Towards an understanding of musical intelligence as a framework for learning to read and play piano notation

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Thesis submitted for the Degree of PhD

14th April 2023

I, Lorraine Chapman, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated and acknowledged in the thesis.

Word count (exclusive of appendices and bibliography): 91,546

Signed:

Lorraine Chapman

Date: 14th April 2023

Acknowledgements

I dedicate this work to my daughter, Rebecca, and to my son, Matt. I also dedicate this to Professor Jeff Burley, who sadly passed before he could read my finished thesis, a true professor who always showed me care and support in my venture.

My sincere thanks go to Dr Hilary McQueen, my longest serving supervisor, for her unwavering support throughout my work – I have always appreciated this beyond measure. My sincere thanks also to Professor Evangelos Himonides for his clear and motivational remarks and strong support.

Thanks are due to all the students and teachers who took part in the research, without whom I would have no findings, and finally my heartfelt thanks go to my closest friends for their continuing support and belief in me.

Abstract

The writing of this thesis was born from concern over the difficulties observed with some of the researcher's piano students in terms of learning to read and play notation simultaneously. It aims to define and develop an accessible and understandable framework for musical intelligence that might support piano teachers in their practice, in particular with the teaching of the simultaneous reading and playing of notation on the piano. Inspired by Gardner's concept of multiple intelligences (2004), the thesis also argues for different musical learning strengths, and suggests that musical intelligence is underpinned by aural intelligence.

Following a literature search to determine whether or not a definition of musical intelligence existed beyond the work of Gardner (2004), whose chapter in *Frames of Mind, The Theory of Multiple Intelligences* (2004) provided no suggestion of how his concept of musical intelligence could be used for learning to play a musical instrument, in particular with the notation, the next step towards defining musical intelligence was to explore the real world of a sample of piano teachers, to try to ascertain:

a) their definition of musical intelligence
b) how they taught their students to read and play notation

In terms of the latter, understanding the participants' teaching practices might help me to improve my own practice and therefore the learning outcomes of my students. In addition, the latter step could serve to suggest what the teachers believed to be important to a musical education, particularly in terms of learning to read and play notation, and from this it could perhaps be inferred that their implicit definition of musical intelligence guided their teaching.

The literature and the data were then used to inform and create a framework for musical intelligence, with a focus on learning to read and play notation simultaneously on the piano.

The work of Gardner (2004), Gordon (1993) and Dweck (2016) have provided the foundation for the theoretical framework for this study.

A summary of the study's key findings follows:

- Reading and playing notation simultaneously on the piano is complex, and is underpinned by strong proprioceptive, kinaesthetic and tactile skills, a reliable musical-spatial intelligence and above all a strong aural intelligence.

- All the study teachers believed, whether implicitly or explicitly, that it was important to be able to read and play from notation, therefore this was inferred to underpin part of their definition of musical intelligence.

- Musicianship was also regarded by the teacher participants as a central part of musical intelligence, and therefore the interpersonal and intrapersonal intelligences put forward by Gardner (2004) also form part of musical intelligence.

- Students appear to demonstrate different musical strengths, generally either an ability to read notation or an ability to play by ear and learn by rote, therefore both need to be equally developed during music education.

- The teachers demonstrated a lack of understanding of how some individuals are able to learn lengthy pieces of repertoire by ear, which seems to lead to a lack of confidence in introducing aural learning in piano lessons. This was evident also from their general lack of awareness of pedagogical research.

- Mental strategies for learning to read and play simultaneously were not understood or used by most of the teachers.

- Some teachers demonstrated an entity theory of intelligence.

- Many of the teachers had engaged in continuing professional development.

- A conclusive definition of musical intelligence is elusive, however it could be argued to be underpinned by the ability to think in sound and be at one with the instrument, thus requiring solid aural, proprioceptive, kinaesthetic, tactile and musical-spatial intelligences, together with strong musicianship, as well as the interpersonal and intrapersonal elements of Gardner's (2004) work, gathered into a deep understanding of the craft of playing an instrument, here, a piano.

  The words that incorporate all of these elements of musical intelligence are 'deep engagement and understanding', in the same way that the Puluwat sailors demonstrate in their craft (see Glossary), but the ear rests at the heart of musical intelligence.

A more comprehensive definition based on a synthesis of the literature, the teachers' beliefs and the researcher's inferences and interpretations can be found in Appendix 22, 'A Framework for Musical Intelligence'.

Impact Statement

This research was undertaken initially to try to understand why some piano students find the simultaneous reading and playing of notation difficult, and to attempt to develop a framework for musical intelligence, which was inspired by the work of Gardner (2004), whose definition of musical intelligence was unlikely to have been intended as a teaching strategy.

It was found that learning to read and play notation simultaneously on the piano was complex since it requires the concurrent execution of many cognitive and physical tasks. It was also found that the study participants were unaware of important pedagogical theories, and many were unable to conceive of how some individuals could use their aural strength to learn lengthy repertoire pieces by ear instead of using notation. The literature argues overwhelmingly that the ear rests at the heart of all musical learning, and this was only partially understood by the participants.

It was also found that piano students seem to demonstrate one of two musical strengths, either a strong aural sense which they use to learn to play, or a strong ability to read and play from notation. The important outcome of this understanding is that those learners who may find difficulty with reading at the start of their journey because their natural skills lie in the aural domain, are acknowledged as being equally musically intelligent as those who show a more natural propensity for reading notation at the start, so that the former are taught how to use their strength and encouraged to persevere with their pianistic journey rather than give up because they find notation too difficult.

I argue that a framework for musical intelligence rests on a deep engagement with, and understanding of, the instrument, and is underpinned by an ability to think in sound. I argue that musical intelligence is underpinned by solid aural, proprioceptive, kinaesthetic, tactile and musical-spatial intelligences, together with strong musicianship, also underpinned by the interpersonal and intrapersonal intelligences

suggested by Gardner (2004). These skills need to be developed thoroughly before the notation is introduced, which may be challenging for some piano teachers who have learnt to play from notation from their very first lesson, may not be confident in teaching these skills, and above all, who may well be challenged by parents and learners alike for not introducing the notation early enough.

I have also argued for the implementation of mental strategies for the development of reading and playing notation simultaneously, which deliberately engage the tactile, kinaesthetic, proprioceptive and spatial senses. As yet there is no literature which discusses this.

It is intended to disseminate the findings to music educators as widely as possible through placings in academic journals and professional media, to encourage piano teachers to reflect upon their practice, and to stimulate the provision of courses to educate piano teachers in new skills and provide practical material for their students to use.

Further research could include longitudinal studies in teams with piano teachers, bringing authenticity to the work as well as providing the teachers with motivation to be part of an ongoing national or international project to invest in their work in terms of education for themselves as well as for their pupils.

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1 Introduction

1.1 The problem

> Bearing in mind the complexity of the task of reading music and successfully conveying the meaning of written symbols on a staff through a musical performance one may wonder how this can in fact be done. As we know, many fail to accomplish a satisfactory fluency in music reading, even after years of musical study, (Gudmundsdottir, 2010, p.332).

In 2006, as a new piano teacher having achieved my CT ABRSM, and finding myself half way through my Dip(ABRSM) in piano pedagogy, I started teaching beginners aged between six and nine years old to play the piano. Contrary to what I would now do, having learnt so much from my research, at that time this involved giving them notation to read from the first lesson and I noticed that, while some students seemed to learn to read and play from the notation with apparent ease (Gudmundsdottir, 2010), others seemed to find the task almost impossible. Some of my students reported being unable to decode the notation, to cope successfully with two lines of notation, some appeared unable (or unwilling) to use logical or given fingering suggestions, others struggled with the co-ordination required for using both hands together while reading and playing, and some found the rhythm patterns on the page very difficult to understand and interpret, with the added burden of needing to concurrently maintain a steady pulse. Thompson confirms this overall difficulty in his introduction to his *Easiest Piano Course* (1996) when he says that 'Part One is devoted to developing fluency in **reading by note,** solving a problem that still seems to rate as 'musical enemy, number one' with most young students' (ibid., p.2, bold font Thompson's own).

Some of my pupils who found it difficult to read and play simultaneously could, however, play very well by ear and responded well to rote teaching, being able to

copy and memorise easily ('I prefer to copy you' - Participant #S17). Other students were trying to memorise and play by ear, without looking at the notation, before they knew what they were trying to memorise. They were guessing, unsuccessfully much of the time, because they could not, or preferred not to, read the notation, all of which suggested that it might be a difficult task for beginners.

It gradually became clear to me that the way in which I had been taught to play the piano, having been given notation to learn to read at my very first lesson, and continuing to read and play similarly at every lesson, had resulted in me being completely unable to address the apparent problems of those of my students who were trying to guess what to play, play by ear or learn by rote. This may have been because I had not been taught to play by ear or by rote myself, however, whatever the reason, I simply did not understand their difficulties, having managed to learn to read notation successfully myself. Likewise, I did not understand how they could learn by any other method than reading a piece from the notation. Thus I decided to try to address these problems through a research study.

First the research was placed in context through a review of the literature regarding learning to play the piano, teaching students to play the piano, and pedagogical writing about musical intelligence. During this period a sample of the researcher's own students was interviewed to understand their experiences of learning to play the piano. This part of the research helped to inform the next stage of data gathering, which was to seek the beliefs of a sample of piano teachers, through a questionnaire and follow-up interviews, regarding how they viewed learning to play the piano, and how they taught their students to read and play piano notation simultaneously, together with their personal understandings of musical intelligence.

1.2 The study

It could be argued that this research resembles an autoethnographic study, since it was inspired by my own curiosity and need to understand and improve what was happening in my piano teaching practice. However, I prefer to regard this study as

being based on a practitioner-research approach, where the person carrying out the work is both practising and researching (Menter *et al*, 2011).

Menter *et al* argue that 'practitioner research in education is systematic enquiry in an educational setting carried out by someone working in that setting, the outcomes of which are shared with other practitioners' (2011, p.3). My work stems from the desire to improve and learn more about my craft because I felt ill-equipped in my teaching practice at the start, despite gaining a well-respected piano teaching certificate and being half-way through my teaching diploma (although during the second half without a teacher).

As a practitioner-researcher one often possesses substantial inside knowledge and understanding which has the potential to grow as research progresses. As well as encouraging the researcher to review relevant literature, this kind of research importantly allows him or her to explore what other, possibly more experienced, practitioners are doing, to see if this knowledge may positively inform his or her own practice. From this data the researcher may also be able to glean information about what other practitioners are *not* doing, based on what has been uncovered in the literature. It is in this context that my data gathering is also situated. Menter *et* al (2011) argue that practitioner research has a positive learning impact on the pupils and the learning outcomes. This is because the teachers are clearly committed to their craft, and in doing the research they develop deeper understanding of their work and the work environment. They add that the practitioner-researcher is well placed to gain understanding in their teaching and research environment, and argue that the benefit of this type of research is that it is a 'more creative way of learning – through both the research experience and the research findings' (2011, p.30). for their part, Igi-global.com state that one of the benefits of practitioner research is that the 'research is embedded within professional practice in the way that purely academic **research** is not', thus with the promise of deep understanding on the part of the researcher.

One of the criticisms of practitioner research is that its influence is quite limited (Menter *et al*, 2011), however it is hoped to disseminate the findings to other practitioners as much as possible.

At the start of my piano teaching career, I was very intent on teaching my students to read and play notation simultaneously, firstly because I assumed that everyone learned in this way, that it was the norm, and of course this was the only way I knew how to learn (Harris, 2006, 2014, Williams, 2017). Another reason was because reading and playing from notation simultaneously is arguably a skill that is highly prized in certain cultures (Hayward and Gromko, 2009, Harris, 2014, McPherson, 1993, 2005, Odam, 1995, Williams, 2017), as well as being a skill demanded by examination boards such as the ABRSM in the UK (Cathcart, 2013) and the AMEB in Australia (McPherson, 1993), evidenced by the inclusion of a sight-reading test as part of the examination. I found myself in a similar position to that of Harris when he began to question his own teaching: 'perhaps it's not my pupil's fault. Perhaps the fault lies with my teaching,' (2014, p.7). Indeed, Nielsen argued that it was important to 'be aware, within the process of teaching, of a kind of blindness in one's own way of addressing the music', (2008, p.485). It was clear to me, then, that I needed to find ways to understand how to improve the learning experience for my students in terms of teaching them to read and play notation simultaneously on the piano.

Nielsen (2008) argues that, as a teacher, one needs to understand that whatever one knows automatically and tacitly needs to be transmitted to the pupils. Therefore the piano teacher has to become curious about how he or she plays, what to do, how to do it, and how he or she learns or has learnt, especially if his or her learning journey began several decades previously. Nielsen (2008) also believes that this needs to develop from reflecting on the teacher's own abilities as a learner, and also points out that one's own way of learning does not always match how some of one's pupils are trying to learn (see also Green, 2010 and Varvarigou and Green, 2015), so it is important to understand and work out how to accommodate these ways of learning, particularly when they are not natural to a researcher as a teacher, and when that researcher does not necessarily understand them. As an example of this phenomenon, when I began to teach the Yamaha method of learning to play the

piano, I could not understand how the children could learn and play quite long pieces by ear rather than reading the notation. Even at this point in my teaching I still do not completely understand, I simply need to accept the phenomenon. This reflects how a difficulty in understanding a different way of learning, because one cannot learn like that oneself, can make this way difficult to teach, even when one tries.

Nielsen's (2008) argument that a teacher needs to examine learning from a different perspective, that is reflecting upon what it means to be a learner, encouraged me to reflect upon my own practice, both as a music teacher and from when I was a learner. Indeed, Schön (1991) commends the practice of self-reflection for its encouragement to learn from observing and engaging in one's professional practice in order to expose one's tacit beliefs. Lowry-O'Neill (2011) suggests that a professional should broaden and deepen their understanding of their craft through critical reflection, which then enhances one's practice. She argues that 'being in a state of perplexity, confusion or doubt is a condition that encourages professionals to engage in critical reflection', (2011, p.482), and continues that 'critical reflection allows the individual to begin a tentative interpretation of the issue that concerns her, to seek further clarity, to develop a theory and design an action plan in order to address the question at hand', (ibid.).

Certainly my study encouraged much self-reflection as it progressed. I was learning from my teaching, and my awareness was heightened by the demands of trying to understand what was happening inside the minds of the learners. As I communicated knowledge, I was finding out what I knew and what I did not know, and many concepts became illuminated, thus opening up a reflective process. This process allowed me to develop an awareness of different ways of learning that I did not know about before, which eventually changed my beliefs during and towards the end of the research. It can be argued that a different kind of learning happens with a reflective study, in that I also learnt from my own pupils. This is possible if a teacher is open-minded and curious enough.

I wanted to know, then, how to better support my students who were finding notation difficult to read and play. During my literature search, I rediscovered Gardner's

Frames of Mind, The Theory of Multiple Intelligences (2004) because it had been on the recommended reading list for two of my piano teaching qualifications. This then sparked my interest in this concept that Gardner called 'musical intelligence' (2004), which did not give me the answers I was looking for in terms of how to teach pupils to read and play piano notation simultaneously, but did lead me to start thinking about what musical intelligence could be, and to wondering if and how it could be developed and used to support learning to play the piano with notation. Not only did I wonder what a 'thing' called musical intelligence might be, and whether it could be the answer I was looking for in my teaching, but it stimulated the idea that there might exist possible connections between what Gardner (2004) was saying about different individual strengths, on the one hand, and the different ways of learning to play the piano that my students were demonstrating, on the other.

At the time that the study was taking shape in my mind I was teaching a student who had come to me from another teacher. He could read notation if it was necessary, but took a very long time to process it, and therefore preferred to commit repertoire to memory. Another of my own students insisted upon learning to play quite complex pieces by rote, and did so extremely successfully, choosing to dispense with the notation before he even began. Their repertoire playing using their wonderful aural skills was excellent, however both individuals were awarded extremely low marks in the sight-reading element of their examinations because the first student could not process the notation quickly enough, and the second student did not make the effort to try to learn to understand it, and both students were relying on their alternative strength. If I compared these two individuals to the students to whom I gave notation at their first lesson, and who flourished with it, it would indeed appear that there might exist different musical strengths. In terms of those who read notation fluently, Woody notes that 'many students have rewarding school music experiences without gaining much fluency in ear playing and improvisation', (2012, p.84), whereas Gudmundsdottir suggests that some individuals 'even report acquiring the skill of music reading without much conscious effort', (2010, p.332), which might support the concept of different musical strengths that I believed I had noticed. Interestingly, when I tried to teach a rote piece to some of the apparently natural readers, they

found the activity challenging, and much preferred to play a piece from the notation, and this phenomenon exists within my student cohort to date and is supported both in the literature (Green, 2010) and my data findings later.

Notwithstanding the possible existence and acknowledgement of these musical strengths, for me the problem of teaching the non-readers to read and play notation simultaneously still existed. Therefore I decided to research exactly what was involved in reading and playing notation simultaneously on the piano and try to learn and understand why some individuals might find it difficult. I began the research process by interviewing a small sample of my own piano students to explore their experiences of learning to play the piano with notation, during which time I was also exploring the literature on piano pedagogy to place the research into context and attempt to gain a better insight into how to teach reading and playing notation simultaneously. At the same time I was searching for any literature on musical intelligence. I followed the student interviews with a teacher questionnaire, to explore pedagogical issues and definitions on musical intelligence, and this data gathering phase was followed by interviews with a selection of the questionnaire respondents. These three data gathering phases would go some way to exploring whether or not the data would consolidate what the literature had revealed in terms of what was involved in learning to play the piano with notation, the teaching beliefs of the participants, and any thoughts on a definition of musical intelligence.

Through these research techniques I was able to explore pedagogical beliefs and definitions of musical intelligence, including the idea of musical strengths, with the aim of furnishing piano teachers, their students and the parents or guardians of their students, with a deeper understanding of this complex teaching and learning process, and to encourage them to acknowledge, understand and appreciate the diverse musical strengths that seem to reside within different learners, with a view to developing optimal teaching methods in this area, the development of musically intelligent teaching. Within this study I aimed to develop an understanding of the meaning of musical intelligence, and whether I could develop it into a framework which teachers might be able to follow and use for educating their students to play

the piano, including playing from notation. I was also very keen to follow through with the idea of different musical strengths.

1.3 Theoretical framework for the study

This study draws on the work of Gordon (1993), Dweck (2016) and Gardner (2004), for its theoretical underpinnings.

Gordon's Music Learning Theory (1993)

Edwin Gordon (1993) developed his music learning theory to explain what he believed to be the best way for individuals to learn to play an instrument. He created a series of stages of readiness, similar to a process of scaffolding, through which he believed that individuals should progress in order develop a strong ear as a foundation for learning to play an instrument, since he insisted that 'all learning, music not being the exception, begins with the ear, not the eye' (1993, p.34). Gordon's intention was to provide a framework for teachers so that they could prepare and structure music learning in an optimal way.

Gordon's (1993) beliefs about learning to play musical instruments are underpinned by the concept of audiation, a term he coined in 1975 and which he defines as taking place 'when one hears and comprehends music for which the sound is no longer or may never have been physically present' (1993, p.3). More simply put, this means hearing and understanding music internally when it is not, or has not been, heard externally. Audiation is a process which begins with developing the ability to listen to music with intelligence, to understand musical patterns aurally and rhythmically and to make meaning from this listening. This also means developing the ability to make musical inferences independently and to use what has been learnt to make sense of new stimuli. To develop this skill, individuals need to experience a sizeable amount of music, and learn how to listen to it intelligently, which builds various schema and familiarity with tonal and rhythmic structures, and enables prediction, for example of an imminent tonic ending, as well as the building of instinctive melodic

and harmonic understanding and tonal and rhythmic structure. Rhythm needs to be felt within the body rather than counted metrically and academically. As well as developing an understanding of how the piece is going to sound, and how it will be played in terms of fingerings used, audiation means understanding a piece of music completely before playing it, including its overall structure, in order to play it well, and to play it musically.

All of this underpins and is interwoven with the ability to think in sound, and develops skill to interpret and express music in such a way that a listener will be drawn into the colours, mood and general excitement of a performance, which is at the heart of musicianship, a concept very dear to Gordon (1993, 2004), and which finds its place strongly at the heart of what could be argued to be his implicit definition of musical intelligence. This wonderful musical understanding then goes on to take its place as the foundation of the development of notation reading skills. Individuals have learnt to internalise rhythmic and tonal patterns, and from this strong grounding they can then learn to understand how these appear when notated (attaching the sound to the symbol). The learners then possess the tools to apply these skills to other series of sounds and patterns in notation. These patterns (rather than single notes) are then gradually read and understood in longer units and combinations, and form an understandable musical context, which represents notational fluency. Thus Gordon's thinking aligns strongly with the Yamaha and Suzuki music teaching methods which advocate learning to play an instrument in the same way that one's mother tongue is learnt, by experiencing the music first through listening, singing (by imitation), playing (from what has been sung), and then the familiarity with tonal and rhythmic patterns is developed before attaching the sound to the symbol (reading and writing the notation).

Gordon also argued that the act of audiating prepares the body for singing and playing, (supported by the work of Brodsky *et al*, (2003, 2008) and Zatorre and Halpern, (2005)), and likened it to the act of visualising and then drawing a picture (1993). Gordon insisted that students must be able to audiate a piece of music thoroughly before trying to play it, and well before trying to play it from notation,

otherwise frustration would arise. He vehemently disagreed with teaching individuals to play straight from notation at the first lesson, arguing 'is it not absurd to try to teach a group of students to read music notation if they lack the readiness to listen to and perform that music with comprehension in terms of audiation?' (1993, p.33). To Gordon, this is just decoding symbols, and is meaningless and unmusical (see also Schleuter, 1997). Gordon is adamant that asking students to read notation too early is the reason behind a failure to sight-read successfully, and insists that 'after audiation has been developed, learning to read and write music notation is relatively simple' (1993, p.41). Gordon (1993) insists that audiating means understanding and giving meaning to what you hear. He argues that audiation represents musical thought. It rests on an understanding of tonality and syntax, pitches, duration and metre, form, style, harmony, modulations, dynamics and timbre.

This study uses Gordon's *Music Learning Theory* (1993) as a lens to examine the methods used by the teacher participants to see if their methods may underpin the successes or the difficulties that some individuals find with learning to read and play piano notation simultaneously.

Dweck's Self Theories (2016)

Dweck's work is also relevant to my study, being situated within the field of theories of motivation, learning, personality and their development. She argues that 'we all have belief systems that give structure to our world and meaning to our experiences' (2016, p.132), and her work centres on individuals' beliefs about their own abilities and intelligence in terms of whether they believe they possess a fixed amount of intelligence that cannot be increased (an entity theory of ability and intelligence), or whether individuals believe that their intelligence is malleable and can be increased (an incremental theory of ability and intelligence). Dweck (2016) found that individuals who believed that they only had a fixed amount of intelligence were not prepared to exert effort in order to solve a task or improve their ability, in case they were seen to fail, and so they preferred easy assignments where they could be seen to perform well and better than their peers. As soon as any difficulty and apparent

failure were encountered, these individuals would demonstrate what Dweck calls a 'helpless response' (2016, p.7), and would usually give up on the task at hand, believing that they did not have adequate intelligence or ability to fulfil it. Applying this to learning to read notation, the main focus of this study at the beginning, this could be damaging for students who have an entity theory of their own intelligence and ability if they cannot see an easy way of overcoming the initial difficulties of understanding and executing it.

On the other hand, Dweck found that those individuals who believed that their ability or intelligence was not finite, and could be increased with effort, demonstrated an incremental theory of intelligence, or 'mastery-oriented' behaviour (2016, p1), and did not see failure as a flaw in their intelligence. In fact she noted that, for these individuals, their store of intelligence did not even occur to them. If they did not succeed at the first attempt, they simply decided that they needed to make more effort, and sought strategies to help them to learn, improve and increase their intelligence or ability to solve a problem for the next time. These individuals were more interested in the journey of self-improvement, and actively sought challenges through which they could increase their ability. Dweck found that it is the individual's self-belief that affects their motivation to continue or give up in the face of difficult new tasks, but also warned that teachers' beliefs about their students' intelligence are vitally important for successful learning, in that, if the teacher does not believe that a student will be able to accomplish a certain task, that teacher is arguably transferring onto that student the belief that he or she does not have the capability to learn the skill and improve in that and other skills (an entity theory), which effectively limits their current and future ability. On the other hand, a teacher who holds an incremental theory of intelligence might equip themselves with many teaching methods to try with their students, expecting them to try to learn in various ways, thus encouraging incremental behaviour within their students.

Dweck (2016) conducted a study in which she found that it was possible to change individuals' beliefs about their ability. The research found that, if the participants (in this case children) were focusing on measuring themselves from a particular

performance (being given a performance goal), and wanting to be the best at this task and outperform their peers, it seemed that they would demonstrate a helpless response in the face of difficulty and give up. If, however, they were given a learning goal (the object of the task being to increase their ability, not to perform to their best), they continued in the face of challenge, and a mastery-oriented behaviour tended to emerge. Dweck therefore implores teachers to focus their students' concentration on positive learning strategies and to constantly provide them with learning goals, and to adopt an incremental approach in terms of how they view and teach their students.

This study uses Dweck's work as a lens with which to try to understand whether the teacher participants in this study hold incremental or entity theories of ability and musical intelligence on behalf of their students, by believing that certain students will or will not be capable of learning certain skills that might be necessary for the development of the successful simultaneous reading and playing of piano notation, which in turn may partly underpin some of the difficulties that some individuals find with this endeavour.

Gardner's Theory of Multiple Intelligences (2004)

Gardner eschews the commonly and widely held belief in one overall, general intelligence, (labelled '*g*'), or the IQ, which is founded upon cognitive, mathematical and linguistic skills, testable by pencil and paper, and which takes no account of other skills, experience, culture or life circumstances. Like Dweck (2016), Gardner (2004) dislikes attaching a permanent label to an individual dependent on these test results which effectively provide a snapshot of an individual's apparent ability on one day only. Instead of one single measure of intelligence, Gardner (2004) believes that all individuals possess several skills, or strengths, and he chooses to call these intelligences. He believes that individuals present with different minds, abilities and different ways of processing information, and that this also depends upon their culture, and what strengths may be important in that culture. An individual's strengths may indeed be steeped within the academic abilities that feature in the IQ

tests, but Gardner wanted to expand the concept of intelligence to include other strengths in which an individual might be outstanding, so that individuals may be viewed more equally in terms of their particular strengths and abilities, and not viewed unfavourably if they do not excel in areas of mathematical, logical and verbal reasoning. Thus he proposed a revival of an idea of a pluralistic view of intelligence, which had begun to emerge during the 18th century with Gall, followed later by Guilford, and then by Thurstone in the early 20th century. Gardner's concept of multiple intelligences is very much inspired by Thurstone's view of the existence of seven 'primary mental faculties', (Gardner, 2004, p.7), and so he aimed to develop 'a positive model of the different intellectual strengths displayed by human beings', (ibid., p. 277), suggesting that humans embody not only linguistic and logical-mathematical intelligence, but also spatial intelligence, bodily-kinesthetic intelligence, [sic] musical intelligence, interpersonal and intrapersonal intelligences. It is important here to note that Gardner's (2004) concept of intelligences is distinct from the notion of learning styles, which tend to be the methods individuals use for learning in more academic areas, although it will be seen that some writers and teachers have confused the two, and at times it does seem as though Gardner himself reverts to a learning style belief (2004).

Thus, *Frames of Mind, the Theory of Multiple Intelligences* (2004) was selected as part of the theoretical underpinning to my study because Gardner's concept of different strengths in some areas rather than in others led me to wonder about a more positive possibility, that those who found reading difficult might possess a different strength, such as an aural strength, and rather than the preference for ear playing or rote learning being a negative phenomenon, this may actually be a positive strength at the root of learning to play the piano. If this was the case, it would be important for teachers and parents or guardians of students, and the students themselves, to be aware of this, and, more crucially, not to label these learners with a lack of ability.

1.4 Aims of the research

The aims of the research were:

1. To place the research in context and develop an understanding of what is involved in learning to read and play notation simultaneously on the piano, and to explore the difficulties that some individuals seem to find with this.

2. To explore the pedagogical beliefs of a sample of real-world piano teachers in terms of how they teach pupils to read and play piano notation simultaneously, in order to place the researcher's own practice into context, establish the focus of what the study teachers deem important and compare their methods to theories in the pedagogical literature.

3. To try to develop an understanding of the meaning of musical intelligence, by examining the literature, exploring teacher beliefs, and generating inferences, and from this to forge a framework or foundation for musical intelligence which might lead to success in learning to play the piano, specifically in terms of the simultaneous reading and playing of notation.

To this end, the following research questions guided the study:

1.5 Research Questions

1. What experiences, observations and beliefs do the students and piano teachers in this study share about learning to read and play notation simultaneously on the piano?

2. What beliefs do the piano teachers in this study seem to hold about teaching pupils to read and play the notation simultaneously?

3. How might musical intelligence be defined?

4. How might a framework for musical intelligence offer support to piano teachers and their students, particularly in terms of learning to read and play notation simultaneously on the piano?

Chapter 2 begins by focusing on the literature related to the first aim of the research, which was to develop an understanding of what is involved in learning to read and play notation simultaneously on the piano and to explore the difficulties that some individuals seem to find with this. The work of music pedagogues is explored in terms of their beliefs about learning to play the piano and to read notation simultaneously, and their teaching beliefs. This sets the context in which to explore the experiences of a sample of the researcher's own music students in terms of learning to play the piano with notation, as well as exploring the pedagogical beliefs of a sample of real-world piano teachers and compare them with what was found in the literature. The chapter concludes with a brief discussion of beginner tutor books.

Chapter 3 examines the literature to try to elicit a definition of musical intelligence, or at least to uncover its meaning, so that research question 3 may be addressed. Beliefs about intelligence according to three pedagogical writers deemed relevant to this study are examined first, in order to place the concept of a musical intelligence

into context, and then possible meanings of the term ‘musical intelligence’ are explored.

Chapter 4 sets out the methodology behind the study, Chapter 5 explores the findings of the study, and Chapter 6 presents the discussion of the findings. Chapter 7 offers my research contributions, Chapter 8 details the implications of the research, Chapter 9 sets out the limitations of the research, and Chapter 10 presents a critical review of my thesis. Chapter 11 offers suggestions for further research, and Chapter 12 presents my conclusions.

2 Literature Review Part 1

2.1 Learning to play the piano

In order to place the research into context, this chapter begins by discussing the literature pertaining to what is involved in learning to play the piano, moving on to what is involved in reading and playing the notation simultaneously on the piano, and follows with an exploration of literature pertaining to the beliefs held by music pedagogues in terms of learning to play, and to read and play notation simultaneously.

McPherson suggests that learning to play an instrument can prove quite challenging for some individuals and argues that 'performing music on a musical instrument is a complex phenomenon comprising a number of distinct, but seemingly interrelated abilities' (1993, p.1). Concina agrees that '…music making is a complex, and highly structured activity which requires musicians to plan and manage several specific skills (cognitive, emotional, motivational, and strategical' (2019, p.1). Benton notes that 'music learning involves acquisition of knowledge and skill in cognitive, psychomotor, and affective domains of learning' (2014, p.23). Liu refers to '…the vast array of skills involved in piano playing…' (2010, p.2), and Jäncke adds that 'there is no doubt that specific cognitive and motor skills are required to perform music. For example, playing a musical instrument makes it necessary to program, execute, and sequence various movements' (2006, p.26). Parncutt *et al* agree that 'virtuoso piano performance involves the training and execution of complex motor programs that approach the limits of human cognitive capacities' (1999, p.209). Davidson adds that 'musical instrument performance requires complex physical and mental control and fluency' (2012, p.769).

Laeng and Park suggest that playing an instrument is 'clearly a bimanual task in which the two hands cooperate simultaneously for the performance of one combined action' (1999, p.364). Indeed, Peters (1985) states the difficulty of dividing the

player's attention between the two hands, likening playing the piano to carrying out two different activities simultaneously. He remarks that 'humans are severely limited when each [hand] requires its own independent time schedule' (ibid., p.30), and wonders whether, if certain students are lacking in this area of co-ordination, 'we can presume that such players will not be found at higher skill levels as they have been selected out' (1986, p.32).

Reading and playing the notation simultaneously

Playing the piano using notation means the simultaneous interpretation of a sheet of musical symbols whilst playing the instrument, occasionally looking down at the hands to ensure that the correct keys are played. Odam remarks that 'the actual task of playing an instrument and reading notation from a book at some distance from the player is one of considerable difficulty, and in some cases is well-nigh impossible' 1995, p.46). Bastien notes that fluent note reading 'demands a complicated coordination of intellect, eyes, ears, and hands' (1995, p.14).

Gordon defines music notation as 'a collection of visual symbols that is intended to represent the sound of music' (1993, p.15). Each symbol on the page represents both pitch and duration (Fourie, 2004), which are processed separately in the brain (Gudmundsdottir, 2010, Schön and Besson 2002, Waters and Underwood 1999). Fourie (2004) and Hallam (2001) both found that, during sight-reading, players tended to focus more attention on pitch than rhythm, when speed of processing is at a premium, and claimed that interference occurs when trying to divide attention between pitch and rhythm. Yurko agrees that 'when the two are combined, rhythm politely slips into the background, and our awareness centers on melody' (2020, p.54). The visual nature of the notation encourages a primary focus on the pitch represented, rather than the aural nature of the rhythmic aspect of the note on the page. Sloboda points out that,

> The central features of the notation are abstract. They specify pitch and rhythmic relationships between notes and groups of notes, not what keys are to be pressed

> on an instrument nor precisely how the notes are to sounds. They are intended to convey something of the musical structure to a reader (1981, p.88).

Fourie (2004) argues that playing and reading notation simultaneously requires the player to quickly combine visual, aural and motor skills. The player's brain must rapidly translate the symbols on the page and programme the body to produce an appropriate motor response, (Dodson, 1983, Gudmundsdottir, 2010, Jäncke, 2006, Oldfield, 1969, Williamon, 2004). McPherson (1993) cites Gordon's observation that the notation does not always reflect how the fingers move on whichever instrument they are playing, which adds to the complexity of trying to play from notation.

For pianists, the need for divided attention escalates when the notation is introduced because they have two lines of notes to read, as opposed to wind, brass, and stringed instruments, for example, where there is only one line (Bean, 1938, Gudmundsdottir, 2010, Hargreaves, 1986, Mills and McPherson, 2006). Although wind, brass and stringed instruments still require two hands to play them, for pianists, both hands are playing, and each hand can, and often does, play something different from the other one and is not restricted to a particular pattern of fingerings to play the instrument as, for example, a flute. Gudmundsdottir (2010) argues that this can definitely challenge young piano students. Parncutt *et al*'s study of six professional pianists found that, although the fingerings for both hands had been prepared in advance for a particular piece, the left-hand fingerings were disrupted more than the right-hand fingerings when the players put both hands together, and they attributed this to trying to give equal attention to both hands while reading the notation simultaneously (1999).

The information on a page of notation is regarded as routine once a pianist has developed experience, but is arguably confusing to a beginner, containing as it does lines, spaces, clef signs, rhythm symbols, notes and finger numbers. The player requires advanced spatial skills, especially as he or she is expected to read horizontally, vertically and obliquely, to encompass both clefs at once, single notes, and multiple notes played as chords. Although the symbols appear higher or lower

on the page to indicate higher and lower sounds, for the piano, the hand needs to move horizontally to the right for higher notes and left for lower notes. If black keys are involved, these are physically raised higher than the white keys on the instrument, and further away, but there is no indication of this in the written score. Gordon (1993) argues that the terms 'up', 'down', 'high' and 'low' are abstract terms in general, which add to the difficult of decoding the notation. Additionally, a pitch on a certain line or space on the treble stave does not correspond to the same line or space on the bass stave.

McPherson's (2005) three-year study on 157 seven- to nine-year-old children (learning to play brass and woodwind instruments, however, not piano) found that one of the factors to cause dropout was early difficulty in learning to read notation. Kuhlman (2005) also believes that many music students have dropped out because of problems in the area of learning to read and play notation, rather than from a lack of musical aptitude (see also Priest, 1989). Williams supports this by noting that 'unfortunately, notated music is often used as the primary vehicle for challenging technique and control, and the pieces given can demand musical experience well beyond pupils' levels of sophistication or understanding', (2017, p.20). Gudmundsdottir claims that 'experienced music teachers know that there can be many obstacles on the road to music-reading fluency' (2010, p.331) and concludes that, out of the large number of individuals that embark upon learning to play an instrument, 'relatively few master music reading at a satisfactory level' (2010, p.336), and many choose to cease instruction because of the difficulties they encounter, particularly if notation reading is the only method of instruction used (Cathcart, 2013, Musco, 2011). Cathcart discusses the 'inability of some young learners to ever fully grasp the concepts involved in reading music' (2013, p.396), and likens the apparently one-dimensional focus of teachers upon tutor books in this respect, and the ensuing focus on notation, to an 'obstacle course to be feared' for students (2013, p.383), implying that reading and playing the notation is difficult, and adding that, if this is all that is done in a piano lesson, it can discourage students quite quickly. Indeed, Priest writes about the 'insistence on literacy that results in some

children giving up their playing' (1989, p.173). Russell notes her own piano beginnings:

> I remember being given a chart of symbols, their names and a number of beats. Then at the same time I was overwhelmed with Every Good Boy Deserves Food and other mnemonics for learning the letter names. With no link to the sound, and no link to an actual understanding of what is happening! (Do Re Mi Piano / Doremi Connect, April 2023)

It would seem, thus far, then, that playing the piano with notation is a sizeable and complex task which can present difficulties (see also Lowe, 2008, 2020). In the literature, learning and teaching aspects are often intertwined, making it difficult to separate them out for this summary. The next section explores the skills required for playing the piano, with and without notation.

Skills and senses needed for playing with notation

In order to be able to play the piano, with or without notation, but especially with, the following skills are required:

- Spatial skills
- Kinaesthetic skills
- Aural skills
- Willingness to practice
- Metacognition and mental rehearsal

I begin by discussing the spatial aspects of playing the piano, since it could be argued that playing the piano, with or without notation, constitutes a task that relies on good spatial awareness and spatial ability.

Spatial awareness and spatial ability

In the literature it seems that the terms 'spatial ability', 'spatial intelligence', 'spatial awareness', 'spatial reasoning', and 'visuospatial awareness' are often used interchangeably (Cornish, 1991). For the purpose of my thesis, I have defined *spatial awareness* as an understanding of spatial relationships, on the piano and within the notation, and *spatial ability* as the capacity to act successfully upon this understanding, implying the actual mental manipulation of the notation into a physical response. Lehmann *et al* talk about mental representation as being the 'essence of a skill' (2007, p.19), and that this involves an internal reconstruction of the real world, which aids the individual in successfully accomplishing a task or solving a particular problem.

Although literature abounds on the so-called 'Mozart Effect', (see also Gardner, 2004, p.xix and Garabello, 2020, p.13), which claims that listening to music, or engaging with music-making, enhances spatial-temporal reasoning, (Hassler, 1987, Hetland, 2000), there exists only a handful of pieces of literature which even then only touch upon what spatial abilities and spatial awareness are required for actually playing the piano, and particularly with notation. In *Frames of Mind*, (2004) Gardner devotes an entire chapter to spatial intelligence, implying that this represents the possession of outstanding spatial awareness and spatial abilities, however I could not find a link in his work (2004) between spatial intelligence and musical intelligence, or learning to play an instrument. Carter argues that one aspect of spatial ability in general life is being able to identify or grasp 'patterns and meaning from what might appear at first glance random or very complex information' (2007, p.29). The fact that piano notation comprises written symbols denoting melody (pitch and duration) and accompaniment moving horizontally from left to right across the page, on two different lines, to be played with different hands, and requiring the whole contour of the piece to be read vertically and diagonally, implies that the notation represents a complex logic problem in spatial awareness and spatial ability, even before transforming it into a motor response to play it on the piano (see also Helding, 2010 and Hayward and Gromko, 2009).

Kell and Lubinski (2013) use the term 'visual-spatial ability' to refer to the mental rotation of objects, in a similar way to Gardner, who argues that mental rotation happens when the 'item (or the observer) is assumed to have moved through space' (2004, p.171), and talks about spatial capacities being used when working with graphic depictions (2004, p.176). He talks about the use of spatial intelligence when performing 'transformations and modifications upon one's initial perceptions' (2004, p.173). Thus it could be argued that the graphic depictions represent the notation, and that mental rotation is used when the image of the notation has been firstly understood, then retained in the mind in order to be manipulated and transformed into an aural image, and then into a physical and tactile motor response. This, in turn, depends upon an excellent spatial memory of the keyboard and its geography.

Fourie writes that the brain is required to 'translate visual distances perceived on the score into different physical distances on the keyboard' (2004, p.7), and supports this by telling her reader that, unlike the reading of words, sight-reading activates the left occipitoparietal cortex of the brain, which is associated with spatial location (2004). She adds that the physical spacing between the notes in the score remains more or less equal, whereas the physical response necessary to translate this onto the piano keys often involves much irregular spacing as the notes or chords can be located anywhere on the piano keyboard.

Smith (1991) draws attention to the spatial awareness needed for linking the movements of the right hand to the top line of stave, and left hand to the bottom stave. Jäncke argues that '…pianists need three-dimensional spatial processing to find the correct position of the keys while they are playing' (2006, p.35). He tentatively suggests that '…there might exist some (admittedly not well understood) relationships between visuospatial functions and musical performance' (ibid.), and that 'it might indeed be plausible that professional musicians automatically practice spatial functions while performing music' (ibid.).

Karma defines musical spatial ability as the capacity to 'organise the elements of perception' (1979, p.50), and applies this to an internal aural discrimination, in order to understand the intervals between notes, as well as direction and contour. Similarly, Hayward and Gromko suggest that there exists an aural-spatial ability and believe that 'music reading skills draw on auditory processing skills with a spatial component in the formation of an aural image of the sound; playing skills allow the imagined aural image to be made audible' (2009, p.33). This aligns with Gordon's music learning theory (1993), in which he puts forward the concept of notational audiation, discussed in the introduction, (see also Brodsky *et al*, 2003, 2008 and Zatorre and Halpern, 2005) but which means being able to hear and understand a piece of music internally from the notation, without anyone having played it first.

Other writers, such as Shuter-Dyson (1999) and Liu (2010) argue that spatial abilities are significant predictors of musical ability on the piano, and Drost refers to the ability of pianists to learn task-specific 'spatial mapping' (2005, p.1383). Knerr argues that 'reading music is a complex skill that requires not only knowledge of note names, but an incredible amount of spatial awareness on the page and in the hands combined with rhythm in real time' (Mini Dissertations, PianoSafari.com, 2008). Spatial intelligence is also required to understand rhythm and duration of notes, knowing not to move onto the next beat until the previous beat has used up its allocated space in time.

Spatial ability and spatial awareness are inextricably linked with kinaesthetic, proprioceptive and tactile awareness. Evans suggests that a well-honed tactile-kinaesthetic-spatial sense is needed to be able to interpret notation quickly (2008, p. 32) and, although a guitar teacher, O'Connor's statement that a player 'will not be able to play without looking if he has not developed some discrimination in his sense of spatial awareness...' (2007, pp.74-75) applies equally to playing the piano, and perhaps there exists a musical-spatial awareness for learning to play an instrument. O'Connor termed this 'cross[ing] from visual to kinaesthetic' (ibid.), thus stressing the need to develop the tactile sense as well, or what he called the 'feeling sense'

(ibid.). This leads me on to a discussion of the kinaesthetic, proprioceptive and tactile senses.

Kinaesthetic, proprioceptive and tactile senses

En.oxforddictionaries.com defines the term 'kinaesthetic' as 'relating to a person's awareness of the position and movement of the parts of the body by means of sensory organs (proprioceptors) in the muscles and joints'. Dictionary.cambridge.org defines the term 'kinaesthesia' as the ability to know where the parts of the body are and how they are moving. Gardner argued that 'our kinaesthetic sense, which monitors the activity of these regions, [of the body] allows us to judge the timing, force, and extent of our movements and to make necessary adjustments in the wake of this information' (2004, p.210). In terms of playing the piano, particularly with notation, this does not refer to the actual feeling of pressing the keys or groups of keys, it refers rather to the knowledge of where the hands are in space as they move around the keyboard.

The term 'proprioception' is defined by En.oxforddictionaries.com as the 'perception or awareness of the position and movement of the body'. It refers to knowledge of where an individual is about to place a part of the body, such as the hand on a particular set of piano keys. Medicinenet.com refers to the term 'proprioception' as 'the ability to sense stimuli arising within the body regarding position, motion and equilibrium', and the Oxford English Dictionary defines it as the 'perception or awareness of the position and movement of the body'.

These definitions of kinaesthesia and proprioception are very similar and overlap somewhat, and Galvao and Kemp (1999) and Stillman (2002) found that the terms were consequently often used interchangeably and suggested that there is no real consensus on the difference between them. The clearest definition which Galvao and Kemp supply is one by Goldstein (1996) who refers to the term 'kinaesthesia' as 'the sense of movement of the limbs', versus proprioception, which he defines as 'the sense of the position of the limbs' (cited in Galvao and Kemp, 1999, p.131).

It is also important not to confuse the term ‘kinaesthesia’ with the term ‘tactile’, which refers to physical sensations coming from outside of the body, for example, the physical sensation of touching piano keys. This latter sensation may be referred to as exteroceptive feedback, defined by Merriam-Webster as ‘relating to, being, or activated by stimuli received by an organism from outside’. Indeed, Galvao and Kemp (1999) and Stillman (2002) found that the terms ‘kinaesthesia’ and ‘proprioception’ were often used interchangeably.

Playing the piano using notation is arguably underpinned by the existence of a reliable internal and external feedback system, since the player is not looking at the piano keys most of the time. This feedback system only becomes reliable once a certain amount of experience has been developed (Pitts, Davidson and McPherson, 2000). The player needs to make a dependable link between the visual representation of the notation on the page, and what he or she is hearing when playing it (aural feedback), and importantly what is being felt in the hands (tactile or exteroceptive feedback). The player also needs to know how to move his or her body to achieve this (which requires kinaesthetic and proprioceptive feedback), and how to build the confidence to move the fingers, hands and arms correctly without looking at them, while looking mostly at the notation (Lehmann and McArthur, 2002). These feedback systems are built from, and depend upon, internal knowledge of visual, aural and tactile patterns in the music, in terms of sound (Gordon, 1993) and in terms of the notation (Parncutt and McPherson, 2002). They also depend upon internal memory systems concerning what is already known and has been experienced by the player, as well as an excellent knowledge of keyboard geography, which must become internalised to be reliable and successful.

Only a very small amount of literature seems to exist regarding the tactile senses in conjunction with playing musical instruments, and a lack of the development of these senses has not been specifically suggested as a problem in learning to read and play notation, nor has a suggestion been forthcoming that their active development could become part of a general teaching strategy. Garabello (2020) argued that the

feedback systems (auditory, tactile and visual) are part of a musical intelligence, yet Gardner, despite dedicating complete chapters of his book (2004) to the discussion of his concepts of bodily-kinaesthetic intelligence and spatial intelligence, did not bring them obviously into his chapter on musical intelligence (2004), although, in his chapter on bodily-kinaesthetic intelligence, he does say that 'a good pianist can produce independent patterns of movement in each hand, sustain different rhythms in each hand, while also using the two hands together to 'speak to one another' or produce a fugal effect' (2004, p.209).

Martin (1965, cited in Gardner, 2004, p.228) talks about a concept of an internal feedback system or sense 'kinaesthetic thought', which he says is distinct from engaging in the physical act of conducting an activity because it relies on the memory of how that activity has been conducted before, and how it has felt within the body to execute the action. Gardner calls this 'focusing inward' (2004, p.235), and argues that it encourages a higher state of alertness, and although he discussed this mainly in relation to acting and dancing, with extremely brief references to musicians, it could be inferred that a deliberate engagement in an internal tactile sense could be beneficial for learning to read and play notation on the piano. Helding regards Gardner's bodily-kinaesthetic intelligence as, 'an ability which virtually all musicians must possess' (2010, p.327).

Gardner defines his 'bodily-kinesthetic intelligence' as 'the ability to use one's body in highly differentiated and skilled ways' (2004, p.206). He adds that 'characteristic as well is the capacity to work skilfully with objects, both those that involve the fine motor movements of one's fingers and hands and those that exploit gross motor movements of the body' (ibid.). Gardner quotes Sir Frederic Bartlett, a British psychologist (1958) who noted the importance of being in touch with one's internal senses in order to achieve fluent performance of any action, and this would align well with musical activity. Gardner argues that priming one's internal kinaesthetic senses to be ready for the next move in whatever they are doing at the time creates a fluidity of performance which he defines as 'virtually the hallmark of expertise' (2004, p.209). Gardner also quotes the work of Benedict, who wrote that, in order to

teach children to write ideographs, Japanese teachers took the children's hands and helped them to form the required pictograms, in order that the children could feel how each was created. Thus it seems reasonable to infer that a deliberate and active engagement in the tactile and kinaesthetic senses could provide a useful part of a piano lesson in terms of the development of an individual's ability to read and play notation simultaneously on the piano.

Galvao and Kemp recount that the Victorians talked of a certain muscle sense, which is 'essentially related to humans' inner experience of space and movement' (1999, p.129), and encompasses kinaesthesia and proprioception. They insisted that this sense of space and movement had important implications for instrumental music teaching and music learning. Kemp (1990) argued that kinaesthesia is an integral part of an overall musical development, while Priest (1989) found that a kinaesthetic sense of the shape of a piece on an instrument was more important for playing it than its translation from notation. Odam suggested that when a child begins to learn a musical instrument, he or she firstly needs to learn the action that produces the sound, '…feel the movements they are making' (1995, p. 24), as well as developing the aural memory for a short melody, and that security in these elements is essential before the introduction of the visual notation.

Kemp urges music teachers to help students to actively engage with this 'unity between mind and body' (1999, p.130) in terms of awareness of the body in space, and argues that '…this integration of imaging in sound and neuromuscular sensation has to be consciously and continuously considered and developed by the teacher's careful choice of activities at every stage' (1999, p.225). Kemp spoke about kinaesthetics as a 'feelingful form of intelligence' (1990, p.223) and wrote about experiencing music through the tactile sense, '…through whole-body experience we can know music and think music' (1990, p.224). He argued that a good kinaesthetic sense (in terms of the tactile sense in his definition) 'should be the central and unifying component in any psychological model for music learning' (1990, p.223). Likewise, Wolf wrote that one of his participants in a sight-reading task claimed his expertise was owing to his creation of kinaesthetic representations of the notes and

put forward that players have a kinaesthetic imagery. His participant described this in terms of a tactile sense and a kinaesthetic-proprioceptive sense:

> That means you feel…the positions of the black and white keys, the stretches of octaves and other intervals, scored positions and things of that kind [and they] have a very precise mental image…you can imagine that you are playing the piano even if the keyboard is not there… (1976, p.159).

The same participant also argued that,

> People who can play the piano without looking at the keyboard at all (that means, who have a very fine tactile feel for the keyboard) are much better sightreaders than people who don't have this tactile feel for the keyboard (1976, p.160).

Lehmann and McArthur (2002) also argue for a honed tactile sense, and Jacobson (2006) stresses the importance of making a link between what is seen on the score and how it feels in the hands, and recommends that students should learn how pieces sound and feel in order to be able to play securely without looking at the hands. Jacobson adds that:

> when this process is operating correctly, the eye-to-brain-to-hand coordination happens instantly and the tactile sense determines whether the hand is in the correct place. If the hand is unfamiliar with the topography of the keyboard and cannot find the proper key, the fingers may play wrong notes or the student will look at the keyboard to find the correct key (2006, p. 143).

Jacobson's thoughts here are key to successful reading and sight-reading, and refer, albeit perhaps tacitly, to all three senses here, proprioception, kinaesthesia and a strong tactile sense in terms of playing the piano.

Mainwaring (1933) also argued that playing an instrument was underpinned by many kinaesthetic and visual processes, and more recently, Knerr expressed the importance of being able to make this visual-tactile connection between looking at the notation and responding without looking at the hands on the piano, when she

advocated that students should learn to recognise patterns aurally and visually, so that they can then learn how they feel to play on the piano, (Mini Dissertations, PianoSafari.com, 2008). The authors of Piano Safari seem to focus quite highly on good proprioceptive, kinaesthetic and tactile development, and insist that 'it is important to train the students not to look down when reading unless absolutely necessary' (ibid.).

Banton (1995), Hodges (1992), and Jacobson (2006) argue that keeping the eyes on the score is one factor which distinguishes strong from weak sight-readers in particular. Banton (1995) insists that players need to develop confidence in their ability to move around the keyboard so that they can read the notation simultaneously. Jäncke suggests that, for skilled pianists '…some kind of optimisation has been implemented not on the visual but rather on the motor side of this complex sensorimotor process' (2006, p.29), which suggests an ability to know how the notes, chords, and groups of notes are going to feel in one's hands before they actually play them.

