the children were assessed using PM Benchmarking assessments in accordance with whole school reading policy.

Ethical concerns mean that there will be no control or test group for Class 2. Fraenkel, Wallen and Hyun suggest that a 'remedy' for this design flaw is to compare the one group with 'another group of students who had the same course content' (2012: 269). Helpfully, historical data *is* available from the 2016 – 2017 cohort of children, Class 1.

All of the children have 'similar characteristics' (Miles and Huberman (1994: 28) in that they were all between the ages of 4 and 6 and all come from the same catchment area. Class 1's exposure to music was mostly centred upon learning and singing songs, and is thus not comparable to the structured, skill-based and progressive series of lessons which Class 2 undertook. They therefore make a good group to compare data with.

Data Collection and Analysis in the Case Study Method

This particular case study is an example of the 'one shot case study' (Fraenkel, Wallen and Hyun, 2012: 269), a very basic form of experiment where 'a single group is exposed to a treatment and a dependent variable is subsequently…measured... in order to assess the effect of the treatment' (2012: 269). The dependent variable here is the children's reading ability, assessed at the end of their first year in primary school.

There could be no quantitative pre-test, as, like in Shadish, Campbell and Cook's scenario of testing children on calculus before they have been taught calculus (2002: 107), the children simply did not have reading skills to be assessed when they began school in August. However, the children's phonological awareness and phonics were assessed in a series of small assignments throughout the year. The hope is to see 'regularities and patterns' throughout both the quantitative and qualitative data (Bogdan and Biklen, 1992: 173).

The raw data from the final assessment will be collected on tables, with the children listed by surnames in (anonymised) alphabetical order. Average scores will also be calculated. Random spot checks will be carried out throughout the process to check for errors (Menter, 2011: 198). Although simple, 'small-scale research does not need to go beyond the use of frequencies and percentages' to adequately present findings (Menter, 2011: 200).

Limitations

Teacher-led research can be viewed negatively due to the inherent limitations of the construct. The teacher-researcher occupies the furthest end and most involved position on Cohen et al's scale (2007: 179) .When so closely involved with the context of the enquiry, the difficulties of remaining objective and establishing 'teacher-class rapport' (Taber, 2007: 113) are clear. Researchers at the other end of spectrum have criticised teacher-researchers, who may struggle 'to maintain a dispassionate, objective, arm's length approach' (Punch and Olancea: 2014: 49).

The small sample size and lack of control group means that there is a limited attempt to control variables, which does have a knock on effect on causality. Did the musical intervention truly have a positive effect or were 'the academic abilities of the two groups were different in some way' (Taber, 2007: 110)?

To answer that particular question with absolute certainty is beyond the scope of a teacher-researcher in one small study, and the case study method was not chosen in order to definitively answer this question. It was chosen in order to offer an insight into what a musical intervention may look like and how it can impact on children living in an extremely deprived area.

Indeed, the complexity of comparing one group of children to another is impossible to do 'without putting the teacher and their class in a laboratory' (Baumfield, 2008: 17). The methodology of this enquiry has been purposely designed in order to provide percentages and averages for discussion (Taber, 2007: 125) and to offer a picture of an intervention which may be have the potential 'to "speak" to people in other settings' (Punch and Olancea, 2014: 153).

Results and Analysis

In August 2017, it was possible to compare the first sets of data. Class 2 completed the same rhyming assessment as Class 1, which was scored out of nine. These results are presented in the table below.

A mark of six or above was considered 'on track' and is highlighted in green.

A mark of between four and six was considered as 'progressing' and is highlighted yellow.

A mark between zero and three is highlighted red. These children have a very low phonological awareness (Fox, 2001).

In total, we can see marked similarities between the two classes.

Class	Number of children with low	Number of children whose phonological	Number of children whose phonological

	phonological awareness	awareness is progressing	awareness is on track.
1	16	4	3
2	16	3	5

Table 1: Initial Rhyme Assessment Results

Class 1 2016- 2017	Rhyme assessment 1	Class 2 2017- 2018	Rhyme assessment 1
11	0	21	5
12	6	22	0
13	5	23	0
14	2	24	1
15	0	25	0
16	4	26	0
17	1	27	2
18	2	28	3
19	4	29	9

110	2	210	3
111	0	211	1
112	0	212	5
113	5	213	8
114	0	214	1
115	1	215	9
116	6	216	3
117	6	217	9
118	0	218	2
119	0	219	5
120	2	220	3
121	3	221	0
122	0	222	0
123	0	223	6
		224	3

After Class 2's series of music lessons, they were retested. Twenty-three children now scored seven or higher in the rhyming assessment. This shows a remarkable improvement and suggested that the children were now ready to begin formal reading lessons. The same thresholds were used to grade scores.