Playing by ear also depends upon a combination of strongly developed kinaesthetic, proprioceptive and tactile senses. McPherson stressed the importance of 'knowing how to connect what is in the mind with the instrumental fingerings necessary to execute one's thoughts' (1997, p.70). The act of memorising a piece of repertoire is also linked with confident kinaesthetic and tactile skills, (Gordon, 1993, McPherson, 1993, 2005), as well as with audiation skills, which will be examined further into the thesis. Similarly, McPherson (1993) cites Kratus (1991), who discusses the various levels of skill development in improvisation, one of which involves such confident knowledge of the keyboard and strong kinaesthetic and tactile ability that the player can improvise without looking at the keys.

In order for pianists to develop a secure feedback system and be able to find the correct keys on the piano, efficient fingering is necessary right from the start. Williams argues that 'there is only one completely wrong type of fingering: inconsistent fingering', (2017, p.67). Students can only know how a chord or a

pattern will feel when they have developed a core vocabulary of fingerings associated with these patterns, which creates a tactile memory. Newman is adamant that, 'fingering can make or break a piece' (1984, p.96) and that bad fingering can also affect how quickly an individual learns a piece, as well as their general confidence at the piano. He likens inefficient choice of fingers to the unstable foundations of a house. Roskell (1995) argues that once a player learns to use efficient fingering well, it will become more instinctive to create a natural solution to playing a piece, which she believes is essential for successful sight-reading as well as for learning new pieces. Williams adds that 'good fingering facilitates fluency, sound, articulation and speed and consistent fingering facilitates muscle memory and control, creating a permanent physical template', (2017, p.67).

For reading, playing by ear and memorising, it is also important to understand that kinaesthetic and tactile experiences are different for different instruments. A flautist, for example, will associate a specific set of fingerings, a particular pattern, with a sound, and producing a scale does not run straight along the length of the instrument as it does for the piano, for example. The flautist will also understand the embouchure required for producing the sound, as well as the speed of air needed. Similarly, a brass player has a different set of physical criteria to produce sounds, especially when there are only three valves to depress in certain ways. The piano is different and could be argued to be more difficult to play in terms of kinaesthetic response because of its size and geography, and particularly in terms of the fact that all the white keys feel the same unless the player can feel the black keys to understand the topography of the instrument, thus relying on a highly developed tactile sense. There is no particular pattern of fingers to use for playing a single tone, just for playing chords of more than two notes, or a scalic pattern perhaps. However, with experience, it is entirely possible to develop a strong, reliable kinaesthetic awareness for playing the piano, together with a heightened musical-spatial awareness and a refined internal keyboard geography, and it is important to note that rote and ear-playing are more visual experiences on a piano. Many of the studies cited in this review were based on band instruments which only play one line of music.

To summarise, then, Hayward and Gromko argue that '…a visual scan across the music notation will yield a mental image of the music's pitches and rhythms, as well as a memory for the experience of rendering those pitches and rhythms kinesthetically. As such, the reading of music notation is an integrated auditory, visual, spatial and kinesthetic process' (2009, p.27). As well as arguing that playing piano with notation relies on the development of secure internal tactile, kinaesthetic and proprioceptive senses in order to predict and respond to what is coming next in the notation, Hayward and Gromko's words above point interestingly to the concept of an internal hearing of the piece when scanning through it visually, which leads me now to examine the auditory sense and its crucial, and sometimes invisible, role in playing a musical instrument.

Aural understanding

The ear is crucial to playing a musical instrument. In the introduction I set out Gordon's Music Learning Theory (1993) as part of the theoretical underpinning to my study. Gordon's thinking (1993) aligns very much with the Yamaha and Suzuki music teaching methods, which advocate learning to play an instrument in the same way in which the mother tongue is learnt, by experiencing the music first, through listening, singing (by imitation), playing (from what has been sung), all the time developing familiarity with tonal and rhythmic patterns before attaching the symbol to the sound (reading and writing the notation). This leads me to the next section of this chapter which focuses on the development of audiation as part of learning to play the piano both with and without the notation.

Audiation

Gordon's (1993) beliefs about learning to play musical instruments are underpinned by the concept of audiation (see Glossary), which incorporates listening to music with deep understanding. He regarded success in musical education as being built on a series of readinesses and advocated that students should build up a wide aural

vocabulary of patterns and tunes by listening and singing first in order to be able to then transfer them onto their instrument. McPherson observes that 'there is a widespread consensus that aural performance activities enable, strengthen and facilitate the development of musical skills and understandings' (1993, p.28). Newman (1984) discusses how ear playing leads to fluency through the development of recognition of patterns and meaningful chunks, rather than just reading and responding to one note at a time. Similarly, Liperote, a staunch advocate of pattern training, suggests that, when students have sung, then played, stock patterns on their instruments, they can then make a strong and reliable link between what they are hearing and what they are seeing in the notation (2006). Williams argues that patterns are 'the musical and physical grammar of tonal piano music…and the very best shortcut to fluent playing', (2017, p.31). Harris (2014) also focuses on the development of pattern recognition in terms of scales and other related patterns as an important building block for an overall musical understanding.

Schleuter (1997) also believes in copious deliberate aural development for building the necessary musical readiness which he agrees must occur before introducing the formal notation. He argues that 'when students are allowed to rely on their eyes, notation only signifies which fingers to put down instead of what sound should be produced', (1997, p.13). Williams, too, notes that it is easy for the pupils to 'rely on the placing of the fingers rather than using their internal and external ears', (2017, p.42). McPherson (1993, 2005) and Odam (1995) are both advocates of the ability to think in sound, and Odam (1995) argues that deep and active listening necessarily precedes the written symbol, so that the player will be able to hear the piece internally before playing it. Further, he recommends learning to manipulate the instrument before adding notation to the mix and suggests developing the aural memory for the sounds of patterns and shapes first. Like Gordon (1993) Odam argues that the student should develop an extensive musical aural vocabulary before they start reading, stating that '… reading music should never begin until the pupils are conversant with musical sounds, procedures and constructions and can manipulate them fluently themselves' (1995, p.33). Davidson supports this idea and

argues that 'the beginner's conscious thoughts are fully occupied with the management of the instrument', (2012, p.771) which suggests that they will have little capacity for rendering the notation onto the instrument simultaneously from the start.

Notational audiation

Notational audiation is underpinned by having developed the initial ability to audiate and listen with understanding, and it refers to the ability to hear a piece of music internally whilst simply reading the notation, without someone having played it first. The Yamaha method of teaching music stresses the need to learn to audiate from notation before learning to play it, and one of the teaching manuals states categorically that the children 'are encouraged to listen to music first, and to imagine the sound when they look at the score, instead of only reading each note as a symbol' (p.33, no date). Again, this reflects the development of language, where the child learns whole words and sentences rather than to read each letter.

Brodsky *et al* (2003, 2008) researched notational audiation and discussed results from studies which showed that there seems to exist a phenomenon called 'auditory imagery', which is the internal creation of information about tempo, pitch and melodic and harmonic relationships, and is generated from experience of these elements, but can also be generated from reading notation. They discussed how participants in these studies were asked to imagine raising a note a tone, for example, to imagine a melody and set a metronome to it or tap out a pulse to it, to imagine the starting note for a melody, and scan a melody to identify certain characteristics. They argue that 'hence, musical images possess a sensory quality that is similar to the experience of perceiving' (2003, p.602). Brodsky *et al* went on to summarise the concept of notational audiation as 'the silent reading of musical notation resulting in auditory imagery involving kinesthetic-like phonatory processes' (2003, p.610), where there is a concurrent physical sensation within the body, most likely the throat, which results from this form of imagination, and is somewhat like silent internal singing.

Similarly, Zatorre *et al* (1996) stress that, 'imagery is not exclusively visual' (2005, p.9), and describe notational audiation as the ability to imagine the kinaesthetic movements required for the task. Zatorre *et al* suggest that, when an individual is asked to imagine an experience, 'the 'imagine' experiences seem to be more directly linked to the sensory system originally involved in encoding the information' (1996, p.29), which aligns well with the beliefs of Martin (1965, in Gardner, 2004) in terms of his concept of kinaesthetic thought (ibid., p. 228, see Glossary). Zatorre and Halpern (2005) and Brodsky *et al*, (2008), found that the act of audiating notation, and the imagination of playing the piece, triggered the supplementary motor area of the brain, which primes the body for appropriate movement, and argued that 'the mental representation of music notation cues manual motor imagery' (ibid., p.427), which suggests that notational audiation prompts the brain to prepare the fingers needed to play the piece, thus aiding the development of fluency in reading and sight-reading. Gordon (1993) believes that the act of audiating prepares the body for the act of singing and playing, and McPherson (1993) suggests that the creation of an auditory image from the notation allows the player to convert this image into the fingering required to play the piece, which he found aided memorisation in his study. He found that using a visual strategy for memorisation, for example reading the notation on its own, was nowhere near as effective. He also noted that this was because of the kinaesthetic element that was involved in audiating and imagining how to play the repertoire to be memorised. Williams asks teachers to 'encourage pupils to sing from a score, even just a couple of notes each time from a piece they are learning, insisting that they need to 'hear' the note in their head to help guide them to the correct note on the piano', (2017, p.40).

Hubbard and Stoeckig describe musical imagery as 'the recreation of a musical experience in the absence of the musical stimulus and direct perceptual experience' (1992, p.199), which aligns well with Gordon's definition of audiation (1993). They too argue for the experiential nature of the process, and that it recreates a relevant sensory experience, which they define as a 'qualia', a perceived sensation when an individual imagines hearing a piece of music internally. They suggest that the

element of ‘qualia’ involved in musical imagery is extremely useful to musicians during performance, and for memorising new music (ibid., p.200). In a similar vein, but from a slightly opposing angle, Haueisen and Knosche reported that they were able to demonstrate that ‘pianists, when listening to well-trained piano music, exhibit involuntary motor activity involving the contralateral primary motor cortex’ (2001, p.786), which supports the idea that listening intelligently to a piece being played (audiation) might also activate the supplementary motor area of the brain. This also aligns well with McPherson’s (1993, 2005) strong advocacy of the development of a link between the auditory image of a piece and the kinaesthetic feel of how to play it on an instrument. His study found that notational audiation, in conjunction with mental and tactile rehearsal, (the silent fingering of a piece), resulted in more successful reading and sight-reading for his participants. Along with Haueisen and Knosche (2001), Kohut (1985), Maggio (1989), Mainwaring (1933 and 1951), Pratt (1990) and Priest (1989), McPherson (1993) cites evidence that silently fingering a piece of notation, while audiating it, starts to develop kinaesthetic feedback and therefore aids memory as well as building, in advance of playing it, a tactile and kinaesthetic picture of the piece to be performed. It must be noted, however, that McPherson’s 1993 study was carried out with clarinet and brass players and not pianists, although he does acknowledge that all instruments are different. It could certainly be argued that these techniques could apply to learning to play the piano and to reading and playing piano notation.

Since his study supported the work of Luce (1965) and Priest (1989) in the finding that ear-playing was positively correlated with good sight-reading, McPherson (1993), supported by Brodsky *et al*, 2003, 2008, Zatorre and Halpern, 2005, and Dodson, 1983, (cited in McPherson, 1993) went on to argue that the ability to audiate music notation necessarily underpinned the development of learning to read and play notation simultaneously. He argued that ‘learning an instrument is most efficient when the sound is emphasised before the sign’ (1993, p.4) and insisted that the ability to think in sound, to aurally represent in their minds what they wish to create on their instrument, is essential to all higher forms of musical performance.

Kopiez *et al* (2006) also suggest that successful sight-reading relies to some extent on the ability to generate an aural image of the printed notation. Fourie (2004) also argues that successful sight-readers need to be able to mentally hear the sounds that are represented on the score as they are reading it, and she claims that many piano sight-readers seem unable to do this, concluding that this lack of ability is most likely the main reason why certain individuals cannot read and play notation simultaneously.

In terms of musicianship, Priest (1989) argues that the ability to audiate enables the player to hear the piece musically before playing it rather than responding mechanically to a sheet of paper containing symbols (see also Schleuter, 1997). Of sight-reading, Priest argues that 'for 'playing at sight' to be a musical experience with a musical result the playing must be preceded by an aural image' (1989, p.189).

Active development of audiation

Educators such as Gordon (1993), Liperote (2006), and McPherson (1993, 2005) believe that audiation and notational audiation need to be actively developed, but Gordon (1993) wonders if indeed many teachers are aware of the term 'audiation' and its true meaning, and believes that they assume that audiation develops by itself, simply through the act of learning to play an instrument and learning to read the notation. Brodsky *et al* believe that 'musical imagery in general and notational audiation in particular may well be within everyone's grasp' (2003, p.611), yet Gordon believes that the role of audiation is ignored by most teachers in their haste to develop instrumental skill and notational competence (1993). He wonders if this is because notation 'is tangible; it can be seen. Audiation is not tangible, it cannot be seen' (1993, p.80). Dalby (1999), too, expresses the concern that some teachers are somewhat daunted by investing time into a project which most of their peers are not aware of or doing, because they feel that they are doing something completely different to everyone else in their profession. Yet Brodsky *et al* suggest that the ability to audiate the notation and experience musical imagery 'may be the outstanding mark of a musical mind' (2003, p.603), and Seashore was of the same belief, (1938,

1967). The reader is referred to Gordon's book, *Learning Sequences in Music* (1993) for an excellent and in-depth explanation of each detail of each stage of audiation. Additionally, more recently the work of Gordon has been further developed with Lowe's *Music Moves for Piano* (initiated around 2004), a method which is based on the work of Gordon, and fully supported by him.

As the above writers point out, playing the piano both with and without the notation demands the concurrent use of several motor and cognitive skills, and to achieve success, informed and thoughtful practice is needed.

Practice

Becoming a proficient player of a musical instrument requires consistent, frequent and effective practice. The notion of practice is a constant area of contention for music teachers (Hallam, 2001, Upitis *et al*, 2017), since many students struggle to find the motivation for what they often perceive as hard work (ibid.), and many appear not to know, or have not been taught, how to practise effectively. Barry and Hallam (2002), Benton (2014), Concina (2019), and McPherson and Renwick (2001) all confirm that efficient and effective practice is central to the development of musical expertise, and that it helps to improve memorisation and retention. However, students need to be taught how to practise effectively (Barry and Hallam, 2002, Benton, 2014), since non-reflective and unplanned practice can impede progress (Concina, 2019, Williams, 2017). Indeed, since there are so many skills that need to be executed concurrently, it is important that teachers give students detailed instructions on what to focus on, in terms of all the senses. Pitts *et al* argue that '… simply telling children to practise is not sufficient to foster the motivational resources that they will need if they are to make significant progress', (2000, p 45). Since the music student only has a short amount of time with their teacher each week, Pitts *et al* (2000) argue that teachers need to model how to engage properly with practice strategies in order to avoid mindless playing through of the assigned pieces or exercises, with the result that mistakes are not noticed and become built into the performance (see also Barry and Hallam, 2002). Concina (2019) believes that many

students are not taught effective learning strategies together with the corresponding practice strategies. One technique that has been proven to generate successful outcomes in learning lies in the area of metacognition. The topic of metacognition is too wide to be fully addressed in this study, however a brief overview is given here in terms of how it seems to benefit music practice.

Metacognition and playing the piano

The term metacognition was coined by John Flavell in 1979, who defined metacognitive experiences as 'any conscious cognitive or affective experiences that accompany and pertain to any intellectual enterprise' (1979, p.906). More simply put, the term 'metacognition' encompasses learning about, and understanding, how one learns (Gharial *et al*, 2017), knowing how to set a personal goal, being able to plan effective strategies to achieve the goal, self-regulation in working towards the goal, and then self-evaluation and reflection on one's own progress. It encompasses knowledge of one's own strengths and weaknesses and understanding how to work with them to best effect. Benton argues that metacognition involves 'monitoring and control of one's own thought processes, actions, and products of effort in learning tasks' (2014, p.91). It means engaging mindfully and thoroughly in learning and how to achieve success in a goal. Harris asks his students, 'what will you think about when practising this?' (2014, p.29).

The literature suggests overwhelmingly that metacognitive skills are a significant predictor of general academic performance and achievement or expertise, (Bathgate *et al*, 2012, Benton, 2013, Concina, 2019, Cooper, 2008, Gagandeep *et al*, 2017, Gharial *et al*, 2017, Hallam, 2001, Hart, 2014, McPherson, 2005, Ohtani, 2018, Schraw, 1998, Zimmerman, 1986), and that they are extremely important for effective learning (Allon *et al*, 1994). Concina argues that '…expert learners usually adopt a growth mind set toward learning (Dweck, 2016), whereby personal effort and engagement in learning tasks are seen as integral to the development and enhancement of individual skills' (2019, p.3).

Barry and Hallam define metacognition in terms of:

> the learner's knowledge about learning itself (i.e. thinking about thinking). This is central to practice. Metacognitive skills are concerned with the planning, monitoring, and evaluation of learning, including knowledge of personal strengths and weaknesses, available strategies (task-oriented and person-oriented), and domain knowledge to assess the nature of the task and evaluate progress toward the goal (2002, p.154).

They argue that 'musicians stand to improve their skill by paying careful attention to increasing their own ability to learn how to learn' (ibid., p.161). Benton views the word 'metacognition' as an 'umbrella term that covers an array of thinking and learning strategies' (2014, p.6), and believes that it helps the learner to develop self-awareness and independence. Her practice strategies including the mental rehearsal of a piece before playing it, which entailed fingering the instrument silently during reading before playing, as well as hearing the piece internally see also McPherson, 1993). Whilst the literature on metacognition and music seems simply to focus upon individuals who have already reached a certain level of notational literacy, it is arguably important to coach pupils to engage in some form of metacognitive strategies as outlined above during their initial learning and practice time.

Mental rehearsal and playing the piano

The importance to learning to play the piano of the tactile, kinaesthetic and proprioceptive senses were outlined earlier. McPherson's 1993 study found that, during preparation for the memorising and ear-playing tasks that he had set for his participants, some of them were using quite sophisticated mental activities to help them prepare, such as humming the excerpt (notational audiation), and silently 'playing' the instrument using appropriate fingering, arguably developing the internal kinaesthetic blueprint of the piece during this process. In the ear-playing element of the study tests, the children reported imagining the contour of the piece, how it might look on the notation and the fingering that they might use. McPherson (2005) argued

that these mental strategies were 'consistently a more powerful predictor for explaining their ability to sight-read, play from memory and play by ear' (ibid., p.27). Odam also believes in developing the tactile sense of how a piece might feel to play on the instrument, away from the notation in the first instance, and that, together with the ability to listen, the student will learn by '…using sensori-motor skills guided by aural acuity' (1995, p.25). Kopiez *et al* (2006) also suggest that successful sight-reading relies to some extent on the ability to generate an aural image of the printed notation. Davidson argued that 'performers develop mental representations (motor plans) that translate information into performed action' (2012, p.770) and suggested that these motor plans strengthen over time and move into the long-term memory. She wrote that it takes time to achieve this, and implores teachers to work hard on instilling these actions into their students.

McPherson (2005) argues that good mental strategies are more important than the amount of practice done or the ability to play from notation and goes on to say that teachers do not teach enough mental strategies, and that they should help their students to develop a range of task-appropriate strategies which will also enable them to think musically and help to avoid falling behind or dropping out. Benton (2014) also argued that it was important to know how to apply strategies to solve problems. She views the word 'metacognition' as an 'umbrella term that covers an array of thinking and learning strategies' (ibid, p.6), and believes that it helps the learner to develop self-awareness and independence. This arguably also supports the work of those who advocate metacognition as a significant predictor of academic performance and achievement or expertise, (see p.51 above). McPherson's participants were demonstrating deep understanding and engagement here, which could represent a certain musical metacognition in that they were using understanding that they had previously developed in order to improve their chances of success while performing his tests. This behaviour was demonstrated by the participants of Dweck during some of her research studies (2016).

Bernardi *et al* (2013) define mental practice as involving the imagination of movements needed for a task, both visually and kinaesthetically, which also aligns with the findings of Brodsky *et al*, 2008, Zatorre and Halpern, 2005 in terms of

notational audiation. Davidson (2012) argues that it is important to imagine musical sound before playing it which, not only helps to know the contour of the piece, but develops good sound on the instrument and rhythmic sense.

Bernardi *et al* (2013) suggest that mental practice may help to develop the same plastic changes in the motor system as those that occur during physical practice. Their study found that mental practice produced a level of proficiency that emerged at between 40% and 60% of what was achieved by physical practice. Although this study was again based on players who could already read notation to a certain level, it suggests the possibility that using metacognition and mental practice to engage in how patterns, intervals, and the general contour of a piece will feel and sound, in advance of playing, (notational audiation) could also accelerate learning to read and play notation from the beginner stage. Greer argues that 'the richer the material is encoded, the more easily it is retrieved' (2013, p.26).

Barry and Hallam also discuss engagement in mental rehearsal, which for them involves imagining playing a piece of music away from the instrument, and they recommend that the student or player '…imagine responses in the muscles that would actually perform the movement' (2002, p.154). This is similar to the work of Brodsky *et al* (2003, 2008) who found that audiating pieces could activate the supplementary motor area of the brain and prime the body for appropriate movement to play the piece. Arguably this can be done only once the student has physically and actively engaged in how the patterns feel to play, an understanding of the internal tactile sense created by those patterns, for example chords and scalic passages, which supports the beliefs of Gordon (1993). Martin's (1965) concept of 'kinaesthetic thought' (see Glossary) arguably also underpins the process of mental rehearsal.

Barry and Hallam (2002), Hallam (2001), and McPherson (2005) found that many teachers did not teach metacognitive skills to their students, and they believed that this was due to a lack awareness of the concept. Several writers (Benton, 2013, Cantwell and Millard, 1994, Concina, 2019, Hart, 2014, McPherson 2005) therefore

urge teachers to teach their students to engage in metacognitive strategies as early as possible. I move on now to discussing the area of piano pedagogy.

2.2 Teaching Individuals to play the piano: exploring pedagogical beliefs

Few would argue that the beliefs which teachers hold influence their perceptions and judgments which, in turn, affect their behaviour in the classroom, and that understanding the belief structures of teachers and teacher candidates is essential to improving their professional preparation and teaching practices (Pajares, 1992, p.307).

Cathcart deems piano teaching an 'unregulated profession' (2013, p.75), observing, like Boyle (2021), Jorgensen (1986) and Upitis (2017), the isolated nature of the individual piano teaching studio, and the fact that qualifications are not compulsory. Boyle notes that 'individuals may begin instrumental teaching in the UK with no formal qualifications and professional practice field is not subject to any regulation or legislation', (2021), Loc 472)[1]. She quotes statistics from the Royal College of Music in which it was suggested that 77% of their students had already carried out some instrumental teaching before embarking upon their study (2021), Loc 621). Boyle noted in her own study (2021) that just over 52% of her 334 study participants said that they had received no training prior to becoming an instrumental teacher, and that those who said they had received some training admitted that it had come from their own instrumental teacher. She comments on the accepted nature of this state of events and goes on to observe that instrumental students seem to accept the norms of their own lessons, and without questioning anything then go on to perpetuate these practices as they themselves become teachers. The lack of regulation and requirement for qualifications bestows upon the individual piano teacher the independence to make his or her own decisions about what and how to

[1] From the ebook

teach, based on their beliefs and opinions. The benefits of this include being able to tailor lessons to the individual yet, on the other hand, because of a lack of syllabus, teachers' strategies can be at times diverse and unstructured (Jorgensen, 1986), and may be one dimensional. Williams argues that this isolated teaching aspect can foster a reluctance to be open to new ideas and techniques in the craft (2017). Taaffe supports this by pointing out her own concern that 'instrumental teaching and learning have remained situated in a 'black box', operating outside of mainstream education, and have not benefited from the research and theory which have influenced other areas of education' (2014, p.14), and Rostvall claims that 'instrumental tuition has become a hidden and almost secret activity that goes on privately behind closed doors' (2003, p.214).

Cathcart (2013), Epler (2011), and Taaffe (2014) acknowledge that the methods which teachers choose can have a positive or negative impact upon their students' learning, and Wilson (1999) suggests that teachers all have their own preferred learning theories. Like Cooper (2008), Epler warns that 'an individual's beliefs vary in strength and can be resistant to change' (2011, p.9). Thus he warns that if teachers do not believe that a particular teaching method will be effective or valuable, they will not make the effort to implement it.

Dweck agrees that 'we all have belief systems that give structure to our world and meaning to our experiences' (2016, p.132) and situates this within her work on self-theories (see Glossary), warning teachers to adopt an incremental approach to their students for best possible outcomes.

Teachers teaching as they were taught

Boyle (2021) argues that many instrumental teachers in the UK are influenced in their approach by their own teachers and teach as they themselves were taught (see also Cathcart, 2013, Froseth, 1983 (cited in McPherson, 1993), Harris, 2014, McPherson and Parncutt, 2002, Priest, 1989, Schenk, 1989, Schleuter, 1997, Yeh, 2018), and attributes much of this to the lack of regulation and requirement for

qualifications in the profession. She argues that 'in the absence of formal training and regulation, individuals commonly develop instrumental teaching practices using only their own experience of instrumental tuition as a guide' (2021, Loc. 650-651), and that this leads beginning teachers to 'apply[ies] rules and adopt[s] strategies acquired during their own training' (2021, Loc. 666). Pacheco-Costa notes that in Spain, also, 'teachers have no previous training for or guidance about how to teach their students to play by ear, and they can only rely on their own teaching style, personal experience and intuition', (2019, p.163). Harris asks his readers about their current way of teaching: 'Exactly how do you teach in your lessons? Do you teach like your teachers did or do you deliberately use different methods?' (2014, p.9). He leaves the question unanswered, although arguably the unspoken element in his mind is that many teachers probably do teach in this way, which is why he created his own teaching philosophy, which is explored below. Cathcart (2013) points out that many piano teachers drift into piano teaching often because someone asks them to teach, knowing that they themselves can play the piano. She says that often these teachers have not been taught to teach and have no formal teaching qualifications. It can therefore be argued that some of them may not have certain skills to be able to pass on to their students. In terms of learning to read music notation, Gudmundsdottir argues that teachers tend to base their strategies on intuition, and that this might not necessarily be enough if students are failing to develop fluency. She goes on to say that '…music reading is a highly specialised skill that, in the case of most individuals, needs to be carefully taught and mastered' (2010 p.333).

Pajares suggests that a good number of teachers seem to believe that 'what constituted good teaching then constitutes it now' (1992, p.324), beliefs which, according to himself and Epler (2011), affect the learning outcomes of these teachers' own students, whether positive or negative. In terms of general teaching, Scrivener (1994), Biasutti (2010) and Taaffe (2014) point out that an individual who is new to teaching will have observed countless hours of various teachers teaching, and will undoubtedly be profoundly influenced by this to some extent and so they

recommend that teachers challenge the assumptions that they have constructed from these observations.

Schleuter comments,

> Most instrumental teachers teach the way they were taught as children; they seldom examine or question traditional methods and techniques of instruction with regard to current theories and knowledge about music learning. Good, bad, and inefficient methods and techniques of teaching music persist through unquestioned adherence to tradition (1997, p.20).

In a similar vein, Varvarigou and Green argue that teachers' learning styles may influence their teaching (2015), and shows concern that a lack of awareness of this on the part of the instrumental teacher could mean that they ''impose' their own learning style indiscriminately and unwittingly upon all of their students' (2015, p.707), and that this 'may conflict in some way with that of some of their students, which could be to the detriment of the learning and teaching' (ibid., p.708). My work does not allow for an in-depth discussion of learning styles, as this is a vast area, therefore, for a succinct discussion on them, see Green (2010).

A strong focus on notation

For several piano teachers, teaching in the way they were taught seems to mean a strong focus on teaching notation, often from the first lesson, to the detriment of the other elements that can enrich a music lesson (Cathcart, 2013, Kinney, 2018, McPherson, 1993, 2005, Priest, 1989, Williams, 2017). Cathcart points out that, 'it is evident from the Piano Survey 2010 findings that the reproductive approach continues to dominate many piano lessons, despite research and publications that promote the benefits of more creative approaches' (2013, p.378). She herself admits to beginning her own teaching career in this way, 'well, I could play the piano quite well so surely I would be able to teach it? So I started to teach in just the way I had been taught; note based, using a tutor book, taking exams' (2013, p.22).

Like Gordon (1993), Dalby argues that,

> nobody would advocate teaching children to read a language before they can think and speak, but often in music education we try to teach students to read notation that they cannot yet audiate. Worse, we sometimes do so while they are struggling with the initial physical challenges of an instrument (1999, p.23).

While learning to read notation is arguably an important skill for a musician, not only in terms of being able to pass examinations more easily, to become more independent in terms of choosing their own repertoire, and to learn repertoire that may be of a length and complexity that is perhaps too challenging to learn by ear or rote, and to grant access to certain careers, the ability to read notation seems to underpin many individuals' assumptions about what learning to play an instrument entails, that it rests at the heart of the skill of playing an instrument, and is the intelligent thing to be able to do, and this in turn seems to underpin the idea of success in instrumental achievement for many individuals. Many parents and guardians send their children to music lessons for the specific purpose of learning to read notation (Cathcart, 2013, Harris, 2008, 2014, McPherson, 1993, 2005). Williams notes that 'for years the piano has traditionally been taught through notation', (2017, p.20). Learners tend to make this assumption as well, and McPherson found that, for a sizeable number of music pupils, 'making music means reading notation' (1993, p.30). Indeed the Suzuki Piano Method, which adopts the same mother tongue approach to music learning as the Yamaha method, listen, sing, play then only read what has been played after this has been criticised for the fact that children do not learn to read from the beginning (hampsteadmusicschool.com). Indeed, Lilliestam argues that,

> it is a common notion that knowledge of music means that we can read musical notation and master traditional Western musical theory. What one then does not realise is that speech and song are primary to writing and notation: just as we can speak without being able to write or know grammar, we can sing and make music without being able to read or write notes or know musical theory (1996, p.196).

This underlying general assumption seems to be perpetuated in the music lesson, and Kinney noted that ‘a typical music student begins to read notes right away, so the process of making music quickly becomes decoding visual symbols, translating them into movements, and attempting to execute these movements correctly in time’ (2018, p.16).

Cziko argues that a sizeable number of music students are not receiving a balanced musical education, owing to the overwhelming focus on notational development and the lack of encouragement to work on aural skills (cited in McPherson 1993 pp.59-60), and Dalby (1999) even recommends postponing teaching notation when dealing with complete beginner musicians, yet Brown (2003) believes that this ability should be taught as early as possible.

Like Lilliestam (1996), who noted that the apparent supremacy of the written form of music had begun to overshadow the oral forms of music-making, McPherson (1993, 2005) notes how, over a period of a century or more, the general belief about what constitutes musical achievement in Western societies has shifted its focus from the ability to play by ear and improvise, and is now more based on the ability to learn a piece from notation, which he terms a reproductive activity. Kinney states that, ‘our pedagogy and our assumptions about what it means to be a pianist and musician remain stuck in the 19th century’ (2018, p.23), and says that the problem is largely down to teaching approaches. McPherson dislikes what he calls the ‘recipe-book’ type approach to music education, based on learning from a tutor book (1993, p.24, but see also Knerr, 2008), and although he openly admits that it is important to be able to read notation, he believes that too much emphasis is placed on this, and suggests that this is because of a lack of time in lessons for developing other areas of a balanced musical education.

Indeed, McPherson warns that ‘a highly developed executant ability to mechanically reproduce a complex series of manipulative processes only partially explains the processes involved when performing music…’ (1993, p.20). Schleuter argued that if notation is given to the student at the first lesson, he or she merely learns to

associate fingerings with the notation, and that 'by skipping the musical readiness for notation, music symbols become visual cues for fingerings rather than for musical sounds' (1997, p.37). Mainwaring, too, (1933) argued that a well-developed kinaesthetic ability to render the notation onto the instrument should not be regarded as evidence of musicianship. Gordon is scathing towards those who might be memorising by the use of muscle memory and fingering patterns, and those who are '…decoding symbols and not hearing music' (1993, p.15). Kinney also seemed to suggest that a sole focus on learning from notation deadens creativity and musicianship and referred to this as the 'Performer Paradigm' (2018, p.22). It has also been noted that an overt concentration on learning to read notation 'focuses attention on the written score instead of sounds and communication', (Williams, 2017, p.11), and 'restricts the types of strategies young learners acquire, and consequently their ability to function effectively as musicians', (McPherson and Renwick, 2001, p.30).

McPherson argues that the examination boards are in large part responsible for dictating what is taught in instrumental lessons (see also Cathcart, 2013, Dow, 2016 and Williams, 2017). The traditional examination syllabus for the ABRSM in the UK, for example, (as opposed to the new Performance Grades which were introduced in 2020) generally requires performance of three pieces of repertoire, (learnt from notation), some scales and arpeggios, some aural tests, and some sight-reading. From this it could be argued that the ability to read notation constitutes an implicit, and large, part of musical intelligence, according to this particular examination board. Indeed, McPherson (1993, 2005) was so adamant about the importance of the ear, that, in 1987, before his 1993 thesis, he had recommended that the AMEB (Australian Music Examinations Board) replace the traditional aural tests with ear, memorising and improvisation tasks. This could have changed the course of the music lesson (Cathcart, 2013, Dow, 2016) if candidates were required to learn these skills in order to achieve the coveted grades. However, at this point (April 2022), so far nothing has changed in the UK equivalent examinations board, the ABRSM, although the Trinity examination board offers improvisation, but it has still been only a choice for candidates, not a requirement. There exists the ABRSM Practical

Musicianship examination in the UK, which covers many aspects of ear playing, listening, improvisation and transposition skills, however this is a completely separate examination to the two practical performance-type examinations that currently exist, therefore incurring extra time and expense. Interestingly, it seems that a good number of teachers are either unaware of its existence or just do not use it. For her part, from her research with Spanish music teachers, Pacheco-Costa argues that 'playing by ear in its diverse modalities should also be present in graded exams, thus encouraging teachers to develop aural skills with their students' (p.171). Within the aural element of the ABRSM examinations there is no room for ear-playing, improvisation or other creative activity, thus for many teachers it seems to be that there is no reason to include these activities during the lessons.

In her article about implicit theories, Dow (2016) suggests that what examination boards specify in terms of content to be tested may infer a particular implicit belief in what intelligence represents within the particular subject. She asks 'are there any clues as to the implicit theories adopted by the examining body? If so, how might these influence the classroom?' (ibid., p.261). This is supported by the views of Cathcart (2013) and McPherson (1993) in terms of the music examination boards of their respective countries.

Kinney writes about the perpetuation of fixating on learning notation, and the 'narrow aims of modern educational practice' (2018, p.29). For his part, McPherson holds the AMEB (Australian Music Examinations Board) responsible for 'neglect of aural and creative skills' (1993, p.23). Harris argues that 'the content of an exam makes up a syllabus, not a curriculum', (2014, p. 65) and that 'a curriculum…is a much more all-inclusive programme of study…to give a comprehensive musical education, (ibid., p.65).

Boyle notes that the overt focus on examinations results from the perpetuation of how the individual teacher was taught themselves, and argues that 'through repeated exposure to public performance, examination and competition, aspiring instrumentalists become accustomed to the goals and expectations of the culture of

instrumental music education', (2021, Loc 555[2]). In certain cultures the constant need for achievement is very pronounced, indeed Williams says that 'assessment is all around us, and our pupils are an increasingly examined generation', (2017, p.46), and laments the 'exam trap' that many teachers and parents of pupils fall into (2017, p.39), and Macintyre states that, while the 'leading musical nations' of Germany, France and Italy did not seem to show a need for such schemes, 'the British Empire's passion for validated personal achievement underpinned its own music examination system' (2007, p.76). Harris notes that 'some pupils are only focussed on outcomes (like exams),' (2014, p.33).

In 2023 this seems to remain the *status quo*, and Boyle (2021) argues that the examination system is seen as a way to validate instrumental progress, which perpetuates the inclusion of examination syllabus related material into the music lesson, focuses on notational skills, and possibly to the detriment of other musicianship developing activities such as composition and improvisation (see also Cathcart, 2013).

Most music education writers believe that notation is overwhelming for a beginner, and that it provides a significant reason for students ceasing instruction (Cathcart, 2013, Davidson, Scripp and Welsh, 1988, Gordon, 1993, Harris, 2014, Kinney, 2018, Kuhlman, 2005, McPherson, 1993, 2005, Priest, 1989, Schleuter, 1997, Varvarigou, 2014, and Williams, 2017). Schleuter argues that 'many problems occur in instrument music instruction because of the common practice of beginning with the symbols rather than the sounds and omitting enough aural/oral practice and efficient verbal association of patterns' (1997, p.37). McPherson agreed that the notation may often develop into an 'obstacle to the way in which they are able to experience the essence of music' (1993, p.30) and argues that teaching notation too early blocks the development of aural skills, therefore students fail to foster an ability to audiate and thus play in an academic and mechanical way because they are merely decoding symbols on a page and not seeing phrases and structures using auditory imagery. Haston also argues that 'requiring students to read musical notation when

[2] From the ebook

first learning to play an instrument places a visual emphasis on musical performance and response instead of an aural emphasis' (2010, p.9). McPherson argued that 'learning an instrument is most efficient when the sound is emphasised before the sign' (1993, p.4) and insisted that the ability to think in sound, to aurally represent in one's mind what one wishes to create on their instrument, is essential to all higher forms of musical performance.

Not only does the overt focus on notation appear to block the development of the aural skills which are the foundation of musical playing, it is argued that the aural skills themselves are the foundation for developing the ability to read notation in the first place. McPherson had found that ear playing was positively correlated with sight-reading ability (1993, but see also Luce, 1965 and Priest, 1989), and that individuals who were less skilled sight-readers, and who did not play by ear successfully were 'significantly more likely to cease instruction' (2005, p.14). Thus if pupils are not given the opportunity to develop their listening skills first, it seems that many may find reading notation difficult.

McPherson's 1993 study found that there exist a number of important and interrelated elements which underpin the development of musical skill, which are all readinesses for each other and for reading notation, and therefore he maintains that using a visual approach to learning, by introducing notation at the very first lesson, fails to allow the student to develop the ability to think in sound, an attribute that seems to be at the heart of his implicit view of musical intelligence. He argued that reliance on a visual approach to learning to play musical instruments leads to a complete lack of key sense, rhythmic security and musical expression and adds that, 'notational skills should never be taught in isolation from perception' (2005, p.30). The concept of readinesses was important to Gordon (1993) who vehemently disagreed with teaching straight from notation from the first lesson, arguing that 'is it not absurd to try to teach a group of students to read music notation if they lack the readiness to listen to and perform that music with comprehension in terms of audiation?' (1993, p.33). To Gordon, this is just decoding symbols, and is meaningless and unmusical. He argues that 'in music, we decode when we name

notes on the staff but are unable to extract the sound of patterns or phrases', (2004, p.vi). He is adamant that asking students to read notation too early is the reason behind failure to sight-read successfully, and insists that 'after audiation has been developed, learning to read and write music notation is relatively simple' (1993, p.41).

Playing by ear

Many pianists and other instrumentalists, popular and jazz musicians in particular (Green, 2002) eschew learning to read and play notation in favour of playing solely by ear. Lilliestam (1996) defines making music by ear as creating, (improvising and composing), performing, remembering and teaching music without the use of written notation, while McPherson (1993) defines playing by ear as hearing a piece of music and then immediately playing it back on the instrument, without the aid of notation. This also includes the recollection and reproduction by ear of a familiar piece from memory. Green's work on ear playing in the Ear Playing Project (2010, 2015) involved the type of ear playing where the participants listened to a recording of a specially composed piece in pop/funk style and then were required to try to join in firstly with the bass part, then later other parts, and try to play it back on their instrument as the track went along. This is similar to the Suzuki method, where children listen to a recorded piece several times and then begin attempting to play it by ear. Playing by ear is distinct from the act of playing by rote, which entails being physically shown how a piece is played and copying the individual who is playing it (or, more recently, from an online tutor or video) while gradually absorbing it into the memory.

Many eminent music educators have extolled the benefits of the ability to play by ear and it seems that this ability is considered the most fundamental skill of all in learning to play a musical instrument, and appears to be the foundation for reading notation, sight-reading, performing repertoire, improvising and memorising as well as representing the foundation of musicianship (Gordon, 1993, Luce, 1965, McPherson, 1993, Mainwaring, 1951, Priest, 1989, Woody, 2012). Liperote argues

that '…focusing on the early development of aural skills prepares students to read notation with an aural understanding of what is implicit in that notation' (2006, p.51), by enabling the learner to make links between what they are hearing and what they are playing on the instrument first, and then making sense of the written form.

McPherson noted that ear-playing was viewed by 'the ignorant' as an 'inferior form of musicianship' (1993, p.64), and argued that it was, in actual fact, a much more highly prized skill in terms of genuine musicianship than the ability to play mechanically from notation. Ability to play by ear fosters more musical playing than decoding a sheet of notation (hampsteadmusicschool.com). Woody argues that 'in music, it is the *ear* that defines great musicianship' (2012, p.82), while Priest argues that '...playing by ear can be said to be the basis of all musical playing' (1989, p.187). Varvarigou notes that the curriculum of Western classical musicians does not usually consider playing by ear as a valued and regular component of their instrumental training in the same way as learning to read notation, and that 'young musicians are generally discouraged from learning melodies by ear and from 'messing about' when practising and during their instrumental lessons' (2017, p.292). Like Gardner (2004) Luce defined individuals as 'musically talented' (1965, p.101) when they could play something they heard straight back by ear. Springborn also regarded ear-playing as characteristic of 'better than average musical intelligence and feeling' (1947, p.31).

Kinney (2018) taught his piano students to play by ear and improvise at their first lesson, believing that then they would be 'doing to learn' rather than 'learning to do (ibid., p.18). His focus was on teaching the students to listen with intelligence right from the start, in the same way as Gordon (1993).

Priest lamented that 'playing by ear has been undervalued by instrumental teachers, yet it is through such playing that some of the aims of music education can best be achieved', (1989, p.173). Pacheco-Costa (2019) said that one-to-one instrumental teaching has traditionally overlooked this form of learning and playing, while Cziko (cited in McPherson, 1993, p.31) argues that a 'musically trained' student is not necessarily 'truly musical,' suggesting by the former an individual who has been

trained to read and play notation simultaneously and, by the latter, individuals who can play by ear, improvise and be creative and demonstrate musicianship. Similarly, McPherson himself contrasts 'performance success' (ability to perform a piece learnt from notation), with 'musical understanding' (1993, p.31), arguing that many teachers place too much focus on the former which seems to represent the cracking of a code rather than the playing of music. He argued that focusing on a piece of paper encouraged the decoding of symbols, with the visual sense overpowering the aural sense, thus precluding the aural skills from helping to develop a musical performance. He insists that the player needs to be able to perform on the instrument the auditory image held in his or her mind (Gordon, 1993). Gardner (2004) noted how certain cultures demonstrated the use of no form of notation when they made music, for example the Anang tribe, who place high value on teaching their individuals to sing, play hand-made drums and dance from the earliest possible age.

Gordon declared that 'instrumental students are especially apt to experience years of music instruction without ever learning to play by ear' (1993, p.20), and Lilliestam lamented that 'music pedagogy is founded in notated music, and a pedagogy of playing by ear is developed very little' (1996, p.196). Cathcart (2013) found that several teachers in her 2010 Piano Survey did not engage in ear-playing, rote playing or improvisation, and McPherson (1993, 2005) found that there existed teachers who could not play by ear themselves, so would be reluctant or unable to teach it. Similarly, Musco noted that 'even among teachers who wish to include playing by ear in music classes, there may be doubts as to how to teach the skill … few resources offer concrete suggestions specifically for instrumental teaching' (2006, p. 59, quoted in Baker, 2016, p. 293). Woody also asks, 'is it possible, then, that we do not value ear playing for our students because we never adequately developed the skill for ourselves?' (2012, p. 84).

Another possible reason for not teaching students to play by ear is because some teachers may believe that their students would not be able to play by ear anyway, thus demonstrating an entity theory of ability and intelligence (Dweck, 2016). McPherson (1993, 2005) found that teachers were reluctant to engage in teaching

ear-playing because they believed that it would make their students become lazy and not want to learn to read notation. Priest (1989) found the same phenomenon in his work, and this attitude is understandable if we consider Helding's observation that moving to formal notation may be 'fraught with resistance' (2010, p.326), which also supports Gardner's prediction of a 'clash between figural and formal ways of knowing' (2004, p. 112), when moving from ear-playing or rote playing to the reading and playing of notation. Gardner warned that, 'if this crisis is not successfully negotiated, it may ultimately prompt the child to cease altogether participating in musical life' (2004, p.111). Varvarigou (2014) also supported the concept that individual instrumental teachers often seem to regard playing by ear as a possible impediment to the development of notational competence. However, Upitis (2017) argued that more teachers were, at the point of her writing, engaging in teaching ear-playing.

Both Varvarigou (2015, 2017), who was also involved in the Ear Playing Project, and Green (2010, 2015) are passionate believers in the importance of ear playing in instrumental lessons, both in terms of supporting the development of notational competence, and in terms of overall creativity and musicianship development, believing that notational work on its own can be restrictive. They believe that the benefits to musical development of playing by ear may not be widely understood, and the Ear Playing Project (2010, 2015) helped to address the reluctance or lack of ability to play by ear on the part of teachers, in that it provided opportunities for both teachers and students to widen their abilities in an exciting and novel way. Many of the teachers and pupils who took part were highly inspired to engage in more playing by ear following their participation in the project. The study derived from the way in which popular musicians learn, by copying each other and copying or playing along with recordings, activities which would rely solely on the ear rather than reading notation. Green (2010) placed this method of learning within the one-to-one instrumental lesson and observed the outcomes. The project outlines how popular musicians learn to play their instrument and use their ear learn to understand harmonic formulae and make various predictions about where the music is going. It demonstrates the deep understanding that these musicians possess, rather than

simply an ability to play their instrument. This deep understanding is born from the ability of these musicians to audiate (Gordon, 1993) and arguably forms part of musical intelligence.

The project's aims were firstly to introduce, develop and extend ear playing skills to a group of learners most of whom had not played by ear before, as part of the researchers' concern that ear playing and aural skills be fostered as an important part of learning to play an instrument. Varvarigou and Green suggest that many students are fearful of playing by ear, and that this may be because they are not given the opportunity in a lesson, often stemming from the fact that their teachers have not been taught to play by ear and therefore either do not know how to approach the task, or deem it unimportant to a music lesson. Varvarigou and Green are keen to show how beneficial ear playing is in terms of learning to play, developing the deep understanding that is required for playing well, and to increase the enjoyment of the student during the music lesson.

The second aim was to develop an understanding of approaches to the task in terms of learning style, which Green (2010), in this area of her work, defines as

> 'an individual's spontaneous or preferred approach to learning; an approach which is independent from other factors such as intelligence, personality, gender, culture, and to a large extent, motivation or learning situation; and which remains constant, or relatively constant, in a fundamental way throughout the individual's life' (2012, p.44).

Varvarigou and Green (2015) sought to raise awareness that different learning styles existed in music learning, as they believed that many music teachers were unaware that this phenomenon existed. They argued that much interest in the concept of learning styles has been forthcoming in the literature, however little has been done in relation to music. They argued that the new understanding that the results of the Ear Playing Project had brought forth could be applied to other areas of music learning, including notation reading, modelling and music theory, and recommend that further research be undertaken to try to establish this.

For the Ear Playing Project (Green, 2010, Varvarigou and Green, 2015) each participant was asked to listen to a recording of a specially composed piece in pop/funk style. They were then required to listen firstly to the bass part and try to play it back on their instrument by joining in and copying the riff as soon as possible while the track repeated for two minutes. Stage two was similar, but used a classical piece chosen from a list, and stage three involved the students bringing in a recording of their own choice of music and trying to play along. None of them had done anything like this before in a normal one-to-one instrumental lesson.

Green (2010) observed and named four types of learning style in terms of how the participants approached the task. Firstly she observed what she called the 'impulsive' style, in which the only student demonstrating this (during the pilot phase) started to play very early on before having heard very much of the riff, played the rhythm correctly but used only a maximum of two pitches. Similar to the 'impulsive' style was the second approach which Green named the 'shot-in-the-dark' style, where the participants either did not try very much, or just kept playing random notes and not really recognising whether or not they were the correct pitches, or understanding that, in order to find the correct pitch, they also needed to play incorrect ones to work it out from there.

Next Green identified a 'practical' style, in which she observed participants playing the instrument quietly straightaway so that they could hear whether or not they matched the recording, and also the strategy of playing up a scale until they found a matching pitch. They were experimenting and listening and engaging in the task. The fourth style noted was a 'theoretical' approach, wherein the learners did a lot of talking to ascertain what to do, and to try to determine whether or not they were doing it correctly, rather than just having a go. They were analytical and keen to work out the riff before playing it.

I move on now to another approach to learning to play an instrument without the notation, and that is learning by rote.

Using a rote teaching approach

Rote learning is another form of copying that, contrary to copying by ear as above, tends to engage the eyes first and the ears second. However, Knerr (Mini Dissertations, PianoSafari.com, 2008) persuades the piano teacher that teaching beginners by rote from the very first lesson enables them to understand that music is based on patterns, and that then they can be shown how to apply this to their notation reading. This supports the work of Priest, who found that 'if the player knows the music already and then sees the notation, the appropriate associations are made' (1989, p.183). Practising pattern exercises repeatedly by rote and then linking them to the notation enables the student to recognise patterns visually and know the fingers to use, thereby also creating an internal tactile repertoire of the patterns (Lehmann and McArthur, 2002) as well as an aural memory. In terms of aurally recognising patterns, Gordon's music learning theory (1993) rests on the concept that patterns are the basic units of meaning, and he argues that such patterns should be aurally internalised (audiated) in terms of their tonal and rhythmic elements as well as their visual cue, in order to develop notation reading.

The concepts of rote, ear and creative activities lead me on to introduce the work of Paul Harris (2006, 2008, 2014). Harris argues that, although in the modern day twenty-first century the piano teacher has access to a plethora of colourful tutor books, 'none of these tells us much about how to teach beginners. It is very much a hit-and-miss affair' (2008, p.5). Apart from his concern with always teaching pupils good posture, a strong sense of pulse, ability to make a fine sound, like many pedagogical writers before him (Gordon, 1993, McPherson, 1993, 2005, Mainwaring, 1951, Priest, 1989, for example), Harris puts the music firmly at the heart of the music lesson before the notation and most certainly before the opening of a tutor book (2008). His work seems to fill a gap left in most tutor books, particularly in terms of inviting and encouraging the teachers to include improvisation and creative work in their lessons, especially those teachers for whom 'improvising and composing fall outside their comfort zone' (2008, p.11).

Harris developed his Simultaneous Learning approach (2014) when he realised that he himself had fallen into the trap of becoming a teacher who followed what he now calls a 'reacting to mistakes' or 'stop and correct' theme, based around a 'tell and then test' approach (ibid., p.10). This seemed to involve teaching from notation and merely reacting to the mistakes of the learner by telling them what was wrong and what the correct version should be, and continually repeating instructions, in the same way, when a mistake was made. He found that this was inducing frustration both within the pupil and within himself, and he arrived at a point where he decided to change his approach.

Harris (2014) does not disagree with using a method book, it is the way in which the book is used that is important. In his Simultaneous Learning approach, he prefers not to lead with the tutor book, but to begin by introducing elements of pulse, the key of the piece being learnt (playing a scale, or a small part of it, and an arpeggio in that key), rote playing of the rhythm patterns found in the piece, and perhaps the first small phrase of the piece by rote, including some improvisation on the rhythm of the piece, and some composition and musicianship-building activities before opening a book at a particular notated piece, whatever the level of the student. Harris (2014) insists that deep musical understanding develops from the understanding of keys, what the notes are within these keys, the fingerings that go with them. He recommends discussing the character of the piece with the pupil before they play it, from what he or she has already heard. This continues right up to the higher examination pieces, and begins to develop real understanding, musical imagination, listening, engagement and also notational audiation within the pupil before learning to play the piece itself. Once all these elements have been addressed, then the teacher can open the book and begin to help the pupil to make connections and apply what he or she has already learnt to what is on the page, thus also using a rote to note approach so that the pupil can see what he or she has already played, and what it looks like on the score, before attempting to play it from the score.

This discussion now leads me to the conclusion of this chapter with a brief examination of some beginner method books.

Piano Tutor Books for Beginners

There are myriad piano tutors on the market for beginners and beyond, all claiming that they are the best. Since there are so many, it is beyond the scope of this thesis to cover all of them, however, Cathcart (2013) set out a list of some of the main books that were used by her 595 survey respondents, and I set those out below, followed by a list of the tutor books used by my own study participants, and conclude this section with a discussion of some methods not mentioned by Cathcart (2013) or my participants, but that seem to fit with the ethos of prolonging the introduction of notation in favour of developing the ear first. Appendix 1 provides a résumé of the books and methods mentioned.

Table 2.1 below lists the beginner tutor books that featured most highly in Cathcart's study (2013).

Method Book	Author	Classification
Piano Time	Hall	Middle C approach
Easiest Piano Course	Thompson	Middle C approach
Chester's Piano Starters	Barratt	Middle C approach
Alfred's Basic Piano Library	Palmer, Manus & Lethco	Middle C/ intervallic (eclectic)
Me and My Piano	Waterman and Harewood	Middle C approach
The Hal Leonard Series	Kreader, Keveren, Kern, Rejino	Intervallic and multi-key
Bastien's Piano Basics	Bastien	Intervallic approach
Piano Adventures	Faber and Faber	Eclectic
Suzuki Piano School	Suzuki	Natural

Table 2.1 Tutor books in Cathcart's study (2013)

Method Book	Author	Classification
Piano Safari (4)	Fisher and Knerr	Eclectic, intervallic approach
Get Set Piano (2)	Marshall	D and B approach
Piano Adventures (1)	Faber and Faber	Eclectic approach
Piano Time (3)	Hall	Middle C approach
Fun for Ten Fingers (1)	Hall	Middle C approach
Alfred's Basic Pno Lib (1)	Palmer, Manus & Lethco	Eclectic, Middle C and intervallic
Piano Junior (1)	Heumann	Middle C approach

Table 2.2 Tutor books used by the participants in this study

Tutor Book Classification

Cathcart (2013) discusses the approach of many of the above listed method books as being categorised into the Middle C Model, the Intervallic Model, the Multi-Key Model, the Eclectic Model and the Natural Model.

The Middle C Model seems to be the approach presented within the majority of the method books since the 1930s (Cathcart, 2013), and is characterised by the early introduction in the book of pitch notation, rhythm notation, note durations, time signatures and hand positions. Both thumbs are positioned on Middle C for many lessons, and notes are named and learned one at a time through the use of mnemonics.

The intervallic approach guides the learner to recognise distances between the notes on the stave, the intervals, beginning with a designated 'landmark' note from which to work out where to go, up or down, and by how far. These method books often employ an off-stave approach at the beginning, where notes are written unpitched without using a stave, and this can encourage the beginner to start making connections between what they are seeing and what they are feeling and hearing,

developing the proprioceptive and aural senses and the act of focusing on a page rather than always on the fingers. Full notation is introduced once competence is gained off stave. Cathcart (2013) mentioned that intervallic method books were few at the time of her study, however since that point, the Piano Safari method (2008) has made an impact, certainly in the UK, through dissemination within Cathcart's Curious Piano Teachers group (established 2015).

The multi-key method introduces five-finger patterns right from the start, and these can start on any note of the keyboard. This arguably widens the mind of the beginner more than always beginning on Middle C, which can often lead to the learner being surprised and confused once he or she needs to begin on a different note after a long period of time on Middle C. Like the intervallic approaches, this method begins with off-stave notation and focuses on learning to recognise shapes of short phrases. Unlike the above two methods, however, the multi-key method introduces chords early on, and places an emphasis on harmony, which gives the pupil a better sense of what the piano can do, and a richer sound, which can also be more motivating than playing solo and often uninteresting repertoire pieces at this level.

Cathcart (2013) explains that the eclectic model combines elements from different methods, and that the natural model focuses on making music rather than learning to read notation from the beginning. The latter approach is the basis of the Yamaha and Suzuki methods, where the children learn to play by ear before being shown what they have played, making a connection in the same way as Gordon's (1993) audiation, where they are also encouraged to sing the piece as they read the notes, all before playing from notation at a much later stage. Within the natural model, familiar songs and tunes are used to develop ear-playing first for a good while before the introduction of the notation. Improvisation and composition are included in these method books. Cathcart noted that these books appeared to be in the minority during her period of study (2013) and found that the Middle C books tended to be the favoured choice within her study participants. She quoted Uszler (1991) who noted that learning to read notation found itself at the heart of the majority of the method books.

A brief résumé and review of each of the beginner method books cited above by Cathcart (2013) can be found in Appendix 1, together with a brief résumé of those used by my own study participants. To conclude this appendix, the reader is respectfully and especially asked to consider the method *Music Moves for Piano*, (initiated around 2004) designed by Marilyn Lowe in co-operation with Edwin Gordon, as this contains a plethora of elements for developing the music readinesses and pattern recognition and deep understanding by listening passionately advocated in Gordon's Music Learning Theory (1993). The reader's attention is also drawn to the work of Helen Russell and the *Do Re Mi Piano* method, which again introduces sound before symbol.

Summary

This review seems to confirm that playing the piano with notation is a highly challenging endeavour, the overarching skill being an ability to multi-task and execute several cognitive and physical elements concurrently. It necessitates the synergy of hands, brain and eyes, and represents an excellent example of psychomotor activity. Playing the piano with notation seems to constitute a demanding exercise in heightened musical-spatial intelligence, requiring the ability to create visual, aural and tactile mental images, performing mental rotation exercises on two-dimensional visual shapes or information (the notational symbols), and to construct a three-dimensional aural outcome, a physical response (the pressing of the keys).

The kinaesthetic, proprioceptive and tactile senses were also found to be integral to reading and playing notation on the piano. The ability to recognise patterns, visually, aurally and through the tactile sense was set out as helpful for developing the ability to read and play and increase fluency, and the ability to audiate the notation was also deemed important. The role of practice was explored in terms of developing skill in reading and playing, and the importance of teaching students to develop and use metacognitive strategies was also examined.

The review suggests that many music education writers are opposed to introducing notation from the first lesson, and the subsequent reliance on this method of teaching throughout a student's musical journey, and instead strongly recommend training the ear for a reasonable amount of time, preferably before the notation is introduced, since ear-playing was found to be at the root of both notation skills and musicianship development, and it was acknowledged that aural skills, including audiation, did not figure highly enough in many teachers' work.

The brief review of the tutor books suggests that many are highly focused on teaching beginners to read notation as soon as possible, although in fairness it could be argued that teachers may be assumed to use a method book for the reading element of their teaching and supplement with non-notational learning methods too. This was not disclosed in the literature. Few of the books reviewed contained inbuilt composition, improvisation and rote work, and none seemed to contain any recommendations for ear-playing, all of which could arguably make a more complete tutor book for a beginner.

I turn now to Chapter 3, which discusses my search for an understanding of the term 'musical intelligence', particularly as it might be applied to reading and playing traditional Western staff notation on the piano.

3 Literature Review Part 2

3.1 Musical Intelligence

In order to answer the main research question, it was necessary to attempt to understand the meaning of musical intelligence. As stated in the Introduction, Gardner's chapter entitled Musical Intelligence, within his book *Frames of Mind, The Theory of Multiple Intelligences* (2004), provided the inspiration for exploring the meaning and possible role of musical intelligence in the piano lesson.

Here it is useful to remind the reader of the two areas of interest that had developed in my mind regarding the term 'musical intelligence': the first whether or not a concise and useful definition of musical intelligence existed, in terms of a framework that could be adopted by piano teachers in their practice, particularly in the area of teaching pupils to read and play piano notation simultaneously; and the second area of interest, my observation that my piano pupils seemed to present with one of two different strengths, either an ability to read and play notation with ease, or a strength in learning by aural means. This initially barely conscious observation seemed to find support in Gardner's (2004) conviction that individuals possess different strengths or intelligences rather than a single IQ. Both areas of interest have remained equally important to me to understand in terms of improving the learning of a beginner pianist.

I begin, then, with a brief discussion of the three theories of intelligence that have particularly influenced my study, then move on to discussing what musical intelligence might be and how to develop it, and then I follow this with a discussion of the alternative concept of a possible definition of musical intelligence as represented by two different strengths.

3.2 Intelligence

> Several existing intelligence models emphasise the complexity of human intelligence, and the question as to whether general intelligence exists is a controversial topic (Ohtani, 2018, p.183).

In order to attempt to place the concept of musical intelligence in context, I carried out a search on 'theories of intelligence', which produced 1,145,154 results. Likewise, a search on 'general intelligence' produced 2,344,616 results, and so I decided that a general section on intelligence was not within the scope of this study. I have therefore restricted my discussion on intelligence to the work of Gardner (2004), since his theory has been influential to my study, the beliefs of Dweck (2016), whose entity and incremental theories of intelligence and how they might affect teaching are important to my work, and the more recent work of Sternberg (2020), whose work is illuminating in terms of learning as well as his thoughts on musical intelligence.

3.2.1 Gardner

An overview of Gardner's (2004) beliefs on multiple intelligences was set out in the theoretical framework earlier (see p.25). However, in terms of a definition of intelligence, Gardner states that an intelligence can only be labelled as such if it can be used to 'solve problems, or to create products, that are valued in one or more cultural settings' (2004, p.xxiv). As an important example, Gardner informs the reader of the outstanding and possibly ultimate intelligence which he bestows upon the Puluwat sailors who, from the age of twelve years, are taught by their elders, who are masters in the craft of navigation, to become masters themselves (see also Glossary for Gardner's explanation). Gardner (2004) discusses the levels of spatial and what he calls 'bodily-kinesthetic' intelligences demonstrated by the Puluwat sailors, who learn to develop expert knowledge for successful and safe navigation, using landmarks and constellations of stars, learn to know the feel of the water at particular points, and demonstrate high levels of intuition for their work. Only a few succeed in mastering their craft, and Gardner says that the status of master

navigator is extremely elusive and difficult to achieve, but he regards this master knowledge, deep understanding and intuition as an outstanding example of intelligence, or, in his words 'considerable expertise' (2004, p.338).

Gardner relates that,

> The key to Puluwat navigation can be found in the arrangement of stars in the sky. To navigate among the many islands in their vicinity, the Puluwats must recall the points or directions where certain stars rise and set around the horizon. This knowledge is first committed to memory by rote, but then becomes absorbed into the intuition of the sailor as he spends many months traveling back and forth. Ultimately, the knowledge must be integrated with a variety of factors including the location of the sun; the feeling one experiences in passing over the waves, the alteration of waves which changes in course, wind and weather; skills in steering and handling the sheet; ability to detect reefs many fathoms down by sudden changes in the color of the water; and the appearance of the waves on the surface (2004 p.202).

Gardner concludes by arguing that 'each of these individuals is attaining a high level of competence in a challenging field and should, by any reasonable definition of the term, be viewed as exhibiting intelligent behavior' (2004, p 4).

3.2.2 Dweck

Dweck (2016) abstains from providing the reader with a definition of intelligence. Like Ohtani (2018), she writes 'we will certainly not settle the question here of what intelligence really is, for there is no agreed-upon answer' (2016, p.60). Dweck views the IQ test as measuring the individual's skills as they existed at the time that the test was taken, and dislikes the fact that this tends to label an individual's potential for life. She states categorically that the goal of her work

> is not really to resolve what intelligence is, but rather to ask: What is the most useful way of thinking about intelligence and what are the consequences of adopting one view over another? (2016, p.63).

Dweck (2016) believes that the understanding of the term depends upon culture, quoting Asian cultures who regard effort as being central to intelligence, much more than some other cultures. Dweck (2016) herself supports this view of intelligence in her work with her two-sided concept of intelligence (see p.23 of the theoretical framework).

3.2.3 Sternberg

Sternberg (2020) argues that intelligence cannot be defined as a single construct, and insists that an individual's contextual knowledge, understanding and ability are all important to acknowledge which, he contends are nothing to do with IQ or general intelligence measurable with pencil and paper. He points out that there are myriad definitions of the concept of intelligence and like Gardner (2004) Sternberg stresses the concept of intelligent behaviour which is built upon many skills not necessarily associated with logical, mathematical or verbal reasoning, and that it is relevant to the culture one inhabits (2004). This resonates somewhat with Dweck's theory (2016), which is similarly not tied to any particular subject area. Sternberg put forward his concept of successful intelligence (2004), at the heart of which is using one's strengths and overcoming one's weaknesses in order to adapt successfully to the demands of one's own cultural environment. He defines successful intelligence as 'the ability to achieve success in life, given one's personal standards, within one's sociocultural context' (1999, p.293). What he means by this is that success depends upon what the individual desires to achieve. Sternberg argues that an individual's context and culture have an important bearing on what is seen as intelligent behaviour, and discusses a study in which some Brazilian children had demonstrated good understanding of the mathematics which was required for their street business, yet who were unable to apply similar strategies in their school mathematics classes. He suggests that the problems that children are asked to solve in school are sometimes too abstract for them to grasp, yet in a familiar context, this is not an issue. He laments that,

> the more abstract and removed from real-world contexts the problems are in their form of presentation, the worse the children do on the problems. These results

> suggest that differences in context can have a powerful effect on performance (1999, p.293).

Sternberg argues that traditional definitions of intelligence have focused on adapting oneself to an environment, but he insists that:

> intelligence involves not only modifying oneself to suit the environment (adaptation) but also modifying the environment to suit oneself (shaping) and, sometimes, finding a new environment that is a better match to one's skills, values, or desires (selection), p. 298.

Sternberg believes that many teachers' implicit views of intelligence are misguided and too narrowly defined, and he is keen to expand the world's view of what it means to be intelligent.

3.3 What defines musical intelligence?

> To think in sounds, rhythms, melodies and rhymes. To be sensitive to pitch, rhythm, timbre and tone. To recognise, create and reproduce music by using an instrument or voice. Active listening and a strong connection between music and emotions. Vocal ability – a good voice for singing in tune and in harmony. Instrumental skill – skill and experience in playing a musical instrument. Composer – makes up songs or poetry and has tunes on her mind. Appreciation – actively enjoys listening to music of some kind. (Branton Shearer - Miresearch.org).

Wilson found that 'a review of existing literature suggests confusion over the assessment of musical intelligence' (1999, p.41). Indeed, an accurate and succinct definition has proven elusive and challenging to create for this study, particularly since a general literature search on the term 'musical intelligence' seemed to use several different terms interchangeably. Murphy (1999) also argued that at the point of his writing that it was not possible to define musical intelligence, although he suggested that it might be defined as a 'way of knowing' (1999, p.40), and asserts that 'to be able to think 'musically', whether as a performer, composer or listener, is to be musically intelligent' (ibid., p.40).

Since there are myriad terms used to suggest a possible definition of musical intelligence, I decided to construct an historical overview of possible definitions from Seashore (1938) to Sternberg (2020), which include such terms 'music aptitude' and 'musical ability'. This can be found in Appendix 3. I then constructed Appendix 4 to set out literature on musical testing and music aptitude since, in order to try to glean more of an outline of what musical intelligence was believed to be within the literature, I reasoned that most musical tests would be devised in order to capture the essence of what their developers believed that musicianship and musical ability (or musical intelligence) would need to encompass.

One element that appeared in many possible definitions in Appendix 3 was the concept of musicianship and I move on now to discuss what the literature suggests about this area. Some of the writers in this part of the chapter also appear briefly in Appendices 3 and 4, but I have chosen to write about them in more detail here because I have made inferences about what their implicit definition of musical intelligence might be, from what they have said is important to them, despite them not necessarily having mentioned the term 'musical intelligence'. Musicianship seems to be underpinned by deep aural understanding, which in its turn is underpinned by audiation and the ability to play by ear. Creativity and ability to read notation as part of a musical intelligence are also considered in this section, which is followed with a discussion on a possible alternative view of musical intelligence as representing different musical strengths.

3.3.1 Musicianship

For a great many pedagogical writers, musicianship seems to represent the most important part of learning to play an instrument. Its development lies at the heart of being a musician (Gordon, 1993, Green, 2010, 2015, Kinney, 2018, Luce, 1965, McPherson, 1993, 2005, Mainwaring, 1951, Odam, 1995, Priest, 1989, Schleuter, 1997 and Varvarigou (2017) to name but a few. As elusive as a definition of musical intelligence seems to be, a definition of the term 'musicianship' seems equally vague, and no academic titles clamoured for attention when I performed a search

on the term. Dictionary.com defines musicianship as 'knowledge, skill and artistic sensitivity in performing music'; dictionary.cambridge.org suggests 'a person's skill in playing a musical instrument or singing'; collinsdictionary.com defines 'musicianship' as 'the skill involved in performing music' and lists the core skills as 'music reading and writing, ear training, performance, composition, improvisation and transcription', while Britannica.com defines 'musicianship' as 'the skill of performing or writing music', and vocabulary.com argues that musicianship entails 'artistry in performing music'.

Priest writes that, 'like sportsmanship, seamanship, or intelligence, musicianship tends to represent a collection of behaviours which can be demonstrated in a way which is recognised by those who have it, but which is difficult to define in a way acceptable to all' (1989, p.176). His work is centred around what he calls 'musicianship' (1989), which suggests that this might be a key element in his implicit definition of musical intelligence. His comment that '...playing by ear can be said to be the basis of all musical playing' (1989, p.187), suggests that this too is a founding element of his implicit definition of musical intelligence.

Sternberg (2020) seems to believe that musicianship represents musical intelligence, in terms of playing in a musical and sensitive manner, being able to successfully communicate to an audience and add one's own expression and interpretation. He declared that, for him, distinguished musicians could read and play accurately and with great expression, as well as being able to play by ear, improvise and show great creativity as well as technical expertise (1993, 2005). McPherson argues that 'the five skills of performing music visually, aurally and creatively are essential to a broadly based concept of musicianship' (1993, p.222), thus perhaps for him, too, musical intelligence is synonymous with musicianship. Harris's (2014) implicit definition of musical intelligence could be argued to contain a large dose of creativity, since he advocates the use of activities such as improvisation and composition in lessons, usually *before* a piece of notation is introduced each time, and Williams informs the reader that, for him, 'musical imagination is put at the heart of the lesson', (2017, p.15). Gibbs also seems to equate musical intelligence with a

sense of musicianship in terms of an understanding of how to interpret pieces musically, including dynamic and artistic expression, having a sense of how repertoire should be played, and the ability to 'read beyond the notation' (2014, p.21). He calls this 'processing the music intellectually' (ibid.).

Mainwaring's definition of the 'complete musician' (1951, p.105) encompasses a 'complex of relevant knowledge, skills, sensitive responsiveness, and creativeness' (ibid.). He asserted that true musicianship was not only performing from notation on an instrument, but also being able to play by ear and improvise. Mainwaring's complete musician should be able to compose, play the piece and possibly memorise it as well. His ideal music lesson would aim to equip the player with:

> (1) a musical imagination with sufficient knowledge of the idiom to make the imagined music articulate and intelligible; (2) the ability to think in musical images; (3) the ability to transcribe into musical notation the mentally conceived music; (4) the ability to read such a script; (5) the skill required for the vocal or instrumental expression of the recorded music; and (6) some form of interest in the music thus produced (1951, pp.105-106).

From a wider review of literature, it became clear to me that the main skill that seems to underpin learning to play an instrument, with and without notation, and that in turn represents a fundamental element of musicianship, is a deep aural understanding and ability, born of active and deliberate engagement in listening and playing by ear, for example McPherson's (1993, 2005) belief that the ability to think in sound is the foundation of both musical ability and musicianship, which may be his definition of musical intelligence.

Important also is the statement by Brodsky *et al* that the ability to audiate the notation and experience musical imagery 'may be the outstanding mark of a musical mind' (2003, p.603), a statement which could certainly be argued to represent part of a definition of musical intelligence. Indeed, Gordon's definition of the term 'music literacy' is based on the ability to audiate, which he describes as 'the basis of musical understanding' (2004, p.vii). This concept of musical literacy does not mean literacy

in the same way as reading the notes on the stave and knowing which fingers to use for the corresponding symbols, which he refers to as decoding and like solving a puzzle. Gordon argues that 'in music, we decode when we name notes on the staff but are unable to extract the sound of patterns' (2004, p.vii) and states categorically that 'music literacy, which includes the audiation of the musical intent encapsulated in the notation, resides in the mind. Audiation is to notation what thought is to the written word', (2004, p. vi). He argues that the notation should sing to us. Gordon is adamant that 'a musician who can audiate is able to bring musical meaning to notation' (2004, p.5), which is surely indicative of an implicit definition of musical intelligence. Similarly, Mainwaring (1951) argued that playing by ear was a criterion of true musicianship, over and above the ability to decode a page of notation with correct fingering.

3.3.2 Creativity

The ultimate demonstration of musical intelligence for Gardner (2004) was the ability to compose (see Appendix 3), and this concept has arguably been supported by the work of the late Forrest Kinney (2018) who taught his students to engage with their ear straightaway and play by ear and improvise at their first piano lesson, the initial step on the journey towards developing the creativity and therefore deep understanding of music that could be argued to lay at the root of his implicit definition of musical intelligence. He wrote:

> let's not celebrate only the tiny percentage of people who thrive in Performer Paradigm, but instead let's also celebrate those students who create, compose, write songs, improvise, and arrange tunes they know (2018, p.23)

Gardner (2004) had extolled musicians who 'decomposed' as well as composed, and McPherson argues that 'traditional views of music aptitude and achievement should be broadened to encompass indications of creative thinking in music' (1993, p.79). Williams is also passionate about the 'genuine understanding' that can be developed through the use of the imagination and creative activities such as composition and improvisation (2017, p. 23), and the holism including creativity

embedded in Harris's (2014) approach could arguably be at the root of developing what might be his implicit definition of musical intelligence – a deep understanding of music.

3.3.3 Ability to read notation

The importance bestowed upon the ability to read and play notation over and above other elements of a music education has already been discussed in detail (Cathcart, 2013, Gordon, 1993, Harris, 2014, Lilliestam, 1996, McPherson, 1993, 2005, Odam, 1995, Schleuter, 1997, Williams, 2017), and it can be argued that the ability to read notation seems to represent musical intelligence in the eyes of many teachers, pupils and their parents or guardians. McPherson laments the fact that the general consensus of proficiency on a musical instrument seems to be measured by 'the capacity of the musician to re-create an accurate representation of a musical composition which has been learned from the printed score' (1993, p 2), and he argues that learning to perform from notation represents only one part of 'expert' performance (ibid., p.19). The reader wonders whether McPherson might be equating the terms 'proficiency' and 'expert performance' with 'musical intelligence' here genuinely or scathingly. Priest (1989) also pointed out the long-term assumption that music literacy represents musical understanding, but in this case the term 'music literacy' refers to the ability to read notation, rather than the more comprehensive definition that Gordon attaches to the term 'music literacy' at the heart of which is the ability to audiate (2004). Indeed, individuals within many cultures consider the ability to read and play notation simultaneously to be the gold standard (Odam, 1995, Macintyre, 2007, Priest, 1989). Gudmundsdottir (2010) argues that people who link notational abilities with musical giftedness are misguided, because many musicians who play exceptionally well by ear are not able to read notation and may even give up learning the instrument if forced to do something that they find very difficult, which supports the concept that different strengths may exist in terms of learning to play. It was also suggested that the strong focus of the examination boards upon notation perpetuates the belief that musical intelligence represents an ability to read notation.

Although Gardner (2004), Hayward and Gromko (2009), Mainwaring (1951), and Reynolds and Hyun (2004) all seem to agree that the ability to read and interpret notation is important to musical aptitude, achievement or intelligence, they stress that this is not the sole or most important factor. Indeed, the definition of musical intelligence on Mireserach.org seems to suggest that notational ability can only develop, and musically, from the prior development of musical intelligence in terms of aural strength.

In summary, the above writers all seem to lean towards the ear and musicianship as the foundations for musical intelligence, rather than the sole ability to decode notation. It can be noted that the word 'understanding' features in the work of the above writers, and that perhaps it finds itself at the root of musical intelligence, which is developed first and foremost through an intelligent ear. It can be argued that musicianship requires deep thinking, deep understanding, deep engagement, as well as understanding of the instrument.

3.3.4 Musical strengths

As stated in the Introduction, I had noted that my piano students seemed to demonstrate one of two different strengths, or perhaps intelligences, either a strength in reading notation or a strength in learning by aural means.

As I noted, in *Frames of Mind* (2004) Gardner put forward his belief that individuals possess different strengths or intelligences rather than a single IQ number to represent their overall intelligence. However in this 2004 work he did not suggest the existence of different musical strengths within his overall concept of musical intelligence. Extremely little seems to exist in the literature regarding the concept of musical strengths, and Green seems to have noticed this when she argued a possible 'distinction between different styles of music learning *within* musical intelligence', (2010, p. 46), although she did not add anything more to this comment or suggest her own definition of musical intelligence. Certainly I could not find any

literature which linked the idea of different musical strengths with Gardner's concept of multiple intelligences overall (2004). The notion of individuals possessing a stronger ability to read or to play by ear is however supported by Odam, who argues that 'a very common experience in all groups of instrumentalists is for them to be categorised into 'sight-reader' or 'player by ear' (1995, p.109). Newman (1984) suggests that, if a student finds playing by ear extremely difficult, particularly at the outset, he or she may demonstrate strengths in other musical areas. Varvarigou (2017) writes about a singing student participant in her study, who stated that she felt completely lost without notation, and Green, in her pilot work on the Ear Playing Project (2010), found that three of her participants went home and wrote some of the notation out for themselves to play from, and argues that 'certainly "writing things down" could define a style that some learners would apply as an inbuilt mechanism' (2010, p.59). She says that

> from a pedagogic point of view, it may be important for teachers to appreciate and understand the different ways that their students might approach a task, as being not the 'failure,' 'success,' or 'idiosyncrasy' of the individual, but less pejoratively, an approach which may be shared across different learners and which sits within a wider context. This could allow teachers to plan more effectively for ways to help and encourage different learners, (2015, p.707).

McPherson had hinted at the existence of different musical strengths in his own thesis, when he noted that 'different students have different abilities' (1993, p.1), and more recently Fisher and Knerr (the Piano Safari method, initially conceived in 2008) have acknowledged that students may exhibit different strengths in learning music and argue for the idea of using these to develop and improve a student's weaker areas. Contrary to Gardner, who seems to suggest playing to the strengths of the individual when teaching and learning in general, matching 'individual students to ways of learning that prove comfortable for them' (2004, p.10) (which seems, at times, to lean towards the learning style concept), Knerr states that the Piano Safari method has been designed so that 'students who are stronger in either eye or ear will be using their strengths and building on their weaknesses simultaneously' (Pianosafari.com, Mini Dissertations, 2008). Williams supports this, insisting that a

piano teacher needs to be able to 'develop a pupil's strengths and to strengthen their weaknesses', (2017, p. 7-8).

Since Gardner was concerned that an individual should not be 'written off' (2004, p.11) as being unintelligent if their skills lay elsewhere than in the traditional IQ domains of logical thinking, mathematics and language literacy, it is perhaps surprising that he did not acknowledge that musicians or learners who exhibit a stronger intelligence in ear playing, playing by rote and memorising, may be demonstrating as equal an intelligence as those who read notation, and that ear-players should not be deemed musically unintelligent (or 'written off') because they use this strength or intelligence to learn repertoire rather than by reading the notation, which is still often regarded by many as the correct way to learn to play (Cathcart, 2013, McPherson, 1993, 2005, Odam, 1995). Sternberg's (1999) findings that certain individuals from certain cultures were able to perform particular tasks well in one context (running their street businesses) but were unable to apply their abilities to a more abstract context (the maths lesson) suggest that perhaps those musicians and learners who may be able to play the piano superbly without notation, having learnt by ear, copying or memorising, find a level of difficulty in playing from notation because it is abstract, seemingly not relevant to them, and does not represent the music. The reader is reminded here of Gordon's insistence that 'notation, not music, is found on paper' (2004, p.vi). In this case it is surely important to acknowledge that players are still demonstrating musical intelligence.

Applying the intelligence theories of Gardner, Dweck and Sternberg to an understanding of musical intelligence

Gardner's theory of multiple intelligences can be applied to an understanding or possible definition of musical intelligence if we apply the concept of individuals possessing different musical strengths to learning to play the piano (or any other instrument), and suggest that either the apparent ease in reading notation or the skill of learning by ear represents musical intelligence within the individual.

If we apply Gardner's argument that an intelligence can only be labelled as such if it can be used to 'solve problems, or to create products that are valued in one or more cultural settings' (2004, p.xxiv), a musical intelligence could represent the possession of good notation skills, which would 'solve' the cultural 'problem' of needing to read notation in order to achieve good results in examinations. On the other hand if, again, an intelligence is required to 'solve problems' or create a 'product' that is valued in particular cultural settings (ibid.), then strong aural skills could equally represent musical intelligence because they underpin musicianship and reading notation, both of which are highly valued in different cultures.

Gardner's insistence that the Puluwat sailors demonstrate a 'high level of competence' in their field, and should most certainly be regarded as demonstrating intelligent behaviour (2004, p.4), suggests that the deep understanding and intuition the sailors have developed from developing a whole gamut of skills, in order to become masters of their craft, could be applied to learning to play any musical instrument, and could most certainly be applied to a definition of musical intelligence, whereby musical intelligence is represented by deep musical understanding built upon skill in many areas.

Dweck's (2016) suggestion that we think more about the most useful way to think about intelligence, when we of adopt one view rather than another (2016), could also support the concept that there might exist two different strengths in learning to play an instrument. In a music learning context it could suggest that to adopt the view that notational competence represents the ultimate ability, or musical intelligence, over aural skills could need reframing, so that those who possess the latter skills are not 'written off' as Gardner suggested of those who do not naturally possess the traditional IQ skills (2004, p.11), but rather revered as already possessing the foundations of musical intelligence. Dweck's (2016) concept that teachers should adopt an incremental belief towards their pupils' learning abilities could also be applied to the encouragement of those stronger in notation skills to learn to play by ear and audiate notation, despite what the teacher may originally believe about a

certain student's abilities. Equally, Dweck (2016) encouraged teachers to adopt an incremental theory of intelligence towards their students in all aspects of learning.

Sternberg's belief that many teachers' implicit views of intelligence are misguided and too narrowly defined aligns somewhat with Gardner's (2004) concept of multiple intelligences, and again could be applied to understanding that aural strength is likely the underpinning of an overall musical intelligence rather than an incorrect way of learning to play. His conviction that the abstract nature of certain areas does not suit some individuals, such as the example of the Brazilian children who can apply certain mathematical strategies to their street business, because it means something to them, but cannot apply them in a mathematics lesson, could be likened to those students who find reading notation almost impossible, but can play astonishingly well by ear. Sternberg is keen to expand the world's view of what it means to be intelligent, and argues that

> intelligence involves not only modifying oneself to suit the environment (adaptation) but also modifying the environment to suit oneself (shaping) and, sometimes, finding a new environment that is a better match to one's skills, values, or desires (selection), (2020, p. 298.)

In a music learning context, this suggests that learners who are better by ear can achieve their desired outcomes using this method (modifying the environment to suit themselves), if they just want to learn to play, and perhaps eschewing the traditional music lesson for a different musical environment such as playing in a band or group which does not rely on notation as its medium (finding a new environment that is a better match to their skills, values or desires). The latter scenario could happen if individuals are pushed to do something that they feel unable to do (Gudmundsdottir 2010).

All of these theories open the mind to the notion that the concept of intelligence is not necessarily tied to the ability to perform successfully in IQ tests, but that different skills in different areas of life and cultures can be considered intelligent behaviour. This then supports the concept that musical intelligence could be represented by the

ability to read and play notation simultaneously, and equally by the ability to play by ear and have outstanding aural skills.

Summary

This chapter examined the literature which seemed to pertain to a definition or understanding of musical intelligence, and began and ended by placing this within the context of the general beliefs about intelligence of three writers (Gardner (1993), Dweck (2016) and Sternberg (2020).

There is a strong trend throughout the literature which suggests that the ear might be the foundation of musical intelligence, because it seems to be at the root of both musicianship and of the development of other musical skills such as improvisation, audiation, notational audiation, sight-reading and the reading of notation. It would seem that Gordon's music learning theory (1993) holds the key to the treasure of an overall musical intelligence, as it rests upon the development of the ear. According to Gordon (1993), music literacy means more than reading music notation, it means audiation and understanding, not decoding.

At the end of this chapter I believe that it is important to note that, although Gardner (2004) and Sternberg (2020) specifically name composition and creativity as aspects of musical intelligence, musical intelligence seems to comprise a sizeable number of skills, of which not all may be possessed by an individual, but yet that that individual may show more musical intelligence in certain areas than others. I argue that Gardner's (2004) description of the outstanding intelligence of the Puluwat sailors could certainly be applied to and underpin a definition and understanding of musical intelligence.

I move on now to discuss the methods I used in order to attempt firstly to discover why some students seem to find difficulty in reading and playing simultaneously from piano notation, and secondly to create a framework for musical intelligence.

4 Methodology

This chapter provides an account of my research design and methodology. Here I have discussed my choice of paradigm and data-gathering methods. I have then set out my ethical standpoint and followed this with my choices for analysis. The research questions are reiterated first, and then followed with a statement on my positionality within the research.

4.1 Research Questions

1. What experiences, observations and beliefs do the students and piano teachers in this study share about learning to read and play notation simultaneously on the piano?

2. What beliefs do the piano teachers in this study seem to hold about teaching pupils to read and play the notation simultaneously?

3. How might musical intelligence be defined?

Research question 4 is addressed in the Discussion chapter.

4. How might a framework for musical intelligence offer support to piano teachers and their students, particularly in terms of learning to read and play notation simultaneously on the piano?

4.2 Positionality statement

Menter *et al* (2011) warn the practitioner researcher to avoid the intrusion of bias in this research setting. As a committed piano teacher, I have acknowledged and attempted to put aside the possible bias that my own beliefs about teaching individuals to play the piano might bring to the research. I was taught to play the piano using notation from the first lesson, therefore I believed, until part-way through my research, that this was the only way to teach and learn. I was unaware of any other possible method such as playing by ear or learning pieces by rote. The individuals from my secondary school (1976-1983) who were also having music lessons also seemed to be learning to read and play the notation as a matter of course although one friend was studying what she called 'Practical Musicianship', which I did not know anything about until I was already teaching, and only because someone had told me that achieving Grade 5 in this was an alternative to achieving Grade 5 theory if one wanted to go on to do Grade 6 practical. A popular belief seemed to be (and this still exists to a large degree) that reading music notation was the 'clever' and 'proper' way of playing the piano, and that playing by ear or rote were not. This is supported in the literature (for example Kinney, 2018, McPherson, 1993, 2005 for example). I have met individuals who consider that their gift of playing by ear is inferior to the ability to read notation. On the other hand, others view playing by ear as a great and enviable skill. In 2006 when I began to teach piano I, too, considered that playing by ear was not the proper way of teaching and learning, (see also Woody, 2012) and if I had to teach a piece by rote, as I did for one or two students in order to help them to pass their examinations, this was, in my opinion, a short-cut, and not the right way. I was surprised that some children could even learn in this way, in particular one individual who, over the course of the twelve years that I taught him, insisted on learning the most complex repertoire by copying me, and successfully retaining it. In addition, I had never been taught to play by ear, by rote, or to improvise myself, and did not know how to do these in order to be able to teach them to my own students in the first place. In fact the ignorance of these methods meant that it did not even occur to me that they were available to teach. This also meant that I did not understand those individuals who appeared to only be able to

learn in this way, which is also supported in the literature (McPherson, 1993, 2005). I wondered whether, had I been taught to play by ear, I would be able to do it as an adult and as a piano teacher, or whether I would always have preferred to read the notation, which was also what led me to wondering if perhaps individuals have a natural preference or ability for reading or for playing by ear, copying and memorising, a kind of 'eureka' moment which tied in with the work of Gardner (1993). Yet this initial bias towards believing that notation is the best way for individuals to learn has also proven integral to my research, since it is the very reason I have explored this important topic. At the same time, my research has opened my mind and has provided me with a wealth of information which has broadened my view of teaching individuals to play the piano and changed my practice considerably for the better.

This leads me to acknowledge another possible bias that my positionality might have brought to my research, which is that, for fourteen of the seventeen students that I interviewed, I was their first piano teacher, therefore my pedagogical methods had necessarily influenced them as this is all they had known. That said, as a piano teacher, I am well placed in terms of an empathic understanding of both my student and teacher participants (Teddlie and Tashakkori, 2009) which is also useful for practitioner research. This in turn compels me to admit that my research is necessarily value-bound, since I bring to it aspects of my own teaching experience, as well as my decisions about my research design. I now turn to a discussion of my research methodology.

4.3 Research paradigm

Quantitative and qualitative research

By the late 1960s researchers had begun to move away from what was beginning to be seen as a restrictive cause-and-effect relationship associated with positivism, which used quantitative methods of inquiry, and was based upon an ontological

assumption that reality is objective, discoverable through experimental means, and is separate from, and exists outside of, the individual. Positivism implies that the individual has no influence over what reality is. Within the positivist approach, reality is measurable by numbers, there is a right or wrong answer to all problems, and there is no place for separate individual beliefs. Researchers who were interested more in the human experience therefore began to look for an alternative way to explore this area, and began to adopt the view that this human experience could not fit into a neat, quantitative, statistical method of examination and analysis. Researchers were seeking to *understand* human behaviour, rather than to *explain* it (Bryman, 2016), and began to eschew a cause-and-effect approach in favour of learning individual beliefs and constructing a possible series of events, behaviours or occurrences which may have led to the development of a situation or phenomenon (Becker in Thomas, 2009). Thus, a qualitative approach to research developed.

This alternative way of exploring human experience began to grow and gain in popularity, and as its basic definition uses words rather than numbers to describe social phenomena which cannot be quantified by numerical approaches. Kumar argues that 'the main focus in qualitative research is to understand, explain, explore, discover and clarify situations, feelings, perceptions, attitudes, values, beliefs and experiences of a group of people' (2014, pp.132-133). Qualitative data collection involves 'looking, asking, noting, describing, listening and interpreting' (Savin-Baden and Howell Major, 2013, p.14) in order to generate meaning from situations.

4.4 A pragmatic approach

Over the last 30 years or so, a pragmatic approach to research started to emerge in America in the late 19th century, and began to gain in popularity. Within this approach, the either/or pathway of quantitative or qualitative methods with the corresponding ontological and epistemological perspectives, began to be regarded as too restrictive, and was rejected in favour of using whatever methods best

answered the questions in which the researcher was interested. This saw the development of the mixed methods approach to data gathering, which allowed researchers the freedom to use both quantitative and qualitative methods to seek the best possible answers to their questions and to develop a workable solution or outcome. This also enables the research to be both exploratory and confirmatory (Teddlie and Tashakkori, 2009), and to answer 'how many' type questions at the same time as 'why' questions (Savin-Baden and Howell Major, 2013, p.180).

Savin-Baden and Howell Major (2013) argue that there are times, particularly for research in areas such as education and other professional fields, when a more practical approach to research is required, rather than the researcher attempting to 'shoehorn' his or her research into a particular paradigm and approach. This is particularly useful when the aim of the research is to develop practical solutions to particular research problems, and to inform professional practice without the need to pledge allegiance to a specific ontological or epistemological perspective, practices in which many researchers had become disinterested and frustrated, and which had formed the basis of the 'paradigm wars' (Teddlie and Tashakkori, 2009). Pragmatists place the research problem at the heart of the study process, therefore the focus on concepts of truth and reality is regarded as secondary to simply getting on with using whatever works to gain insight into and solve the research problem, documenting it in everyday language with less abstract concepts, and to describe events and experiences using their own interpretation.

Pragmatists are interested in understanding all the factors which are found in the actions of individuals in a particular situation. They also view knowledge as being developed and steeped in the reality which individuals construct based on their experiences of the world. They argue that knowledge may be gained through the use of many different methods, and that all are valid in order to develop understanding of the world and the people that live in it. Pragmatists are interested in creating meaning from human experience, however they believe that truth and reality are always subject to change over time, and that 'truth' is whatever works as a solution to the research problem.

The aim of pragmatic qualitative research is to implement improvements in real-world situations, and it is particularly suited to studies dealing with professional practice, including education and health, which arguably require practical, down-to-earth and accessible solutions to problems, often for busy teaching personnel. Indeed, Biesta and Burbules argue that 'it is widely expected that educational research should generate knowledge that is relevant for the day-to-day practice of educators' (2003, p.1), and this direct statement suggests that a pragmatic approach to research is more likely to provide answers than a preoccupation with concerns about establishing a view on truth or reality. The University of Nottingham website informs its readers that 'pragmatic studies are inductive, moving from a complex problem to a general theory of understanding, in order to improve a given situation'.

Like other approaches, there are advantages and disadvantages within a pragmatic qualitative approach to research. It is a flexible approach which does not rely upon or need to be bound by a strict adherence to a particular philosophy or theoretical perspective or methodological rules, but uses both qualitative and quantitative data gathering methods, and appropriate choices of methods of analysis in order to answer the questions of interest to the researcher. On the other hand, Savin-Baden and Howell Major (2013) argue that pragmatic qualitative enquiry is sometimes regarded as less rigorous theoretically and philosophically compared with other research traditions, particularly in terms of its use of description over interpretation. However, they argue that pragmatism is a philosophy, and therefore, if a pragmatic qualitative study has pragmatism as its paradigm, it can be counted as 'philosophically informed' (2013, p.178).

Since I was seeking to explore the reasons for some students finding the simultaneous reading and playing of piano notation difficult, it might have been assumed that I was embarking on a cause-and-effect approach to the research. Human social research does not lend itself to numerical analysis, and, where constructivism completely rejects the idea of causality, arguing that all entities affect each other and everything is in a constant state of change, pragmatism

acknowledges that there *may* be causal relations within the research problem, but that they are transitory and difficult to identify. I have therefore chosen to adopt the stance of Becker, who suggests that one should:

> assume that whatever you want to study has, not causes, but a history, a story, a narrative, a 'first this happened, then that happened, and then the other happened, and it ended up like this.' On this view we understand the occurrence of events by learning the steps in the process by which they came to happen, rather than learning the conditions that made their existence necessary (cited in Thomas, 2009, p.82).

My study thus draws upon a pragmatic qualitative research approach, and a paradigm of pragmatism, in order to find a practical solution to a problem that I saw in my work, a solution that I could potentially share with other piano teachers and other instrumental teachers perhaps globally, or at least where the simultaneous reading and playing of piano notation was an important part of the music learning culture. With this in mind, I chose to use a combination of quantitative and qualitative data gathering tools to answer the research questions. Teddlie and Tashakkori (2009) argue that pragmatic research can contain both exploratory and confirmatory elements, so both types of data were required, as responses to quantitative questions can also provide both exploratory and confirmatory data.

In addition to pragmatism being lauded for its central focus on creating a solution to a real-world problem, the fact that pragmatic research can be both exploratory and confirmatory allowed me to:

- explore the learning experiences of a sample of my own music students;
- use this analysis to inform the next phase of the research which was both exploratory and confirmatory in terms of discovering whether or not the teacher participants were experiencing similar phenomena to myself in their work;
- explore the teachers' methods for teaching notation;
- find out whether or not the teachers held a belief about musical intelligence.

I move on to discussing my data gathering methods next.

4.5 Methods of data gathering

Williams argues that 'we are unlikely to question the way we teach unless we experience other teachers' approaches with similar pupils, witness teaching strategies and performance ideas from other professional pianists or discuss piano teaching with teachers from different backgrounds' (2017, p.8). Therefore I believed that survey research promised to elicit the information I needed from the two different groups of participants, music students and piano teachers. Survey research is not restricted to questionnaires, it can include interviews, observation and content analysis, for example (de Vaus, 2014). It enables the researcher to elicit information regarding individuals' experiences, beliefs, opinions, and methods of work (piano teaching. Yin (2014) states that a good piece of exploratory research requires the use of multiple methods of data-gathering (see also Creswell, 2013, Robson, 2002, Savin-Baden and Howell Major, 2013, Stake, 2006, Thomas, 2011) in order to enable the researcher to present an in-depth understanding of the situation under review. This also enables triangulation of the data (Braun and Clarke, 2013) by examining the problems from different points of view. Efforts at triangulation can impart robustness to the research and can enable the researcher to guard against generalising from insufficient information (Thomas, 2011), and are essential to gain a broader view of the phenomenon under study. This underpinned my decision to interview a selection of my own music pupils first, in order to develop a broad understanding of their experiences of learning to play the piano, so that this could inform the design of my teacher questionnaire and follow-up teacher interviews.

According to Biesta (2017) it could be argued that I employed a concurrent mixed methods research design, since I used both qualitative and quantitative data within the same study, indeed within the same strand of the research, the questionnaire, using a QUAL + quan combination (Teddlie and Tashakkori, 2009), and since the main focus is on the qualitative data for illumination purposes and to explore and develop understanding of the situation. However, it could also be argued that, since the questionnaire was followed by in-depth interviews with the piano teachers in the

study to explore both the questionnaire data more closely and to ask specific questions about teaching beliefs and practices, the study aligns more with a sequential design. Teddlie and Tashakkori (2009, p.138) quote Johnson & Onwuegbuzie (2004) who argue that, in a mixed methods approach, the researcher should create a research design that answers their questions effectively, and Biesta goes on to state that 'there are no typical methods for data collection in mixed research. Depending on what one aims to achieve, any method can, in principle, be included' (2017, p.162). Biesta argues that designs in mixed methods research depend upon the purpose of the research, which also aligns with a pragmatist perspective of employing whatever works to answer the research questions. Biesta (2017) adds that it is actually the research purpose that defines the approach rather than the research questions.

The research is not a mixed methods study in the sense of having two distinct phases, a qualitative phase and a quantitative phase, although each phase arguably informed the next, with the data from the student interviews serving as a justification for asking the piano teachers in the questionnaire to talk about difficulties that they saw their students encountering in reading and playing the notation simultaneously. Had this student interview phase not occurred or presented different data, difficulty reading and playing would have been simply conjecture on my part. This was required in order to ground the study.

Research Interviews

Koshy (2010) deems interviewing a fact-finding exercise, and Elliot (1991) terms it a reconnaissance phase. Savin-Baden and Howell Major argue that interviewing is 'not about getting specific answers to questions but rather to develop understanding and interpretation of people and situations' (2013, p.358). They argue that the interview is the point at which knowledge is constructed together with the individual. Despite Robson's argument that interviews are time-consuming, (see also Menter et al*, 2011),* he agrees that the face-to-face interview is a 'flexible and adaptable way of finding things out' (2002, p.272) and as such is regarded as one of the most

valuable methods of data-gathering. Thomas (2009) praises the face-to-face interview for its ability to allow the interviewer to relate to the respondents during the process and develop rapport for the gathering of more honest data. This means that the interviewer can also benefit from, and potentially create meaning from, additional information in the form of facial expression, nuances and gesture on the part of the participant. Conversely, the lack of anonymity in a face-to-face interview might cause anxiety for a participant, and therefore this type of interview might not produce as much detail as would be desirable. It is important, then, that the researcher gains the trust of the participant, in order that in-depth and accurate information may be forthcoming (Kumar, 2014). Since I had taught each of the student interviewees for a minimum of one year, I had already established a good rapport with them, however, care and consideration were always observed according to a strict ethical conduct (BERA), and participants were reassured that they could withdraw from the research at any time, with no negative repercussions in terms of how I taught them or treated them.

Interviewing can provide much rich qualitative data since it collects information about individual attitudes, beliefs and opinions directly from the participants, and the interviewer then gains their individual interpretations of reality. This was important to this strand of my research because, although I had my own attitudes, opinions and beliefs about how the students might think about learning to read and play piano notation simultaneously, based on what I had observed of them during my first few years of teaching, it was crucial to set my thoughts aside.

For the student and teacher interviews I chose a semi-structured approach, with a list of pre-set questions and prompts (see Appendices 7 and 20 respectively). Thomas believes that 'the semi-structured interview provides the best of both worlds as far as interviewing is concerned, combining the structure of a list of issues to be covered together with the freedom to follow up points as necessary' (2009, p.164). This allows for the possibility of new ideas to surface, which might shape the research differently to how the researcher might have initially expected. Thomas suggests that 'you may have some familiarity with it [the phenomenon] but what you

know may be one-dimensional since you only ever see the situation as one person – in your role as a teacher' (2011, p.104).

Kumar (2014) refers to a list of interview questions as a useful research tool in case any issues that the interviewer wants to discuss are not forthcoming during the interview. It also allows a systematic approach to promote some sense of comparability between participants (Savin-Baden and Howell Major, 2013). However, Savin-Baden and Howell Major also argue that semi-structured interviews may not always provide the interviewee with an option to add his or her own thoughts and perspectives on a matter, so in order to overcome possible restrictions in this respect, I designed the questions specifically to encourage thought about the particular areas I wanted to investigate, and then allowed the participants to elaborate freely, together with additional probing questions arising from their answers, thus enabling me to maintain an open-minded approach as much as was possible. For the student interviews I asked direct and descriptive questions to elicit general information, (Savin-Baden and Howell Major, 2013), contrast questions to encourage participants to think about extreme cases (the 'easy bits' and the 'difficult bits'), and evaluative questions to help them make a judgement ('why is that easy or difficult for you?'). The teacher interviews were also based on a semi-structured schedule but did not require similar contrast questions.

There are advantages and disadvantages to all research methods, and Yin (2015) suggests that bias might be possible if, for example, the questions are not well-articulated, or if they are worded in such a way, knowingly or unknowingly, which might elicit responses which the researcher is hoping to find ('leading' questions), and so I attempted to avoid this in the construction of my student interview questions (see Appendix 7). One of the reasons for conducting the student interviews was so that I could still ask the teachers in the questionnaire about difficulties, without it being argued to represent a leading question, since the student interview data had already yielded several responses about difficulties encountered in learning to read and play notation simultaneously on the piano. Yin (2015) also suggests the possibility of receiving a biased response from the participants in terms of

'reflexivity', where the interviewee offers information that he or she thinks the interviewer wants to hear, rather than what is actually the case. This could express itself in students saying they enjoyed piano lessons even if they were finding them very difficult, so it was important to encourage much honesty.

Yin (2015) also warns about the possibility of inaccuracies appearing if participants are unable to recall information properly. Creswell adds to this by expressing a concern with interviewing regarding possible hesitancy on the part of the participant in providing detail. He argues that 'the less articulate, shy interviewee may present the researcher with a challenge and less than adequate data' (2013, p.164). Indeed, most of the student participants were children and teenagers without the life experience to enable them to articulate thoughts and experiences as much as adults. For example, during a normal piano lesson, students may know that they find certain aspects difficult, but they do not know why, or how to explain it. Thus, it requires acknowledgement that this part of the data may only be accurate to a certain degree, as well as acknowledgement that the researcher will use his or her own individual experience and observations to interpret the data. For the teacher questionnaires and interviews, there is also the possibility of slightly less than accurate data since the participants in these phases were detached from their pupils and their teaching environment whilst answering the questions, and would have to try to remember much data, and so they may also have generalised to some extent.

The student interviews gathered mainly qualitative data regarding the participants' experiences of learning to play the piano. The teacher questionnaire contained seven quantitative questions, of which four employed checklists, two requiring a yes/no response, and the final one using a Likert type scale, and there were nine qualitative questions. The teacher interviews represented a solely qualitative phase which was informed by the data gathering phases that had preceded them. Triangulation could be said to have been achieved in some way by examining the problem from the perspective of the students and of the teachers, and then consolidating the questionnaire answers with more detail during interviews with the selected piano teachers.

The student interviews

I decided that interviewing the music students was the most promising method of initial data collection, and I now turn to discussing how I organised my sample for this first phase of data gathering.

Whilst the literature review was ongoing, I preceded my main data-gathering phase with a set of semi-structured interviews with a selection of my own piano students, and one of my flute students who was receiving piano lessons from a different teacher. This phase was designed to probe the students' individual lived experiences regarding learning to play the piano with me as their teacher, (except the flute student). This was an important part of the overall data gathering process since it was used to inform the next phase of the research, and to help to place my initial beliefs into a realistic context and perhaps confirm some of my observations. Since it was early in my piano teaching career, and since I had always played confidently from notation and could not understand why some of my pupils could not, and again due to the isolation of the piano teacher (Cathcart, 2013), I used this part of the research to create a foundation from which to construct the next level of questions to piano teachers.

Garabello (2020) used semi-structured interviews as part of her research approach to discover what musical intelligence meant to her students, how they assessed their own musical intelligence, why they took music lessons, and how music improved their lives. In another study involving Gardner's theory of multiple intelligences (2004), Bernard (2005) assessed each of the students in her music class in terms of what she regarded as their preferred intelligence for learning, and set up her school music classroom with workstations embracing each of Gardner's (2004) intelligences in order to reinforce certain musical concepts. She interviewed the children at various points during the twelve-week action research intervention, to find out how they rated their own preferred learning strength and what they thought about

the new ways of working, and she asked them to complete reflective journals at the beginning and end of the project.