Table 2: Secondary Rhyme Assessment Results (post intervention)

	Rhyme assessment 1	Rhyme assessment 2
21	5	6
22	0	6
23	0	5

24	1	6
25	0	0
26	0	3
27	2	9
28	7	9
29	9	9
210	3	9
211	1	9
212	5	9
213	8	9
214	1	6
215	9	9
216	3	5
217	9	9
218	2	9
219	5	9
220	3	6
221	0	7
222	0	9
223	6	9
224	3	6

The next set of data which could be compared came from a phonics assessment, which came after the children had been taught twenty sounds. Class 1's average score was fourteen. Class 2's average score was seventeen. This was a positive indication that the work on phonological awareness had been beneficial.

Table 3: Initial Phonics Assessment Results

Class 1 2016- 2017	Dec /20	Class 2 2017- 2018	Dec /20
11	19	21	20

12	20	22	19
13	20	23	9
14	16	24	18
15	10	25	20
16	20	26	11
17	10	27	19
18	2	28	19
19	16	29	20
110	20	210	19
111	8	211	18
112	13	212	19
113	20	213	20
114	20	214	19
115	20	215	19
116	20	216	18
117	6	217	18
118	absent	218	15
119	20	219	18
120	20	220	18
121	2	221	17
122	1	222	19
123		223	14
		224	8

The positive trend was confirmed in reading assessments, which were carried out between April and May. Eighteen children in Class 2 achieved Level Three or higher and were therefore regarded as being 'green' and 'on track' in their learning.

Table 4: Final Reading Assessment Results

Children in Class 1 2016- 2017	End of year reading level	Class 2 2017- 2018	End of year reading level

11	7	21	5
12	6	22	5
13	6	23	2
14	1	24	3
15	1	25	0
16	2	26	5
17	1	27	5
18	1	28	5
19	1	29	5
110	1	210	17
111	1	211	5
112	1	212	5
113	5	213	12
114	1	214	1
115	6	215	5
116	6	216	1
117	5	217	12
118	5	218	5
119	1	219	5
120	1	220	3
121	6	221	5
122	1	222	5
123	5	223	-1
		224	1

The following table collates all previous tables to provide a side-by-side comparison of the two year groups across all assessments. Colour coding has been used to delineate the children who were regarded as 'on-track' and to provide an at-a-glance analysis of the two year groups, which were broadly similar on entry to school.

Analysis shows that children who had poor phonological awareness in August 2016 overwhelmingly remained on Level 1 of the reading assessment, whereas

the children who had poor phonological awareness in August 2017 and undertook the musical intervention developed higher levels of phonological awareness. Their reading results were also improved on the previous cohort.

Ultimately, these results suggest that the intervention was followed by a positive increase in attainment.

Table 5: Comparison of Rhyme and Reading Assessments

Class 1 2016-2017	Rhyme assessment 1	End of year reading result	Class 2 2017-2018	Rhyme assessment 1	Rhyme assessment 2	End of year reading result

11	0	7	21	5	6	5
12	6	6	22	0	6	5
13	5	6	23	0	5	2
14	2	1	24	1	6	3
15	0	1	25	0	0	1
16	4	2	26	0	3	5
17	1	1	27	2	9	5
18	2	1	28	3	9	5
19	4	1	29	9	9	5
110	2	1	210	3	9	17
111	0	1	211	1	9	5
112	0	1	212	5	9	5
113	5	5	213	8	9	12
114	0	1	214	1	6	1
115	1	6	215	9	9	5
116	6	6	216	3	5	1
117	6	5	217	9	9	12
118	0	5	218	2	9	5
119	0	1	219	5	9	5
120	2	1	220	3	6	3
121	3	6	221	0	7	5
122	0	1	222	0	9	5
123	0	5	223	6	9	1
			224	3	6	1

Conclusions and Next Steps

Initial results, gathered over the course of a year in a Primary One class, suggest that teaching music does improve literacy outcomes.

There is a significant body of global research which supports this hunch, especially when the effects of the attainment gap are taken into consideration. This small-scale case study has the potential to be used as a basis for further research into this pedagogical choice. The case study method employed focused on a very small group of children and gathered only quantitative results. Further research would require larger groups of children, more detailed data and perhaps comparison groups across the socio-economic divide.

Results showed that delaying phonics and teaching a programme of music lessons helped to build initial phonological awareness and suggested that this then translated into quicker acquisition of the skills necessary to read short books. The use of a programme of music lessons may also be an area to focus on in further research.

As ever for teachers, the children must come at the heart of their practice. The children in this study undertook an intervention that they overwhelmingly enjoyed and which seemed to benefit their overall attainment. This is at the heart of any teacher-researcher's studies and, ultimately, quantifies the success of the project.

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