I used the student interviews as a data gathering tool for broadening my reflection on, and understanding of, my teaching, and to try to see the process from a different perspective.

The student sample

> The purpose of sampling … in qualitative research … is designed to gain in-depth knowledge either about a situation, event or episode or about different aspects of an individual on the assumption that the individual is typical of the group and hence will provide insight into the group. (Kumar, 2014, p.228).

Stake also writes that 'for qualitative fieldwork, we will usually draw a purposive sample [of cases], a sample tailored to our study' (2006, p.24). For this initial phase of data-gathering I selected a purposive sample of eighteen participants from my own piano students, which included one of my flute students who was having piano lessons with a different teacher. The sample also included two 'transfer' piano students, so-called because they had had lessons previously with a different piano teacher. It was important to include the 'transfer' students and the flute pupil to see whether or not they might provide different insights into the area under research, having received different input into their lessons, and this could be argued to provide a small element of triangulation. The sample was purposive because it was intended to generate data about learning to play the piano directly from those who were engaged in the activity, therefore it was tailored to the study (Stake, 2006) and would arguably provide some of the best information to achieve the study's objectives (Kumar, 2014), as well as helping to illuminate my research questions (Yin, 2015). The sample cannot be said to be completely representative of a wider population of piano students (Thomas, 2009) because these were all students learning to play the piano with me as their teacher, (apart from the flute student), as opposed to students taught by other teachers who may use different teaching methods and have different

outlooks and experience. Thus the representativeness is slightly limited and possibly biased to a certain degree.

This was also a convenience sample because the students were easily accessible, being local to my house, to which they came for their music lessons. The interviews were not part of a piano lesson, they were conducted separately, either at my house (with or without a parent, depending on age and ethics approval) or at the student's own house with a parent in the room if the student was under eighteen years old.

The selection represented a range of ages from eight years up to adult, male and female, and included those who had been playing for only a year up to those who had been playing for several years. I chose a mix of eighteen students, and this included students who continually looked at their hands instead of at the notation when I was trying to teach repertoire, students who made repeated errors each week with learning repertoire, and those who seemed to spend several weeks learning a repertoire piece that I believed should have been learnt earlier than this. The sample also included students who I believed seemed to find reading and playing notation simultaneously relatively straightforward. I acknowledge that my choice of sample is completely subjective, but from my entire teaching practice, (at that time around 40 students) I tried to generate a wide range of data from different ages of students, genders, years of experience, and apparent ease or not with understanding the notation. Interviewing every student in my practice was beyond the scope of this study in terms of time and resources. The table below shows the students who took part in the interviews.

Number	Gender	Age	Time spent learning to play the piano
#S1	M	17	8 years
#S2	F	14	7 years
#S3	F	15	6 years (with a different teacher – this was my flute student)
#S4	M	14	5 years (transfer student)
#S5	F	14	5 years
#S6	M	12	1 year
#S7	F	11	3 years
#S8	F	11	4 years (transfer student)
#S9	F	12	4 years
#S10	M	10	3 years
#S11	F	11	3 years
#S12	F	12	3 years
#S13	F	8	2 years
#S14	F	Adult	2 years
#S15	F	10	2 years
#S16	M	8	1 year
#S17	F	7	1 year
#S18	M	8	1 year

Table 4.1 : Details of the student sample for interviews

The student interview questions

The questions were exploratory, designed to construct an account of how my student participants experienced their piano lessons, and thus they were seeking qualitative data.

Question 1

What is it like to learn to play the piano?

This question formed an introduction to the topic and encouraged the participants to start thinking about the lessons, the piano and the playing. It was open-ended, which allowed the students to talk freely about their experiences of learning, and to enable ideas to develop which I may not have considered. This sometimes generated data which I could follow up with additional questions.

Question 2

What do you like or dislike about learning to play the piano? (Why?)

This was also an open-ended question and was asked in order to try to discover the elements which students liked or disliked in their piano lessons, and to see whether or not there was a theme emerging amongst the responses. With this question I also sought the reasons for their thoughts about each element of the lesson. I used prompting questions if sparse information was forthcoming, for example asking what their favourite and least favourite things were.

Question 3

What things are easy or difficult? (Why?)

This question followed naturally from the previous question. I was particularly interested to hear the participants' thoughts about fingering and rhythm because I had noticed that some of them seemed to find it tricky to use the fingering that was prescribed on the notation, and some of them could not understand rhythm from the score.

Question 4

How do you learn a tune or a piece?

This question asked the students to think about how they learnt a piece, what sort of procedures they thought they needed to work through, and how they knew what to do. This was to see what they had understood from how I had been teaching them.

Question 5

Which part is easiest to learn, the left- or right-hand part?

Initially this was designed as a fact-finding question to help me find out whether left-handers would prefer the left-hand part. In retrospect, since my research is no longer about handedness it may be irrelevant here, but still important to insert for a complete account of my methods. Some students had said that the right-hand part is easier to learn because it has the melody generally, and is usually the first to be taught from the beginning of lessons. When the left-hand part, or bass clef part, is taught, confusion often arises because the notes are not on the same lines or spaces as the treble clef part, thus this question is still valid to an overall understanding of the pupils' experiences.

Question 6

Do you like to play from a piece of music or from memory (copying the teacher)? (Why?)

This question was designed to gain a sense of preference for learning method. The idea of different strengths had already begun to germinate in my mind before I discovered the work of Gardner (2004), namely that some students seemed to prefer to learn from the notation, whereas others preferred to learn by rote. It was also understood that learning a piece of repertoire by copying did not necessarily imply that the learner possessed an aural strength, it could have simply indicated that the learner found reading notation difficult. At this point in the research, I had not discovered the literature on playing by ear. The results from this data-gathering phase can be found in the findings chapters.

Questionnaire research

A questionnaire is regarded as a technique for producing a systematic set of data, since it allows organised comparison between cases (de Vaus, 2014). A wide range of information can be collected in a relatively short space of time, as well as allowing the possibility of generating larger samples (Menter *et al*, 2011). Questionnaires are one of most frequently used data gathering tools in educational research, and particularly for practitioner enquiry (Menter *et al*, 2011). A questionnaire is also a valuable tool for triangulation in that, whereas the use of student interviews in this study explored learning to play the piano from the students' points of view (perhaps the receiver of the experience), the teacher questionnaire clearly regarded the phenomenon from the point of view of the piano teacher (perhaps the giver of the experience). As expressed above, gathering such data helps to avoid biased results from one's own observations of one's own practice. Questionnaires are often regarded as only containing quantitative questions, however, Epler (2011) argued that it was necessary sometimes to use both qualitative and quantitative data in the same study, for example in his study which he examined the role played by teachers' beliefs during the making of instructional decisions in their work, and explored their beliefs about intelligence as well as how their epistemological beliefs influenced their teaching (2011). He argued that sometimes, the quantitative results might not adequately illuminate a problem with good explanations, which is where the qualitative data can offer to enrich and aid further interpretation of the results (Teddlie and Tashakkori, 2009).

One possible problem with social research is that it can generate answers that are biased by social desirability (Bryman, 2016, de Vaus, 2014, Menter *et al*, 2011). This happens when an individual tries to make themselves appear better than they really are in the eyes of the researcher. However, Bryman (2016), and de Vaus (2014) both argue that this phenomenon is less likely with the use of self-administered questionnaires than with face-to-face interviews. I was slightly concerned that this phenomenon may occur in my questionnaire responses if teachers perhaps suggested that they used certain methods in their lessons that they in fact did not,

perhaps activities that they thought they should engage in, but did not always have time for, or were not confident in using. On the other hand, I wondered whether there may be some reluctance to share their unique ideas and methods owing to concern about a researcher passing on or using their ideas without due credit, or respondents who failed to divulge certain ideas if they were not convinced of their worth. Another possible disadvantage of the questionnaire is the lack of a real person for asking questions about meaning (Menter *et al*, 2011). For example, if a respondent does not understand the question in the way that the researcher intended it to be understood, a slightly different answer may be given, based on that initial understanding. Of course, the participant may not realise that he or she has taken a different view to the question from that which was intended by the researcher, but by administering a questionnaire live, or in an interview form, some misunderstandings may be able to be avoided.

Cathcart's (2013) study also set out to explore the behaviours, beliefs and attitudes of a sample of real-world piano teachers in the UK using a questionnaire, albeit she generated a much larger response than my own. Similarly, she had planned to use follow-up interviews, however with 595 responses to the survey, this phase had to be postponed due to time constraints of the study period. Taaffe's (2014) study is similar to Cathcart's (2013) work in the way that it examines piano pedagogy, but specifically in Ireland. Taaffe (2014) set out to examine how the role of teachers may determine cultural practice, and how they themselves may be influenced by the institutions in which they work, and how powerful the teachers believed they may be in terms of implementing change. Taaffe argues that teachers bring their own educational beliefs to their practice, and therefore established her research upon a constructivist paradigm, despite using a mixed methods approach, conducting questionnaires with parents, semi-structured interviews with teachers, and a focus group with students. She argues that her use of quantitative methods satisfied exploratory and confirmatory purposes, and thus her questionnaire also contained open and closed questions.

Lennon's (1996) study focused on the work of six piano teachers, using observation and semi-structured interviews, since she believed that one needs to be complemented and enriched by the other, and that these research methods cannot be carried out in isolation otherwise they do not explore the problem in enough detail. Lennon (1996) observed many different teaching approaches and individual styles. Her study was concerned not only with teachers' behaviour, but also with the teachers' thinking and meaning behind that behaviour, and how this affects the learning outcomes of the students. Her study aimed to make the teachers' tacit theories and beliefs explicit and attempted to be exploratory and explanatory rather than prescriptive. Similar to my research intent, Lennon hoped to encourage the teachers in her study to reflect on their practice, which she believed was very important. Teddlie and Tashakkori (2009, p.267) quote a study by Parasnis, Samar and Fischer in 2005, that used a questionnaire with a mix of open-ended and closed questions, of which the data from the two strands were gathered and analysed separately. The results of both were then integrated. These studies, as well as those linked with my student interviews, provide some justification for the methods I chose to use, and I turn now to the distribution of the questionnaire, and the methods which I employed to attempt to generate a wide-ranging and purposive sample of piano teachers to whom it could be addressed.

The piano teacher questionnaire

Notwithstanding the possible slight problems discussed above, informed by the data from the student interviews, the teacher questionnaire was designed to help answer research questions 1, 2 and 3, concerning the beliefs held by the study participants about learning to play piano with notation, how to teach their students to accomplish this, and to explore the teachers' implicit or explicit beliefs about musical intelligence.

The isolation and private nature of the individual piano teaching studio has already been established (Cathcart, 2013, Jorgensen, 1986). According to Cathcart (2013), a sizeable number of piano teachers work from home studios teaching one-to-one lessons, unaware of what other teachers do. Being a piano teacher myself, I was no

exception. Although some teachers hold recognised piano teaching qualifications, this is not mandatory yet, and there is no set or recommended curriculum for actually developing the notation reading skills of the piano student. Teachers often select a particular method book and devise their own personal teaching strategies according to their own beliefs (Cathcart, 2013, Epler, 2011, Froseth, 1983 (cited in McPherson, 1993), Gudmundsdottir, 2010, Jorgensen, 1986, Knerr, 2008, McPherson and Parncutt, 2002, Priest, 1989, Schenk, 1989, Schleuter, 1997).

Epler (2011) and Pajares (1992) argue that the beliefs of teachers necessarily influence how they teach, and therefore impact the experience and learning outcomes of their students.

Following the student interviews it became clear that I needed to gather information regarding the experiences and beliefs of a range of piano teachers in order to elicit what their lessons included compared to my own teaching methods, whether they found similar phenomena to myself in their practices, whether their students experienced similar difficulties to those which some of my participants were explaining, and what the teachers may have done to rectify or avoid difficulties from occurring in the first place. The fact that some of my students were encountering difficulties in learning to read and play notation on the piano could simply have been because my own methods were lacking in efficiency, so I decided that a teacher questionnaire seemed to offer promise in gathering data from a large number of fellow professionals in the first instance, followed by individual interviews with a selection of questionnaire respondents. This development of awareness of others' experiences and methods would go some way to avoid generalising my own observations. Savin-Baden and Howell Major deem this type of research to be inviting the participants to become co-researchers in the study (2013) and Bryman (2016) describes it as a method of constructing meaning during interaction, and I turn now to a discussion of that data-gathering phase.

The piano teacher sample and distribution of the teacher questionnaire

Seventy-two piano teachers agreed to take part in my questionnaire research. In order to generate a purposive sample of piano teachers for this phase of the research (Stake, 2006), I approached various groups of piano teachers to which I either belonged or with which I was familiar with the hope of eliciting rich data and illuminating the research questions (Yin, 2015). I decided to administer the questionnaire online, as this has many advantages. One is that anonymity can be maintained, and this can often persuade a respondent to feel more comfortable and willing to provide more detailed answers to questions than they might if the questionnaires were conducted face-to-face or even over the telephone. Another advantage is that the researcher can potentially collect a large amount of data quickly and easily. Technology in the twenty-first century has improved beyond measure, and the internet has become a viable and popular platform for administering questionnaires, is cheaper and more convenient than posting them, and enables access to many people, some of whom belong to various online teaching groups (Bryman, 2016, De Vaus, 2014), and of course those who live in different countries to the researcher. Some online survey packages also offer inbuilt analysis, and I chose to use SurveyMonkey, since it had been recommended by fellow researchers, and it allowed me to design the questionnaire online and create a web address to which respondents were directed, for ease of access.

Taking advantage of the accessibility and convenience which the internet provided, the invitation to take part in the questionnaire, together with a brief explanation of my research and my ethical code of conduct, were placed, with permission, firstly with The Curious Piano Teachers (established in 2015, a group which requires paid membership, and of which I am a member), on piano pedagogy Facebook pages, namely Professionalism in Piano Teaching UK, The Art of Piano Pedagogy, and Piano Network UK. I also contacted the ISM (Independent Society of Musicians), who agreed to share the questionnaire with its members. The UK Administrator of EPTA (the European Piano Teachers' Association), of which I am also a member,

decided to include the invitation within the newsletter which, unfortunately did not elicit as many responses as it may have done had it been mailed to members separately. Having asked the ABRSM if it would be willing to share my questionnaire, I received the response that, 'at the moment, this would not be something we can issue' (24th October 2017). Similarly, the administrator at Musicteachers.co.uk told me that, because of the introduction of GDPR (General Data Protection Regulation) in May 2018 in the UK, it was no longer something they could do. Piano-tuners.org were contacted as inspired by Chappell (1999), but the response was similar in that, owing to changes in UK law, it was no longer allowable for personal details of members to be divulged.

De Vaus (2014) argues that low response rates can bias the sample, and I was surprised to have received only seventy-two responses in total to the questionnaire. On the other hand, Bryman suggests that, for a purposive sample, a low response rate is 'less significant' (2016, p.225). However, it could equally be argued that an element of bias may have been introduced into the study, since those piano teachers that did respond to the questionnaire and agreed to be interviewed could be the more committed teachers, and in line with that commitment, could possibly have provided more one-sided and positive responses to the questions regarding their beliefs, attitudes and behaviours. Menter *et al* argue that 'people who choose to respond on the survey may be different from those who do not respond, thus biasing or skewing the findings' (2011, p.105). This could well have biased the overall results of the research and may make it appear that all piano teachers engage in certain methods that are lauded in the literature, rather than revealing any piano teachers who perhaps adhere to a certain way of teaching which may not be the best. I turn now to a discussion of the questions.

The questionnaire questions

Whilst the student interview schedule contained qualitative questions to generate qualitative data, the teacher questionnaire was designed to elicit both qualitative and quantitative data, and was both exploratory and confirmatory. Some of my

quantitative questions were designed to try to elicit some confirmation that certain phenomena may not necessarily be unique to my own teaching practice but may be more universal. This was important to help to avoid bias and generalisation that may have crept in if I based my research solely on my own teaching practice. Biesta argues that quantitative data can be used to 'deepen the interpretation and provide a more robust confirmation of the understandings acquired through the collection of qualitative data' (2017, p.161) and that they have the potential to increase the explanatory potential of the research. With each quantitative question in my questionnaire I also included a box which allowed for a wider qualitative response instead of just a brief quantitative response, if the respondent needed to add more details, which might help to broaden the data somewhat for this phase.

Use of open-ended questions may help to avoid prompting for answers that may fit with the researcher's own thoughts, or which may be regarded as leading questions, both of which could be argued to be introducing bias. There is also the school of thought that suggests that it is possible to glean much from what is not said. Occasional prompts were prepared only in order to give the respondents a more accurate idea of the area I was asking about. Of course, there still exists the danger, if the questions are too complex and require too much thinking and too much writing, that even the most dedicated of respondents may tire and just give satisfactory but not necessarily detailed answers, and this is called 'satisficing' (De Vaus, 2014). Bryman (2016) suggests that online questionnaires may fare better in terms of open-ended questions than paper and pencil ones because it is easier and quicker to type answers into a box than to hand-write everything, and that they may therefore provide more detail. The complete questionnaire is set out in Appendix 9, but each is reiterated below for ease of reference.

Question 1

In your experience of teaching piano, what do you perceive as the difficulties that your students seem to encounter when learning to play piano and read the notation at the same time? (Please tick all that apply).

- Using both hands simultaneously (divided attention)
- Remembering and finding the notes (pitches)
- Rhythmic issues
- A busy score
- Direction (whether the notes go up or down the score/keyboard)
- Which fingers to use
- Matching the layout of the score to the layout of the keyboard
- Dealing with two staves
- Concern because cannot see where the hands are going
- Mixing up the clefs
- Other (please specify)

This quantitative question was intended to be exploratory, to see if the study teachers were noticing and experiencing similar phenomena to those I was observing in my own teaching studio, and whether their stories confirmed what the students had said in their own interviews. It was designed to go some way to placing my observations into context, to try to see if notation learning difficulties did indeed exist, so that some form of justification could be given for my study. If there was no support from the teacher data (there had been support in my student data, but that could have been the methods I used to teach the participants), then no study would have been needed.

Question 2

What skills do you believe are required to read and play piano notation simultaneously?

This was an open-ended, qualitative question, intended to supplement the responses given in Question 1, and deliberately did not contain a checklist, so that the ideas were the respondents' own. It was hoped to elicit the teachers' beliefs and attitudes regarding the skills required for playing the piano with notation, from which it may have been possible to infer that non-possession of some of the skills may contribute to some difficulties with the simultaneous reading and playing of notation. The question was also asked so that I may be able to place the skills mentioned into a possible framework for musical intelligence in terms of reading and playing simultaneously. I was also interested in elements or ideas that were not forthcoming in their responses, (what was not said), in terms of pedagogical theories and concepts which I had discovered during the literature search and my own observations.

Question 3

Do you have any students that use the following strategies when you are asking them to play piano from notation? (Please tick all that apply).

- Looking mostly at their hands
- Trying to memorise a piece before they are ready (i.e. they don't know the notes or rhythm well enough yet)

This quantitative question was exploratory, again to try to place my own teaching practice in context and see whether this phenomenon occurred widely. It can be argued that the behaviour of hand-looking represents a response to difficulty in reading and playing the notation simultaneously, due to inability to process both the notation and execute a corresponding response on the piano keys. It can also be a

response to a lack of proprioceptive confidence, in that individuals feel the need to look at their hands in order to move them to the correct place on the keyboard. Looking at the hands instead of at the notation can also arguably be representative of different strengths, perhaps a preference to use the ear as a musical score, rather than a written score, in which the hands can be watched instead. In this case this behaviour would not represent a difficulty, but a choice. Both concepts are important in answering the research question because if the hand-looking is merely representative of difficulty, it suggests that methods need to be developed to help with this. If the hand-looking corresponds to ear-playing as the preferred method of learning to play, this means that this skill needs to be harnessed for its power to develop notation reading (Luce, 1965, McPherson, 1993, 2005, Priest, 1989).

Question 4

If you have any students who look mostly at their hands or try to memorise a piece before they are ready, could you give a brief outline of why you think they do this?

This exploratory question was intended to go some way towards answering the research question about the difficulties and overall complexities of learning to read and play piano notation simultaneously, but also to see whether or not the teachers believed that their students had different musical strengths which they preferred to use instead.

Question 5

If you have students who look mostly at their hands or try to memorise a piece before they are ready, what effect does this have on their learning of the pieces? (For example, does it slow down the learning process, do they make continual mistakes in pitch and/or rhythm, is a piece never completely satisfactory).

On the surface this question seems to suggest that students looking mostly at their hands constitutes a negative behaviour, and indeed I initially found that those of my

own students who did this did not fare well in the sight-reading element of the examinations. I also found that it often takes them a long time to learn a repertoire piece fully in this way. Therefore, this question was designed to help place my own experience into context and to explore whether or not other teachers shared my beliefs. It also allowed for the possibility that some teachers did not regard it as a problem, and indeed may view it as positive in some ways. This I was open to discovering. The purpose of this question was also to gauge how important learning to read notation was for the study teachers, which would also help to justify my study about finding ways to support this learning.

Question 6

If you have students who look mostly at their hands or try to memorise a piece before they are ready, do you find that this has any effect on other elements of their development as competent pianists? (For example, sight-reading, aural skill, independent learning).

Perhaps this question could have been merged within Question 5, and I acknowledge here that the possible suggestions might have biased the respondents to believe that I regard reading and playing notation as the most important element of a lesson.

Question 7

If you answered Yes to the last question, could you outline what areas you believe are affected?

Again in hindsight this question could have been merged with Questions 5 and 6.

Question 8

We know that it is necessary to glance down at our hands from time to time while playing a piece. However, when learning a new piece from notation, would you say that it is preferable that students keep their eyes fixed mainly on the notation, and only glance down occasionally to check where their fingers are going?

It was hoped to further clarify teachers' attitudes and their methods of instructing their students with this question.

Question 9

Please would you say briefly why you think the students should or should not keep their eyes fixed mainly on the notation?

Although this question might have been merged with the preceding ones, it did generate some different perspectives about learning to read notation, so was valuable in terms of broadening the overall picture which helps to lend justification to my study.

Question 10

If you believe that students should look mostly at the notation when learning new piano pieces, please could you briefly outline what you have found helps to nurture this skill?

This question was designed to gain an insight into the teachers' methods for helping their students to keep focused on the notation while playing. It was also designed to help to answer the research question about what a framework for musical intelligence might look like in terms of learning to play the piano, particularly with the notation simultaneously. It was hoped that the responses might illuminate whether or not the teachers used methods derived from pedagogical strategies put forward

in the literature as well as to probe their own strategies in this area. This was an important set of data to gather because it had the potential to inform the research of what the participants believed was important in their teaching, and how they developed it.

Question 11

My work and my thinking have been influenced by Howard Gardner's multiple intelligences theory. If you are aware of this theory, do you use it in your piano teaching? (Please tick all that apply).

This was designed to go some way to answering my question about the possibility of developing a framework for musical intelligence in terms of teaching students to read and play notation simultaneously on the piano. I wanted to know if other piano teachers had thought about applying Gardner's (2004) theory to their teaching, how they used it, whether or not it was successful, how I could maybe follow their example, and whether this had triggered observations that there may exist different strengths within students which present either as a stronger ability to read and play notation simultaneously or as a stronger ability to play by ear or rote rather than with notation. If any of the teachers had different strengths within their students, I wanted to see whether or not they acknowledged them and worked with them to develop the students' weaker areas. If they answered that they were aware of the theory, and they used it, I would select them for an interview, to find out how they interpreted the theory, and how they used it in their lessons.

Question 12

How would you define musical intelligence in terms of learning to play the piano?

I did not mention that Gardner had written a chapter entitled Musical Intelligence within his theory of multiple intelligences (2004), choosing to stimulate the teachers into thinking about what musical intelligence might mean to them individually.

Originally I had hoped to construct an idea of what piano teachers believed was important for the music education of their students, and I had assumed that this would reflect their implicit belief in what musical intelligence represented. I wanted to see if a concept or framework for musical intelligence existed outside of Gardner's (2004) world, one of which I was at the time unaware, but could develop for my own teaching as well as support other piano teachers. If the concept did not seem to exist in this way, it suggested that I might be able to make a pertinent contribution to the body of knowledge on teaching individuals to play the piano with notation.

Question 13

Based on your definition of musical intelligence, how do you develop this within your piano students?

This question was designed to elicit some more detail on teaching strategies and illuminate what the teachers considered important in their work, which might further reflect their implicit definition of musical intelligence and provide useful data for constructing its framework.

Question 14

What is your own preferred method of learning new pieces?

- Do you learn best by ear and memorise as quickly as possible?
- Do you need the notation at all times?
- Other (Please specify)

This allowed for both qualitative and quantitative data. The first reason for asking this question was to try to discover if the teachers had a strong preference for learning one way or the other. The second reason was born of a kind of 'Eureka' moment, where I came to realise that my preferred method of learning a new piece (straight from the notation, I am not yet competent at learning by ear or rote) was a

direct result of the way I was taught. This prompted me to acknowledge that I had begun my piano teaching career by teaching in the same way in which I was taught, and led me to wonder if other teachers were teaching their pupils in the same way they, too, were taught, whatever that method might have been, through ignorance of other teaching methods or theories on learning to play the piano (Biasutti, 2010, Boyle, 2021, Cathcart, 2013, Gudmundsdottir, 2010, McPherson, 1993, 2005, McPherson and Parncutt, 2002, Pajares, 1992, Priest, 1989, Schenk, 1989, Schleuter, 1997). It also prompted me to wonder if, perhaps, some of the teachers' methods may provide clues as to why some of the students are, at least initially perhaps, unsuccessful in learning to read and play simultaneously, whilst others are more successful, and whether the teachers were unaware of this fact, and unaware of other methods, and of what is contained within the literature. This inspired the following question.

Question 15

On a scale of 1 to 5, where 1 is the lowest, how much do you believe that your method of teaching piano might reflect your own way of learning?

Unfortunately, I believe that I should have perhaps done a literature search and more research into this area in order to supplement this concept. This will be a recommendation for further research, however I did follow up the concept carefully with my selected interview participants.

Question 16

This was a space for teachers to add their own general overall comments on anything else that they had thought of, or that I had not mentioned.

Question 17

This final item asked participants if they would be willing to be interviewed in order to provide more detail on some of their responses. I selected fourteen teachers to interview, using Skype or telephone, and I now turn to this section of the data-gathering.

The piano teacher interviews

The interviewing process, together with its benefits and disadvantages within research has already been discussed regarding the student interviews. Teddlie and Tashakkori (2009) claim that questionnaires can provide greater breadth in terms of eliciting data, while interviews provide more depth, and the combination of the two can generate richer results, which may enable the researcher to make more informed inferences. Interviewing adults often has the further advantage of a wealth of life experience, teaching experience (in this case) and general understanding to explore, thus wider and richer detail can be more forthcoming than with children. Interviewing selected questionnaire respondents allows the researcher to clarify and explore questionnaire responses (Menter *et al*, 2011). These piano teacher interviews were a vital part of bringing together evidence from all of the isolated individual teachers, and provided an excellent opportunity for gathering richer and more detailed data than the questionnaire alone (Kumar 2014, Koshy, 2010). The interviews also provided a method of triangulation, in that I was able to probe some of the questionnaire responses more deeply. I was also able to ask questions regarding elements that the teachers had not mentioned in their questionnaire responses.

The piano teacher sample

The sample for this interview phase consisted of fourteen piano teachers who had agreed to be interviewed when they had completed their questionnaire. Within this sample I included all of those participants who had claimed that they used Gardner's

(2004) principles when teaching individuals to play the piano, and others who had left what I considered to be potentially interesting remarks in their responses about how they taught, and which I wanted to probe further and understand. Unfortunately there were some questionnaire respondents that I would very much like to have interviewed, but who had not left contact details. I used a semi-structured approach to the interviews, with general questions as well as more specific questions on areas about which I wanted to understand in more detail. Thirteen teachers were interviewed live via Skype, an internet software application that provides a platform for video face-to-face conversations across the world, with the potential of recording the interview and the transcript being available to both parties for thirty days. The remaining participant was interviewed via normal landline telephone. The sample consisted of three male and eleven female piano teachers of varying ages between mid-twenties to sixties, and who had been teaching between eighteen months and twenty-five years, with a range of pupils between them varying from ten to thirty-five in number. A profile for each teacher can be found in Appendix 10.

The piano teacher interview questions

Question 1

What is your approach to helping your students to read and play from the notation simultaneously?

This question was designed as a deliberately wide, open-ended question to gain as much data as possible, without leading the participant down any particular route. It was hoped that the teachers' beliefs, values and attitudes towards their piano teaching would be reflected, and possibly their implicit concept of musical intelligence. From the responses to this question, I was able to probe for more detail regarding specific elements that the participants discussed.

Question 2

Do you introduce notation at the very first lesson?

Following certain articles in the literature (e.g., Cathcart, 2013, Gordon, 1993, Kinney, 2018, McPherson, 1993, Odam, 1995, Priest, 1989) I wanted to ascertain the educational approach of today's piano teachers, and this question was asked if the participant had not mentioned anything about notation in their response to Question 1. This was important in order to see whether the teachers were aware of the sound before symbol debate in particular, and related literature or opinions, and whether they may teach as they themselves had been taught, which usually consisted of learning straight from notation from the first lesson and thereafter, with no ear-playing, rote learning or creative work.

Question 3

Do you teach your students to play by ear and rote?

This question was asked if the teacher had not volunteered this information spontaneously in Question 1. If the teachers did teach by rote, and did not elaborate, the following prompts were used:

- Can you describe briefly how you start?

- What sort of length piece or section of piece do you give each time?

- How successful are the students at practising it correctly at home for the following week? i.e., how much do they remember?

- How do you make the connection with the notation?

- How far do you go before you introduce the notation for the pieces you are teaching by rote/ear?

- How difficult are the pieces that you teach by rote/ear? i.e., are they up to Grade 1 and above, or do they relate to beginner tutor books?

Since I had not done much rote teaching at the start of my research, this information would also be useful to help me to understand the rote teaching process in more detail, to see what the teachers thought might be successful in their own teaching, how much this teaching element featured in their work, and to what extent their teaching was characterised by it. The sparse literature on rote teaching did not seem to contain this level of detail.

Question 4

Do you have students who constantly look at their hands and try to memorise?

This question was to supplement the participants' responses from the initial questionnaire, where it had also been asked.

Question 5

What do you do to try to avoid it happening in the first place?

This question probed for more detail on the respondents' general teaching methods, and their beliefs, attitudes and values towards their work.

Question 6

Can you hear a piece internally from the notation?

This question was designed to ascertain whether or not the teachers could perform notational audiation (see Glossary), and I also asked them if they taught their students to do this. No teachers had mentioned the exact words in the questionnaire responses, although a few had suggested that it is good for pupils to know how the piece sounds before playing it. By this, however, some of the questionnaire respondents had implied that the students might hear the teacher playing it first, rather than learning how to hear a piece internally themselves from the notation, so I wanted to explore this area and find out exactly what was happening in the teachers' practices, although I did not specify the term 'notational audiation'. It was important to understand that some teachers might not necessarily have heard of the terms 'audiation' and 'notational audiation' but might still be teaching the actual process.

Question 7

What mental strategies do you encourage your students to use when they are learning a new piece from notation?

This question was prompted both by my observation of my own playing and learning, and by McPherson's (1993, 2005) finding that his participants had engaged in mental strategies to help them to accomplish his tasks, to see whether or not the teachers in my study also encouraged their students to engage in similar strategies, apart from simply looking at the time signature, key signature and starting notes which are standard preparation techniques for normal sight-reading tasks. Although I did have to explain what I meant by the question to quite a few participants, I did not give specific prompts for this, wanting to glean as much from what the teachers did not say as from what they did say.

Question 8

Do you believe that you teach in the same way you were taught?

This question was intended to expand upon responses from the quantitative question in the questionnaire on the same topic, and which I realised afterwards was not well designed. I wanted to see whether or not those teachers who had been taught straight and solely from notation had expanded their own methods of teaching and, if so, how they had changed, and why the teachers believed that the change was needed. I did not use any prompts for this, choosing to leave the question completely open-ended to gain as much unbiased information as possible.

Question 9

What do you believe musical intelligence is, in terms of learning to play piano and read notation simultaneously?

This was one of the most important questions as it was linked to the theoretical framework of my research study. For those questionnaire respondents who had stated their awareness of Gardner's theory of multiple intelligences (2004), and specifically for those three participants who had stated that they used the theory in their lessons, this question was to ask them how they used it, as well as ascertaining an overall belief on what musical intelligence signified to each interview participant, including those who had not heard of Gardner (2004) or his theory. This would hopefully inform the research regarding the participants' values and beliefs on piano teaching. I acknowledge here that it could be argued that, by specifically linking musical intelligence with notation reading, the responses could have been biased, and ask the reader's patience to read the findings chapters before making judgement.

The complete interview schedule can be found in Appendix 11, and my analysis is located within the findings chapter.

4.6 Data analysis

Analytical approach

Since my study drew upon a mixed methods research approach, beginning with a student interview phase followed by a questionnaire containing both closed and open-ended questions, and then finishing with an in-depth interview phase, I generated a mix of both qualitative and quantitative data. My data was gathered sequentially, so that the analysis of one set of data informed the gathering of the next set. Thus, the student interview data analysis informed some of the questions that were asked in the teacher questionnaire and follow-up interviews. Responses from the teacher questionnaire also guided the choice of sample for an in-depth interview.

Thematic Analysis

I chose to use thematic analysis within an interpretative framework as my approach to working on the data, in order to explore the data more deeply and to develop meaning from it by seeking beyond the surface (Braun and Clarke, 2013). This is a flexible analytical approach and can be used to work with most types of data from most types of research questions. It is a common approach for working with qualitative data and is usually inductive in nature because it is used to look for emergent themes that are grounded in the data, and to develop inferences or conclusions from certain concepts within the data, as opposed to deductive analysis which is generally used to test *a priori* hypotheses (Teddlie and Tashakkori, 2009). Thematic analysis involves identifying recurring concepts or categories within the data, according to the similarity principle, followed by attaching a code to each category, and using the constant comparative method to comb several times through the data and refine the codes (Teddlie and Tashakkori, 2009), grouping together similar categories into a larger code if necessary, and then developing themes from the interpretation of the data. I chose to use complete coding in order to be receptive to all ideas that developed from the data. Braun and Clarke describe complete

coding as identifying ‘anything and everything of interest or relevance to answering your research question, within your entire dataset’ (2013, p.206). This is important because, as already stated, the researcher comes to the analysis with their own assumptions, however thoroughly they try to avoid bias, and important data could be missed by selective coding.

Critics argue that thematic analysis does not allow the researcher to present an accurate picture of individual participants in terms of their thoughts and contradictions, partly because the analysis is regarded as subjective on the part of the researcher. It is also argued that thematic analysis is not scientific, because it is biased by the opinions of the researcher. It is true that we cannot see inside the minds of the participants, however this is the very point of qualitative research, that it does not fit neatly within a scientific, positivist approach where only one answer can be found for the research questions. As Thomas (2009) argued, it is expected that the researcher uses his or her knowledge and life experience to interpret the data as closely as possible to what the participants have said. In addition, where the researcher is also an integral part of the research, as in this case, where I am also a piano teacher, he or she may possess a depth of knowledge about the subject under research which an outsider would not, and is therefore better placed to understand and interpret the comments of the participants (Thomas, 2009). Thematic analysis allows the researcher to notice patterns within the data that link back to broader theoretical issues (Braun and Clarke, 2013), which better places the research in context.

Braun and Clarke (2013) argue that, in terms of questionnaire research, it is important to develop themes from looking at the whole dataset, not just within each question in isolation. Therefore I coded the questionnaire data both by question and by interview participant for a cross comparison, and it was extremely enlightening to explore and clarify the data from these different perspectives. Braun and Clarke (2013) also argue that some data entries in questionnaires can be quite short and not in-depth, which is possibly a negative element of questionnaires. Indeed, in a world where people are continually busy (I asked a member of one teaching group

if she would please take part and she said she did not have time), some of the teachers in the study may have been willing to help with the research but forgotten some of their strategies in a hurry to complete the questionnaire and get the job done, in which case the data may not all be as rich as it might be. However a questionnaire is also arguably an effective method of gaining a large set of responses which can begin to create a foundation of themes and then be used to inform a subsequent interview phase of the research. Follow-up in-depth interviews offered the potential to counteract the short answers, and to raise and capture ideas that were not mentioned in the questionnaire responses, even those narrative responses that were analysed qualitatively. Interviewing allowed for the expansion of what might have been a narrow account, because new ideas were generated, and this phase also allowed for the possibility of exploring what the teachers did not mention, for example certain theories that had appeared in the literature (Brodsky *et al*, 2003, 2008, Gordon, 1993, Luce, 1965, Priest, 1989, McPherson, 1993, 2005, Zatorre and Halpern, 2005).

The analysis of the questionnaire could be argued to follow a parallel mixed data method of analysis as it includes the analysis of both quantitative and qualitative data to answer related strands within the same phase of the study. Each of the two sets of analyses complements the other, and together they help the researcher to develop understanding about the phenomena under examination. However, since the questionnaire phase informed the series of teacher interviews, I argue that my study is more appropriately described as a sequential mixed design. Teddlie and Tashakkori (2009) suggest that this design is used for the purposes of expansion, where the qualitative analysis aims to expand upon the understanding that evolved from the previous phase, which is often quantitative, but in my case was a mix of quantitative and qualitative data.

Quantitative data analysis is usually based on descriptive statistics or inferential methods of analysis. Descriptive statistics can also be used to discover patterns within the data. My study used descriptive statistics for the analysis of the quantitatively based questions in the questionnaire to support thematic development

in terms of teachers' experiences, and offer potentially confirmatory information, which I wanted to do to try to locate my own teaching practice and methods. Some of the themes had been supported within the student interview data in terms of the difficulties of reading and playing piano notation, and all were then expanded during analysis of the teacher interview data.

Teddlie and Tashakkori (2009) argue that quantitative analysis is usually deductive in nature because it is used to test hypotheses and predictions, however they do go on to say that it can be used inductively in exploratory research, which aligns with my study, in which the quantitative questions served to show how often a particular phenomenon seemed to occur within the dataset, and an example of this is the phenomenon of hand-looking. Following the quantitative question asking if teachers had hand-lookers in their cohort, I then sought qualitative data by asking for beliefs about particular reasons for the behaviour, what the effects of the behaviour seemed to be, and how teachers either avoided or dealt with it. This was also followed up in the teacher interviews. Another example is the quantitative question about difficulties, which involved a checklist, and again sought how many times each particular phenomenon was believed to occur, and was then followed up by a qualitative question on the skills that the teachers believed were required in order to read and play piano notation simultaneously. I interpreted the data here by suggesting that, if certain skills were lacking, this may be consistent with some of the difficulty encountered.

Framework for analysis

Student interview data

The interviews were recorded, and then transcribed by hand into Word. Each transcript was printed out for ease of complete coding. I decided to code by hand because I had concluded that, firstly the timescale of the study did not allow for evaluating and learning to use a software package, and secondly I believed that a human being with in-depth understanding of the research area, rather than a computer, would have a more profound insight into the research area for

interpretation of the responses. Each participant was given a number preceded by S representing “student”, for example #S1.

The next step was a preliminary read-through of the responses. Following this, in line with my statement about complete coding, I used a line-by-line approach to code all concepts which emerged within the data, of which there were 102. The next step involved taking similar concepts and grouping them together to condense them into codes, following which the next step was counting and noting the frequencies of each code to collate into a table. There were so many concepts noted at first because this was the first attempt at data analysis for this researcher. However this was useful because it provided a sense of the real breadth of the endeavour of learning to play the piano, and outlined minute details of this from the viewpoint of the student participants, This provided a rich picture for the researcher who had learnt to play the piano at least forty years previously but had had a gap of at least 25 years in the meantime prior to the research. Once the coding reached an acceptable stage, a smaller table was created (see page 144), themes developed, and the responses interpreted in the findings chapter.

Piano teacher questionnaire

The responses to the teacher questionnaire were analysed by firstly printing out each response set from SurveyMonkey for ease of reading and hand-coding for the same reasons as above. Each respondent was given a number preceded by T for “teacher”, for example #T1a. The a or b was given according to which phase of the interviews the respondent was in.

As with the student interview data, the next step was a preliminary read-through of the responses to each individual question (as opposed to each teacher’s full set of responses at this point) in order to begin to generate initial coding. This was the foundation to beginning to create an overview of the beliefs and observations expressed. Following this, in line with my statement about complete coding, I used a line-by-line approach to code all concepts which emerged within the data. The next

step involved counting and noting the frequencies of each code and a table was produced with this information (see Appendices 7-16). New tables were then created with space to insert each code that had emerged, with basic and more in-depth descriptions, and each response from each participant was quoted in order to illustrate the meaning of the code. Then followed the process of using the latter tables to combine similar codes to attempt to develop themes from the questionnaire responses. I revisited the data on several occasions in order to ensure that I had coded all ideas, before then developing themes, both from the qualitative and the quantitative aspects of the data.

This was followed by an examination of the complete set of responses from each individual participant in order to create an overview of each teacher's overall beliefs and observations. Braun and Clarke (2013) suggest that collating data by participant helps to see patterns across the whole data set and not just the individual question. Each individual set of responses was then analysed to develop a pattern of behaviours and beliefs for that individual. This cross-checking was extremely enlightening and the results of this phase were integrated with the analysis of the individual questions.

Piano teacher interviews

All teacher interviews, apart from one which was executed via telephone, were carried out using Skype, and were therefore easily recorded, with the interviewee's permission. Recordings were available for 30 days, and the interviewee was given this information so that they could review the recording in order to validate it and have the opportunity to withdraw their consent to be included in the research should they so wish. None of the Skype interviewees withdrew, and neither did the telephone interviewee.

The benefit of the Skype interview recordings enabled transcription to be relatively straightforward, as I could pause the recording and review it to make an accurate account of what had transpired. I gave each interview transcript a respondent

number, which corresponded to the number (preceded by the # symbol) in which they appeared in the printout of the responses from SurveyMonkey. Once the whole interview had been transcribed, I replayed it and compared it with what I had typed, so that I could check for errors in my copy. In respect of the telephone interview, I had to take notes as I was going, which resulted in possibly less data being captured. However this interview was still fruitful.

Following transcription of the interviews, I then printed them out for ease of reading and hand-coding as with the questionnaire responses and applied the same analytical coding process as with the questionnaires. The nature of qualitative interviews is that much more data is produced, so that in-depth answers may be probed and coded with more understanding. There were two elements to the interviews: one was to expand upon some of the questionnaire data, including the participants' explicit definitions of musical intelligence, and the other was to develop understanding about teachers' methods within their practice, to try to illuminate the reasons why some students can read notation and others cannot, in terms of general ideas but also to see whether teaching methods may have been less than conducive to learning for certain individual students. The interviews also allowed the researcher to notice what the teachers did *not* mention, for example certain theories that had appeared in the literature (Brodsky *et al*, 2003, 2008, Gordon, 1993, Luce, 1965, Priest, 1989, McPherson, 1993, 2005, Zatorre and Halpern, 2005), and to include this in the analysis.

For the interview question about beliefs on a definition of musical intelligence, which provided more complex data that could be analysed in terms of quantitative and qualitative data, I created matrices in Word so that the responses could be seen clearly, examined and coded. I coded each element that these teachers had given for their definitions of musical intelligence, then created a table showing each teacher's set of codes. This is shown in the Findings section (p.240??).

The information from this was then compared with the table concerning definitions of musical intelligence that was developed from the questionnaire responses. I

created frequency tables for some of the more qualitative questions as well, in order to demonstrate the frequency of the beliefs, which also helped with the development of themes.

As stated earlier, a profile for each of the study piano teachers can be found in Appendix 10. This was created after the interviews, and includes as much information as possible that was gathered related to elements of their teaching practice, existence of pupils who look continually at their hands, their thoughts on musical intelligence and some information on how they were taught, if forthcoming. I attempted to use the profiles to create a table to show which teachers taught rote, ear, audiation, creative activities and so on, but the information was more qualitative overall, as it also deals, for example, with their thoughts about proprioception, so I kept to a qualitative analysis of this data.

4.7 Ethical standpoint

My research was conducted according to the 'Ethical Guidelines for Educational Research' outlined by the British Educational Research Association (BERA). De Vaus (2014) argues that ethical conduct is important to obtaining quality responses from questionnaires. He suggests that people respond more fully and honestly if they know that strict anonymity and confidentiality will be maintained, even if their email addresses are provided. For the student interviews, an information leaflet and consent form were prepared (see Appendix 5) which explained what my research was about, and assured participants that they were able to opt out of the research at any point, that they would not be penalised in any way for doing this, and that anonymity would be strongly maintained. Appendix 6 provides a copy of the consent form for interviews with students.

Regarding the teacher questionnaire, ethical considerations were covered in the introduction to the survey (see Appendix 8), and voluntary informed consent was assumed by receipt of the completed responses. As with the student interviews, anonymity was guaranteed, and teachers were able to opt out if they wanted to.

They were informed that they could even withdraw their responses after they had submitted them, if they chose to. Teachers were only interviewed if they had given their voluntary informed consent through agreeing to be contacted for this, and by giving their email address at the end of the questionnaire.

During the analysis process, all questionnaire and interview respondents (student and teacher) were given an ID number (#T + number for teachers and #S + number for students). I turn now to a discussion of my findings.

4.8 Findings schedule

The next chapters present the findings that relate to each research question in turn.

The aims of the research were:

1. To place the research in context and develop an understanding of what is involved in learning to read and play notation simultaneously on the piano, and to explore the difficulties that some individuals seem to find with this.

2. To explore the pedagogical beliefs of a sample of real-world piano teachers in terms of how they teach pupils to read and play piano notation simultaneously, in order to place the researcher's own practice into context, establish the focus of what the study teachers deem important and compare their methods to theories in the pedagogical literature.

3. To try to develop an understanding of the meaning of musical intelligence, by examining the literature, exploring teacher beliefs, and generating inferences, and from this to forge a framework or foundation for musical intelligence which might lead to success in learning to play the piano, specifically in terms of the simultaneous reading and playing of notation.

The first aim was partially addressed through the literature review and then supported by data from the student interviews, the teacher questionnaire and the teacher interviews. The second aim was also partially addressed through the pedagogical theories that were found in the literature, and then explored through the teacher data. The third aim was addressed by bringing together ideas from the literature and the teacher interview data and interpreting them with the benefit of the researcher's own experience and observations.

The findings chapter addresses each research question in turn. Research questions 1 and 2 are linked with the first aim of the research, to understand what is involved in learning to read and play notation simultaneously on the piano:

1. What experiences, observations and beliefs do the students and piano teachers in this study share about learning to read and play notation simultaneously on the piano?

2. What beliefs do the piano teachers in this study seem to hold about teaching pupils to read and play the notation simultaneously?

Research questions 3 and 4 are concerned with the aim of developing an understanding of musical intelligence and creating a framework:

3. How might musical intelligence be defined?

4. How might a framework for musical intelligence offer support to piano teachers and their students, particularly in terms of learning to read and play notation simultaneously on the piano?

Chapter 5 presents the data concerning research questions 1, 2 and 3, Chapter 6 is the Discussion chapter and presents the overall themes to have developed from the data, and addresses research question 4.

5 Presentation of Findings

5.1 Learning to read and play notation simultaneously on the piano

This section starts with a brief analysis of the student interviews, which explored the experiences of seventeen of my own piano pupils, plus one of my flute students who had piano lessons with another teacher, in terms of learning to play the piano. The section continues with the data gathered from the teacher questionnaire and interviews. Each student in the findings section is referred to by a number preceded by S#.

Student data

The students in this study were aged from seven years to adult. When asked about their experience of learning to play the piano, all eighteen of the participants agreed that they enjoyed learning. The overarching theme to emerge from this data was that learning to read and play the piano together with the notation involved the concurrent performance of several tasks, both cognitive and physical, and this led to the encountering of several difficulties. The following table sets out the findings that emerged from the interviews.

Students' observations on learning to play the piano with notation
The notation is too complex. I can't see where my hands are going. Sight-reading is difficult. There are two clefs, two staves, two lines to play simultaneously. Divided attention is required. Speed of processing is a problem. Rhythm notation and pulse can be confusing. Co-ordination is difficult to achieve. Mapping the score onto the stave is difficult. Translating the written code into the correct physical response is complex. Playing without the notation is easier (rote or memorising). Guitar tablature makes more sense, as does drum notation. Other instruments are easier because they only have one line of notation to follow (e.g. flute, 'cello, drums).

Table 5.1 Student interview data

Playing the piano with notation is difficult

These remarks illustrate the observations of the students:

> The difficulties, I think, is probably reading the music properly. (#S18)

> It's just that there's a load of notes coming together, and it looks sort of big. (#S11)

> It's a bit like a maze for your eyes. (#S14)

> Um, they come in at different timings and it's just a page full of jam-packed notes! (#S15)

> I find it hard to read both left hand and right hand at the same time, so sometimes I might miss something in the right hand, like an interval, because I'm looking at the left hand, which trips me up in the right hand. (#S1)

> Lots of jumping around between different notes. (#S1)

> Like fitting the hands separately and the hands together. So the left hand and the right hand, trying to put them in at the same time. (#S18)

> Because you have to look at both of the notes and then play them together. So you're putting them both together and then it gets tricky. (#S11)

> So when I'm playing here, I keep forgetting to move up, so I keep going down instead of up. (#S17)

> The music almost looks 3D, whereas I suppose the piano suddenly it's kind of just laid out there…(#S14)

> It's just thinking, no it's not this note, it's the next note, whilst trying to play the piano as well and thinking what note it is. (#S15)

> I don't really like looking at the music because it kind of just confuses you. (#S4)

These students pointed out that the notation contained two clefs, therefore two lines of notation needed to be played simultaneously. This required divided attention:

> You seem to be able to control the left one when it's doing the same thing as your right, but it's harder to control it when it's doing something on its own Because you're torn between the two hands. (#S14)

> Lots of notes in different places and the left hand comes in and makes it tricky. (#S15)

> It's focusing on two things at the same time. (#S3)

> I usually forget everything. I forget if the left hand's meant to go where the right hand usually goes or if the right hand's meant to go there. (#S17)

Participants #S14, #S3, #S4, #S11, #S15 reported difficulty with co-ordinating the two hands to move together yet differently, whilst Participants #S7 and #S5 found it tricky to co-ordinate the eyes on the notation and the hands moving simultaneously without looking down at them.

Comments about difficulties in co-ordination ensued:

> Using both hands at the same time. I find that quite difficult. (#S1)

> You can have different rhythms in each hand and you need to make them fit together. (#S7)

> Yes when you've got the co-ordination you can actually do it. 'Cause I find co-ordination quite hard. (#S5)

Added to this was the need to understand and execute rhythm notation and maintain a strong and steady pulse (#S8, #S4, #S11, #S15, #S7, #S5). Participants #S8 and #S6 argued that other instruments would be easier to play because their notation

consisted of only one line, particularly guitar tablature and drum notation, which made more sense to them. This however could have been because participant #S8 had been playing drums for a while, and participant #S6 had been playing guitar for a while, and they were more attuned to this notation.

> I think rhythm is the hardest when I'm going from looking at the notes to playing it, I think that's the hardest bit. (#S5)

> Rhythms… in the left hand and you're doing something completely different in the other hand, I haven't really got the hang of that yet. (#S8)

> I think the one that we're doing where you have in the left hand quavers, holding down the G and then doing the octave G in quavers, and you have different stuff, slightly kind of dotted rhythms, it's quite hard putting them together because you can kind of want to play them at the same time. Because if you do something with one hand, you kind of want to do the other things as well. (#S4)

> When it's harder rhythm and it's lots to remember in one go. (#S2)

Dividing the attention was at the root of this student's concerns:

> I think it's quite hard if you have the different rhythm on the bass line and then a different one on the top one. I find it quite hard to put them together. (#S7)

Another theme to develop from this data centred around proprioceptive, kinaesthetic and spatial abilities, as demonstrated by those students who admitted to feeling uncomfortable with not being able to see their hands while they were reading the notation (#S16, #S5, #S8). This suggests that, in order to read and play notation

successfully on the piano, students need to have a strong internal sense of keyboard geography, good co-ordination, and reliable sensory skills.

Asked to confirm what she meant by difficulties were with reading and playing piano, Participant #S16 said:

> Having to look at the music and not at my hands! I can't see where my hands are going! … so I often get the wrong notes. (#S16)

Her comments were supported by others in the student sample:

> I think I sometimes…prefer looking at my hands because I don't trust them to go to the right place without looking at them. So that works. (#S5).

This latter comment from participant #S16 suggests not only inexperience at developing proprioceptive skills, but also a lack of internal keyboard geography which at the time was not subsequently disproven by covering his hands, despite the fact that, when their hands were covered with a light piece of card in a lesson, participants #S4, #S5, #S6, #S8, #S15, #S17 and #S18 mostly improved their playing dramatically when focused on the notation and learning to feel where their hands were going. It seemed that they needed to develop confidence in their own ability to find the keys without looking at them, but could if challenged. Participant #S16 had only been learning for about a year, so perhaps had not yet built up this confidence and keyboard geography knowledge.

Participants #S4 and #S8, who managed to read the notation to a certain degree, albeit quite slowly, employed the strategy of looking at the notation, memorising a very short chunk, and then looking down at the keyboard to find the appropriate keys, because they could not process and execute the notation quickly enough (for example Participants #S8 and #S4). This lack of ability to map the written code onto the keyboard led to hesitant and disjointed playing:

> I find out where the notes are on the piano, then I look up at the music to see if I've got the notes right, and then I play the notes and then I basically do the same for the other hand. (#S8).

Participant #S4 was an advanced student who had previously had lessons with another teacher, and could read notation, but seemed to find difficulty with being able to process the notation quickly enough to find the appropriate piano keys in time, and this resulted in many hesitations. He commented that:

> I prefer looking at the keys like being able to just remember what to do and kind of where everything goes. (#S4).

The attempt by some of these participants to avoid looking at the notation and instead to try to remember how a piece sounds, and learn it somehow by memory or by copying the teacher, lends support to the notion that reading and playing piano notation simultaneously is difficult for some individuals (#S8, #S11, #S15, #S18, #S4), and is also strengthened by the observation that some of the students use inefficient fingering almost as a response to a difficult and possibly stressful cognitive activity. This was one of the areas I was keen to examine, having observed this phenomenon during my teaching. It seemed that some of the students did not really understand that good fingering can 'make or break a piece' (Newman, 1984, p.96), and can help them to learn to play a piece comfortably, consistently, and therefore confidently, and build a strong kinaesthetic memory of it. These remarks illustrate:

> …it's just kind of whatever finger gets there first sometimes, it's just, that's about the last thing you think about. (#S14)

> I usually just tend to make up the fingering. I would use the fingers that are closest to the notes. And then go up to and then move my whole hand up to the B. I just normally start with my thumb. (#S8)

> I try and use most of the fingering but sometimes the fingering that's on the page is trickier for me so I kind of use my own way of doing it. (#S15)

> I don't always use the same fingering because sometimes I find it a bit weird and sometimes it's quite hard the fingering they normally suggest on a piece. (#S7)

Lack of consistency with fingering makes it extremely difficult to learn a piece successfully and fluently because there are no linear links between the fingers for phrases and no use of set patterns of fingering, and a sound tactile memory of musical chunks and patterns cannot be created and stored. Playing becomes very random. The brain thrives on creating and using patterns (Science Daily, 20180), as well as maintaining some form of consistency in which fingers are used, in this instance, which it cannot do if the student is not engaging in sensible and consistent fingering.

Aside from difficulties with the notation itself, these students commented on problems with technique, such that they found it difficult to play fast passages comfortably or successfully. These remarks illustrate:

> …when it starts moving all over the place my fingers keep getting muddled up. (#S13)

> Yes, you have to move your fingers fast and that's something I'm not very good at. (#S18)

This could have been due to lack of consistent or sensible fingering, lack of practice or, in the case of those who had only been learning for a short term, lack of experience.

Some of the participants said that they preferred to be shown how a piece sounded first in order to understand it, suggesting that the notation is difficult to understand and make musical sense of, for example this student:

> I probably just need somebody to show me first and then I'll get it. (#S6)

Students also commented that the learning was time-consuming, and practice was disliked:

> Having to sit down and practise for long periods of time just to get one bit. (#S3)

> I don't like practising. Because the tunes get harder and harder. (#S17)

> You have to keep on playing it over and over again until you get it right! #S11)

Practice is arguably disliked if a task is difficult or if the individual does not know exactly how to practise (Upitis *et al*, 2017, Williams, 2017). Perhaps, however, a lack of practice was at the root of some of the difficulties, which could have been because the students perceived the task as difficult, so a 'chicken and egg' situation, or perhaps I, as their teacher, had not properly specified how to practise, or spent long enough drilling the proper fingering.

Summary

The remarks from the student interviews suggest an overarching theme that piano notation is difficult to understand and to read and play simultaneously, due to the amount of tasks that are required to be performed concurrently, and the concept of decoding a page of notes. The other themes to emerge concerned the need for divided attention between the hands, eyes and brain, co-ordination, finding the

correct keys to play, sometimes quickly, understanding and maintaining rhythm and pulse, use of sensible fingering and concern from not being able to see the hands moving when looking at the notation. Dislike of practice was a final theme to emerge.

I move on now to explore the findings from the teacher participant data in relation to Research Question 1.

Teacher data

As with the student data, the overarching theme to pervade the teacher data was that reading and playing notation simultaneously on the piano is a sizeable multi-tasking endeavour, requiring a substantial set of cognitive and physical skills to be deployed concurrently and, as such seems to be difficult for some individuals. Also reflecting the student data, a significant theme to emerge from the teacher participant data was that a lack of good proprioceptive skill underpins some of the difficulties that are apparent in reading and playing notation simultaneously. Dividing the attention, co-ordination, finding the correct keys to play, rhythm and pulse, use of sensible fingering and dislike of practice were themes that were also common between the student and teacher data. I will now address the findings from each of the questionnaire questions in turn as they relate to Research Question 1 and the first aim of the research.

Questionnaire question 1

The data from questionnaire question 1 focused on the difficulties that the teachers believed their students encountered when learning to read and play piano notation simultaneously on the piano. Table 5.2 and Figure 5.1 below display the list of possible difficulties that were provided in the questionnaire together with the number of teachers who said that they noticed that at least some of their students encountered these. The initial coding can be found in Appendix 12.

Difficulty	No. of teachers mentioning this
Using both hands simultaneously	55
Remembering and finding the notes	50
Rhythmic issues	44
Dealing with two staves	42
Which fingers to use	35
Direction	34
Concern because cannot see hands	35
Mixing up the clefs	32
Matching layout of score to keyboard	26
Busy score	20

Table 5.2 Difficulties reported in reading and playing piano notation

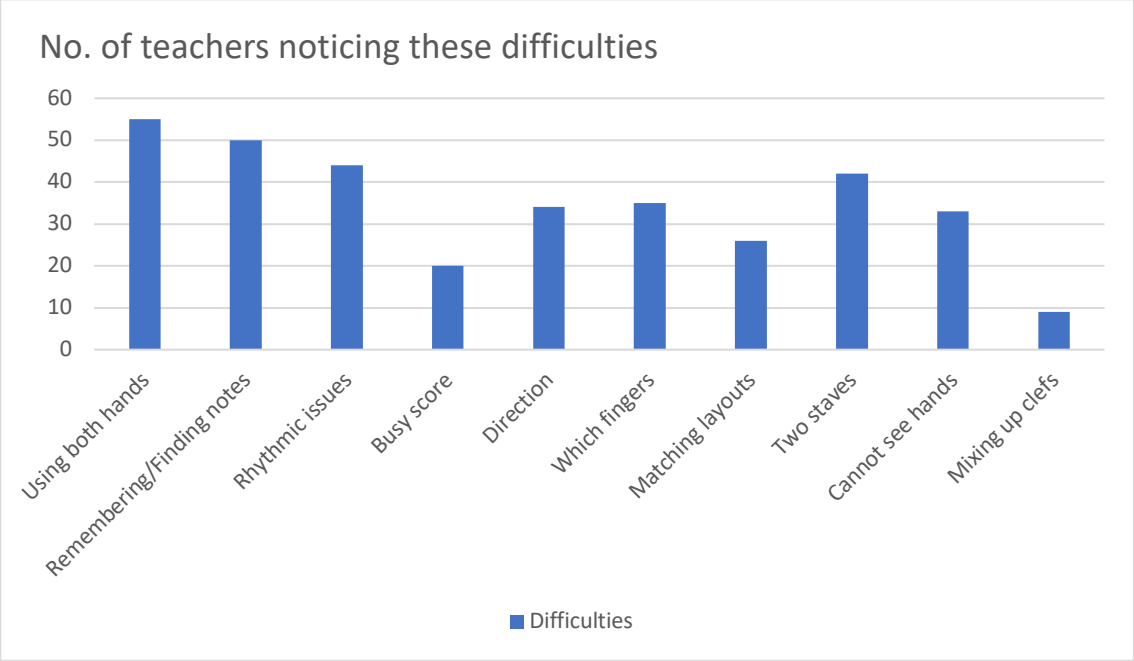

Figure 5.1 Difficulties reported in reading and playing piano notation

All seventy-two participants answered the question. The data suggested that all ten of the given difficulties in the list were encountered by at least some, although not necessarily all, of the participants' students, which supports the overarching theme that the simultaneous reading and playing of notation on the piano is complex, in terms of cognitive and physical abilities.

Most items in the list attracted a high response rate, but it should be noted that these figures only represent teachers who said that they had observed these difficulties, and the numbers do not reflect precisely how many of their students found these areas difficult. This is probably because the teachers would have taught a range of ages of students demonstrating different ability levels. The fact that none of the responses attracted a 100% response rate could be linked to various factors. For example, possible reasons for item 'Using both hands simultaneously' not attracting a 100% response rate could be that some of the teachers' students had not yet begun to try to use both hands simultaneously at the time of the questionnaire or, conversely, some of them had been playing for a little while and hands-together playing was no longer a problem (if it had been a problem initially). Some responses may have been influenced by the mixed levels the teachers were teaching. Equally, the numbers may have been affected by the teachers' memories, as they were separated from the reality of the teaching situation while completing the questionnaire. It could be argued that some of the participant teachers did not detect difficulties in certain areas because their teaching methods were very successful and thus certain difficulties may not have arisen. Numbers and percentages could also be affected by the teachers' subjective opinions and interpretations of the questions.

Key remarks in the 'Other' box concerned proprioception and co-ordination of the hands:

> Youngest ones find it difficult to move a specific finger without looking at it! (#T34a)

> Co-ordination of different rhythms in each hand. (#T16b)

> Left and right hand confusion. (#T26a)

There were also general remarks about the notation:

> Stress, remembering the key, fluency. (#T9a)

> Forgetting/confusing methods of note reading e.g. rhymes for lines/spaces. (#T3b)

A more accurate and detailed portrayal of the possible difficulties encountered in learning to read and play notation simultaneously on the piano may have been obtained by interviewing a selection of each individual teacher's students, because the data would not be 'second-hand', deriving as it did from the teachers, rather than from the actual viewpoint of their students. However this would have been extremely time-consuming, and would have generated an especially large amount of data, and was therefore considered outside of the scope of this thesis. The question was designed to explore general beliefs and experiences of the teachers in the first instance, to place my own work in context in terms of whether what I was experiencing in my teaching practice was common to other piano teachers.

Summary

The overarching theme of difficulty with reading and playing notation simultaneously emerged as strongly throughout the interview comments as it did in the student interview and teacher questionnaire responses with remarks such as those below:

> I would drop the other bits of the curriculum away from focusing on reading, because I think that's how difficult reading can be. (#T24b)

> Reading simultaneously is too much multi-tasking. (#T26a)

> Notation is distracting for young beginners. Especially with the littlies, they struggle to read the music, they just want to play. (#T18b)

> I've just taught a lady in her lunch hour, she really doesn't enjoy the note reading… (#T10a)

Questionnaire question 2

Skills required for reading and playing notation simultaneously on the piano

This highlighted the skills that the teachers believed were required to read and play piano notation simultaneously. Thirty-five codes arose from this, and supported the overarching theme that reading and playing notation simultaneously on the piano is complex since it requires these skills. These codes were condensed into two broad areas. Appendix 13 presents codes and frequencies. Figure 5.2 outlines the skills.

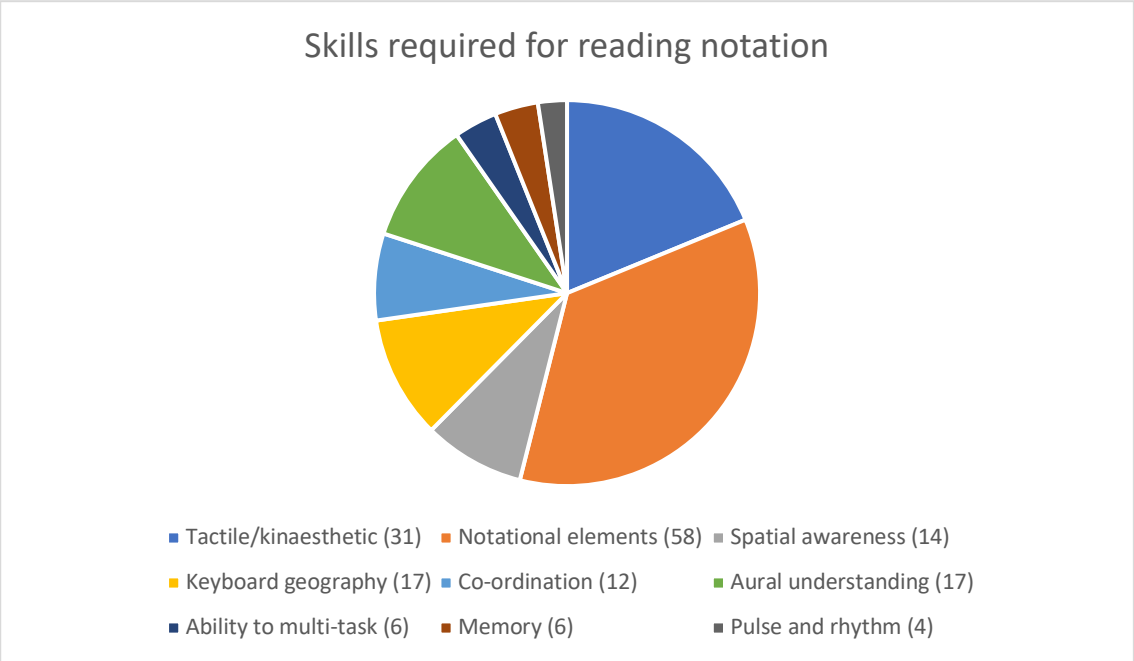

Figure 5.2 Skills required for reading notation

The themes arising from this data relate to the main skillsets that were identified by the teachers as required for reading notation, and they concern two main areas, firstly the cognitive skills pertaining to the understanding of all of the aspects of what is written on the page of notation and secondly the physical skills required for the execution of the notation. All of these skills are interdependent and interlinked, and all underpin the understanding and ability to read and play the notation simultaneously on the piano. Since all of these skills are necessary, these data also support the overarching theme of overall difficulty to have emerged. Table 5.3 below sets out the concepts which emerged from the data.

Understanding and executing the Notation	
Cognitive skills required	. Clefs . Key and time signatures . Reading a [3]vertical, horizontal and diagonal space . Contour and direction . Pitch and rhythm . Internal image of keyboard . Interval and pattern recognition . Short and long-term memory . Aural awareness . Notational audiation . Spatial awareness and spatial ability
Physical skills and senses required	. Proprioceptive, kinaesthetic and tactile senses . Co-ordination and divided attention . Familiarity with the instrument

Table 5.3 Skills required for reading and playing piano notation simultaneously

Cognitive skills

The table sets out the elements which respondents discussed specifically in terms of understanding the written notation in order to be able to process and transform it into a physical response. According to the teachers, this seems to require a sizeable amount of cognitive as well as physical skills, and this data supports the information set out in the literature review about what is involved in playing the piano with notation (Bastien, 1995, Benton, 2014, Concina, 2019, Jäncke, 2006, Laeng and Park, 1999, Liu, 2010, McPherson, 1993, 2005, Parncutt, 1999, Peters, 1985).

General notational understanding

On a page of music notation there is a sizeable amount of information, beginning with clefs, a key signature, and a time signature. The player must understand how to read the symbols on the page, because each note symbol contains information on both pitch and duration (rhythm) (Fourie, 2004, Gudmundsdottir, 2010). Notes are grouped together in rhythmic patterns which need to be understood cognitively and to be played with a reliable pulse. This is also underpinned by a strong internal aural sense. The player must follow the contour and direction of the note symbols, know how to move the hands accordingly, and process all the information quickly in order to play a fluent piece of music.

These quotations illustrate some of the skills the study participants believed were required:

> Ability to take in a lot of information quickly (optically). (#T15a)

> Being able to read notation fluently and relate notes on the stave to notes on the keyboard. (#T48a)

> Players need to have complete confidence in their understanding of the notation and be able to recognise pitches and time values instantly,

> as well as other score features such as dynamics and articulations. (#T38a)

Teachers stressed the need for students to be able to track and follow the notation, and read the notes intelligently, in phrases, rather than just one at a time.

> Seeing the shape and not the individual note. (#T46a)

This also supports the patterning and chunking literature (see p. 161).

Participants pointed out the need to read a large vertical space, encompassing chords, and to see the 'big picture':

> Ability to read two lines of music simultaneously, knowledge of how hands together notation works… (#T11b)

Rhythmic understanding

Several teachers mentioned rhythmic understanding and sense of pulse (keeping a regular beat) as important skills to develop when learning to read and play notation simultaneously on the piano:

> How to count properly and also subdivide the beats. (#T39a)

> Rhythm-notation decoding, and ability to fit that to a steady pulse. (#T7a)

Participant #T3a argued that a lack of rhythmic understanding was often more of a problem than the pitches when learning new pieces or sight-reading, which is also supported by Fourie (2004), Gudmundsdottir (2010) and Sternberg (2020).

Keyboard geography

Understanding keyboard geography means developing a deep and reliable internal visual image of what the piano keyboard looks like, the layout, spacing of the keys, how to locate notes and intervals on the keyboard, and understanding direction. This knowledge underpins the ability to locate and play the correct keys using the proprioceptive, tactile and kinaesthetic senses while reading the notation, and was referred to specifically by these questionnaire participants:

> Secure keyboard geography. Mapping hand to notes on stave. (#T9b)

> …a familiarity with the geography of the keyboard, so that looking at their hands isn't necessary all the time. (#T43a)

> Fluency with keyboard geography to aid gesture (equating notation range to keyboard range). (#T24b)

> Being able to see the keyboard layout in your head without having to check back to the piano keyboard. (#T19b)

Intervallic understanding, patterning and chunking

Interval recognition, understanding the gap between the notes on the stave, was put forward in the questionnaire data as a necessary ability, together with pattern recognition and chunking, in order to read ahead, and supports the literature (Bean, 1938, Deutsch, 1969, Dodson, 1983, Evans, 2008, Gudmundsdottir, 2010, Hodges, 1992, Jäncke, 2006, Kopiez *et al*, 2006 and 2008, Lehmann and Ericsson, 1996, Lehmann and McArthur, 2002, Liperote, 2006, Rayner and Pollatsek, 1997, Schleuter and Schleuter, 1988, Sloboda, 1974, Waters *et al*, 1999, Williamon, 2004, Wolf, 1976). This is also supported by the work of Knerr and Fisher (2008) in the Piano Safari series. Participants remarked that these elements were important in order to be able to read fluently:

> Having a few intervals in muscle memory (minimum of being able to work out a starting note and intervallic reading from there). (#T11b)

> The development of recognising patterns, both visual and aural. (#T19a)

> Recognising basic chord shapes and associated hand shapes. (#T11b).

> Committing common rhythm patterns to memory. (#T24b)

> Pattern recognition both on score and keyboard. (#T15b)

Memory

Nine questionnaire participants said that, in addition to a deep and thorough understanding of the written notation, efficient speed of its processing also relied on good long- and short-term memory. When notation is thoroughly learned, it passes into the long-term memory for storage (Harris, 2014). The short-term memory is activated during the reading of the notation and a few notes are processed here, a pattern or a chunk, and then the long-term memory is deployed in order to find the keys for this section, while re-engaging the short-term memory in order to look ahead to the next chunk of notation. This helps a fluent performance to be delivered:

> The ability to read slightly ahead at a given tempo. (#T15b)

According to the teachers, lack of this ability resulted in needing to look down at the keys, or think about what the next notes were, which often meant losing their place on the score, and resulted in faltering playing. This was also forthcoming in the student interview data.

Aural awareness

Thirteen of the questionnaire respondents mentioned some form of aural ability as a skill needed for reading and playing notation:

> Good ear training. (#T47a)

> Understanding tonality. (#T34a)

> Awareness of harmony. (#T9a)

Some of these aural skills are quite complex, and are developed from experience over time, but can be taught as early as possible. Participant #12a noted that sometimes the ability to listen becomes blocked if notation is given too early, because the visual sense takes precedence when trying to process a piece of notation, and warned that students should:

> Not 'switch[ing] off' your listening when other functions overwhelm you. (#T12a)

Participants said that students needed to listen in order to check for mistakes:

> Aural awareness to match what you see to what you hear. (#T18b)

Notational audiation

Well-developed aural skills and the ability to engage and listen intelligently form the basis of being able to hear the music internally from the page of notation, known as notational audiation (Brodsky *et al*, 2003, 2008, Gordon, 1993, Odam, 1995, Zatorre and Halpern, 2005). This then allows the player to make a connection between the visual representation and the internal aural representation, and imagine how the piece will sound when played, without having first heard it externally, which speeds

up processing and results in confident playing. As set out in the literature review, it was also suggested that this process can trigger the supplementary motor area of the brain, which then goes on to stimulate imagination of the body movements required for playing the correct piano keys. Although none of the questionnaire participants specifically mentioned the theory surrounding notational audiation, or the actual terminology, some of them argued that this was a useful skill for reading and playing notation:

> Inner ear, being able to predict to some degree how the written music will sound before trying to play it. (#T7a)

> Understand everything on the page, know how it's supposed to sound and send accurate messages from brain to hands/fingers. (#T17a)

Spatial awareness and spatial ability

The spatial functions underpin:

- keyboard geography and understanding
- ability to match or map the notation onto the piano keys
- ability to use both hands simultaneously doing different things
- confidence in the position of the hands on the piano keyboard
- ability to look between the hands and the notation without losing one's place

Spatial functions can be argued to be both cognitive and physical for reading and playing notation simultaneously (Helding, 2010, Karma, 1979, 1985, Lehmann *et al*, 2007, Liu, 2010, Shuter-Dyson, 1999). Twenty-one questionnaire participants mentioned or alluded to spatial awareness and spatial ability in terms of playing the piano with notation, and their remarks included:

> Spatial awareness when not looking at the hands. (#T6b)

> Being able to judge distances between notes by touch. (#T13b)

> Ability to jump around the keyboard accurately with minimal looking at hands. Good spatial awareness – being able to see the keyboard layout in your head without having to check back to the piano keyboard. (#T19b)

> They also need to be familiar with the piano and roughly the distance between keys. (#T38a)

In terms of understanding the written notation, participants suggested the need for spatial awareness for these reasons:

- understanding intervallic relationships
- understanding direction of pitch
- understanding how the parts fit together
- ability to visualise the keyboard layout internally
- reading two lines of stave simultaneously

Participants said that spatial awareness was crucial for:

> …being able to see the keyboard layout in your head without having to check back to the piano keyboard. (#T19b)

And that students should develop:

> A good understanding of the layout of the piano and how that relates to the stave. (#T39a)

Again it seems that a musical-spatial awareness is required for reading and playing notation simultaneously on the piano, something I did not notice Gardner putting forward in his 2004 work.

Physical skills

Not only do pianists have to understand the notation, they also need:

> …to be able to take it in, interpret it correctly and execute accordingly. (#T12b)

The physical execution of the notation is underpinned by the cognitive skills already put forward for the understanding of the notation, but also seems to be dependent upon speed of processing:

> Automatic reaction as opposed to having to process it at point of encountering (sight, how they sound and the execution / kinaesthetically). (#T24b)

> …recognition of notes without conscious effort…(#T9a)

These skills rest on long- and short-term memory as discussed above, as well as practice and engagement with the learning. Some teachers discussed students who could read the notation, but were very slow to process it, and so they learnt it slowly, memorised it and then discarded the notation. For example, this participant said:

> I have other people who are really quite musical and struggle [with the notation] but they're all right with something once they've learnt it. They don't process it immediately. (#T31a)

Co-ordination and divided attention

Co-ordination was believed by thirteen questionnaire participants to be important for reading and playing piano notation simultaneously. These remarks illustrate:

> Being able to co-ordinate two hands whilst keeping eyes on the score. (#T5b)

> Co-ordination – hand/eye – eye/brain – brain/hand: this requires practice until natural. (#T26a)

> Knowledge of how hands-together notation works and coordination between hands. (#T11b)

Co-ordination is linked with the need for dividing the attention between the hands, as well as between the hands, eyes and brain, as mentioned by Participant T#26a above (also Parncutt *et al*, 1999, Peters, 1985). Yet, of the seventy-two questionnaire respondents, only three mentioned the concept of dividing the attention. This was mainly in relation to translating the visual notation into a physical response onto the piano:

> The ability to use both hands simultaneously doing different things. (#T39a)

> To be able to do more than one thing at a time as hands can be playing a different timing of notes. (#T25a)

Proprioceptive, kinaesthetic and tactile senses

Proprioceptive skill emerged as an important theme throughout the teacher questionnaire data, aligning with the theme apparent in the student data where not being able to see the hands was a concern. If reading from the notation, pianists

need to be able to know where their hands and fingers are on the keyboard without looking at them, and to be completely confident that they will move correctly since the performer needs to keep their eyes mostly on the score to deliver a fluent performance. The tactile sense aligns with this and is necessary because the player also needs to know how the playing feels, how each pattern of keys feels, how each chord and scalic pattern feels to execute. Kinaesthetic ability in playing the piano is required for knowing how to move the body, how far to stretch for an octave leap, how much and how far to move a hand or fingers to achieve an aim. Of course, spatial awareness and spatial ability are required for this, and all are inextricably linked.

In contrast to the literature, where these tactile skills are barely mentioned, twenty-four out of the seventy-two questionnaire respondents mentioned good proprioceptive, tactile and kinaesthetic ability as being the root of successful simultaneous reading and playing of notation. These next remarks illustrate:

> Pupils need to play notes mainly by feeling them from the very early stages, so that eyes can remain on the printed score. (#T22a)

> Knowing which note is under which finger. (#T11b)

> Understanding…chord shapes (by touch and visually on the score). (#T34a)

> Confidence in being able to rely on finger/muscle memory for fingers to be able to find their way around without having to look at them all the time. (#T2b)

> Excellent keyboard geography and trusting yourself that your fingers are moving correctly. (#T4a)

Arguably these physical skills rely on a certain familiarity with the instrument:

Thorough sensory familiarity with the keyboard. (#T50a)

Summary

The long list of skills required for reading and playing piano notation simultaneously divided into two main areas, cognitive and physical skills and senses, and considering this, it is perhaps not surprising that some students try to avoid learning to read the notation, and thus make their pianist journey more difficult. I turn to this area now.

Questionnaire question 3

Questionnaire question 3 asked if the teachers had any students that looked mostly at their hands when they were being asked to play from notation, or who tried to memorise a piece before they really knew it. The teachers were also asked why they thought their students might do this, and what effects it seemed to have on their learning. The teachers were also asked what they themselves did, either proactively to avoid the behaviour happening in the first place, or to try to eliminate it. This area was followed up in the interviews for more details. Once again this probing was to try to place my own experiences in context.

Figure 5.3 below provides a clear visual account of the breadth of the phenomenon.

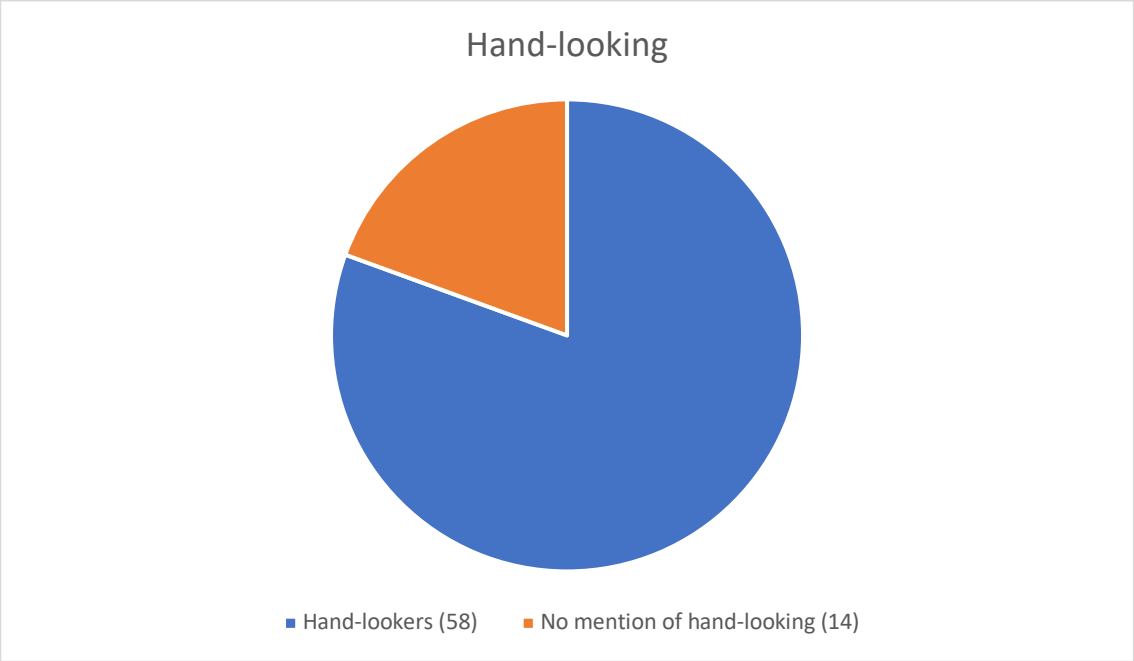

Figure 5.3 How many teachers had at least one hand-looker in their cohort

Although fourteen questionnaire participants made no mention of hand-looking, fifty-eight said that they taught at least a few students who looked mostly at their hands when being asked to play from notation. Sixty reported that they had some students who tried to memorise a piece before they were completely ready to do so. A sizeable number of participants taught students who did both. All fourteen teachers who participated in the interviews had at least one student who persisted in looking at their hands more than trying to learn to focus on the notation. It could be argued that this avoidance behaviour may be indicative of the notation presenting difficulties, yet it could equally be argued that those who did not mention hand-looking used more effective teaching methods from the beginning of tuition which avoided this phenomenon. Participant T#21b said that she did not have any hand-lookers in her cohort and attributed this to her carefully planned beginning lessons which included singing and playing by ear using a mini stave.

Another possibility is that for those who did not mention hand-looking, all of their students were natural readers and understood the notation from the start.

Many of the teachers with hand-lookers expressed their frustration with this behaviour, especially concerning what they regarded as the slow, faltering, mainly inaccurate and inefficient playing outcomes:

> I … have a nine year old boy who … tries to memorise too early and before he has grasped all the details on his music. … he seems to be concerned about where his notes are on the piano. Also tries to remember from the patterns of the music rather from the script. (#T24a)

> Yes, it is quite difficult. I have a young girl who looks at her hands nearly all the time and can't seem to do both… (#T10a)

Respondent #3b reported having a student who chose to look up into the distance, away from the notation or the piano, when asked to read from the score instead of looking at her hands, demonstrating a real determination to avoid the notation. Anecdotally, as a researcher and piano teacher myself, I have also experienced this with two students, one of whom has an excellent ear having learnt to play the violin according to the Suzuki method, and the other seeming not to understand notation. The data from this question supports the overarching theme of difficulty.

Summary

The data inform the reader that hand-looking and early attempts at memorising are indeed prevalent in many of the teachers' cohorts. I move on now to exploring the reasons suggested by the teachers for this phenomenon.

Questionnaire question 4

This asked the reasons why the teachers believed students engaged in this avoidance behaviour. Thirty-nine codes were generated (see Appendix 14). These

were then condensed into seven broad themes which were believed by the teacher participants to underpin hand-looking and avoidance behaviour when learning to read and play notation on the piano. This data is set out in Figure 5.4, and Table 5.4 illustrates the themes to have developed.

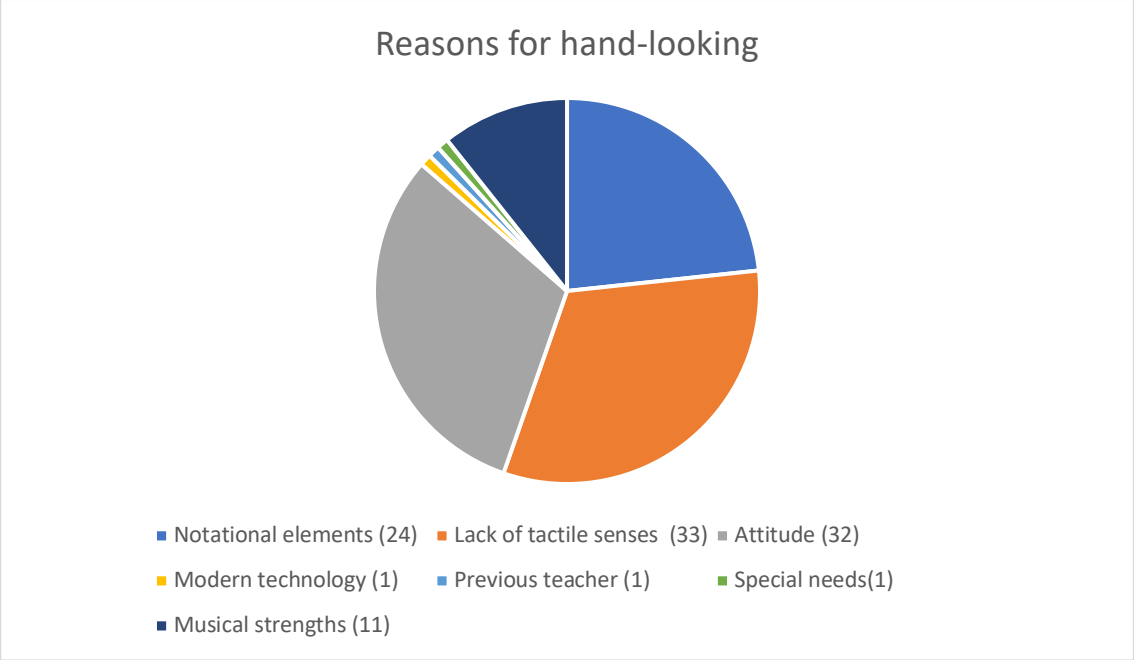

Figure 5.4 Main themes emerging from reasons given by teacher participants for hand-looking and early memorising

Notational elements	. Understanding the notation . Executing the notation
Lack of proprioceptive, kinaesthetic, Tactile and spatial skills	. Proprioception . Kinaesthetic awareness . Tactile sense . Spatial awareness/ability . Keyboard geography/knowledge
Attitude	. Avoidance . Laziness . Lack of practice

	. It's difficult . It's too time-consuming . Lack of patience in analysing notation
Modern technology	. Prefer to learn from online tutorials
Previous teachers' methods	. Giving too much rote repertoire . Giving pieces too easy to memorise . Inefficient method
Special needs	. Dyslexia . Dyspraxia . Aspergers syndrome
Musical strengths	. Good aural skills . Excellent musical memory . Ability to learn patterns easily

Table 5.4 Themes arising from the reasons given for avoiding the notation

It was interesting to note that the language some of the teachers used when answering this question was quite negative, and included words such as 'avoid', 'refuse', 'unwilling' and 'wilful', in terms of not reading the notation (Participants #T31a, #T35a). Participant #T31a talked about students who were either 'willing to accept' reading or those who were not. It could be argued that this choice of language reflects the frustration of the teachers, and that they feel that the students are not making the effort to learn, rather than perhaps the teachers understanding that the behaviour might arise from the difficulties in learning to read and play the notation, or that there may be some other reason such as using a preferred strength to learn a piece such as ear playing. This language may also reflect the importance that the teachers attach to learning to read notation. I turn now to exploring the themes that arose from this data.

Notational elements

Six teachers acknowledged that their students often tried to avoid reading and playing the notation simultaneously because of the multitude of tasks involved:

> …we are asking them to do too much at once. It's an almost impossible task for them to achieve, they are overwhelmed so they cope however they can. (#T21b)

> Because they are trying to process too much information. (#T45a)

> Those who memorise a piece often do so because they struggle with pitches and intervals. (#T4a)

Note reading skills not solid enough, brain automatically avoids reading. (#T41a)

Lack of proprioceptive, kinaesthetic, tactile and spatial skills

Twenty-eight teachers believed that a lack of proprioceptive, tactile and kinaesthetic awareness and confidence was at the root of looking mostly at the hands, and believed that some students found it difficult to move a finger without looking at it first.

> In the early stages, not trusting their fingers to receive messages from the page via the brain! (#T37a)

> They tell me they need to see what they are doing. (#T29a)

> They think they can't find the notes without looking at their hands. (#T17a)

> They lack confidence and sometimes lack spatial awareness to play a note without looking. (#T19b)

Participant #50a said that she based her whole teaching strategy around a strongly developed tactile sense right from the beginning:

> Developing a thorough, felt, relationship with the instrument through the touch of fingers on keys. (#T50a)

Some teachers suggested that their students had not developed their internal keyboard geography or spatial awareness sufficiently which was why they believed that they needed to constantly refer to their hand position on the keys:

> They are insufficiently familiar with the keyboard, with actually feeling it. (#T50a)

This lack of keyboard geography also resulted in an inability to internalise the keyboard layout:

> Beginners who are not confident in holding the keyboard in their head look at their hands because they lack confidence. (#T19b)

Participant #35a said that most of her students were hand-lookers, and that she believed that it was because of habit and insecurity.

Attitude

Forty questionnaire participants believed that students engaged in persistent and deliberate avoidance of the notation through hand-looking or early memorising because it was easier than making the effort to understand the notation. They implied that these students were lazy or impatient, and that this behaviour was

indicative of the difficulties which they encountered with the notation. These remarks illustrate:

> To get round the difficulties of note reading. (#T18b)

> Because reading from notation is time-consuming they try to memorise it as a short cut. (#T4b)

> They think it will be easier to play if they just focus on the keys and aren't thinking about the notation at the same time. (#T38a)

> Easier to remember the position of fingers on keys than position of notes on stave. (#T34a)

> They perceive reading of the score to be difficult, and think it is easier to guess what note comes next. (#T13a)

> Because they are impatient to learn the piece. They want to be able to play it straight away. (#T23a)

> They try to memorise because they think the piece will be learned more quickly and hope thereby to avoid having to read it! (#T50a)

> [they tend to]…be people with excellent musical memory who feel it is 'easier' to just remember the music, and see that as less effort than learning to read all the notes properly. (#T31a)

These comments arguably support the premise that reading and playing notation simultaneously is difficult and time-consuming to learn for some students.

Lack of practice in terms of trying to play from notation was cited by the following questionnaire participants as a reason for pupils preferring to look at their hands,

memorise, and avoid reading the notation, and this element also falls under the umbrella of attitude:

> Thinking about the students who have real problems with this through my 15 years' experience, laziness and lack of regular practice is evident. (#T33a)

> They don't make the mental effort to learn notation whatever method you employ. (#T32a)

> Unstructured practising despite what the teacher might suggest. (#T16a)

The following teacher discussed an adult student who did not practise enough because she did not enjoy reading the notation, which again suggests that it is difficult, and again her language is indicative of frustration:

> She just will not practise reading enough at home. (#T31a)

Two teacher interviewees believed that a lack of patience affected the motivation and concentration of the students, particularly in terms of learning to read and play from notation:

> I believe this is also a symptom of a lack of patience in analysing notation – impetuosity really and the desire to get onto the next piece. (#T16a)

However, it is also important to note that Williams argues that a teacher should 'allow pupils to look at their hands and back to the score', (2017, p.24) because 'this is a useful skill in itself and helps those 'half playing' from memory to avoid getting lost', (2017, p.24). This behaviour was demonstrated by the comments of the student participants #S4 and #S8.

Modern technology

An interesting observation to develop from the data was that modern technology may be partly responsible for some students not wanting to make the effort to learn to read notation. This is because there exists a sizeable number of online tutorials, most of which demonstrate physically, or graphically, how to play repertoire, mainly popular music, on the piano or keyboard, so that the students learn by copying a video. If they have not had music lessons before, or if their peers show them this method, being able to achieve their aim in this way arguably suggests to them that this is the way learning to play the piano is carried out, which may result in reluctance to learn to read with a piano teacher because they can play something much more complex and satisfying in their own way. Students then often perceive trying to learn to read notation as regression, since they often need to begin with simplistic material, which can seem uninteresting and meaningless in comparison with what they have taught themselves to do already. Participant #T31a argued that modern technology is affecting how people are learning and also how people are teaching, and these teachers argued that learning in this way does not develop the students' listening skills, relying, as it does, more on a different form of visual skill. This way of learning also seems to result in much inefficient use of fingering, which again inhibits a fluent performance.

> …I do find it quite a problem, the note reading, in this life of people being able to do things very quickly and children getting very good at the games on their phones. It's harder, I've noticed over the twenty years, it's harder to get them to really stick with the note reading. (#T10a)

In a similar vein, one participant mentioned a student who had come to her for piano lessons but had taught herself several popular songs using YouTube tutorials. This student had found learning notation difficult, despite a gentle approach using a structured method book, and had regarded this as a backward step, since she could

already play more interesting pieces using technology. She had ceased instruction within the first term of learning.

Previous teachers' methods

Two respondents attributed the constant engagement in hand-looking and early memorising to the methods of some of their students' previous teachers, and argued that these former teachers had given too much rote work, which had resulted in students thinking that this was the only way to learn, and therefore becoming lazy and reluctant to learn to read which seemed more difficult:

> Teacher error in early stages – only giving them music they could pick up quickly aurally so they haven't needed to rely on notation. (#T15a)

> They assume they can do it from memory because they are used to having memorised pieces and not used to learning lots of new material from notation. (#T6a)

This is supported somewhat in the literature by McPherson (1993) and Priest (1989) who found that some teachers were reluctant to teach their students to play by ear in case they became lazy and did not make the effort to learn to read notation.

This phenomenon is also evident from the comments of Participant #T18b, who said that she taught her students by rote for their first year, gradually introducing notation, and found that she still had several hand-lookers. She too believed that her students found it difficult to trust their fingers to move without looking at them, supporting the remarks about lack of proprioceptive and tactile skills made earlier, but it could be that these students had also become reluctant to try to read the notation, having been able to play much by ear and rote for an extended period of time. They were not interested in adding a new learning problem to what they could already achieve.

Participant #T3a said that she had found that several students, aged around eight or nine years, who had come to her having previously learned according to the Yamaha method, were unable to read and play notation simultaneously (also Woody, 2012, in terms of the similarly ear-based Suzuki training). Harris (2008) also argues that students who have learnt purely by ear may display wonderful technical proficiency on the instrument, yet once notation is introduced, the same pupils encounter a shock and may have difficulty with this at the start. Having taught the Yamaha method myself, I understand that the reason that these students look at their hands continuously is because they have learnt by ear from their very first group lesson, the majority starting at around four years old, and when the notation is gradually introduced, many still prefer to use their ear to learn new repertoire, even though they may be able to read the notation to a certain degree. Participant #T3b said that she believed that, whilst this method may be a good system for younger children initially, it is important to introduce the notation at a timely point, otherwise the children do not learn to read. Harris believes that 'there are considerable benefits in learning to play and read more or less at the same time' (2008, p.28), and Priest (1989) also said that this was possible if reading and ear playing are developed simultaneously.

Ear-playing and rote teaching will be explored further in the section regarding teachers' beliefs on the best way to teach students to play the piano.

Special needs

Participant #T24b said that the only students who persisted in hand-looking in her cohort displayed traits of dyspraxia or dyslexia, which is supported by Lowe (2005), and this participant believed that these conditions hindered the development of both proprioceptive ability and multi-tasking. She seemed to feel that this was the only reason that individuals might display a lack of proprioceptive ability and feel the need to look at their hands constantly. Similarly, Participant #T4b found that her only hand-looker was a student who presented with Asperger's Syndrome.

Musical strengths

Despite a wealth of negative comments about students who avoided looking at the notation, a few teachers regarded ear-playing and memorising more positively and it could be argued that they thought of this way of learning more as a strength:

> A few quite musically gifted students will get it mostly right from hearing the piece a few times. (#T50a)

> I've got some people who've just got a very good musical memory, and it's not that they can't read it, they very quickly memorise it, so read it for a few days, and then they've got what they need, and they come away from the music. (#T31a)

> …in many ways learning by ear and memory is in itself a useful skill that may, over time, bring its own rewards. (#T26a)

> However, they do seem to develop good aural and musical memory skills. (#T15a)

> Those who try to memorise/rote learn, tend to have great aural and muscle memory. (#T24b)

According to these teachers, this kind of student may:

> …have an excellent ear and try and rely solely on memory and can often be note perfect. (#T25a)

> …find it easier to remember the sounds than interpret the symbols. (#T8b)

> Often if they struggle a lot with notation, they're actually very good at aural skills or improvising. (#T10a)

> …there is an advantage I think. Those who play well from ear and don't rely on the music play more musically very often. (#T1b)

These comments support the observation that the visual sense can dominate the aural sense, particularly in terms of the development of musicianship and the aural abilities that seem so fundamental to learning (Gordon, 1993, McPherson, 1993, 2005). Indeed, Participant #T1b was one of a few teachers who believe that ear-playing or rote playing enable the performer to play more musically, and her comment contrasts sharply with those teachers who seem to believe that a musical performance cannot be achieved if the student does not look at the notation to see the dynamics, articulation and other musical instructions written on it. She continues, though,

> The downside is that if relying on memory, in concerts or exams, a small slip can throw them completely. (#T1b)

Despite suggesting that the notation may be a barrier to musicianship, none of these teachers seemed to give a positive reason why ear-playing might be a useful skill to have or to learn, however, in terms of learning to read and play piano notation (Gordon, 1993, Luce, 1965, McPherson, 1993, 2005, Priest, 1989).

Other teachers mentioned students who observed and memorised the patterns created by their hands and fingers on the piano keys, and who used this as their preferred method of learning pieces. It transpired that the students who played like this said that this was because they could make more sense of the piece in this way than by trying to understand and process the notation. This could be argued to represent another visual-kinaesthetic way of internalising the music, perhaps distinct from the difficulty that some students find, and more because it makes more sense to their way of thinking and learning. These comments illustrate:

> Easier to remember position of fingers on keys than position of notes on stave. (#T34a)

> They find it easier to memorise patterns than to read the notation. (#T48a)

Indeed, Knerr and Fisher (2008) bring attention to the fact that music is based on patterns.

Participant #T35a was an accordion player and said that her very good ear had enabled her to pick out pieces by ear and memorise them. She regarded this as 'cheating', perhaps overlooking her own outstanding ability and strength, but she did believe that all students have different strengths and learning styles.

Additionally, in the same way that some students seemed to demonstrate strengths in aural and kinaesthetic ways of learning pieces, other teachers mentioned strengths in reading:

> Some of my pupils seem to take to note learning really quickly and others just don't. …he's always been a really good note reader, he didn't find it difficult at all to read the notes. He just kind of knew the notes almost effortlessly. (#T10a)

> Some people are incredibly good at reading I think. (#T31a)

> I do have other pupils who learn to read notation quite happily! (#T31a)

> He could decode stuff very, very quickly, very bright boy…(#T4b)

These comments support the beliefs of Gudmundsdottir (2010), and Lowe (2005).

Participant #T21b discussed a student who could work something out by ear but then wanted to write it down so that she did not have to keep remembering how it went by ear, which may suggest a preference for notation over ear-playing (see also Green, 2010). Indeed, during the student interviews, one participant stated that he much preferred to play using notation, as he regarded it as a 'crutch' or a set of instructions to follow, and found trying to learn something by rote or by ear an insurmountable challenge. It seems that some students need a written form of information from which to work in different areas of life and work.

Similar to Bernard's (2005) action research project in which she assessed her students' learning styles in terms of a framework using Gardner's list of intelligences (2004) so that she could guide them to an appropriate workstation in her music classroom, some of the teachers in my study used what they saw as the students' preferred 'learning style' to help them learn, although this is not the way in which Gardner (2004) intended his strengths or intelligences to be interpreted. These remarks illustrate:

> I try and tune into their strengths and also use a simple questionnaire to discover if they are mainly visual, auditory or kinaesthetic learners. (#T39a)

> Have found through many years of teaching that different students have different learning styles. (#T49a)

> They are more natural at playing by ear than a visual learner. (#T2a)

On the other hand, other teachers saw the potential of using the students' strengths to develop and improve the areas in which they seemed to show less ability. This remark illustrates:

> I get to know my students and how each one responds to different materials and strategies, and develop custom lessons that will support

their learning style but provide enough challenge in weaker areas. (#T39a)

It could be argued that these beliefs are positive in that they demonstrate that these teachers are aware of, and identifying, different ways of learning, be these viewed as learning styles, strengths or intelligences, and Knerr (2008) believes in developing weaker and stronger areas. Similarly, Green (2010) argued that, if teachers are aware of different learning styles among their students, it could make them more open to a wider range of pedagogic approaches, which could enable more learners to succeed in their musical journeys. Indeed, Baker argues that it might well be that learning which always starts with the printed page is unsuitable, or at least, not most suitable for some children regardless of their musical potential (2016, p.292).

Summary

The teacher participants provided various beliefs about the reasons for hand-looking, including lack of notational understanding, lack of proprioceptive, kinaesthetic and tactile skills, lack of musical-spatial awareness and ability, lack of good keyboard geography, a negative attitude to learning and practice, reluctance to learn notation if they can learn by ear and rote, the use of modern technology meaning that they can learn by watching videos, previous teachers' methods including too much rote, special needs, and differing musical learning strengths. The data also support the overarching theme of difficulty, and help to lend justification to my study firstly because they confirm that other piano teachers apart from myself do have piano pupils who look at their hands constantly instead of at the notation, which suggests that the notation may be difficult to execute for some students, or that different students have different strengths.

I move on now to explore the outcomes that the teachers put forward as a result of avoidance of notation.

Questionnaire questions 5, 6 and 7

Teachers' beliefs about the negative effects of avoidant behaviour

These questions focused on asking the teacher participants what they believed the effects of continual hand-looking seemed to be. Twenty-one codes were generated from this data, which can be found, together with their frequencies, in Appendix 15 for Question 5 and Appendix 16 for Question 7. Seven themes emerged from the data, concerning different problems ensuing from hand-looking, the fact that learning was very slow, pieces were never finished, musicianship and fluency suffered, players lost their place in the notation, and note-reading did not develop. Figure 5.5 below sets out the codes that attracted the most remarks (with frequencies of four or more):

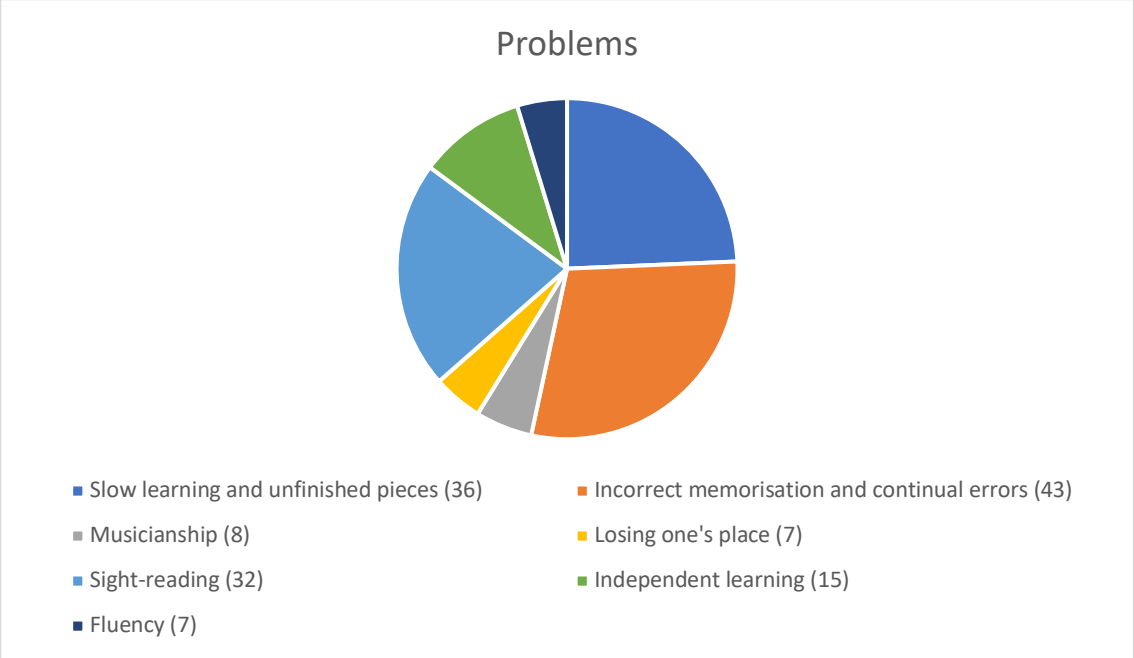

Figure 5.5 Problems arising from avoiding the notation

Slow learning and unfinished repertoire pieces

Only three of the seventy-two questionnaire participants did not regard the avoidance of trying to read and learn notation as a problem. One of these said:

> I don't think it is necessarily a problem as long as they are learning it correctly. (#T11a)

However thirty-six teachers specified that they believed that hand-looking and attempts to memorise without knowing what they were memorising slowed down their students' learning. Within this category fourteen teachers also lamented that pieces tended not to ever be finished. This situation was clearly causing much frustration, both for the students and the teachers. Participant #T47a went so far as to say that avoidant behaviour was 'disastrous', and that the students really do need to read the notation. Participant #T49a argued that independence for learning new pieces could not be achieved if the notation was not learned.

Incorrect memorisation and continual errors

Sixty remarks concerned various problems that occurred when the student was not reading from the notation. One such area involved incorrect memorisation:

> They often memorise incorrectly and then find it hard to play from the score to rectify this. #T50a

> If they memorise it too early, it makes it harder to unlearn mistakes. #T18b

> Students who have tried to memorise too early, continue to play the wrong notes…and make the same errors (omitting details of articulation etc.). #T36a

Other problem areas were as follows:

> Continual pitch/rhythm/fingering mistakes #T30a

> Memorisers can also tend to use inefficient/clumsy fingering…which means that a piece will always be a bit awkward. (#T7a)

> Frequent mistakes as they 'guess' what notes to play. #T5b

> Because they don't see the corrections on the score the mistakes stay and get built into the memorised version. #T12a

> Lots of repeated mistakes in pitch and rhythm. #T17a

> Negatively affects rhythm. #T9b

Musicianship and musicality

Some teachers were concerned that avoiding learning to read and play the notation simultaneously resulted in less than musical performances, because they believed that the student was not seeing the details in the score concerning dynamics, articulation and other instructions. For example:

> Failure to observe detail of articulation and dynamics. (#T34a)

One participant believed that the avoidance of the score did not allow students to develop an understanding of the structure of repertoire pieces, and how they are composed:

> It slows down the comprehensive understanding of how composition is formulated. (#T43a)

Losing one's place within the notation

Six teachers found that those of their students who looked constantly at their hands instead of at the notation when learning a new piece lost their bearings, which meant needing to start again from the beginning when they made a mistake or forgot where they were in the piece.

> They…have no idea where they are on the music. (#T25a)

Sight-reading

Good sight-reading depends upon having learnt and deeply understood notation and committed it securely to long-term memory. Forty-five of the sixty-three teachers who responded to this part of the questionnaire mentioned that they believed that the avoidance of reading notation had a negative effect on sight-reading. Participant #T42a suggested that this was partly because students were not forging the link between the visual information on the score and the tactile response in the fingers, resulting in and from a lack of proprioceptive skill, which aligns with comments from Question 4 about why students try to avoid reading in the first place:

> Sight reading – not confident of hand and finger placement. (#T42a)

> Definitely sight-reading. They can't pay attention to the score if they are looking at their fingers constantly. (#T13b)

> Sight reading is affected because the knowledge of the notes is insufficient and leads to playing that isn't fluent. (#T10a)

> Sight reading obviously – those students get away without doing much so they don't improve. (#T7a)

The language used in these comments arguably demonstrates the frustration felt by these teachers, five of whom stressed that, if students were continually looking at their hands, they did not have chance to develop their note-reading skills. Teachers believed that keeping the students' eyes mainly on the notation enabled them to:

> …develop[s] trust in the hands and fingers on the keyboard and really feeling (as well as seeing on the notation) interval stretches, scale or arpeggio passages. (#T50a)

> …build[s] up a tactile map of the keyboard. (#T37a)

> develop their spatial awareness, geography of the piano. (#T15a)

> This way they are learning the piece by what it feels like, learning distances from note to note… (#T12a)

> Reading should trigger…piano mapping, body awareness. None of this can be developed if we fix the eyes on the keyboard. (#T3a)

Independent learning

Teachers were concerned to develop their students' sight-reading ability particularly for examination purposes, but twenty-one of the sixty-three respondents to this question believed that avoidance of notation learning resulted in a lack of independence on the part of the student in terms of being able to learn new pieces without the support of their teacher:

> …some pupils can play really well from memory but then are very poor sight readers and so not able to help themselves to new music independently. (#T31a)

> Confidence and independence in attempting a new piece are inhibited in pupils who always strive to play from memory. (#T4b)

> By not being comfortable in reading notation, it can inhibit the independent learning, as they are unlikely to try something new with notation away from the lesson. (#T18b)

Fluency

The teachers argued that, if students are not attempting to read and play, their reading is not consolidated and development of fluency, literacy and future independence is hindered, because they sometimes memorise a piece incorrectly, and hesitations become a permanent part of their rendition of the piece:

> Impedes development of fluent performance. (#T9b)

> The main problem is frequent pauses in the piece, while they look back at the score to try and remember the next notes and often also lose their place. Once this has become entrenched it becomes extremely difficult to ever get that piece flowing smoothly because in addition to the notes they have memorised these pauses. (#T38a)

On the other hand, fluency may not present a problem if learning a piece by rote or ear, as this participant argues:

> It can be very quick to learn a piece by rote/memory compared to by reading. (#T7a)

This suggests that notation can impede fluency by creating a barrier to it, again implying that the notation is difficult and complicated for some students. However it depends upon the level of complexity of the piece since, as Participant #T28a pointed out, once the individual arrives at around Grade 3, the pieces become much

more difficult to learn by rote or memory, and can often result in more frustration with the student giving up lessons.

Overall these comments indicate that these teacher participants believe that note-reading is an important part of their teaching, thus suggesting it forms a major part of their implicit definition of musical intelligence. These teachers believed that reading the notation was the quickest, most efficient way of learning new pieces:

> Developing connection between hand position and notation is essential to fluent performance from score. (#T9b)

> Fluent reading allows for a speedy learning process and constant correction. (#T26a)

> Looking at the notes makes the process of learning a piece quicker. (#T18a)

One teacher found that, if the student is not attempting to learn to read, he or she struggled to know what to practise at home which also had the effect of impeding development of independence and thus creating a 'catch-22' situation:

> [they] have less productive practice at home. (#T16b)

On the other hand, considering the comments of the teachers who discussed students' use of modern technology, it could also be argued that, even if students do not learn to read, their independence may not be quite as badly affected as some teachers fear, because they can learn what they want to from online tutorials, as was suggested by Participant #T24a:

> They will scour the internet for videos or listen/pick out the melody they'd like to learn if they do not receive help from me as a teacher. (#T24a)

Summary

The teachers noted the following mostly negative outcomes that arose from students deliberately avoiding notation reading: slow learning and unfinished repertoire pieces, incorrect memorisation with errors learnt and built in, lack of musicianship, loss of place on the page, sight-reading does not develop, fluency is compromised and the individuals do not develop the ability to learn new repertoire independently of the teacher.

As well as the themes that developed overtly from the data, I have added another two themes that I believe implicitly underlie the data in this section. The first is a theme that these study teachers are concerned about teaching their students to successfully read notation on the piano, and that they believe that persistent hand-looking hinders this development, which firstly may represent their implicit definition of musical intelligence, and secondly lends justification to my wish to develop a framework for musical intelligence to support them in their work. The second implicit theme I believe is that the data suggest also a lack of understanding of how non-readers learn, and this will be explored in more detail in the Discussion. Meanwhile I explore next what the teachers thought about keeping the eyes mainly on the notation when learning a new repertoire piece.

Questionnaire question 8

Beliefs about keeping the eyes on the notation

This question asked the teachers whether they believed that students should keep their eyes mainly on the notation when learning a *new* piece of repertoire and only glance down occasionally to check their fingers. This was a quantitative question with a comments box for qualitative responses to be added if a yes/no answer was not appropriate. Figure 5.6 illustrates the responses.

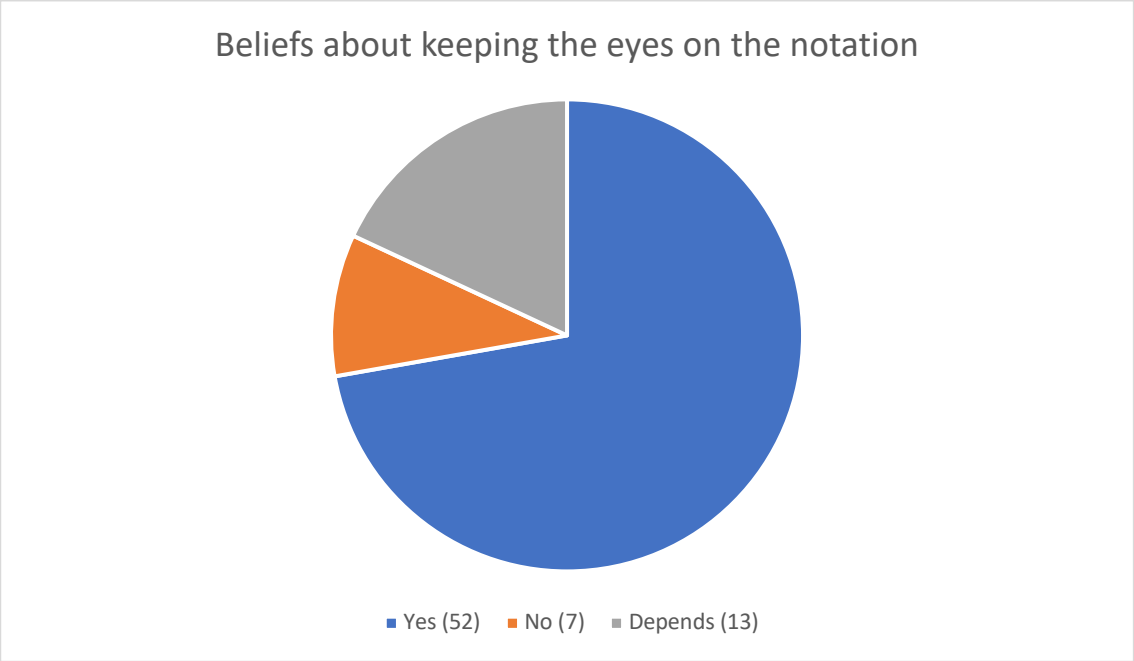

Figure 5.6 Beliefs about keeping the eyes on the notation

The overall theme here seems to be confirmed by the fact that forty-eight of the sixty-six respondents who answered this question believed that it was necessary to look mostly at the notation when learning new repertoire. However a few teachers said that sometimes the student would benefit from working on tricky passages separately, perhaps learning them by rote and memorising them before relating a passage back to the notation:

> Depending on the complexity of the music, sometimes it really helps to memorise short sections of one hand or both… (#T31a)

> …or look at the score, look at the hands to see how to manage the bar physically, and then repeat the section looking mainly at the score. (#T22a)

> I do believe elements of pieces should be initially introduced in isolation from notation, sound before symbol approach. (#T30a)

Participant #T24b also applied this to learning technical passages, which also requires focus on the hands rather than on the notation. One teacher pointed out the valid point, though, that, if students do not look at their hands at all, it is difficult to really know what the hands are doing. Looking at the hands for tricky passages, to see what shape they are making on the keys, how far they need to stretch, for example, is important for developing an understanding from another perspective, and sometimes it can help the student to see that it is not as far as they first thought to stretch to reach the next notes or chords. Again this aligns with the concept of good proprioceptive, kinaesthetic and tactile skills, which has found itself at the heart of so many of these study teachers' responses.

Similarly, a few study participants mentioned that it was important to teach 'glancing down' as a specific skill, because otherwise it becomes difficult to do this, and the student becomes fixed on the notation, and does not develop a thorough keyboard geography. Participant #T25a argued that players do need to glance down for extremes of the keyboard, since the kinaesthetic sense is perhaps only reliable to a certain degree.

> I think it sometimes helps to watch hands for a section till confident, then play with eyes closed. (#T34a)

> When focussing on the sections that are technically demanding, I would expect pupils to focus on their motion and the quality of the sound produced as opposed to notation. (#T23b)

> Mainly as above but depending on the complexity of the music sometimes it really helps to memorise short sections of one hand or both to really firmly grasp the patterns of the music. (#T31a)

> It will depend on the piece. I would always encourage pupils to look at the music as much as possible. (#T48a)

> Depends on the student and the piece. Sometimes it is absolutely fine as long as it is balanced with other activities to improve their reading ability. (#T11a)

These comments demonstrate understanding that some passages of notation do require a rote learning approach, or developing an internal representation through watching the hands first, but that there is a specific place for this in the learning.

The comments about hand-looking arguably suggest a belief on the part of the teacher study participants that the only way of understanding a repertoire piece is in a visual manner, that is visual in terms of notation rather than looking at the piano keys. However this may not resonate with certain students. It suggests that a visual 'map' of the piece more clearly conveys the mathematical or graphic structure of a piece. Teachers who are not opposed to rote and ear playing may choose to argue with this and say that, if the student is listening more than reading, he or she will just as quickly understand the rhythm and structure of the piece, possibly more easily, and that sometimes the complexity of the visual medium of notation can present a barrier to musical understanding, as well as obscure the listening (Williams, 2017). However, if a student is unsuccessfully trying to memorise a piece, as noted by many teachers, there may be several hesitations while they try to remember parts of it, often playing the easily-remembered parts more quickly than the more difficult areas, which does indeed result in less than rhythmically secure and fluent playing. Yet on the other hand, the following teacher believed that:

> …an ear/memory learner (with a good model performance to imitate) would play much more musically. (#T7a)

Summary

The majority of those (fifty-two teachers) who responded to this question agreed that keeping the eyes on the notation was beneficial while learning a new piece. Seven

did not, and thirteen others said that it depended upon the situation, for example learning a specific tricky passage might require the player to look at the hands on the keys to create an internal visual image of the passage to help. I explore their reasons in the next section.

Questionnaire question 9

Reasons given why pupils should keep their eyes on the notation

Question 9 went on to explore the teachers' beliefs about *why* they believed that players should or should not keep their eyes on the notation when learning new repertoire. Twenty-eight codes were generated from this data, (see Appendix 17) which were then condensed into five themes concerning the tactile skills, the benefits of notational skills, the concept of different strengths, and the concept of this depending upon student or piece. A space was dedicated to other ideas that were forthcoming that did not fit into a broad category.

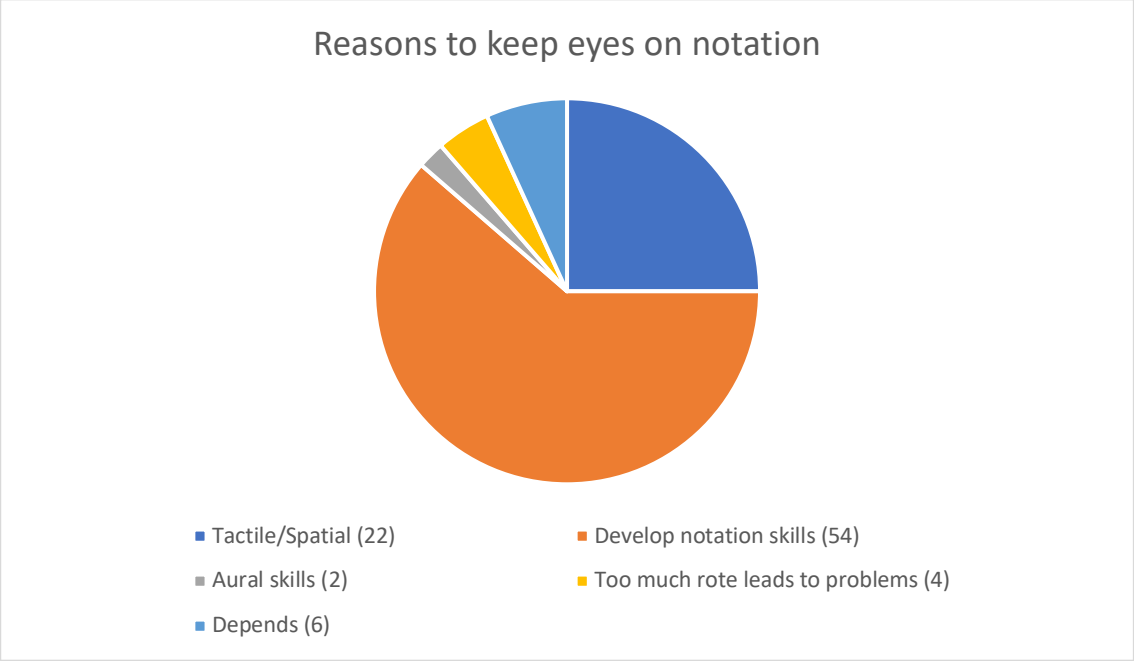

Figure 5.7 Reasons to keep eyes fixed on the notation

The overarching theme in this section was confirmed by the seventy-five remarks which concerned arguments in favour of keeping the eyes fixed on the notation when learning new pieces, and these were condensed into five broad areas or themes as shown in Figure 5.7 above.

Tactile and spatial development

Thirty comments concerned the tactile, kinaesthetic, proprioceptive and spatial elements of learning to play using notation, and that these skills, as well as co-ordination ability, could only be developed by learning to keep the eyes on the notation while playing.

Notation skills

Participant #50a believed that it was important to read from the notation in order to 'play the piece accurately in the first instance'. Other participants suggested that:

> If the musical notation gets more complicated, or fast you need to be able to look ahead to the next bar at least. (#T28a)

> The notation shows us how to play a piece, and as the instructions can be quite complicated they should demand most of our attention. (#T38a)

> If they keep their eyes mainly on the notation, they are able to look ahead and play fluently. (#T49a)

Teachers were concerned that their students learn to read notation in order that they could improve their sight-reading ability, play a piece accurately, understand the contour of the notation, develop the ability to look ahead in the score and enable fluency and independent learning capacity. They argued that looking down at the

hands too often caused them to lose their place in the score, and prevented them from seeing the overall picture and structure of the piece.

Aural skills

This teacher believed that reading the notation strengthened the aural skills:

> It also encourages the development of aural skills, because they need to learn when they have heard that they have played the wrong note. (#T18b)

Participant #12a argued that keeping the eyes fixed mainly on the notation enables students to learn 'what it sounds like rather than what their hands look like'.

Too much rote can lead to problems

Participant #T28a argued that, if students continually avoid trying to read and play notation, they may be able to play slightly more complex pieces by rote or ear for a while, but that the memory capacity is limited, and after a certain point, the repertoire becomes too complex to learn by rote and memorise, thus the possibility exists that the student will become frustrated, lose motivation and often cease playing altogether:

> by the time the music gets to approximately Grade 2 level it's too complicated and they give up trying to play. (#T28a)

Depends on the overall situation

On the other hand, some participants did not believe that students should always be forced to read the notation. Participant #T11a adopted a strong stance on whether or not to insist on learning to read and play the notation:

> Entirely depends on circumstances. The particular student and their learning aims, the nature of the piece, the other pieces or skills being learnt at the same time. Not all students either want or need to become fluent sight readers – they may not be sitting exams and just want to play for fun. They may have very good ears and find notation reading very difficult in which case allowing them to work within their strengths is much less likely to cause frustration. If we take a one-size-fits-all approach and always insist that they are reading then we will lose those students for whom it is really difficult and possibly unnecessary. (#T11a)

She is supported by Participant #31a who says:

> …for some students this [notation] is difficult and if they enjoy learning through a different method I would not say it is completely wrong. (#T31a)

These remarks support the work of Gudmundsdottir (2010), who argues that individuals may give up learning the instrument if forced to do something that they find very difficult. What is also concerning is that some of these remarks suggest the existence of a certain tension between teacher and student that could also lead to the student ceasing instruction. The following participant stressed her own and her students' frustration when they appear to refuse to learn to read:

> They are much harder to teach as they want to do things their own way and are less open to my help and suggestions. (#T17b)

One teacher wondered whether the frustration which arose between herself and her students might be down to her own inability to see any other way of teaching them, and she questioned her own methods and whether or not they were somewhat inflexible:

> Is my irritation [about them making the same mistakes and having to repeat things a lot] because they are not learning my way and I have to adapt or because it would be better for them to learn my way? (#T15a)

Generally these comments suggest that the majority of these teachers were concerned that their students should learn to read and understand the notation. Some of the comments also arguably suggest that the teachers in this study may be visual learners, or at least were taught from notation themselves, and have this as their learning preference, which affects their assumptions about their learners. This may arguably be consistent with a lack of awareness, or understanding, perhaps, of how natural ear-players use their aural representation of a piece to know what comes next in a piece, and possibly discounts this way of learning. Likewise, the four participants who stated that the accuracy of a rendition of a piece depended upon reading the notation seem not to understand how an ear-player can recreate a piece accurately. Similarly, the concept of not being able to see the "big picture" by not reading the notation would not apply necessarily to an aural learner, who would represent the piece differently internally. It could be argued that the tangible piece of notation is much more understandable to these teachers, with its visible boundaries and its visual shape and patterns, which can be shared easily and pointed to physically during a lesson. Indeed, this teacher admitted that if the students could read notation it made it easier for her to keep track of their learning, and suggests a visually oriented teacher:

> …easier for me to tell where they are and what they are doing. (#T15a)

Perhaps some teachers feel that teaching a piece by ear (if indeed they can play by ear themselves, or are willing to teach by ear) may be too time-consuming and too difficult for they themselves to manage. In addition, this method relies on the student understanding the piece straightaway, remembering the parts to learn accurately each lesson, and more importantly their dedication to listening and to practice.

Summary

The teachers also argued that keeping the eyes on the notation helped to develop the tactile and spatial skills, as well as musicianship skills (seeing the dynamics and articulation for example), and aural skills, the ability to listen while looking at the notation. One argument was that avoiding notation and depending upon rote or memory learning could only go so far before the repertoire level increased such that it was too difficult to teach and learn, and the learners would often cease learning at this point. I move on now to explore the teachers' methods of helping their students to focus on the notation.

Questionnaire question 10

Important to note here is that this area is separate from the beliefs about how to teach notation from the start, which will be discussed as part of the next findings chapter. Twenty-two codes were generated which can be found, together with their descriptions and frequencies of occurrence (see Appendix 18) and were then condensed into three themes which are displayed in Figure 5.8 below.

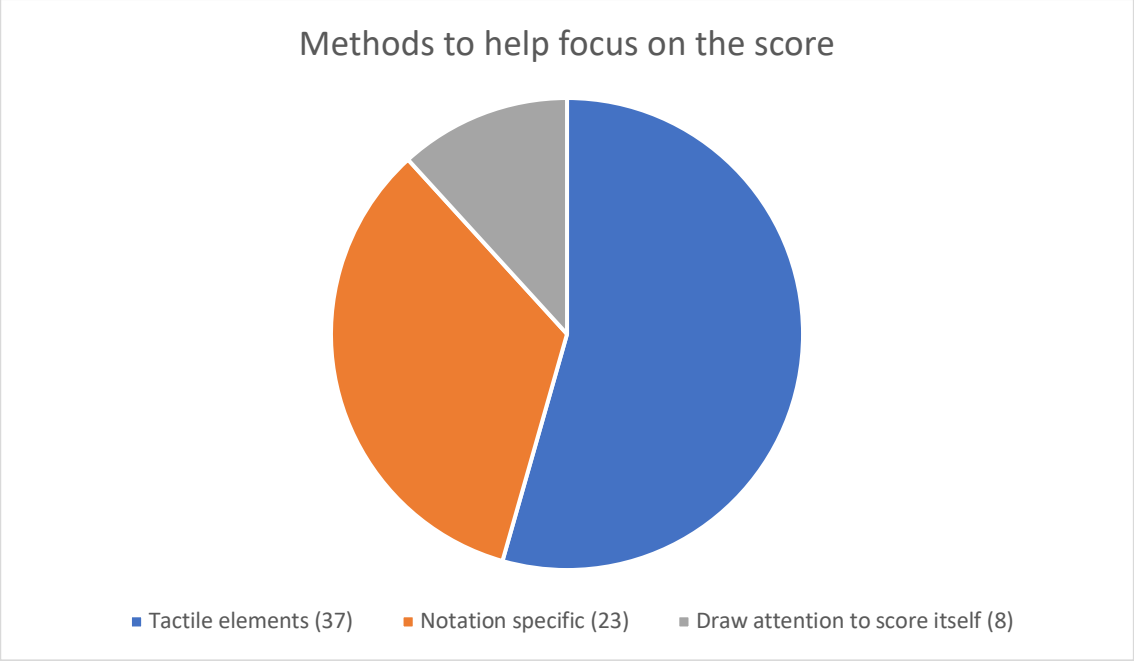

Figure 5.8 Methods to help students to focus on the notation when learning new pieces

Developing proprioception, the kinaesthetic, tactile and spatial senses

The topic of avoiding looking at the notation had prompted more discussion of an important theme to emerge from the data. Several teachers were very concerned that one of the reasons for students' avoidance of looking at the notation, and instead trying to remember a piece by looking at their hands, rested on a lack of good proprioception, kinaesthetic, tactile and spatial awareness. Teachers argued that students need to be encouraged to:

> …challenge the hand to touch the keys (instead of looking at the keys) and get familiar with it, e.g. remember how big of a stretch the hand has to be to play an octave. (#T41a)

> If students can find their way around the piano without looking at their hands, their sight-reading is better and their playing is more fluent, their brain can continue to process the score without stopping to look at their hands and re-find their place in the score. (#T17a)

Participant #T50a was extremely keen for her students to:

> Develop a thorough, felt, relationship with the instrument through the touch of fingers on keys. (#T50a)

Twenty-five of the seventy-two questionnaire participants said that they covered their students' hands with a book, piece of card, or something similar, in order to encourage them to focus on the notation and to help them learn to trust their hands to move to the correct place without looking at them.

> Cover the hands with a book. (#T47a)

> In extreme cases I cover their hands with a book so that they can't see their fingers even if they look down. (#T45a)

> Occasionally, just covering hands (tea towel or just holding a book above them) to play a phrase or two just to prove they can do it! (#T40a)

This participant found that, with the hands covered, the students often played the piece better.

> Holding something above their hands so they can't see them. Pupils play a lot better when they can't look at their hands. (#T17a)

Those teachers who tried this activity believed that it increased the students' confidence in finding the correct keys. A few other teachers asked their students to play something familiar with their eyes closed, such as scales, intervals or sections of their pieces:

> …basically they need confidence that they can find any key by feel. Slow or non-rhythmic pitch-finding exercises with eyes closed can help. Or learning a little pattern by rote and then playing with eyes closed. (#T7a)

Both of these strategies would develop trust in the fingers, as well as a musical-spatial, tactile, kinaesthetic and proprioceptive awareness, although with the eyes closed the student is still not focusing on making a link with the notation.

Helping students to better understand the notation

Strategies to help the students learn to understand the notation included specific games, digital applications and quizzes, easy sight-reading and duet playing,

composition, pattern recognition work, use of flash cards, intervallic teaching and learning small sections by rote first.

Helping students to focus more on the score

Strategies to help keep the eyes focused on the notation included asking questions about the score, regularly reminding students to look at the score as they play, analysing the notation before playing, the teacher using a finger or pointing device to track the notation as the student plays,

> Following along the music with a finger/pencil, either they do it while I play or I do it while they play. (#T38a)

> Using a pencil or small baton to indicate to the pupil where he or she is on the score. (#T28a)

> I keep them engaged with the score by asking questions. (#T45a)

Teachers also used naming notes out loud, and memory games where the student is allowed to memorise a small section and then has to reproduce it when the section is covered up.

Another method to try to overcome hand-looking was the use of regular sight-reading practice to develop notational confidence, where teachers often gave easier repertoire pieces than the students were currently learning, in order to keep notation reading fresh and continually developing:

> I make sure I do separate easier sight reading often to help build this skill separately so that it doesn't slow down their learning of bigger pieces. (#T15a)

> Playing lots of new music at lower level than actual ability, to reinforce score-reading. (#T9b)

Continually offering new pieces can also help to avoid the phenomenon of students memorising over-practised examination pieces, which can result in them seeming to 'forget' how to read notation (Participant #T52a). This student's comment illustrates this point:

> When I memorise a piece then I don't really look at the notes again and then I kind of forget the notes… (#S12)

These teachers' remarks also add to the concept of the importance that most of the study teachers attach to the reading of notation. They also suggest that the ability to engage in the tactile, kinaesthetic, proprioceptive and spatial senses is fundamental to the ability to read and play notation simultaneously. It is however interesting to note that of those teachers who used the hands-covered and eyes closed strategies, only one used it consistently for a long period of time (six months or however long it took to improve the hand-looking behaviour). Most of the teachers only used the activity sporadically. Also interesting was that some teachers implied that they thought this was a negative activity to do with students:

> …cruelly(!) holding a book between their eyes and the music. I try to make this a game and only for a short while. (#T35a)

Two teachers suggested that they had not found an answer to the hand-looking behaviour at the time of this questionnaire. Participant #T25a said that she was 'still working on it' and Participant #T7b admitted that:

> I am very new to teaching and haven't yet come up with an answer to this. I tell them to look at the music! (#T7b)

Comments such as this arguably act as justification for seeking to develop a framework for musical intelligence to support piano teachers in their work, especially in terms of reading and playing notation simultaneously.

Teachers who deemed that rhythmic insecurity occurred because the individuals were not reading the notation said that they selected specific rhythmic motifs from the notation and worked on them separately before beginning to play the piece, and others suggested learning small sections of the piece first:

> Just to learn a section of a piece slowly and patiently first. (#T29a)

Other strategies given by teachers included composition and improvisation, although only one or two teachers engaged in the former two elements:

> Writing notes on manuscript paper and then playing them – ideally as a compositional exercise where they write within given parameters. (#T50a)

> Doing lots of improvising in the key of the piece so they don't need to 'remember' the sharps/flats. (#T17b)

These strategies are supported by the work of Harris (2014) in his Simultaneous Learning approach.

This concludes the presentation of findings related to Research Question 1, regarding the experiences, observations and beliefs shared by the learners and piano teachers in this study in terms of learning to read and play notation simultaneously on the piano, and this section ends with Question 10 of the questionnaire data. The questionnaire data will resume with questions 14 and 15, exploring teachers' learning preferences and previous learning, before returning to questions 11, 12 and 13, which relate to Research Question 3 and the participants'

beliefs about musical intelligence. The data from the questionnaire and interviews are combined in that section.

For now, though, I turn to the findings which relate to Research Question 2 and the second aim of the research, to explore the pedagogical beliefs of a sample of real-world piano teachers in terms of how they teach pupils to read and play piano notation simultaneously.

Summary

The teachers used methods to develop the tactile, proprioceptive, kinaesthetic and musical-spatial skills of their students in order to help them become more confident in reading the notation rather than looking continuously at their hands. They used exercises to help them develop confidence understanding the notation, and used notation-specific ideas to help the students to focus on the score.

Summary of Section

The questionnaire data suggested that learning to read and play notation simultaneously on the piano was complex, involved a number of tasks to be performed currently, underpinned by the development of several cognitive and physical skills, and as such was difficult for many beginners. Most of the teachers had at least one hand-looker in their cohort, and most were concerned about effects such as lack of note-reading development, the fact that pieces were learned very slowly and sometimes unfinished because it took too long to learn them, errors were learnt and memorised, fluency was compromised, and students could not become independent learners. Thus the teachers took steps to help their students to keep focused on the notation. The main outcome of this section seems to be that these teachers are all focused on the importance of learning to read notation.

5.2 Beliefs about teaching pupils to read and play notation simultaneously

This section explores the teacher interview data which focused for the greater part on the participants' beliefs regarding methods of teaching individuals to read and play notation simultaneously on the piano.

Many music educators within the literature had stated their dislike for the overt focus on introducing notation from the beginning of learning, (e.g., Cathcart, 2013, Gordon, 1993, McPherson, 1993, 2005, Odam, 1995) arguing that it was inimical to the development of musicianship and in fact to the successful reading of notation. This, together with comments within the questionnaire data which argued that introducing the notation too early presented difficulties for the students, made it clear to me that I needed to clarify and understand at what point the teacher participants introduced notation to their students. Although when I devised the questions I chose to ask about teaching approach first, on writing up the analysis I felt that it would be better to situate the findings regarding when the teachers introduced the notation before their methods as it places the teachers' beliefs in context. Therefore, for the analysis here I have chosen to begin by presenting responses from Question 2 which asked the participants whether or not they introduced notation at the students' first lesson.

At what point do the teachers introduce the notation?

The main theme to develop from this question concerned the fact that, of the fourteen teachers who were asked this question, twelve said that, in light of the difficulties that they perceived that notation presented, they deliberately chose not to introduce the notation at the first lesson (Participants #T50a, #T4b, #T16a, #T24b, #T26a, #T35a, #T10b, #T31a, #T10a, #T21b, #T18b and #T3a). The pre-notation stage ranged from two to twelve weeks, with Participant #T18b continuing with rote teaching for up to a year, but simultaneously introducing the notation gradually. The data suggested that this was due to the complex nature of the notation which was

argued to create a barrier to the development of musicianship, to listening and to sound rhythmical development and understanding.

Participant #T50 responded in this way when asked if she introduced the notation at the first lesson:

> If it was a beginner child no, I don't. I think it's more important to begin with to learn the geography of the keyboard, what it feels like, and to have fun with it. Then they're usually raring to go after a couple of lessons. (#T50a)

A 'couple of lessons' is not long to delay introduction of notation, however.

Another reason why these participants did not introduce notation in the first lesson was because this had been the way that most of them had been taught, and they no longer agreed with this method of teaching. Participant #T21b argued that this had felt as though she was being taught to decode symbols on a page rather than how to play the piano (Lowe, 2020). She thus developed strongly negative feelings towards playing the piano, which lasted well into adulthood. She said,

> It meant nothing. I hated music, I hated playing the piano. (#T21b)

This is a very powerful remark which should arguably ring alarm bells in the minds of piano teachers, since the placing of notation in front of some students at their first lesson could very well be the one element that deters them before they have really begun (see also Cathcart, 2013 and Kuhlman, 2005). Participant #T4b also said that for some students (and in the opinion of their parents) reading the notation is like code-cracking.

Participant #T26a said that he usually spent the first lesson assessing the students' potential for musicianship, because:

> If I just sit down and give them notation right from the beginning, I don't think that's a very constructive way of starting, I just don't think that works. (#T26a)

This participant said that he began with, and continued to include, rote pieces in his teaching, insisting that the music itself was the most important thing:

> Notation is approached secondary to playing, so they can play above the standard that they're reading, always. (#T26a)

Gradually he taught his students to make the visual connection with what they had played by rote, which was how he taught them to read notation.

Listening was stated by most of these participants as extremely important for playing an instrument, since music is, after all, an aural tradition, and some teachers argued that it was not possible for a student to hear what they were playing if they were struggling to decode the notation. For example, Participant #T4b found that a strong focus on notation too early forced the students to:

> get very hung up on the pulse and the technical side of it, and the expression drops out entirely. (#T4b). She then went on to add:

> I'm teaching a couple of children Agincourt song, and I find they're interested in the notes and the counting but there's no real connection with it there… (#T4b)

This suggests that the visual medium overshadows the aural sense, and that if that happens the playing is often halting and does not make any musical sense.

Respondent #T3a said that she did not introduce the notation until the third or fourth lesson, because,

> I want them to start listening first before reading…otherwise they become mechanical, they don't play well the pieces. It goes from notation to the fingers, and nothing comes. (#T3a)

This remark aligns with the work of Schleuter (1997) wherein he argued that if students are not listening and engaging with their playing, all they are doing is associating finger numbers with the notation, which deadens any chance of musicianship from developing. The importance of listening arose in the literature with Gordon's (1993) and Odam's (1995) insistence upon developing a strong aural vocabulary with a wide range of patterns and shapes before the learner starts to read notation. Odam says that 'overreliance on notation can be inimical to aural development' (1995, p.103).

On the other hand, two participants said that they did introduce notation at the first lesson. One remarked:

> I don't see why not. I think that's why they've come to piano lessons. (#T14a)

This remark is consistent with what many pupils and parents and guardians seem to expect (Cathcart, 2013, Harris, 2008), and possibly what a sizeable number of these study participants would have expected when they started their own piano lessons.

Participant #T31a said that she started teaching her students using off-stave notation, which entails following the contour of note shapes along a page, but without any stave lines. This is not as complex as full notation, however it still focuses the attention away from the keyboard and away from the aural sense.

Overall, however, it can be argued that the main theme to develop from the data from this question is that, of the fourteen teachers interviewed, twelve believed that introduction of notation at the first lesson was not sensible.

Teaching approaches

I now turn to the themes that developed from the first interview question which asked the piano teachers in this study about their approaches to teaching students to read and play notation simultaneously. Table 5.5 illustrates the themes to have developed from the data regarding these approaches, however following a discussion of these overt themes, I discuss a further three areas which could be argued to be implicit themes by their absence from the interview responses, and these concern audiation and notational audiation, the use of mental strategies and playing by ear.

Themes developing from the data	
Rote teaching	Tactile and spatial skills development
Keyboard geography development	Teaching pulse and rhythm
Intervals, patterns and chunks	Active aural development
Personally and carefully designed teaching methods	

Table 5.5 Approaches to helping students to read and play the notation

Rote teaching

I had not asked the questionnaire participants about rote teaching, because it was not something with which I was familiar at that point in time, however the data had revealed that several of the respondents used rote teaching in their practice as a precursor to introducing the notation. Therefore I created an interview question to focus on rote teaching, and explored how participants used this technique and what they believed that its benefits were. Literature concerning rote learning for musicians was scarce and, in terms of a definition, the word 'rote' often seemed to be

interchangeable with the concept of playing by ear. I also found that often the teacher participants, both in the questionnaire and the interviews, confused the two concepts. (See Glossary for a definition of rote teaching).

One of the main reasons for teaching rote pieces at the beginning of a student's piano career seems to arise from the teachers' beliefs about how difficult it is to read and play notation simultaneously, and therefore that to try to teach students notation from the very first lesson is counter-productive and dispiriting. Thus, delaying the introduction of notation, and focusing on the separate elements of reading and playing notation, seems to forge various benefits. Several reasons given for using rote teaching as part of the standard piano lesson link to the skills that the teachers said were required in order to read and play piano notation simultaneously, (Questionnaire question 2) and which are best focused on initially without the distraction of the notation. According to the data, rote learning and playing help to develop:

> playing a piece in manageable stages, so the skills have time to be assimilated. (#T31a)

Participants argued that rote teaching enables beginners to be able to play a piece, however small, at their very first lesson. This is motivating and satisfying for them, and starts developing musicality and rhythm straightaway, as long as the student is able to copy, and the piece is achievable. One teacher routinely used rote throughout all of his teaching:

> I'm always working on them playing pieces of a higher standard than they're reading. (#T26a)

Participant #T24b used rote teaching to develop rhythmic competence:

> This is also the point of doing rote pieces – to sew the rhythm chunks and articulation technical playing together in terms of coordination

> before I expect pupils to include pitch reading at the same time. (#T24b)

Since several teachers believed that a lack of good proprioceptive skill was at the root of not being able to play and follow notation simultaneously, the use of rote teaching at the beginning of the pianistic journey was considered another way of building that important internal sense. Participant #T24b said that she used rote teaching for several weeks before introducing notation, in order to develop proprioceptive ability as well as confidence in playing pieces. For those of her students that encountered difficulty with understanding finger numbers and did not have good proprioceptive ability (and, according to her, this was only students who displayed traits of dyslexia or dyspraxia), she also considered rote playing to be a positive way to achieve success in her progress plan, because it still enabled these students to play as many pieces as those who had progressed earlier onto the notation, just using a different learning method, thus increasing their motivation to continue learning.

> I teach them rote pieces, so that's how they keep the motivation up and they don't feel they are too far left behind. (#T24b)

Participants argued that playing by rote helped the students to learn the geography of the keyboard, since they are focused on the keys rather than on the notation, which in turn helps them to focus more on the notation when they encounter it because then their internal representation of the keyboard is strong:

> …doing a lot of playing by rote at the start so that they develop familiarity with the keyboard first. (#T2b)

Rote teaching at the beginning of a student's piano career enables him or her to learn how to manipulate the instrument and develop technique without being concerned with notation:

> I teach them quite a bit by rote first, so by probably the first three to four weeks entirely by rote, they have the physical ability to play the notes fluently… (#T4a)

Rote learning enables the development of aural skills because the students need to recall the sound of the piece they are learning, and then ensure that their fingers are on the keys that will produce the correct sounds in the correct order. Preparatory to learning the notation, rote teaching helps the student to become accustomed to the 'sound and feel of the note production' (Participant #T38a) as well as to begin to learn certain patterns of keys and pitches, how they look, sound and feel.

A few teachers (Participants #T3a, #T26a and #T24b) said that they would teach a short piece by rote and then show the student the notation so that they could make the connection between what they had just played and what they could then see in a book (the 'rote to note' approach, Odam, 1995, also Harris, 2014).

Most interviewees who said that they taught pieces initially by rote engaged with this method for perhaps three to four weeks before introducing notation in conjunction with it, although one or two did not introduce notation for up to twelve weeks or more.

Consistent with the questionnaire data in which some teachers criticised their students' previous teachers for using too much rote learning:

> Teacher error in early stages – only giving them music they could pick up quickly aurally so they haven't needed to rely on notation. (#T15a)

and aligning with the literature about teachers who were reluctant to engage in ear and rote playing because they believed it made students lazy and not inclined to learn to read notation (McPherson, 1993, 2005, Priest, 1989), the teacher interview data also revealed some negative attitudes towards rote teaching and learning. Participant (#T35a) said that she only taught short tricky passages of pieces by rote because she was worried that her students would simply learn pieces by 'mimicking'

and would fail to learn to read. This belief was born because she herself had used this technique when learning to play her accordion, and she felt that she had a sizeable amount of catching up to do when it was time to learn to read and sight-read.

Two other participants argued that students taught by rote from the start can become too accustomed to learning in this way and are surprised when they have to learn something from a piece of notation. This remark illustrates:

> They assume they can do it from memory because they are used to having memorised pieces and not used to learning lots of new material from notation. (#T6a)

This supports Gardner's observation (2004) that students with a good ear (something he considered part of a musical intelligence), often have what he called a 'crisis' when presented with the notation, or the 'formal side', and resist the work involved, or just stop trying to learn at this point.

Tactile and spatial skills development

The student data had suggested a theme of concern over not knowing where their hands were going on the keyboard when looking at the notation. Similarly, emerging as a very important theme from both the questionnaire and the teacher interview data was the argument that good proprioceptive and kinaesthetic senses are essential to reading and playing the notation simultaneously on the piano, and a lack of their development sits at the root of a lack of ability in reading and playing. Proprioception and kinaesthesia are linked with spatial awareness, but the tactile sense must also be engaged so that the player knows the feeling in the fingers when keys are played (see also Martin's 'kinaesthetic thought' (1965), in Glossary). Participants did not specifically mention any particular strategies for developing these senses, however the questions about hand-looking elicited either a reactive strategy, which entailed dealing with the problem of looking more at the hands when

it arose, or more proactive strategies to try to avoid it happening in the first instance, both of which would result in some development of these senses if engaged in enough.

Over half of the teacher interviewees took a reactive stance and said that they often held a book, piece of card or something similar above their students' hands in order to discourage them from looking at their hands, and to help them to make the connection between what they were seeing on the notation and what they were feeling in their fingers. Five teachers engaged in a more proactive stance towards this and said that they asked their students to play with their eyes closed sometimes, for example scales, short studies, or parts of the pieces they were learning and with which they were already familiar. This latter technique does not develop the link between the visual and the tactile, however it does still start to develop the confidence to move the fingers without looking at them, just from a different perspective, and is using the internal senses to do this by eliminating the visual completely and focusing on the tactile and possibly the aural sense, although this latter concept was not specifically mentioned. Similarly, over half of the questionnaire participants had said that they used one or both of these techniques, whilst other teachers played specific games to develop confidence to move the fingers without looking at them first. These remarks illustrate:

> Cover hands with a book. Turn it into a game, allowing only x number of looks down which gets reduced each repetition. (#T21b)

> Covering up music after 10 seconds and asking them to tell me as much as they can about it to develop their ability to take in lots of information at once. (#T15a)

> Playing games where they shut their eyes and have to find certain notes. (#T20b)

> Identifying notes in online quiz games. (#T50a)

Participant #T50a stressed that her whole method and outlook were centred around the tactile, proprioceptive, kinaesthetic and spatial senses involved in playing the piano with and without notation, as well as developing the students' keyboard geography, which she believed helps significantly to avoid hand-looking. This deliberate engagement in the feeling of playing the keyboard could be argued to represent a metacognitive approach:

> My strategy is that I try to give my students to begin with a really good feel for the geography of the keyboard, so that they know where everything is…that actually seems to help the sight-reading process by knowing where things are so that you don't have to look…And the feeling, most importantly the feeling. (#T50a)

These teachers were in agreement:

> Teaching them to play mainly by feel from the very early stages. (#T22a)

> Learning the geography of the piano by feel – being able to play an octave, for example, without looking. (#T8b)

> Duet playing in a 5 finger position, that develops confidence at feeling where the notes are. (#T31a)

Despite teachers using off-stave notation, interval training, pattern recognition, and ear and rote playing, these were not specifically mentioned as aids to developing confident tactile skills, yet it could be argued that they are proactive in the development of good proprioceptive skills.

Two participants spoke about how they helped their more advanced students to avoid too much hand-looking. This participant said:

> I reduce things to chords as much as possible, if I can see it's chord I-IV-V, by reducing it you gain control over it, you master it. I encourage my students to look for those connections and once they find the connections it makes it much easier for them I think. (#T26a)

Arguably this strategy corresponds with the concept of patterning and chunking, but at a higher level.

Keyboard geography development

Understanding and knowledge of keyboard geography had emerged as a theme in the questionnaire data as a skill required for reading and playing notation simultaneously on the piano, and was similarly a strong theme in the teacher interview data. This means knowing what the keyboard looks like, where everything is, and how to find it, so that when reading the notation, the keys can be found without needing to look back and forth at the hands constantly. Musical-spatial awareness, musical-spatial ability and proprioceptive ability are interlinked with a sound keyboard geography:

> I encourage them to play closer to the black keys so that they can feel the black keys and get more of a sense of geography. (#T34a)

Participant #T24b outlined her method of developing keyboard geography right from the start by going through the letter names of the keys and working firstly with the white key names, and using the black keys as markers to find certain groups of white keys, consistent with the development of tactile skills. A few teachers mentioned practising large jumps on the piano to develop confidence in keyboard geography, and this also links with development of the kinaesthetic sense and a musical-spatial awareness:

> Learn[ing] the geography of the piano by feel – being able to play an octave, for example, without looking. (#T8b)

Interestingly, one teacher seemed to approach internalising the keyboard rather differently, almost rejecting the tactile sense:

I have a paper piano, so while they read the music I point to them where is that and where is that on the paper piano. So they have the keyboard as an image and not as feeling the fingers. They imagine it first. (#T3a)

Teaching pulse and rhythm

An integral part of being able to play a musical instrument is the ability to understand rhythm and develop a strong internal pulse. This arose as a theme within the interview data, since many of the participant teachers discussed this as part of their approach when teaching notation. Respondent #T3a argued that, in the sight-reading section of the practical playing examinations, if all the notes are played correctly but with incorrect rhythm, zero marks will be allocated, however, if correct rhythm is demonstrated, even with some pitch mistakes, she said that at least 75% of the marks are achievable. This is supported by McPherson, whose study found that 'efficient sight-reading is largely dependent on the capacity of a musician to read and comprehend rhythm' (1994, p.229). Respondent #T3a argued that a piece of music is recognisable first and foremost by its rhythm. She added that:

> Sometimes the rhythm is the problem, not the sound. I have students that have great difficulty in reading rhythm… (#T3a)

Aligning with the work of Fourie (2004) and Hallam (2001), three of the teachers in this study specifically stated their concern that rhythm and pulse suffered because of the multi-tasking involved in reading the notation, and the fact that each note on the score represents both pitch and duration. This teacher's remark illustrates:

> Rhythm tends to be sacrificed in the effort of reading pitch. (#T24b)

Participant #T4b noted that rhythm also tended to be ignored in favour of the visual aspect of the pitches.

Several participants were strongly convinced that rhythm and pitch should be taught separately, because often, when the notation was introduced, and especially if it was introduced too early, they found that fluency in reading the pitches took priority in the students' minds, and they began to play with no pulse and no idea of note durations. Respondent #T4b admitted that, when she began her piano teaching career, she used to introduce full notation at the first lesson, but eventually noticed that rhythm would suffer because students were concentrating on the visual nature of the notation, rather than on listening:

> …sometimes they could read, but it was really difficult for them to get fluency and then that led in the longer run… to them never playing within a beat, it was, always, there was no pulse to whatever they were playing because fluency was such an issue (#T4b)

Indeed, a comment from the student interviews confirms this well:

> …the rhythm just goes straight out the window, because I'm so busy concentrating on the notes… (#S14)

Participant #T24b said that she tried to develop rhythmic security by teaching rote pieces and off-stave pieces with just the finger numbers for at least the first whole term of learning before the students even started playing the piano. She said that her aim was for her students to have internalised rhythmic chunks and patterns of four bars before they started learning pitch notation. Even before introducing pitch notation, she taught pieces by rote to start making a strong and reliable connection between the rhythm and a melody, and hoped that this overall strategy might avoid a second level of difficulty and decoding when the students had to read both

elements of the notation simultaneously (pitch and rhythm), a remark which supports the themes of multi-tasking and the dual information contained in the notation that were put forward earlier (Fourie, 2004, Gudmundsdottir, 2010 McPherson and Renwick, 2001). This participant tries to ensure that the students can audiate the patterns (hear them internally) as well as visually identify them, clap them and feel them first.

Participant #T26a also focused on rhythm patterns, and taught them before introducing the pitch notation because:

> …once they have the rhythm, then the piece tends to play itself. (#T26a)

Participant #T16a said that he began a student's pianistic journey by teaching short rhythm patterns in the first few weeks of learning, showing the students the rhythm notation for the pattern, and then asking them to play a little song along with it, even using only one finger.

Intervallic teaching

Over half of the interviewees spontaneously mentioned intervallic teaching as something which they included in their routine piano lessons for beginners. Four of these participants used the same method series, Piano Safari (Fisher and Knerr, 2008), which focuses very much on rote and intervallic teaching, and of the other teachers who used different method books, (*Piano Junior* (#T34a), *Piano Time* (#T16a) and *Piano Adventures* (#T10a) some also taught using intervals as a basis (see below). Intervallic teaching encourages students to observe and recognise the gap between two notes on the musical stave, and this is also at the root of learning to identify shapes and patterns.

> I try to get them reading by steps and jumps rather than note names… (#T12a)

> Doing a lot of interval work so they can read intervals more competently. (#T20b)

Several of the participants began this recognition development with rote and ear playing work, and then showed the student how the sounds appeared in the notation, making a link between the two visual media (a 'rote to note' approach, see also Odam, 1995, Harris, 2014). This can also lead the student to recognise how it feels physically to play that interval, thus developing the aural, tactile, proprioceptive and kinaesthetic senses simultaneously:

> I teach them intervals on the keyboard with eyes open and closed, identifying by ear then playing. Then they learn how to read them on a score. (#T13b)

This and the use of 'landmark notes', an example of which are notes designated by the Piano Safari (2008) authors, one in each clef, and which students are encouraged to use to find their way around the notation, enable the pupils to play a reasonably long piece, starting on different fingers each time, without having to learn one note at a time and decipher each, from the start. Longer pieces can be quickly developed once the student recognises and can execute the interval of a second. Of the Piano Safari method, this participant said that:

> you can get quite a long piece out of seconds. (#T4a)

Participant #T10b referred to his own intervallic teaching approach as 'joining the dots' and said that he taught his students to find the starting note, and then to read 'the spaces between' rather than actually knowing the names of the notes themselves. Two teachers extolled the intervallic approach in their discussion about some students they had taken on from different teachers, learners who were finding reading and playing the notation difficult. They said that when they themselves had

introduced the intervallic approach to these new students, the individuals had immediately understood, and their reading had begun to improve dramatically:

> I've gone in straightaway with the landmark notes and steps, and he can now read steps on the stave. (#T21b referring to the Piano Safari method, 2008)

> …we've gone back to looking at the intervals rather than kind of looking at note names and she's picking that up really quickly. She's a lot more confident in reading. (#T18b)

Conversely, five of the fourteen interviewees said that they used an approach from a method book which, rather than using an intervallic concept, introduced one note at a time, and two of these teachers (#T31a and #T34a) seemed to find this quite inefficient, since students had often forgotten the first few notes once they had reached the end of learning the first five. However, these teachers still persisted with this method of teaching. Haston (2010) refers to this as an 'atomistic' way of learning and for him this constitutes one of the reasons that learners are disheartened right from the start of the journey.

As stated above, intervallic teaching forms the basis of pattern recognition, which was another theme to develop from the teachers' approaches. The process of patterning and chunking refers to the ability to recognise and confidently execute patterns of notes on the notation, such as groups of seconds or thirds, short motifs, scalic and chordal patterns. It was found that the ability to recognise, in the notation, a set of notes as a pattern rather than having to work out each one, increased reading speed, improved fluency and allowed more chunks of short term working memory to be available for faster overall processing (see patterning and chunking, p. 161).

The interview respondents agreed that learning to recognise patterns and chunks was a good strategy for developing fluency. Several were keen for their students to recognise chord shapes and the fingering needed to execute them, and to this end

taught their students firstly to learn to understand intervals, and from there to develop recognition of larger shapes. In the same way as learning to read words, teachers recommended that learners needed to:

> make that leap between naming every note, which is so slow, to recognising a shape. You recognise an interval and then you are recognising a shape – ah OK C-E-G oh yes right well that's like that arpeggio isn't it. (#T50a)

> I might say, 'could you spot any scales, could you spot any triads or broken chords that you've done before so you know what that's going to be like?' (#T18b)

Active aural development

The importance of listening has already been discussed as it emerged as a theme from the teacher interviewees, who considered this essential in respect of learning to play the piano with notation. This section deals with deliberate development of listening skills.

Participant #T50a said that she developed her students' aural abilities by asking them to listen to a short excerpt and then to attempt to play it back. She also asked her students to choose a favourite song and try to pick it out by ear, as well as encouraging them to attempt transposition, which relies upon engagement of the ear in order to make an exact copy of a short piece in a different key. She also encouraged her students to listen in order to understand the shape of a piece aurally:

> is it like that, or is it going up like that, you know, sound-wise, where's it going? (#T50a)

On the other hand, one teacher said that the only time she engaged in aural work with her students was when an examination was approaching, and Participant #T35a

said that she sometimes taught her students to hear the interval of a third, for example, but nothing more than that.

Carefully and personally designed teaching methods

Just a handful of interviewees (#T4b, #T10b, #T21b, #T24b) said that they only had one or two hand-lookers in their practice, or none at all and, with the exception of the two teachers whose cohort included students with Asperger's syndrome, dyslexia and dyspraxia (#T4b and #T24b), and which they believed were part of the root of their looking down, the former teachers seemed to attribute success in reading to their general teaching methods from the start. Participant #T24b believed that her thorough preparation and slow introduction to notation reading averted the problem of hand-looking and early memorising, but said that she was also very thoughtful and careful regarding what repertoire she assigned to her students since, if it was too difficult, she found that the students would look down more, and if it was too simple, she found that they would simply memorise it quickly. She said that she developed her students' skills by 'separating out the component skills of notation reading into smaller distinct skills to work on consistently'. She wanted her pupils to have some patterns in their memories, so that 'some form of automation is retained', and her strategies were designed to overcome what could be argued as the complexities of the notation. Participants #T21b and #T10b attributed their lack of hand-lookers to their own uniquely developed method from the beginning, the foundation of which, as stated earlier, was singing and playing short melodies by ear before notating on a mini stave.

I move on now to discuss the three areas that had not been forthcoming in the interviews, and they concern audiation and notational audiation, the use of mental strategies and playing by ear.

Audiation and notational audiation

Having discovered the concept of audiation and notational audiation during my literature search (Brodsky *et al*, 2003, 2008, Gordon, 1993, Zatorre and Halpern, 2005), and their key contribution to reading and sight-reading notation, since it is believed that imagining playing the notation primes the movements needed for its execution (Zatorre and Halpern, 2005), I wanted to know if this was something that these teachers included as a normal part of their practice. Firstly, though, I needed to know if they themselves were able to hear internally a piece of music from looking at the notation without someone playing or singing it first (Gordon, 1993). Most of the interviewees said that they could do this themselves, a few said they had not tried it, one said that she could not do this, and a few said that they did try to teach their students to do something similar, which involved singing the piece before playing it:

> Most importantly, singing it…so that you attach the sound to the interval. (#T50a)

> Yes, it's incorporated in those sight-reading books – listen, look at the notes, and then we'll sing it. I'll play the first note and then they'll sing that line. (#T14a)

> At Grade 1, pupil should be able to sight-sing a melody of 5-finger position piece with articulation. (#T24b)

Participant #T26a said that one of the books within the Alfred Basic Piano Library series, which was his preferred method, focused specifically on ear training, and I found, on an examination of the method, that the ability to audiate the notation is actively developed, although not straight from the beginning. This participant said that he did not teach this skill specifically, because he believed that the skill developed spontaneously without specific teaching, as did Participant #T31a, which supports Gordon's (1993) and Dalby's (1999) observations. However, the use of

these books would certainly go some way to developing the skill. The following teachers mentioned notational audiation as a useful ability for students to possess, even if they did not teach it specifically:

> I try to, yes, I try to get them to hear it but a lot of them don't want to sing it, and you can't internalise the sound unless you can sing it. (#T10b)

Participant #T10a said:

> It doesn't come particularly naturally but I can work it out. I could probably do more on getting them to read it from the music. (#T10a)

Participant #T35a said that she did not make an effort to teach this, as she believed that most of her students would not be able to do it, suggesting that she held an entity theory of ability and intelligence (Dweck, 2016). The following teachers said that this was not one of the elements they would generally teach as a matter of course:

> I can't say we've done that actively, no, if I'm brutally honest. (#T16a)

> I don't specifically teach that as a skill. I imagine that comes with playing. (#T31a)

> No, a lot are reluctant to sing. (#T34a)

Being able to hear the notation internally, however, is arguably a useful mental strategy for learning and playing the piano (McPherson, 2005, Brodsky *et a*l, 2003, 2008), and it is to this concept that I now turn as I explore the data that derived from asking the teachers in the study what mental strategies they encouraged their students to use when learning a new piece from notation.

The use of mental strategies

McPherson's study findings (2005) aligned with what I had discovered while thinking about my own learning and how I played the piano using notation, since I noticed that I engaged with the physical feeling of playing the piano while reading the notation. This tends to be more pronounced with patterns, chunks, and structures such as chords and scalic passages (Gordon, 1993), but I noticed that, while I was looking at the notation, I knew internally how it was going to feel in my fingers to play that pattern, chunk or structure before I played it, and I believed that this mental strategy was a positive ability that I should encourage my students to develop, with the aim of increasing fluency, understanding and confidence.

For this reason I decided to ask my teacher participants whether they encouraged their students to use any mental strategies while learning to play notation or to sight-read. Some of them did not understand what I meant by the term 'mental strategies', (for example Participant #T4b) so I needed to explain it as outlined above. Participant #T34a simply answered the question "No". Most of my participants did not have a particular set of mental strategies which they encouraged their students to use, and those that said they did, tended to quote what they did to prepare a student for a regular sight-reading test, that is to look through and focus on the rhythm, establish a strong pulse, note the key signature, the contour of the notation, the starting notes, style and articulation, (for example Participants #T16a and #T10b).

> If we start on the very left hand side of the first stave and work through what you're looking at there, i.e. clef, time signature, key signature then anything above it that might indicate the style of the piece…(#T16a)

These could still all be regarded as valid preparatory mental strategies, although only if the students are already able to read notation to a certain level.

Participant #T50a centred her whole teaching approach around the tactile sense, and encouraged her students to engage in this sense, saying that she would ask her students to put their hands on the keys and then engage their inner tactile sense by saying,

> can you feel C, can you feel… (#T50a)

This teacher was arguably trying to develop sophisticated mental strategies within her students. Participant #26a put forward what could be argued to be an advanced mental or metacognitive strategy:

> Identifying chords, identifying scales, identifying arpeggios, so anything that they are already playing or familiar with if you can identify those in new music, or music that you're learning, that can then be sight read, that doesn't need any learning. (#T26a)

He continued:

> And then harmonies when chords change, if you know the relationship between tonic, dominant and sub-dominant and chord II etc., you can almost predict how the music's going to go. (#T26a)

Participant #T3a suggested that:

> They have to have the score in their head. (#T3a)

This suggests an internal auditory strategy which is consistent with notational audiation. Only one teacher said that she might ask her students to look through the piece and see if there were any shapes or patterns that they might recognise so they might know 'what that's going to be like' (#18b), which comes the closest to engaging in an inner tactile sense, although this is an inference.

Another area that had not been forthcoming in the interview data regarded playing by ear and I discuss this now.

Playing by ear

As part of the question to interviewees about whether or not they used rote teaching, I also asked them whether or not they taught their students to play by ear. As discussed in Chapter 2, Luce (1965), McPherson (1993, 2005) and Priest (1989) found that, despite some teachers' reluctance to engage in it because they believed students would become lazy and not learn to read notation, playing by ear was found to be positively correlated with good sight-reading ability.

Three teachers expressed that ear-playing featured as an integral part of the method they had created independently for teaching notation to beginners (T#10b, T#21b and T#50a). Participant T#21b said that she taught her pupils to sing short melodies by ear, and then the next step would be to notate the song on a mini stave using counters. Participant #T10b taught his beginner students to play a very short song by ear on the piano, and once this was learnt, the pupil would notate the song on a mini stave, using a pencil. Participant T#50a used ear playing at the very start of the students' pianistic journey, asking pupils to pick out a short, familiar tune, then to transpose it, before then showing them the notation for it.

Participant #T50a was very enthusiastic about playing by ear, both for herself and for her students, and encouraged them to:

> go away and listen to something you really like and pick it out on the piano. (#T50a)

On the other hand, Participant #T4b said that she did not engage in ear-playing with early beginners because she believed that some of these pupils found it frightening since they did not know how to do it. Participant #T31a said that she did not want to make her pupils feel silly if they could not manage to play by ear, so she did not

pursue it, which suggests that she did not in fact believe that the students would be able to play by ear and so she did not try to develop methods of encouragement in this area, and implies an entity theory of intelligence (Dweck, 2016).In addition, this was not a skill that Participant #T31a herself possessed, so she did not feel confident in trying to teach it. Similar to some teachers' beliefs on playing by rote, and aligning with McPherson's (1993, 2005) work, Participants #T35a admitted that she believed ear playing made people lazy and reluctant to read, and a few others said they might use it a little (Participants #T18b, #T10a) but were not particularly committed and did not have specific ear-playing strategies.

Summary

This section set out the teaching beliefs of the study participants particularly in terms of teaching the notation. In terms of when they introduce the notation, it seemed overall that they said they disagreed with introducing the notation too early, yet most introduced it after anything between two and twelve weeks, which suggests firstly that they believe it is important for individuals to learn to deal with notation as soon as possible, and secondly that they are perhaps not confident with teaching by rote or ear for any long period of time before introducing the notation. This may be because they do not understand how to teach by ear, or how it works, they are unable to play by ear themselves, or they feel pressure from individuals and, more likely, their parents or guardians to introduce the notation as soon as possible as that is what is generally expected, with many believing that piano lessons mean learning to read notation, and that is the intelligent thing to be able to do.

The teachers discussed the benefits of rote teaching, a few engaged in a small amount of the development of tactile skill (particularly Participant #T50a), some did a small amount of aural work (especially Participant #T50a), and some worked on keyboard geography development. Several teachers used an intervallic approach to their teaching, and there was a general concern with ensuring a confidence in pulse and rhythm. Three teachers had designed their own beginner methods, but none actively taught their students mental strategies, with the exception again of

Participant #T50a. Ear-playing presented a mix of thoughts, with a few teachers using it for fun, some using it as a serious part of a lesson (again, Participant #T50a), three as part of their own unique method, whereas others did not teach it because they could not do it themselves, believed that their students would be fearful of it or demonstrated an entity theory of ability and intelligence (Dweck, 2016) by thinking that their students would not be able to play by ear.

Having concluded the presentation of the ideas given by the study teachers regarding their teaching beliefs and methods, I return to the questionnaire data for questions 14 and 15 at this point, since it might have a bearing upon the teaching beliefs. Interview data is also combined with this, since different but related questions were asked in the interviews as a follow-up to questions 14 and 15 which were under-developed.

Questionnaire question 14

Study participants' personal learning preferences

Question 14 asked the participants about their personal learning, and their own preferred method of learning new repertoire pieces, whether this be through using notation, by ear, or another method. As previously stated, the rationale of this question was to begin to examine whether teachers' own learning preferences influenced their teaching. The data are presented in Figure 5.9 below.

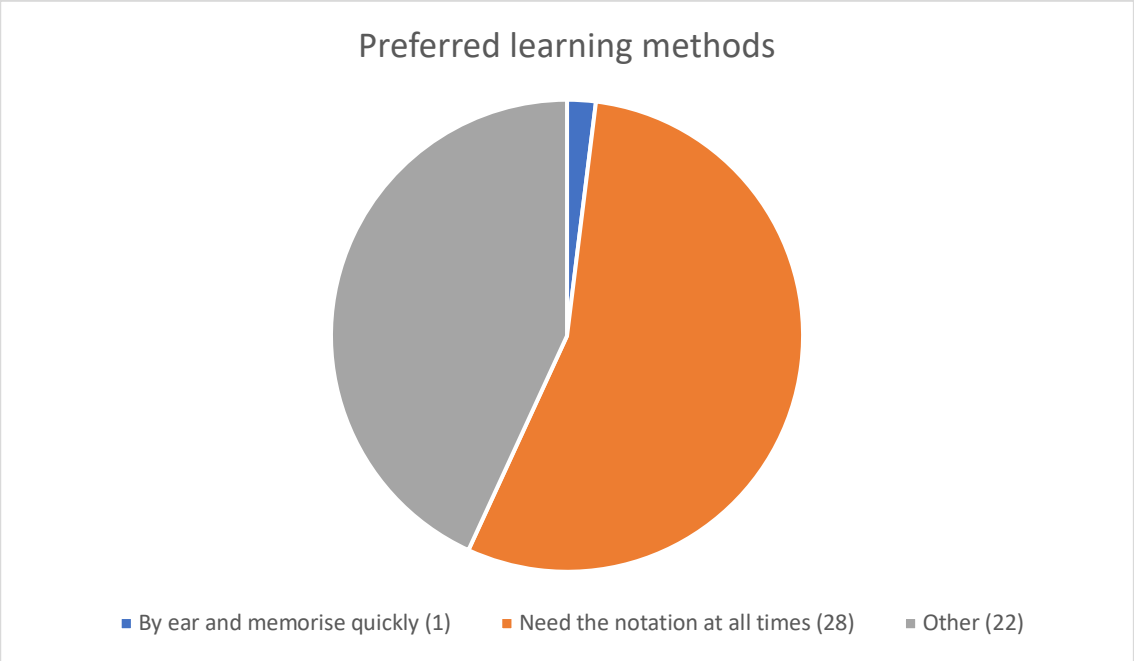

Figure 5.9 Teachers' preferred methods for learning new pieces

Twenty-eight participants expressed the definite need for the notation when learning new repertoire, arguably an important theme to emerge here. Of the twenty-two in the 'Other' category, six participants expressed that they might learn using either or both ways according to preference and the genre of repertoire they were learning (jazz, popular or classical). Seven said that they learnt a piece from notation initially and then memorized it. One used chord charts and notation, and another began by analysing the notation away from the piano, then learning each section thoroughly before memorising it and building up to memorising the whole piece. It is interesting that only one participant said that they learnt best by ear. The following participant arguably demonstrates the idea that if an individual can play by ear to a certain extent but is not that confident, he or she may be unlikely to try teaching this skill, which is a reason why some students may then not have that ability:

> I can pick out a tune by ear but plenty of mistakes, so not that confident teaching such skills. (#T30)

That the data suggest that most of the respondents require some form of notation in order to learn a piece, could be interpreted that they do not play by ear and therefore do not think about teaching their own students to play by ear. This could be firstly because it does not occur to them, or because it is not something they feel comfortable teaching, perhaps because they do not feel it is the correct way to teach, or because they think students will become lazy and reluctant to learn the notation. This may also be a legacy from how they were taught themselves, or a belief that, in order to be able to teach individuals to play the piano, one needs to be able to read the notation oneself, which one would not be able to do perhaps if one were reliant on the ear. Perhaps this would preclude this career pathway anyway. On the other hand, Participant #T7a, despite making the positive connection between ear-playing and sight-reading (Luce, 1965, McPherson, 1993, Priest, 1989) and having played by ear herself for many years before learning to read notation, did not seem to carry that through into her own teaching.

A limitation of this question is that the responses to it were not followed up in the interviews. This will be a suggestion for further research, since it could be that the teachers' own learning preferences and strengths in this respect could also limit the skills they are able to give to their students, in terms of the teachers' own abilities or beliefs about teaching by ear and with notation, for example.

Summary

It was interesting to note that, although 28 teachers said they needed the notation above all else to learn a piece, one preferred to learn by ear and memory, and twenty-two used a mix of ear and reading, which was very enlightening, if surprising, for me as a complete reader.

Questionnaire question 15

Do the study participants' learning preferences influence their own teaching?

This asked whether the teachers believed that their method of teaching piano might reflect their own way of learning. Green had already suggested that this was a valid question to ask oneself (2010) and suggested that teachers examine their own learning styles to try to ensure that they do not impose these upon learners who demonstrate different styles. This was a quantitative question asking them to choose a number between1 and 5 to situate their teaching. It is interesting to see from Figure 5.10 that the majority of responses fell into category 3 and above, which suggests a neutral stance or not really having an opinion either way. This may be because the question was not specific, and arguably is subjective and difficult to pin down quickly. It probably requires more thought on the part of the teachers to reflect deeply upon their methods using the lens of their own preferred learning method to think about it.

Two themes developed from this data, one that many of the participants taught from notation fairly early on because they had been taught this way themselves, and the second theme to develop was the seeking out of professional development on the part of several of these teachers to improve their craft.

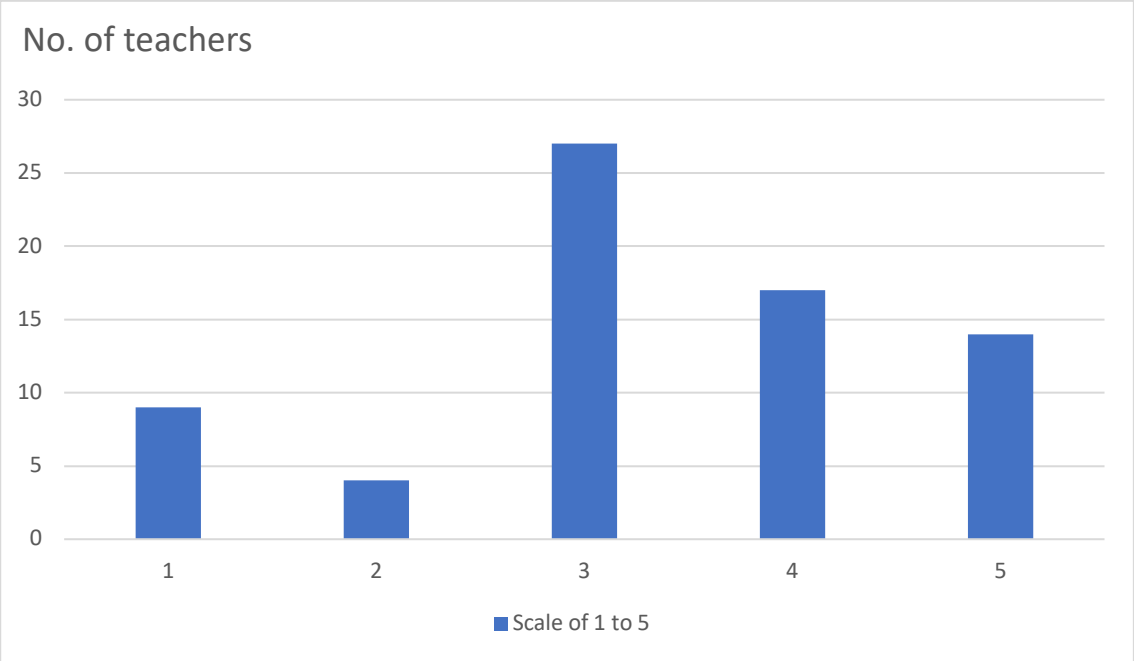

Figure 5.10 Teachers' beliefs about how their learning method influences their teaching

Teachers teaching as they were taught

Questionnaire question 15 could have been better designed, and therefore was expanded in the teacher interviews to ask whether the teachers believed that they taught in a similar way to how they themselves were taught. The reasoning for this question was to explore whether the teachers were forward thinking and might use strategies other than notation, or whether they had not considered other ways of teaching. Epler (2011) and Pajares (1992) argued that teachers' beliefs influence how they teach, and these beliefs therefore impact the outcomes and experiences of their students. The piano teaching literature and the data suggested that often piano teachers teach as they themselves were taught (Boyle, 2021), because this is all they know, or believe is best, and this literature implies, unfavourably, a heavy focus on teaching solely and straight from notation, at least at the start of their careers (Biasutti, 2010, Cathcart, 2013, Gordon, 1993, McPherson, 1993, 2005, and several study participants). This was unless they participated in specific courses or became members of active professional groups (for example The Curious Piano

Teachers, Cathcart and Mark-Teggart, founded in 2015), which was a theme that emerged from both the questionnaires and teacher interviews.

The literature had suggested that several piano teachers still taught in the same way in which they were taught themselves, which was usually straight from the notation at the very first lesson (Cathcart, 2013, Froseth, 1983 (cited in McPherson, 1993), McPherson and Parncutt, 2002, Priest, 1989, Schenk, 1989, Schleuter, 1997). Three themes developed from this question and are interlinked. They centre around teachers being taught straight from notation when they learned themselves, around an entity theory of intelligence and learning, and the seeking out of continuing professional development.

The overarching theme to emerge from this area of the research was that most of the study teacher participants admitted that their own experiences had been focused on learning notation from the start of their lessons, and that they had been given no opportunity or encouragement for ear-playing, rote-learning, improvisation or other creative skills. For example, some of them said that they had not learned to play by ear, (for example Participants #T14a and #T31a) and this meant that they did not feel able to teach this aspect, thus potentially limiting their own students' learning (Gordon 1993). Participant #T31a said this:

> I must admit, from my upbringing, I'm very much a reader of music, I find it difficult to pick up tunes by ear, I don't very naturally do that. So I tend to teach what I know. (#T31a)

Participant #T21b articulated that she was taught solely by notation herself and admitted that she found it meaningless, and disliked her lessons intensely:

> I'm pretty bitter about the way I was taught, actually. (#T21b)

Participant #T10a admitted to being taught solely from notation, with a 'stern, one-dimensional approach…' with no improvisation or similar creative activities being

included in her lessons. However, since attending training courses, she now offers a multi-dimensional approach in her lessons.

Participant #T18b said that she had begun her own teaching career in the same way in which she had been taught:

> It was going through the method book, using mnemonics, didn't do any improvisation, didn't do any playing by ear, and I think…as the years have progressed, and as I've learnt more as a teacher, then I've changed my ways of teaching. Or I've tried to, anyway. (#T18b)

The above quotation leads me to another theme that was woven throughout this data, and that is that many of the participants sought professional development in order to expand from a purely notation-based approach. Participant #T4b admitted that she had begun her teaching career teaching in the same way she was taught, until she undertook professional development:

> I didn't know any better when I started out. When I think about my first couple of years, I was probably an abysmal teacher… (#T4b)

She said that, since attending piano pedagogy courses and becoming a member of a professional body of piano teachers,

> I think all of those things combined have changed my teaching a lot, but certainly coming away from that kind of feeling that I have to read with them from their first lesson. (#T4b)

Participant #24b said that she had been taught primarily from notation and

> …only discovered all the other components of what makes a well-rounded pianist during my teacher training and have been trying to make sure that they gain these skills. (#T24b)

Participant #T21b argued that:

> …piano teachers teach as they were taught unless they have undertaken professional development. So before I took the mttp…I taught the way I was taught, using solely notation. Since starting the course I teach in a far more rounded way, trying to develop all aspects of musicianship. (#T21b)

An interesting comment from the data shows remarkable insight from this teacher who questions her own methods within the section on avoidance of notation:

> Is my irritation [about them making the same mistakes and having to repeat things a lot] because they are not learning my way and I have to adapt or because it would be better for them to learn my way? (#T15a)

Summary

Overall it seems that the study teachers began their teaching career teaching in the same way that they taught and learnt, which was using notation straightaway. The exception may be Participant #T7a who learnt the accordion, and learnt everything by ear until she tried to learn to read as a teenager. Enlighteningly again, she stated that she believed that her excellent sight-reading ability was due to the way she had learnt by ear for so many years, which then helped her to make sense of the symbols when she had to attach a sound to them. Her learning preference did not influence her teaching, however, as she said that she made sure her students could read notation so that they were in a better place than herself, which suggests a lack of knowledge of the pedagogical theories of writers such as Gordon (1993).

Several of the study teachers admitted to taking part in continuing professional development to learn to improve their craft, having developed the remarkable insight that there was more to teaching individuals to play the piano than notation.

I turn now to exploring the data in terms of beliefs about musical intelligence.

5.3 Beliefs about musical intelligence

This section explores the data arising from questions (both questionnaire and interview) about Gardner's Theory of Multiple Intelligences (2004), whether the teachers were aware of it, and if they used the principles in their own teaching. Secondly the section explores what the teachers said about musical intelligence, if it existed as a construct in their minds and, if so, how they developed this within their piano students.

Gardner's Theory of Multiple Intelligences

Questionnaire question 11 thus asked the participants whether or not they were aware of Gardner's Theory of Multiple Intelligences (2004) and, if so, whether or not they used the principles in their own teaching. Figure 5.11 illustrates the data emanating from the responses to this question.

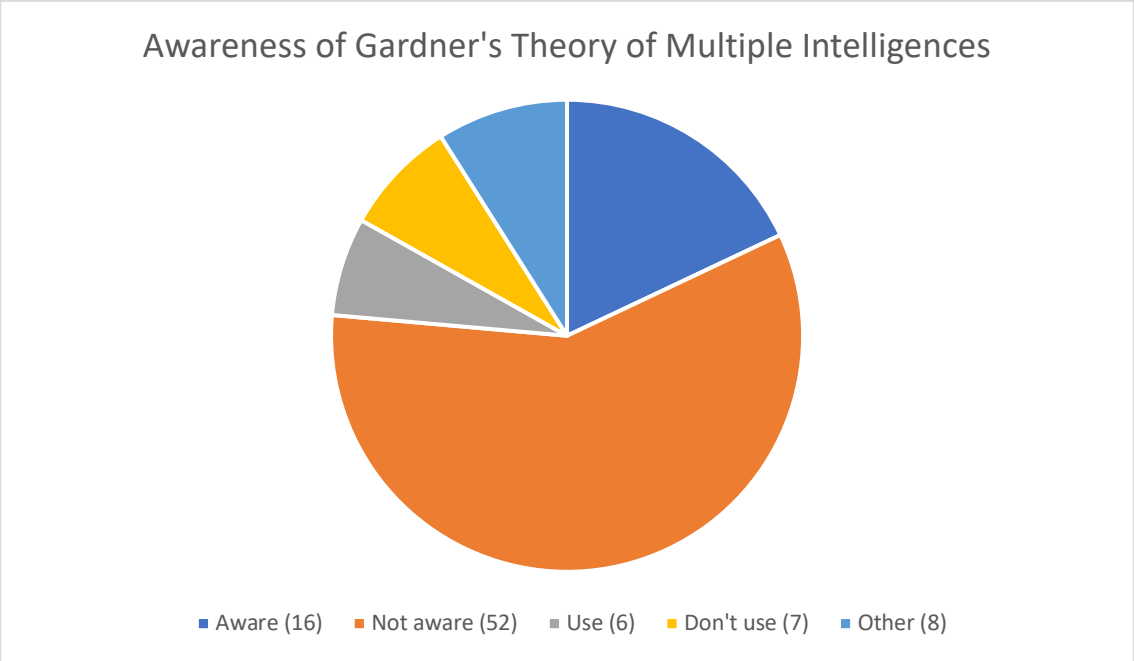

Figure 5.11 Awareness and use or otherwise of Gardner's Theory of Multiple Intelligences (2004)

It was important to establish this information in quantitative format, so that I could see firstly if many teachers believed in Gardner's theory of multiple intelligences (2004) and understood his concept of a musical intelligence and, if they used it, whether or not it was proving successful in their teaching. If this was indeed the case, I could find out how to use it in my own teaching, perhaps. Also, If this was the case, the second thing I would need to do would be to include the question in the interviews so that I could find out how the participants used it, and a definition of musical intelligence would perhaps be naturally forthcoming, to which I may be able to suggest additions, but it may be that I did not need to create a new definition. The above figures demonstrate, however, that only sixteen of the seventy-two respondents were aware of the theory, while fifty-two were not. Of the sixteen teachers who claimed awareness, only six said that they used it in their work, and seven said that they did not. Three did not answer these parts of the questions, but may have left their answers in the comments section which I will turn to now.

Some teachers confused this theory with learning styles, as mentioned earlier, such as these participants:

> Think I've been using a similar method intuitively! Have found through many years of teaching that different students have different learning styles. (#T49a)
>
> Sounds interesting – will check it out. Perhaps it's what I do – guessing it's about tactile, visual, aural…(#T34a)
>
> I don't directly draw on that particular theory when planning lessons or strategies, but I encourage students to understand and experience their piece from multiple perspectives, focussing on different senses or aspects of the piece. (#T9a)
>
> Have read this but forgotten what I discovered! (#T8b)

These comments arguably suggest that most of the teacher participants did not really know what Gardner's (2004) theory was about. One participant suggested that,

> It's a bit outdated nowadays. With each student I try various approaches to see what works best, and don't really worry or make a big deal out of any difficulties, I'm confident they will resolve with patience. (#T7a)

I turn now to exploring the responses from the piano teachers in this study as to how they might define the concept of musical intelligence in terms of learning to play the piano. I begin with setting out the questionnaire data and follow this with the interview data, and then discuss what was found.

Definitions of musical intelligence

From questionnaire question 12 regarding twenty-one codes were generated regarding beliefs about musical intelligence (see Appendix 19). Figure 5.12 illustrates the two broad categories into which these codes fell. The first concerned being able to read and play notation, and the second concerned musicianship, musicality and holism. These two themes were then reflected in the data from the teacher interviews.

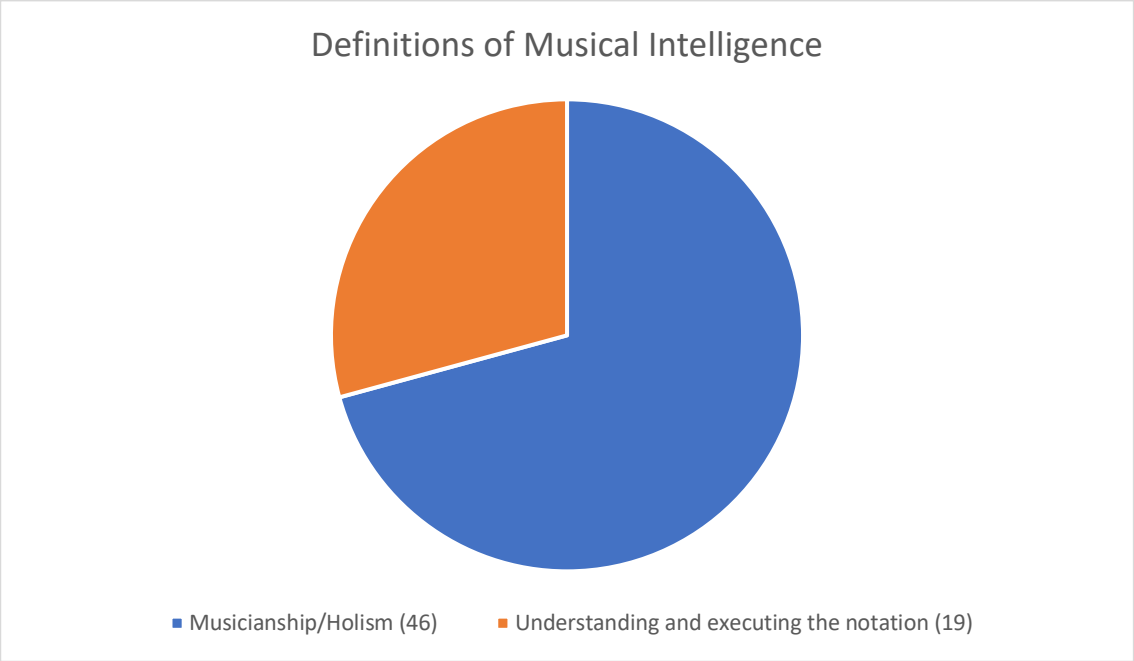

Figure 5.12 The two themes developed from question 11 data

The teacher interviews allowed for the gathering of more in-depth data, which enabled the construction of a matrix, (Table 5.7) to illustrate each participant's beliefs about musical intelligence. This is preceded by a key to the codes (Table 5.6).

Aud	Ability to audiate
Aur	Aural acuity
Prop	Good proprioceptive skill
Ear	Ability to play by ear
Musi	Musicality/Musicianship
Appr	Ability to appreciate and understand music
Creat	Possessing creativity
Patts	Ability to understand, hear, see and read patterns
Read	Ability to read notation

Table 5.6 Codes developing from beliefs about musical intelligence

Tchr	Aud	Aur	Prop	Ear	Musi	Appr	Patts	Read	Creat	Summary of definition
#T3a				Y				Y		You have to have multiple intelligences to be a good musician. Musical intelligence is either there or acquired by correct training and practice.
#T4b					Y			Y		Seeing the whole picture not just note by note.
#T10a		Y			Y			Y		Musicality over notes. Listen to own playing and think how to improve. Good technique.
#T10b	Y					Y				The ability to read a piece of music, no matter how slowly, and understand how it goes.
#T14a					Y					Equates to high general intelligence. Can use both hands. Divided attention.
#T16a	Y							Y		Wanting to read and play it well. Know how something should be played. Ability to read the musical language (not notation).
#T18b	Y	Y		Y		Y		Y		Understanding what it is they're hearing and in some ways being able to internalise it and replicate it but also if they're reading music, being able to hear it in their heads.
#T21b	Y	Y								I don't know if there's such a thing as musical intelligence.' Teacher's method is responsible for the student's musical intelligence.
#T24b	Y				Y	Y				Audiate more than just the melody, get an overall internal idea of a piece as to whether they want to learn it. Look at new piece and interpret it independently.
#T26a					Y		Y		Y	Play something musically straightaway from first sight. Marry the emotional and the technical side. 'The ability to co-ordinate multiple sensory perceptions into a unified purpose of creating organized patterns of sound.' Use all the senses.
#T31a				Poss	Y			Y		Talent – got it or not. Equates with general intelligence. Divided attention.
#T34a					Y	Y	Y			Understanding phrasing, breathing, where the music is going.
#T35a						Sort of				Seeing musical structures and shapes before playing
#T50a		Y	Y	Y	Y		Y	Y	Y	A felt sense of all the elements of music. Use all the senses. Awareness of world.

Table 5.7 Teacher interviewees' definitions of the elements of musical intelligence

The codes were mostly the same ones that were used to code the questionnaire data, except for new ideas arising such as creativity and music appreciation. A full account of each teacher interview participant's definitions can be found in Appendix 19 and includes their questionnaire response and their interview response.

It is clear that there is a mix of ideas suggested by the interviewees concerning the elements that they believe are part of a definition of musical intelligence, whether or not they already had an opinion prior to the study. As part of their definition, 8 teachers mentioned musicianship, 7 mentioned ability to read and play notation, 5 mentioned notational audiation, 5 mentioned music appreciation, 4 believed aural strength was important, 3 mentioned ear playing, 3 mentioned pattern recognition, 2

suggested creativity, and one mentioned proprioception as part of a definition of musical intelligence. It was interesting that only one teacher mentioned proprioception, since many had stated that a lack of this skill seemed to underpin the difficulties of reading and playing notation simultaneously, so it would arguably make sense that proprioceptive skills were considered part of musical intelligence.

Musicianship and reading notation were the most popular choices to include in a definition of musical intelligence, and this remark sums up a definition well:

> The ability to co-ordinate multiple sensory perceptions into a unified purpose of creating organised patterns of sound (#T26a)

Like the questionnaire data, the two overall themes regarding a definition of musical intelligence emerging from the teacher interviews related to understanding and executing the notation and to musicianship, musicality and holism. I turn now to exploring the findings of both sets of data. Figure 5.13 illustrates the questionnaire data in terms of notational understanding and execution.

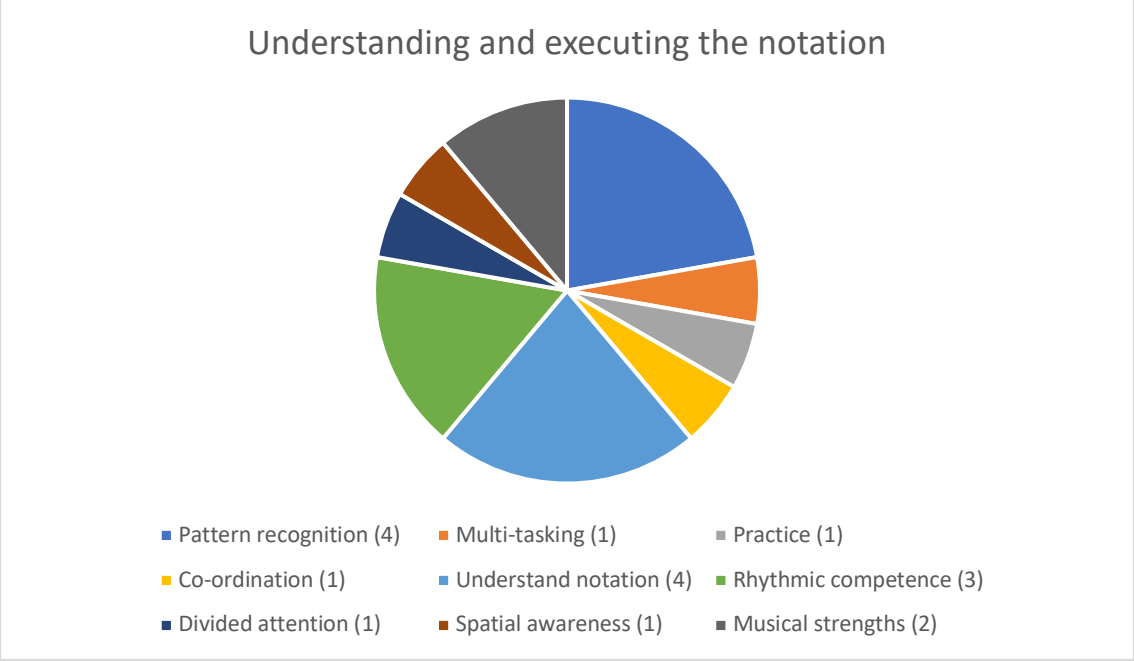

Figure 5.13 Elements involved in understanding the notation

Understanding and executing the notation

Specifically in terms of playing from notation, participants talked about a musically intelligent player as having well-developed ability in physical aspects such as motor skills, co-ordination and tactile skills, and a well-developed spatial sense, as well as specific notational skills in pattern recognition, rhythmic understanding, ability to divide the attention, and the ability to multi-task and the willingness to practise.

These remarks illustrate:

> Finding notes kinaesthetically. (#T24b)
>
> A clear ability to connect sound and symbol. (#T6b)
>
> Ability to see, hear and feel patterns. (#T50a)
>
> Easily read notation. (#T21a)
>
> Strong sense of pitch and rhythm. (#T19b)
>
> It's when they can independently look at a new piece of music and that they can interpret it without help from me. (#T24b)
>
> My teaching centres around rhythm through the medium of notation, aural and physical development. Musical Intelligence I therefore would define as a grasp of these areas. (#T19a)
>
> The ability to understand the connection between the physical, spatial and auditory aspects of the piano and the music produced as a result. (#T1b)

> Musical intelligence integrates a lot of skills such as co-ordination (with timing and with using both hands), listening, pedalling, following score, finding notes kinaesthetically. (#T23b)

> Body awareness and engaging with the instrument in a very physical way. (#T50a)

Participants argued that musical intelligence implied an ability to read the notation intelligently in phrases rather than single notes, as well as understanding pitch, rhythm, contour, and pattern. The ultimate demonstration of musical intelligence for these participants was to be able to read a piece of repertoire with complete understanding, to connect sound and symbol and also to be able to learn and interpret a new piece of repertoire independently without the help of a teacher. For these teachers, musical intelligence in this context also incorporated the ability to translate the notation from a visual medium into a physical response on the piano. These remarks illustrate:

> It's being able to play but in phrases, in units that make musical sense… (#T4b)

> It's the ability to read the musical language, I suppose, if we're talking specifically about notation, I guess. (#T16a)

However, the following remark suggested that the term musical intelligence represented a much larger concept for this participant:

> It is important to note that 'notation' is only a slice in the elements that make up Musical Intelligence. (#T24b)

That all of the teacher participants in this study taught notation as a standard part of their piano lessons, (see also Upitis *et al*, 2017) and that many of them showed concern that students who looked more at their hands than at the notation were not

consolidating their reading skills, suggests a strong belief that this is an important component of a piano lesson, and it could therefore represent an implicit definition of musical intelligence. Participant #T14a's comment that she thought that learning to read and play notation simultaneously was why the students came to piano lessons supports the concept that this is what is expected of the teachers by most parents or guardians and pupils. I turn now to the other main theme to emerge from this data, the concept of musical intelligence representing musicianship.

Musicianship

Sixteen questionnaire participants and eight interviewees suggested that musical intelligence embodied a musical player who demonstrated musicianship born of an innate understanding and awareness of the world in general, as well as the music that individuals were playing, a good imagination in terms of how to paint pictures or tell a story with their playing, a good aural sense together with the ability to audiate and play by ear, and body awareness and the ability to engage in this whilst playing.

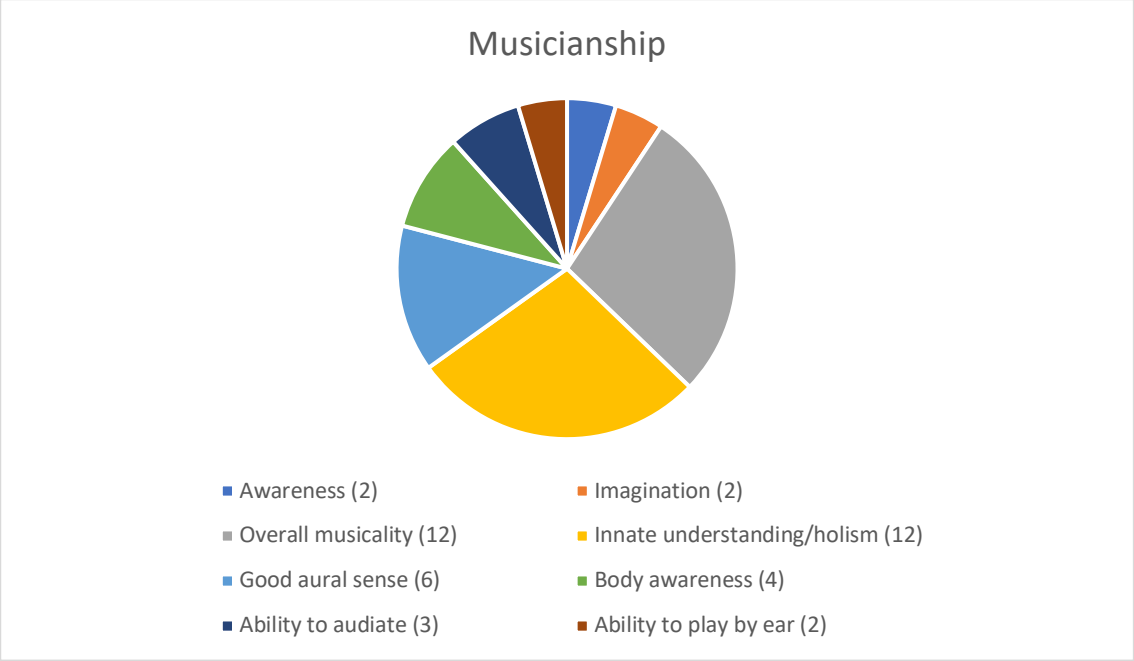

Figure 5.14 Elements of musicianship as part of musical intelligence

These remarks illustrate:

> Having a good understanding of the music they are playing, they can hear it in their heads when they are not playing it. (#T18b)
>
> Being aware of the music one is learning in all its aspects. (#T48a)
>
> 'Seeing' the music in your head while you are listening to/playing it. (#T17b)
>
> Interpreting the code/black notes of music into something alive. (#T18a)
>
> Make music instead of just playing the notes. (#T13a)
>
> Using a combination of skills (aural, rhythmic, note reading) consistently to make connections and create a pleasing performance. (#T10a)
>
> Musical intelligence in playing is the ability to shape phrases, play with feeling, coherent pulse, control of your instrument and production of appropriate tone at any point. (#T7a)
>
> A combination of innate aural awareness [and] spatial awareness. (#T6b)
>
> Aural skills e.g. developing inner ear. (#T32a)
>
> I think it is more a case of developing a musical ear. (#T29a)

> An ability to interpret what's written on the page and to reproduce that or reinterpret it yourself such that a listener would call it music. (#T50a)

> I think that musical intelligence is about playing in a really beautiful way rather than strictly reading the notes correctly… (#T10a)

> Musicianship: The ability to think in sound. (#T46a)

This latter comment supports McPherson's (1993, 2005) beliefs.

Concepts of musical intelligence were also very much about understanding the instrument:

> Musical intelligence is the understanding of how to produce sounds – being able to imagine how you want the music to sound…including dynamics and articulation and then how to manipulate the piano keys to achieve this sound. (#T38a)

For some participants, musical intelligence was innate:

> While a level of skill can be achieved by anyone with the proper dedication to practising and study, an innate musical intelligence makes it easier for a student to understand the concepts in relation to music as a whole. It also helps them to master many of the finer points of performance, as it makes sense to them on an instinctual level. (#T43a)

> It's a gift. Some have it, some don't. (#T8a)

Some teachers assumed that musical intelligence developed spontaneously:

> It develops over many many years and is absorbed through lessons and learning repertoire and technique. (#T20a)

while the following participant believed that musical intelligence was not innate, and that it needed to be taught, which is supported by Suzuki (2008):

> I think that musical intelligence is in everyone. The ability to learn is there. It just needs to be taught. (#T5a)

Participant #T21b argued that:

> I don't know if there's such a thing as musical intelligence. Surely it comes from your music education, what you know about music. From your own experience, you know, it has to be taught, it can't really come out of nowhere. (#T21b)

Table 5.7 shows that, supporting the work of Gordon (1993), McPherson (1993, 2005) and Priest (1989), participants argued that musical intelligence required good aural skills, an ability to think in sound, hear patterns, listen and understand well enough to play by ear, together with the ability to audiate the notation. Participant #18b said that being able to internalise and replicate was an important part of a musical intelligence, suggesting that an ability to play by ear also finds a place in her definition.

Despite certain participants stressing the need for complete understanding of the written symbol, an overall feeling to develop from the data was of a sense of musical intelligence that embodied musicality, expression, and intended interpretation of the music score:

Linked to the concept of musicianship, and running throughout the data, was also a strong sense that musical intelligence embodied a certain musical holism, the concept of understanding the music at a deeper level than just the 'code' (#T18a).

This included being at one with the instrument, a deep understanding of how to play it, possession of excellent technique in order to produce the desired sounds, understanding of the music itself, (as opposed to just the symbols) and ability to execute the notation, living the music. This amalgamated all the skills and senses mentioned in the earlier sections into an holistic musical intelligence in terms of playing the piano with or without notation, awareness of much more than just the mechanics of how to play. This holism arguably aligns with the meaning of intelligence which Gardner (2004) attributes to the Puluwat sailors (see Glossary). Remarks included the following:

> I think it's the ability to connect something that is visual and make it aural, and to do it almost instantaneously… and that's incredibly difficult, and to do it musically. (#T26a)

These participants' definitions of musical intelligence suggested a link with an overall intelligence or high IQ:

> …I think musical intelligence is up there with the higher intelligences. If you can play a piano, you're quite intelligent. (#T14a)

> It's often those who are just more intelligent generally that can cope with that [the notation] more easily. (#T31a)

Overall this data suggests that musical intelligence seems to combine an equal amount of musicality and musicianship qualities, in terms of being able to produce a pleasing, sensitive, meaningful and arousing performance on the instrument, skills which are either developed by the teacher or already innate, together with a sizeable amount of skills and heightened senses for being able to play the instrument with or without notation. It also seems that reading from notation is an important part of a complete musical intelligence according to this study data.

Thirteen questionnaire participants did not know what musical intelligence was or did not understand the question, however all of the teacher interviewees had something to say about it. I move on now to look at how the questionnaire participants taught the skills that they had put forward as being necessary to their own definitions of musical intelligence.

Summary

Although the teachers demonstrated different priorities in their definitions of musical intelligence, where they had one, or where they understood what it meant, overall the themes of musicianship and ability to read notation dominated, and were supported by other elements that they had mentioned, such as aural skill and pattern recognition. Interesting was the comment from Participant #T8a who thought it was an entity that one either has or has not, rather than it being able to be nurtured.

How are the skills required for musical intelligence developed by the study teachers?

Questionnaire question 13 asked the participants how they developed the skills that they had defined as part of musical intelligence within their students. Although this question assumed that a definition of musical intelligence was going to have been forthcoming in question 12, the responses indicated that most of the participants had an implicit definition of what musical intelligence was even if they claimed not to have understood the question or not to know what the term meant.

The table in Appendix 20 sets out the eighteen codes which developed from the concepts mentioned, and the frequency with which they were mentioned by the participants. These codes were then condensed into nine overall categories of teaching strategy and then into two main themes which correspond with the two themes from the questionnaire data, and which are illustrated in Figure 5.15.

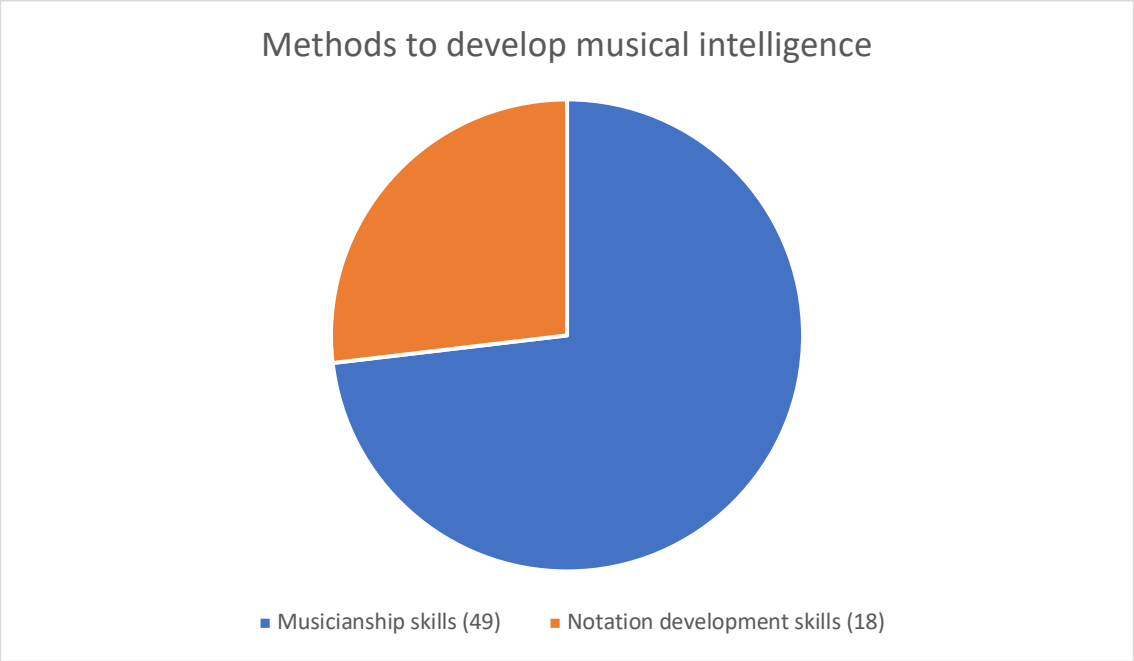

Figure 5.15 The two categories of musical intelligence development

Interestingly, this chart suggests a higher focus on a definition of musical intelligence representing musicianship than notational competence.

Development of musicianship

Listening was important to these teachers for developing musicianship within their students:

> I try and get them to listen to music as much as possible…they listen to me playing. (#T35a)

> We listen to lots of music and I demonstrate different ways of playing the same passage. (#T13a)

> I ask them to close their eyes and genuinely listen to their execution of a passage. Then ask if it sounded the way they thought it should. (#T12a)

> An open awareness to listening, not just to music but to the world at large. (#T50a)

Singing was mentioned by thirteen participants as important to the development of musical intelligence. Singing is underpinned by listening, and can help predict how something will sound once played. The voice is also capable of much in terms of dynamics, articulation and rhythmic patterns, and can help the performer to play in such a manner. Singing is a very important element of the Yamaha method, of which the focus is learning repertoire through solfege singing, with the idea that once the individual can sing a piece confidently, he or she can then play it on the instrument. These remarks illustrate:

> Using the voice helps to develop a sense of pitch and melodic shape and to underpin rhythms where needed. (#T49a)

> I encourage my students to sing/hum the melody line or section they are playing. (#T38a)

And listening are also at the root of notational audiation.

Those teachers who expressed a definition of musical intelligence in terms of a sense of musicianship said that they taught their pupils to interpret the notation through awareness of dynamic and articulation marks, to understand phrasing, speed and to paint a picture or tell a story through the music having listened to different versions of a piece, and through experimenting with different ways of playing it, different moods, using pictorial cues and similar:

> Encourage them to think about what story the music is telling based on the character of the piece. (#T13a)

> We play any given piece in various different ways, prioritizing different elements – so they understand that there isn't one ideal performance, they have to decide how they want to balance all of the elements to create their own favourite version. (#T7a)

Development of notational competence

Some teachers said that they used composition and improvisation activities within their teaching practice to help develop what they believe is musical intelligence, which helps to develop both musicianship and notational skills.

> The act of writing down music notation/scoring own composition often helps reinforce notation reading skills. (#T23b)

Other strategies for developing the notational side of musical intelligence included active development of kinaesthetic, proprioceptive and tactile skills, engaging with consistent and efficient fingering, covering the hands to increase confidence in notation reading, trying to develop automaticity in reading, teaching understanding of the contour of the notation, teaching intervallic understanding, learning to use the memory, working on chords and their inversions, pattern recognition and internalisation of rhythmic and harmonic patterns.

Six teachers mentioned good rhythmic competence as part of musical intelligence:

> Strong sense of pitch and rhythm. (#T34a)

> A good awareness of rhythm, pitch, notation and aural. (#T34a)

Summary

The combined questionnaire and interview data suggest that for over half of the teachers, notational competence represented a large part of musical intelligence, although I have inferred that most, if not all, of the teachers hold an implicit belief that notation represents a large part of musical intelligence, if not the main part, since they all taught their students to read notation. Eight of the interviewees and sixteen of the questionnaire respondents inferred that musical intelligence represents musicianship and holism, a complete understanding of one's instrument in terms of how to play it, and how to express music with it. It was also found that some teachers did not think in terms of any concept or framework for musical intelligence, and had not heard of the term, or did not understand what it might imply. This data is also powerful in what ideas were *not* forthcoming from the participants, which will be examined in the Discussion section.

I finish this section with a look at the responses from questionnaire question 16.

Questionnaire question 16

The final question in the questionnaire asked the participants to add any other thoughts about teaching notation into an open-ended box. Four overall codes were generated from this data, which can be found, together with their descriptions and frequencies of occurrence, in Appendix 21. Figure 5.16 summarises this data.

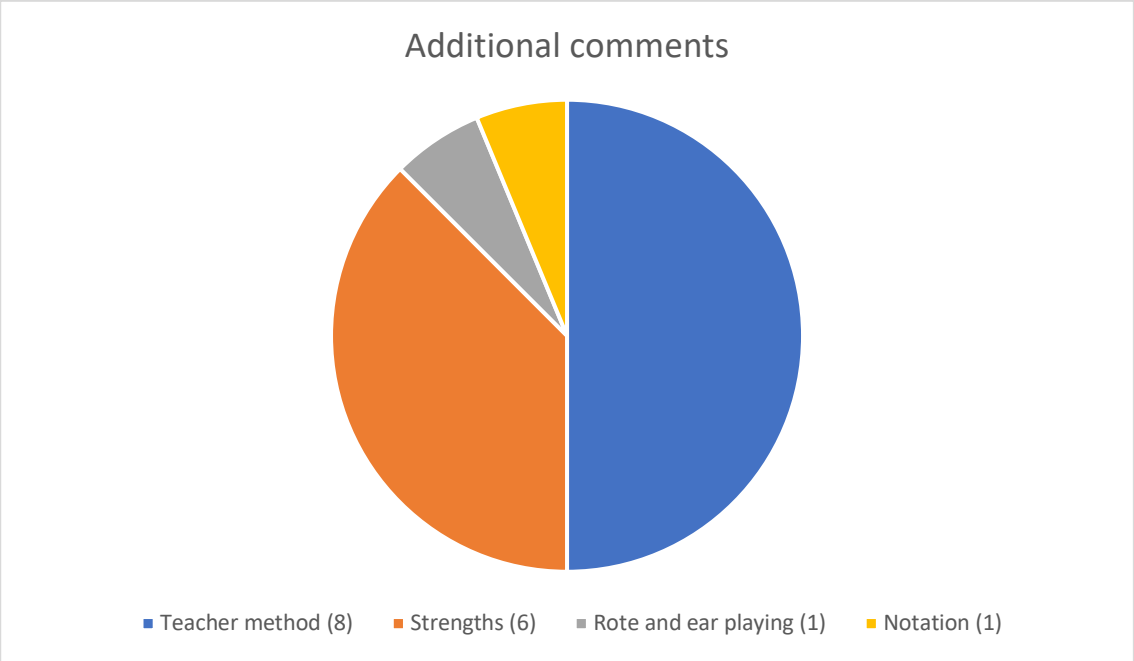

Figure 5.16 Additional comments

Many of the remarks supported and expanded upon the questions in the questionnaire, and four broad categories developed from the qualitative data, which consisted of twenty-six valid responses. Those responses who offered good wishes for the study, or suggested that my students take part in a masterclass or just wrote N/A were not included as valid responses.

These four categories concerned strengths, rote and ear playing, notation, and teacher method. The teachers suggested that individuals learn in different ways, talked about learning styles, and how they tried to work to the pupils' strengths and improve areas of weakness. Those who responded to this part of the questionnaire were, in the main, concerned that their pupils should learn how to read notation confidently, suggesting that this was important to their implicit concept of musical intelligence. Many of the teachers who responded in this section also stated that they themselves had been taught by 'traditional' methods, which implies a heavy emphasis on playing from notation from the start of lessons, although, in addition to those who had earlier stated participation in continuing professional development, two of these respondents had had the awareness to attend courses from which they

had learned to incorporate a more balanced approach to teaching, including improvisation and compositional activities. Participant #T23b admitted that,

> It is not comfortable to teach these skills that are new to me which is why it is important for me to deep developing my skills alongside my teaching practice. (#T23b)

One of the most enlightening comments came from Participant #T7a who, unfortunately, did not leave contact details, as she would have been an excellent teacher to interview. In addition to being the participant who believed that Gardner's theory (2004) was outdated, she was the only participant to acknowledge the positive part that regular and copious ear-playing had in the ability to sight-read:

> I'm an excellent sight-reader and I think it's a result of playing by ear a lot as a child, only really trying to read as a teenager. So once I was reading I knew a lot about how music in general should sound, so had context in which to make sense of the notation. 'Sound before symbol' in a very exaggerated way! (#T7a)

This concludes the presentation of the findings relating to research questions 1, 2 and 3, and I will now move onto the Discussion chapter, in which I have compiled a table of the overall themes which I believe have emerged from the data. These themes will be further explored, and the threads in the thesis drawn together. This is also where I will address Research Question 4, regarding how a framework for the development of musical intelligence might offer support to piano teachers and their students, particularly in terms of learning to read and play notation simultaneously on the piano.

6 Discussion

While this is a small study, in comparison for example to that of Upitis *et al* (2017), for which five researchers were available to create and analyse a much larger sample of teacher participants, and that of Cathcart (2013) which garnered 595 questionnaire responses from piano teachers, it has explored and provided valuable insight into the beliefs, practices and experiences of a sample of real-world piano students and teachers in terms of developing an understanding of what is involved in learning to play the piano, with particular focus on learning to read and play the notation simultaneously, of why some students might seem to find this difficult, and how the teacher participants try to develop the necessary skills within their pupils.

The research has also explored the concept of musical intelligence, inspired by the work of Gardner (2004), and attempted to construct a framework for musical intelligence that might be offered to piano teachers to support them in their work, and in particular for the development of reading and playing notation simultaneously.

This chapter begins by presenting a summary of the key findings of the study, reiterates the research questions and then explores the findings and relates them to the overall title of the thesis, which was 'Towards an understanding of musical intelligence as a framework for learning to read and play piano notation'.

Key Findings

The key findings from the study are as follows:

- Reading and playing notation simultaneously on the piano is complex, and is underpinned by strong proprioceptive, kinaesthetic and tactile skills, a reliable musical-spatial intelligence and above all a strong aural intelligence.

- All the study teachers believed, whether implicitly or explicitly, that it was important to be able to read and play from notation, therefore this was inferred to underpin part of their definition of musical intelligence.

- Musicianship was also regarded by the teacher participants as a central part of musical intelligence, and therefore the interpersonal and intrapersonal intelligences put forward by Gardner (2004) also form part of musical intelligence.

- Students appear to demonstrate different musical strengths, generally either an ability to read notation or an ability to play by ear and learn by rote, therefore both need to be equally developed during music education.

- The teachers demonstrated a lack of understanding of how some individuals are able to learn lengthy pieces of repertoire by ear, which seems to lead to a lack of confidence in introducing aural learning in piano lessons. This was evident also from their general lack of awareness of pedagogical research.

- Mental strategies for learning to read and play simultaneously were not understood or used by most of the teachers.

- Some teachers demonstrated an entity theory of intelligence.

- Many of the teachers had engaged in continuing professional development.

- A conclusive definition of musical intelligence is elusive, however it could be argued to be underpinned by the ability to think in sound and be at one with the instrument, thus requiring solid aural, proprioceptive, kinaesthetic, tactile and musical-spatial intelligences, together with strong musicianship, as well as the interpersonal and intrapersonal elements of Gardner's (2004) work, gathered into a deep understanding of the craft of playing an instrument, here, a piano.

The words that incorporate all of these elements of musical intelligence are 'deep engagement and understanding', in the same way that the Puluwat sailors demonstrate in their craft (see Glossary), but the ear rests at the heart of musical intelligence.

A more comprehensive definition based on a synthesis of the literature, the teachers' beliefs and the researcher's inferences and interpretations can be found in Appendix 22, 'A Framework for Musical Intelligence'.

The four research questions were as follows:

1. What experiences, observations and beliefs do the students and piano teachers in this study share about learning to read and play notation simultaneously on the piano?

2. What beliefs do the piano teachers in this study seem to hold about teaching pupils to read and play the notation simultaneously?

3. How might musical intelligence be defined?

4. How might a framework for musical intelligence offer support to piano teachers and their students, particularly in terms of learning to read and play notation simultaneously on the piano?

Table 6.1 presents my synthesis of the themes that developed from the entire study, which include those that were explicit in the data, and those that were implicit. I then address each of the research questions in turn.

	Themes
	Research Question 1:
1.	Reading and playing notation simultaneously on the piano is complex.
	Research Question 2:
2.	The importance of proprioceptive, kinaesthetic, tactile and spatial skills.
3.	Timely introduction of notation is critical.
4.	Rote teaching is important.
5.	Notation is important
6.	Some students appear to demonstrate different musical strengths.
	Research Question 3:
7.	Musicianship and musicality are important for musical intelligence.
8.	Notation is important for musical intelligence.
	Research Question 4:
9.	A lack of awareness of pedagogical research and theories exists.
10.	A lack of understanding of individuals' learning strengths exists.
11.	Mental strategies were not understood or used.
12.	Some teachers in this study demonstrate an entity theory of intelligence.
13.	Many teachers have engaged in continuing professional development.

Table 6.1 Themes developed from the data

6.1 Experiences, observations and beliefs about learning to read and play notation

1. Reading and playing piano notation simultaneously on the piano is complex

The overarching theme that emerged from both the student and teacher data was supported throughout the literature, and concerned the sheer overall complexity of understanding and executing the notation, and the fact that it requires heightened development of the internal senses, as well as involving many tasks of be executed concurrently. Arguably, that most of the teachers in this study had at least one or two students within their teaching practice, sometimes several, who looked at their hands more than at the notation when being taught to play new repertoire pieces, lends support to the concept that this complexity exists, although beliefs about students demonstrating high aural strength were also put forward as reasons for hand-looking, so, arguably, this was not necessarily completely consistent with a difficulty in reading the notation.

6.2 Beliefs about teaching pupils to read and play

Having confirmed that reading and playing notation simultaneously on the piano requires the combination of several cognitive and physical actions to be executed concurrently, the skills that the teacher participants put forward as necessary for developing this ability are set out in Figure 6.1 and could be argued to represent sub-themes of the overarching theme, in that achievement of them arguably presents challenges for some individuals.

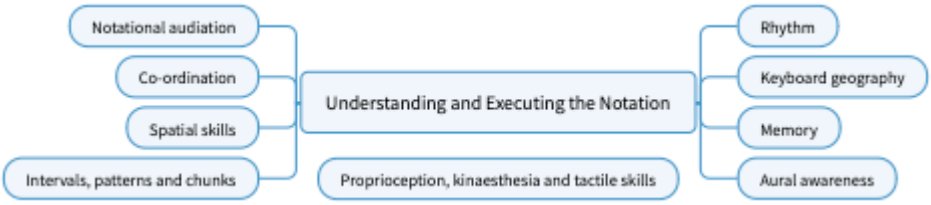

Figure 6.1 Skills required for understanding and executing the notation

An important aim of the research was to try to establish good teaching methods to help students to achieve the ability to read and play notation simultaneously, thus the teachers' beliefs and attitudes regarding this area of their practice were explored through the questionnaires and follow-up interviews. The next theme to develop both form the student and teacher data concerned proprioceptive, kinaesthetic, tactile and spatial skills.

2. The importance of proprioceptive, kinaesthetic, tactile and spatial skills

This theme had firstly appeared in the student data in the concern manifest by some students that they could not see where their hands were going. This was supported by twenty-four of the seventy-two teacher questionnaire respondents who believed that a lack of good proprioceptive skill was at the root of much difficulty in reading and playing and gave this as a reason for students feeling the need to look at their hands in order to move them first, which resulted in a lack of fluency in their playing and led often to a complete dependence on looking at the hands from that point. Methods to try to eliminate hand-looking entailed a reactive response, which involved covering the students' hands with a book or light piece of card or similar, and asking them to play focusing on the notation, or a proactive stance, which entailed asking them to play scales or familiar extracts from their repertoire with their eyes closed. Both strategies can be assumed to develop stronger proprioceptive skills as well as a musical-spatial awareness and ability. Spatial skills are linked with proprioceptive understanding, and it was understood that spatial skills were involved in reading and playing notation simultaneously on the piano. However only a few

teachers mentioned strategies to develop musical-spatial skills, including asking students to practise large jumps between keys (Participant #T18b), but there was scant reference to this aspect of learning to play the piano throughout the study. I could not find a link in Gardner's (2004) work between spatial intelligence and musical intelligence, yet both the (admittedly scant) literature and the data support the need for spatial awareness and spatial ability in playing the piano, and specifically for playing piano with the notation. Thus it could be argued that a musical-spatial awareness should be taught to beginner piano pupils. In a similar vein, although Gardner (2004) seems to have made only a brief allusion to the link between his bodily-kinaesthetic intelligence and playing musical instruments, the data leads me to infer that it is arguably an important intelligence to develop in this respect (see also Martin, 1965, in the Glossary), thus a musical-tactile intelligence also needs to be actively developed as part of a piano lesson.

3. Timely introduction of notation is critical

A third theme emerging from the data concerns the acknowledgement of the overall complexity of reading and playing from notation which provided the basis on which twelve of the fourteen teachers interviewed chose not to introduce the notation at the first lesson, or even for a few lessons afterwards. This aligns with the beliefs of Cathcart, (2013), Dalby (1999), Gordon (1993) and McPherson (1993, 2005). Most of the study participants believed that trying to introduce notation too early was problematic because of the vast amount of multi-tasking involved, of which decoding of symbols was only one part. Participant #T21b argued that if teachers force their students to read notation from the first lesson, they are asking them to do too much, and the pupils will either cope however they can (using hand-looking or their ears to try to memorise) or give up trying and cease instruction.

One teacher's method involved separating out the elements of the action of playing from notation in order to focus on them individually rather than all at once, for example the development of rhythmic security and ability to develop a strong pulse, which was one aspect to suffer when pupils were introduced to notation from the

start (Participants #T3a, #T4b and #T23b). This is supported by the work of Fourie (2004) and Gudmundsdottir (2010) who observed that each 'dot' on the page has a dual purpose, since it represents both pitch and duration, thus asking a player to divide their attention between the two. Also supporting this finding is McPherson's (1994) study on sight-reading, where he found that rhythmic errors accounted for 59-64% of all mistakes, whereas errors in pitch occurred three times less. Teachers in my study also observed that the visual nature of the notation seemed to encourage more attention towards the pitch than the rhythm (Participant #T4b). To try to overcome this phenomenon, Participant #T23b spent at least a term working on rhythmic development before she allowed her students to even touch the piano, thus developing this aspect separately. The teacher participants also argued that the fact that the visual medium of the notation tended to take precedence over listening risked impeding the development of musicianship since the students were not listening to their own playing.

On the other hand, two teacher participants criticised their students' previous piano teachers for not introducing the notation early enough, and for using too much rote work which, in their opinion, was consistent with these students becoming reluctant to learn to read when they could simply copy and therefore avoid reading the notation. This belief is supported by the findings of McPherson (1993, 2005) and Priest (1989). It was found that sometimes prolonged rote learning seemed to lead, over time, to difficulties being encountered once a certain level of complexity in terms of repertoire had been reached, because the students found it too challenging on their memory as well, did not want to return to basic note-reading because they were able to play repertoire that was more complex, and at this point often ceased instruction.

Similar concerns were voiced in terms of students who played by ear. Indeed, Participant #T7a believed that her preference for playing by ear had negatively affected her ability to read notation, and that she had had to work hard to learn to read and sight-read later in life, and this was the reason why she did not allow her students to play by ear but introduced notation early to try to ensure that they learnt

how to read. Conversely, Participant #T35a said that her copious ear-playing over several years had made her a much better sight-reader by the time she had come to needing to learn to read notation.

Participant #T3a specifically named the Yamaha method as a reason why many of her transfer pupils could not seem to read and play notation simultaneously, since the method teaches students to play by ear for the first two years of the course, from the age of four years. She argued that this led to students being reluctant to extend the effort required in order to learn to read the notation, which arguably made it appear to her that these students found reading notation difficult.

Since the data did seem to suggest that some students who had played much by rote and ear did not want to revert to what they often saw as simplistic learning, or a backwards step, by trying to learn notation for pieces that were regarded as uninteresting and too easy, when they could play more complex repertoire using other methods, it could be argued that the introduction of notation needs to be carefully integrated at an optimal and timely moment within the student's musical curriculum, and this is entirely dependent upon the individual. Participant #T18b said that she had a sizeable number of hand-lookers in her cohort, and it is possible that this is consistent with her practice of teaching mainly by rote for a year and introducing the notation slowly. Perhaps her students did become reluctant to read when they could already play more complicated repertoire by rote, and perhaps it was a shock, as suggested by Gardner (2004) when the formal side of the music learning was encountered.

However, it is important to note that, within the Yamaha schools, students show interest in reading the notation when they feel ready and desiring to become more independent and learn the repertoire in which they are interested. It cannot be argued that learning by ear and rote are causes of difficulties, however, merely that these may become preferable for some students who then regard learning by ear and rote as an easier option for playing pieces, which then has the effect of lowering their interest in trying to learn to read notation. It then appears as though the student

is finding notation difficult, but that is because he or she is not practising or consolidating the skills that the teacher is trying to instil during the teaching of the meaning of the notation, possibly due to lack of interest. Priest (1989) argued that it was possible to teach individuals to play by ear and introduce notation simultaneously. I move now to the next theme to have developed from the data, which involves rote teaching.

4. Rote teaching is important

I had found that a few of my own students preferred to learn repertoire by copying me (#S8 and #S18 and one other not included in data collection) and, as I wrote at the beginning of the thesis, I did not at first consider this the correct way of learning to play the piano. This also puzzled me, because I had not been taught this way myself, and I did not understand how anyone could learn in this way. However, the data revealed that most of the study participants began their teaching with rote learning as a precursor to reading the notation because, according to them, this can address several of the elements involved in reading and playing notation.

The data reinforced the concept that rote playing helps a student to learn and internalise the geography of the keyboard, to develop musical-spatial awareness and musical-spatial ability, in terms of how far to move the arms, hands and fingers to find the appropriate keys, to develop the tactile sense of playing the piano, and to manipulate the instrument from the start, all without the notation adding to the mental workload. It also enables the teaching of efficient fingering, since the player can see the keys and make a connection between this visual medium and the aural sense of the piece they are trying to play, in terms of direction and interval. This aligns with Schleuter's referral to Pestalozzi's belief that concepts need to be experienced as a whole before names or symbols are associated (the notation for example): 'after experiencing the whole, its parts are analysed and then labelled' (cited in Schleuter, 1997, p.21). In this way, Participants #T16a and #T26a said that they used a 'rote to note' approach, in which they taught students either a short piece of new repertoire, or a tricky passage of a longer piece, by rote, before then showing them what that

extract, or piece, looked like when notated (see also Gordon, 1993, Harris, 2014, Odam, 1995). Thus a visual-aural connection could be created, and better understanding of the notation developed at a timely point. Rote teaching is also directly supported within the Piano Safari method (Fisher and Knerr, 2008) for these reasons and for its ability to aid pattern recognition.

Teachers also argued that rote playing enabled beginner students to play a meaningful piece at their first lesson, which was motivating and exciting for them, and Participant #T23b used this to maintain motivation for those of her students who she believed were dyslexic or dyspraxic, and who thus found reading and playing difficult, and in particular found it tricky to use logical fingering and demonstrated lower proprioceptive ability overall.

5. Notation is important

Even though twelve of the fourteen teacher interviewees eschewed the idea of introducing notation at the first lesson and began teaching by rote and ear, for the majority of the teachers this aural form of teaching did not last longer than two or three weeks in most cases. This suggests that these teachers may be more comfortable teaching notation as that is what they know, the majority having been taught this way themselves, and also suggests that their confidence in the efficacy of ear and rote methods may not be high. This behaviour may also be consistent with the lack of knowledge about the pedagogical theory of Gordon (1993), that developing musical readiness through copious listening to music and learning many patterns by ear represents the precursor to both musicianship and notational literacy. It may also be indicative of the lack of confidence of the teachers to pursue ear and rote playing methods in terms of their own lack of understanding of how individuals can learn in this way.

The strong emphasis on teaching notation also suggests the possibility that these teachers may feel the need to conform to the pressures and demands of parents, guardians and students who assume that reading notation is the whole point of piano

lessons, (as stated by Participant #T14a). The data also suggested that some parents and guardians do not understand the place and benefit of ear-playing and other aural methods of learning in a normal music lesson. Participant #T27 said that she had experienced this phenomenon with a parent, and Participant #T4b stated that the parents of her students seemed to want an ever more complex problem for them to solve each week, which she labelled as 'code cracking', suggesting that musicianship did not enter the equation for these parents, and that playing the piano was a purely academic venture in the same vein as mathematics or literacy. If parents, guardians and individuals cannot physically see a book with notation where written indication of progress visible, perhaps pages being ticked and dated when accomplished, they may find it difficult to understand that development is actually being achieved (see also Harris, 2008). Williams admits that 'it is possible that parents will take some convincing of a less conventional approach but communicate and explain that the pupil's personal and musical development is at the heart of this approach', (2017, p.23).

6. Some students appear to demonstrate different musical strengths

Although the teacher participants were not asked specifically about strengths, a theme of different musical strengths developed from the data in connection with reasons given by the teachers for some students looking at their hands more than at the notation when learning to play. However, although negative remarks about notation being difficult and students being lazy formed the larger percentage of responses to this question, positive statements emerged that some of these students had a remarkable ear and aural memory on which they depended for learning repertoire, rather than reading the notation. Participants #T25a and #T36a said that, for some of their students, this was easier than reading because it made more sense to them on a musical level.

This participant remarked that:

> They are more natural at playing by ear rather than a visual learner. (#T2a)

Similarly, it appeared that some non-readers seemed to make more sense of learning by looking at the patterns made by the hands on the piano keys, which could be representative of a stronger logical-mathematical intelligence (Lazear, 2000).

> They find it easier to memorise patterns than to read the notation. (#T48a)

Thus the data supported my musings to some extent that individuals may demonstrate different musical strengths in terms of learning to play the piano, with and without notation.

Odam argued that 'we need to strengthen the aural memories of notation readers and to encourage less dependence on notation, and aurally reliant pupils need to discover the benefits of the skills of reading' (1995, p.4). Gardner (2004) asserted that his intelligences could be nurtured and developed, thus, since Luce (1965), McPherson (1993) and Priest (1989) all found that ear-playing was positively correlated with good sight-reading, and Gordon (1993) stated categorically that this aural readiness needed to be in place before teaching students to read notation, it could be argued that, if a student is stronger in ear-playing, this skill could be used to develop the reading element, and a reader could be encouraged to develop their ear-playing, as this could also improve the notation reading of the latter (also McPherson 1993). However, despite Priest's (1989) assertions that it is possible to develop both ear and note reading skills from the start of lessons, it should be borne in mind that this still might not necessarily render both abilities equal in a student, and one natural strength may always outperform the other.

The finding that different strengths appear to exist suggests that, if a framework for musical intelligence is to be developed, the belief held by many that reading notation represents musical intelligence needs to be countered by convincing these believers

that those who learn to play by using their remarkable aural skills are also demonstrating valid musical intelligence. The main point here is for teachers to become aware of individuals' strengths and to acknowledge them as equal musical intelligences. Although Gardner (2004) did not seem to make the connection between his concept of different strengths by applying it to musical intelligence in this way, it is important that the concept of different musical strengths be acknowledged, because this could improve a learner's musical journey in terms of understanding that the strength of aural players represents one form of musical intelligence, and the strength of the natural readers represents another. This could also be vital for ensuring that these aural learners are supported in their pianistic career rather than ceasing instruction because they are regarded as musically unintelligent (or 'written off', Gardner, 2004, p.11) if they do not readily read notation, of if they are forced to read notation and dislike it because it is difficult for them. Equally if their teacher does not incorporate ear-playing as part of a normal music lesson and use it as part of the development of notational competence, this might be a disadvantage to them. Participant #T35a said that, although she had grown up playing by ear and committing pieces to memory from the aural image provided by her teacher, she considered this 'cheating', which suggests that she did not think this was the proper way to learn. Sadly she did not acknowledge that her wonderful ability to play by ear could be her own personal playing strength, or that it might be at the heart of a musical intelligence, or indeed at the heart of all musical learning. Instead she said that she wanted to make sure that her own students learnt to read properly, which is supported by Boyle (2021) who found a similar intent voiced by 'TP', one of her study participants.

It is important that parents, guardians and the learners themselves be aware of the different musical strengths, so that aural learners understand that they have a remarkable strength which rests at the heart of learning to play an instrument, learning to read the notation, and of musical intelligence overall, and not believe that they are not good enough because they prefer not to read notation. It is crucial to inform parents, guardians and pupils that improvisation and creativity are a vital part

of musicianship, which is the basis of overall musical intelligence, not just the ability to read notation with no musical understanding.

As a note of caution, it may, of course, be the case that an individual does not actually possess a better aural skill than reading skill, it may simply be that he or she finds the simultaneous reading and playing of notation completely overwhelming and he or she may always have found notation reading difficult regardless of the teaching method.

Summary

This section has explored the themes that developed from the data in terms of the teachers' beliefs about teaching students to read and play the notation simultaneously. These themes were that:

- proprioceptive, kinaesthetic, tactile and spatial skills are important for developing reading and playing
- the timely introduction of notation is highly important
- rote teaching formed a large part of most of the participants' teaching practice
- notation is important
- some students appear to demonstrate different musical strengths when learning

I move on now to exploring the themes that arose from the data gathered regarding beliefs about musical intelligence.

6.3 How might musical intelligence be defined?

Two main themes developed from the data gathered from the teacher questionnaire and interviews regarding a definition of musical intelligence, and the first of these suggested that musical intelligence embodied an overall sense of musicianship, musicality and holism. The second main theme was that notation seemed to form a large part of a definition of musical intelligence, both explicit and implicit.

7. Musicianship and musicality are important for musical intelligence

This theme embodies the concept of musicianship in terms of musicality, expression, and intended interpretation of the music, and the 'ability to think in sound' (Participant #T46a, but also supported by Gordon, 1993, McPherson, 1993, 2005, Odam, 1995 and Priest, 1989). Elements of musicality and musicianship were defined in the data as imagination and creativity, how to produce a desired sound, playing with expression and a sense of appropriate mood, correctly interpreting dynamics and articulation, phrasing, and the ability to play a piece meaningfully, so that it would 'speak' to its audience (Participants #T26a and #T10a). Several teacher participants expressed concern that musicianship needed to be developed within their students (#T26a, #T34a), suggesting that this was an implicit part of their definition of musical intelligence, even before they were asked the question, and argued that introducing the notation too early impeded musicianship, because the students were focusing too much on decoding the symbols correctly (#T4b), and others saying that (despite not understanding how they learnt in this way) those who learnt by ear, rote or memorised and dispensed with the notation, often played more musically than those who relied solely on the notation to play (#T50a, #T1b). It was found that relying solely on the notation often seemed to produce more mechanical playing, which supports the comments of Gordon (1993), Mainwaring (1951), McPherson (1993, 2005) and Schleuter (1997), that kinaesthetic and mechanical security, and ability to decode symbols does not equate to musicality, and can completely overshadow the

ability to listen and play musically. Indeed, Gordon's view of musical understanding (1993) infers a deep and active understanding of music and musical elements, knowing how to listen, what to listen for, and how to use this in one's learning.

Strongly linked to the concept of musicianship, and threaded throughout the data, was also a sense that musical intelligence embodied a certain sense of holism, the concept of understanding the music at a deeper level than just the 'code', (Participants #T4b and #T18a). Elements that demonstrated musical intelligence in this respect included understanding the instrument and how to play it, how to make a beautiful sound with it (#T10a), understanding concepts in relation to the music as a whole, for example the structure of a composition, and an innate sense of musicality. Indeed this is supported by Helding's (2010) interpretation of Gardner's (2004) interpersonal intelligence, which she sees as being relevant to musicians, in terms of needing a certain sense of empathy in order to deliver a convincing and emotional performance of a work, and to evoke the required response from an audience. It could therefore be inferred from this that an important element of a complete musical intelligence is a musical empathy which again needs to be encouraged as part of a piano lesson.

8. Notation is an important part of musical intelligence

An analysis of the data gathered from the teacher questionnaires and interviews suggested that skills in the following areas are necessary for the part of musical intelligence that they saw as learning to read and play notation simultaneously on the piano:

- Excellent aural awareness and aural skills
- Reliable proprioceptive, kinaesthetic and tactile senses
- Spatial awareness
- Rhythmic competence and understanding
- Understanding of elements of notation including intervals and patterns, pitch and rhythm.

- Internal understanding of keyboard geography
- Willingness to practise
- Co-ordination
- Reliable short- and long-term memory

I stated at the start of my research that I myself had believed that being able to read and play notation simultaneously on the piano was the most important skill to possess and to teach in terms of learning to play, indeed that it *was* the embodiment of musical intelligence, an inference which had been noted by Macintyre (2007), Odam (1995) and Priest (1989), to name but three.

The theme of the overall importance of learning to read notation pervaded the data, since it was the main focus of my study. However, although half of the teacher interviewees, and seven of the seventy-two questionnaire respondents explicitly argued that a large part of being musically intelligent signified the ability to read and understand the notation, to connect sound and symbol, and eventually to be able to interpret a new piece of repertoire independently without the help of a teacher, the fact that all of the teacher participants in this study focused on teaching their students to read notation, and showed concern about those who avoided reading and looked more at their hands, has led me to infer that most of them probably believed implicitly that the ability to read notation represents musical intelligence, or at least is a crucial part thereof, and thus to infer that this is one of the reasons that this rests at the centre of their teaching practice. All of these teachers began to teach notation early in their students' pianistic careers, despite arguing that introducing the notation too early was too much for the student to cope with.

Summary

The two main themes that emerged from the data regarding these teachers' beliefs about a definition of musical intelligence concerned an emphasis on musicianship and the ability to read and play notation. According to the literature, both of these elements are underpinned by excellent aural skills which need to be developed from

the very first lesson, and since Cathcart (2013), McPherson (1993, 2005), Schleuter (1997), Kinney (2018) and many other writers have lamented the strong focus on learning notation from the first lesson because it seems to provide a barrier to musicianship, perhaps, then, musical intelligence is built upon, and begins with, the development of the aural skills from the beginning of the pianistic journey, with notation being introduced much later than the first two or three weeks.

The literature suggested myriad possibilities about a definition of musical intelligence (see Appendix 3), many of which rest on listening and understanding. Thus, synthesising the definitions from the literature and the teachers, I suggest that the word that seems to sum up intelligence overall, in any area, is the word 'understanding', and musical intelligence is no exception. Thus it could be argued that musical intelligence represents:

- a deep understanding of the craft
- a deep understanding of how to make a beautiful sound on the instrument
- strong aural intelligence
- a deep understanding or how to play the instrument in any way, either with notation or by memory or ear
- knowing the instrument well enough to improvise, create and harmonise
- possession of excellent keyboard geography, kinaesthetic, tactile, proprioceptive and spatial intelligence
- musicianship and holism, including aspects of Gardner's (2004) interpersonal and intrapersonal intelligences to support this
- a deep engagement in the playing and learning
- intuition

All of these elements are born of a strong foundation developed over several years, and arguably underpin the concept that, although ability suggests something that someone can do, intelligence may be underpinned by a much deeper engagement in and understanding of that something. This deep understanding can be likened to the skill of the Puluwat sailors (see Glossary).

Taking into account the work of Gordon (1993) it would seem that the ear rests at the heart of every element on which a music education is built and, ironically, it could be argued that the very strength of those individuals who prefer to learn by ear and memory, and who may sometimes be regarded as less musically intelligent because they do not enjoy, or find difficulty with, reading the notation, is potentially the foundation of an overall musical intelligence.

A visual representation of a summary of musical intelligence might look like this:

Figure 6.2 Visual representation of a summary of musical intelligence

It is vital that students' musicianship develops alongside their reading (through listening, ear playing and rote playing), in order that they become one with their music and their instrument, together with developing the musical-spatial, tactile, kinaesthetic and proprioceptive understanding required, and incorporating all the facets of musical intelligence put forward by the teachers in this study. I argue that the concept of a complete mastery of skills (like those of the Puluwat sailors, see

Glossary) could represent a framework for musical intelligence, not just for reading and playing notation, but for overall musicianship of which reading and playing notation is only one part.

I move on now to discussing the themes that arose from the data to suggest how a framework for musical intelligence might offer support to piano teachers and their students, particularly in terms of learning to read and play notation simultaneously on the piano.

6.4 How a framework for musical intelligence might offer support

Having set out my definition of, or framework for, musical intelligence in the previous section, I can now address this research question of how a framework for the development of musical intelligence might offer support to piano teachers and their students, particularly in terms of learning to read and play notation simultaneously on the piano. The first interesting and potentially concerning theme to have developed form the data involved a lack of awareness of pedagogical research and theories in the literature, and is something which might be addressed by this study.

9. A lack of awareness of pedagogical research and theories

Gudmundsdottir argued that 'the reading of staff notation is an important albeit neglected field in music education research' (2010, p.331), and added that 'research on music-reading skill in adult experts is more advanced than research on music-reading acquisition in childhood' (ibid.). She noted that 'it has been suggested that methods for teaching music-reading skills are flawed' (ibid.) and quotes Mills and McPherson, who argued that 'many children are failed by the ways in which they are taught to read music', (2006, p.133).Taaffe (2014) argued that instrumental teaching, in particular the individual lesson, seemed to be neglected in comparison with the

amount of research and theory that had been bestowed upon mainstream education. Lennon (1996) also noted that much in the literature refers to methods and techniques of playing the piano rather than the art of teaching students to accomplish it. This all suggests that there is scant support for the new piano teacher, perhaps even for piano teachers who have been teaching for a while, and that this problem needs to be addressed.

Cathcart (2013) argued that not many individuals understand the skills needed to teach individuals how to play the piano, and indeed, the small amount of literature that does exist regarding teaching individuals to play, cited throughout this study, is not easy to find, one reason being the high cost of access to academic literature (Gakonga, ELT-Training, March 2023), which makes it inaccessible to many piano teachers, and also in terms of research jargon, making it difficult to understand. This contributes to a lack of awareness of those excellent pedagogical theories which do exist. None of my study participants mentioned Gordon's Music Learning Theory (1993), which urged the development of fine aural ability as a vital precursor to learning to read and play notation simultaneously, (and of course its importance to the development of musicianship) or the work of Luce (1965), Priest (1989) and McPherson (1993) who had found a positive correlation between ear-playing and good sight-reading.

There was a general lack of awareness of the research on notational audiation (Brodsky *et al,* 2003, 2008, Zatorre and Halpern, 2005) which followed on from the work of Gordon (1993). A small number of the teacher interviewees believed that an ability to audiate the notation was useful, although only three actively taught their students to engage with hearing a melody from the notation before playing it, or to internalise sets of rhythm patterns, and none mentioned the terms 'audiation' or 'notational audiation' in which it was suggested that notational audiation can support sight-reading and can prime the body movements required to play the correct keys on the piano. Dalby (1999) and Gordon (1993) found that those teachers who maybe had heard of audiation, often ignored it or were daunted by how to teach it, partly because they do not understand how it works.

In order to structure their teaching, teachers often seek assistance from the plethora of method books on offer (Cathcart, 2013, Knerr, 2008, McPherson 1993), which can constitute a daunting and confusing task, and most books do not seem to support the pedagogical theories in the literature, nor contain specific concepts regarding the types of mental strategies outlined in this study. This could be another reason why a busy teacher does not learn about the pedagogical theories in the literature. Schleuter (1997) lamented teachers' heavy reliance on the method book for instrumental teaching, something which was supported in Cathcart's findings (2013) and lamented equally by McPherson (1993, 2005) and Woody (2012). Schleuter (1997) criticised those teachers who did not make the effort to research the theories of instruction, or who were simply not aware that theories were available to be discovered. Perhaps the dissemination of an accessible document outlining a framework for musical intelligence might support piano teachers in developing their knowledge. This leads me to a related theme that emerged from the data in terms of teachers not understanding how their students could ever learn pieces well by ear.

10. A lack of understanding of individuals' musical learning strengths

This theme derives from and supports the strong belief indicated by the teachers that learning to read and play notation simultaneously is important. The data revealed a sense that many of the teachers demonstrated a lack of understanding and implicit incredulity regarding how individuals are able to learn repertoire by ear and rote and memory, rather than by reading from a score, in particular longer pieces of repertoire. This theme derived mainly from the data gathered on hand-looking and its negative effects on learning to read notation, and the following remarks demonstrate, the first regarding learning repertoire by rote from online tutorials, and those afterwards regarding learning by ear and memory:

> Think how long that took you to learn that, look what I can do. You can put a quite complicated piece of music in front of me and I can just do it! I don't have to go over and over to put it in my head. (#T31a)

> Looking at the notes makes the process of learning a piece quicker. (#T18a)

> [The notation] helps them play more accurately. (#T48a)

> The notation shows us how to play a piece, and as the instructions can be quite complicated, they should demand most of our attention. (#T38a)

> … they are learning to follow the shape of the music. (#T36a)

> If the musical notation gets more complicated, or fast, you need to be able to look ahead to the next bar at least, also when the music goes from the extreme ends to the other. (#T28a)

These comments imply a belief that the only way to learn a piece of repertoire correctly, and to be able to plan ahead when playing is to physically look at a page of notes. They imply a belief that an individual can only understand the structure, contour and dynamic shape of a piece of repertoire by looking at the notated page. The process of learning by ear does not seem to make sense to most of the teachers in this study, they cannot understand that it is possible to play a piece accurately and beautifully without recourse to notation. This arguably also derives from the way that most of the teacher participants were taught themselves, which was from notation, therefore they find difficulty in understanding how anyone can learn by not reading notation. They only know how to learn from notation themselves, so only feel equipped to teach this way. This suggests that, if these teachers do not understand how ear-players can learn to play repertoire without needing the notation, then the teachers themselves may be unable to understand how to teach

these students according to their preferred strength. It may also be that this lack of understanding precludes the teachers from even trying to teach any ear-playing, even shorter pieces, which also restricts the skill development for this and for what it develops in terms of sight-reading and musicianship (Gordon, 1993, Luce, 1965, McPherson, 1993, 2005, Priest, 1989). It could surely be argued that this method of learning and playing represents a high level of musical intelligence because the individual is deeply engaged in the learning process and internalises the music itself rather than decoding symbols on a piece of paper. Perhaps, then, at least some form of acceptance by teachers needs to be in place so that they can allow their pupils to work within this strength, understanding also that it is very beneficial, that there exist learners who depend on this way to learn because perhaps they really are unable to learn to read. In this case it is perhaps useful for teachers to adopt an incremental theory of intelligence towards themselves and try to learn this skill or at least accept it in others.

I move now to discussing the use and development of mental strategies for learners.

11. Mental strategies were not understood or used

Mental strategies are treated as a theme in this study in terms of their virtual absence from the questionnaire and interview data as part of an approach for teaching students to read and play notation simultaneously on the piano. The specific mental strategies in which I am interested are a deep tactile engagement with playing the instrument, and notational audiation, being able to hear the piece from a reading of the notation in the absence of a live or recorded playing.

Booth said that ‘all thought begins with sense impressions’ (1971, p.26). The reader is asked to consider how a woodwind or brass player, for example, needs to engage in what their body is required to do in order to produce a beautiful sound on their instrument. When individuals are practising, they need to be fully mindful of exactly how they have just produced that beautiful sound, so that they will know how to repeat it. Similarly, a string player needs to engage in the kinaesthetic and spatial

senses required to find the correct place to put the fingers on the instrument to create the desired pitch, and how to hold the bow to create a pleasing sound across the strings. It follows then, that as well as understanding how to produce a beautiful sound on their instrument, a competent pianist would probably know how a combination of keys would feel to play, engaging in their tactile sense, as well as their spatial and kinaesthetic senses, and know this in advance of playing it, when he or she sees it either in the notation or internally if playing from memory. This might be a chord, a scale passage, larger leap or other pattern of notes or sounds. Being able to notationally audiate the series of notes on the page and know how the passage will sound, would also trigger an imagination of how they are going to feel to play (Brodsky *et al*, 2003, 2008, Zatorre and Halpern 2005). It is important to note that McPherson's study (2005), in which he noted his participants using mental tactile and auditory strategies, was carried out with brass and woodwind instruments, however, and not pianists. With the former instruments, there is only a limited number of combinations of keys and fingers to use, all constrained to a small space and size of instrument. The piano, on the other hand, is a much larger instrument, requiring more spatial awareness and kinaesthetic and proprioceptive ability, with possibly infinite possibilities of finger combinations to play notes and combinations of notes. However, an internal tactile knowledge is extremely useful.

For a while before I discovered McPherson's findings on mental strategies and mental rehearsal (1993, 2005), I had begun to ask my students to engage in how it feels to play certain patterns on the piano, chiefly because this is what I had noticed myself doing. To use an analogy here, I asked the students to consider an orange, and suggested that they probably knew, without touching it, how it would feel if they picked it up and ran their fingers over its skin, because they had most probably executed this activity several times before. When they agreed and understood, I suggested that this could be applied to various patterns of keys on the piano, and I extended it to asking them to tap out some notation on a table or book, and to engage in how that felt, and then transferring it to the piano and again asking them to engage in this feeling when playing, so that they could later imagine what patterns of notation were going to feel like in their hands and fingers. This aligns with Martin's concept

of ‘kinaesthetic thought’ (see Glossary) because it relies on the memory of how something has felt to execute before. I argue that these mental strategies could be actively taught almost from the very start of lessons. Such deep mental and metacognitive strategies could enhance the development of the proprioceptive skill that so many of the teachers in my study valued as being at the root of successful reading and playing.

McPherson had noted that there was very little research on mental strategies of the nature found in his studies (1993, 2005), and recommended that it was a high priority ‘to focus more attention on this area of musical thinking and learning’ (2005, p.32). This is important, particularly since he believed that the high level of the mental strategies demonstrated by the children in his study represented the difference between those who succeeded and those who did not. Cooper (2008), although his study focused on mathematics students, suggests that one reason that students produce inferior educational performance is that they are not ‘instructed on how to become mentally and emotionally involved in their learning’ (ibid., p.5). Concina defined ‘expert learners’ as being those that see the value of engaging in their learning (2019, p.3), adopting a growth mindset (Dweck, 2016).

With the exception of a small few participants, namely Participant #T50a who centred her teaching very much on the tactile sense to develop the ability to anticipate in advance how a pattern of notes would feel to play, Participant #T18a who suggested that she might ask students to have a look through the extract and see if there was anything there that they might have played before, so that they might ‘know how it’s going to go’, and Participant #T22a who argued that students need to learn to feel the notes from the early stage of learning, the data revealed that the only possible metacognitive and mental strategies suggested by the teachers to their students for reading new pieces were standard sight-reading observations, such as noting the key and time signatures, the contour of the melody, any harmonic progressions (for more advanced students), the rhythmic pattern and finding the starting note. All of this, and much of the literature on music and metacognition, is more applicable to students who can already read a certain amount of notation.

It is important for music educators to teach active engagement of the senses, in the same way that the Puluwat Sailors demonstrate, (see Glossary) with their instinctive knowledge which is arguably rooted in powerful metacognitive and mental strategies. These strategies could form another key part in the development of musical intelligence in terms of learning to read and play notation simultaneously on the piano.

I move now to explore another theme to have developed from the data, and that is the concept of an entity theory of intelligence and learning.

12. Some teachers in this study demonstrated an entity theory of intelligence

I had not asked a particular question, either in the questionnaire or in the teacher interviews, about entity and incremental theories of intelligence and learning (Dweck, 2016), however questions about teaching students to play by ear and to audiate the notation stimulated some interesting responses which arguably fall into the realm of entity theories of learning and so I have identified this as a theme emanating from the teacher data.

As stated in the literature review, teachers' beliefs play a large part in the formation of their student's learning outcomes and experience (see also Epler, 2011, and Pajares, 1992) and it follows that this could apply to learning to play the piano with or without the notation. Dweck (2016) suggested that some teachers may project similar beliefs onto their students, which could imply that they have a fixed belief about the intelligence of their students whereupon, if for example a piano teacher believes that a student is of a fixed or low ability in terms of learning to read and play notation, the teacher may not make the effort to train the student in certain areas which might expand their ability, for example mental strategies, ear-playing and notational audiation, strategies with which they themselves might not feel comfortable either.

It did indeed transpire within the data that some teachers seemed to demonstrate an entity theory of intelligence and learning (see below for participants). This was not only in terms of what they believed that their students would or would not be able to do, but what they could or could not do themselves as piano teachers. Some teachers had not been taught to play by ear and therefore could not do it, and most did not suggest that they might try to learn. Participant #T35a believed that her students would not be able to play by ear even if she tried to teach them. When asked how she helped her hand-lookers to improve their notation reading, she went on to say that, although she does some hands covered work, she 'gives up' if they are persistent because, according to her,

> However much you try, sometimes they just can't resist looking down. (#T35a)

Participant #T31a also showed a tendency towards an entity theory of intelligence regarding the development of ear playing, believing that, if a student could not do it, she would not persist and try to help them improve, because,

> I wouldn't make someone feel stupid because they couldn't do it. (#T31a)

Participant #T36a felt the same way about notational audiation, not believing that it was possible to train her students to do this, and Participant #T4b suggested that some students, especially younger ones, found ear-playing frightening, and so she did not persist with this activity, thus potentially limiting her students' overall musical development. This phenomenon of an entity theory of ability also pervaded beliefs about teaching audiation and is demonstrated also by Participant #T35a who argued that this was 'usually beyond them'.

On the other hand, a forward thinking teacher may learn to play by ear and learn to teach by rote, so that they can incorporate these elements into their piano teaching

methods, even if they were never taught to do this themselves. Participant #T24b, for example, admitted that she made a conscious effort to push herself to learn these new skills, because she had not been taught like that herself, but saw the positive benefits of teaching using these techniques:

> It is not comfortable to teach these skills that are new to me, which is why it is important for me to keep developing my skills alongside my teaching practice. (#T24b)

This leads me to the final theme to have developed from the teacher data, and this concerns the seeking out of professional development.

13. Many study teachers have engaged in continuing professional development

The findings showed that many of the teacher participants had been taught straight from notation themselves and had begun their own teaching careers in a similar way until they discovered that this was not really efficient, or that they showed an interest in improving their craft themselves. This is supported by the work of Upitis (2017) who found that her study sample demonstrated interest in continuing professional development as long as it was accessible, and for them it meant doing more things themselves such as reading and reflecting upon their practice rather than attending courses, seminars and certification events. Harris writes about the 'myth of difficult' (2014, p.52.) He says that one will often label something as 'difficult' because one cannot do it, yet the term 'difficult' is quite arbitrary and, in his words, 'meaningless' (ibid.). He argues that just because he himself cannot fly a plane or speak Icelandic, he cannot say that these are difficult to do, it is simply that he does not know how to do them. He argues that if an individual learns and engages in understanding how to do these things, they may be possible, however a good teacher is required, together with the learner's willingness to engage and practise. Harris (2014) argues that it is important to teach every step of a learning process thoroughly and with understanding of the pupil's stage of comprehension and ability at each moment,

which suggests that a teacher needs to have a deep understanding of their own craft at the outset in order to nurture the specific type of intelligence required for a pupil to achieve their desired outcome.

Therefore my work could be useful as a self-support measure.

It requires a forward-thinking teacher, who is ready to question the best way to teach his or her students and who recognises that the way he or she was taught is not necessarily the only way to teach, and who has perhaps attended continuing professional development courses or researched their craft, to widen their own and therefore their students' abilities, and these positive comments about continuing professional development also support Cathcart's (2013) findings.

Summary

This section of the Discussion chapter has offered a framework for musical intelligence and discussed the themes to have arisen from the teacher data which suggest that a framework for musical intelligence might offer value to piano teachers in terms of addressing the lack of awareness of pedagogical literature, lack of understanding of learning by ear, and introducing the concept of mental strategies particularly in terms of internal tactile, spatial and aural engagement. The list of elements that I believe constitute a framework for, or definition of, musical intelligence can also be borne in mind, for example the importance of teaching students to develop spatial and kinaesthetic intelligence in terms of reading and playing.

The fact that many of the participant teachers had sought out training and professional development supports a need for more information, and a framework for musical intelligence might help to address this as well as to encourage piano teachers to reflect on their practice and look to develop their own craft in a similar way to the Puluwat sailors (see Glossary). The framework is also intended to

encourage teachers to reflect on their methods and consider the adoption of an incremental theory of learning and teaching.

Belief and trust in such a framework for musical intelligence might also give confidence to piano teachers in terms of using alternative methods at the start of their students' pianistic journeys rather than introducing the notation as early as some of them do, and in turn to be able to defend their new methods to parents, guardians and students with confidence and understanding, above all, with a watchful eye on maintaining an incremental theory of learning and intelligence both towards themselves and their pupils.

Summary of Discussion Chapter

This chapter has drawn together the thirteen themes that developed from the student and teacher data and related them to the research questions. It was found that there was general agreement that reading and playing notation simultaneously on the piano is complex and requires heightened development of the internal senses as well as the concurrent execution of many tasks both physically and cognitively.

It was found that, despite the teachers insisting that introducing notation too early was counter-productive for their students, most still introduced it quite early in the student's pianistic journey, thus demonstrating their belief that this aspect was important to learning to play the piano. This also more pertinently suggests that these teachers did not seem confident to engage in alternative ways of teaching at the beginning of a student's career, such as rote and ear playing, for any length of time.

Comments about the perceived benefits of learning to read notation revealed a lack of understanding on the part of the teachers about how individuals could have the capacity to learn to play longer pieces of repertoire by ear, and it was found that some of the study participants demonstrated an entity theory of intelligence and learning (Dweck, 2016).

A key finding was that some of the teacher participants had noticed that some students demonstrated different strengths when learning to play the piano and it was reassuring that this supported my observations.

The teacher participants held mixed views about a definition of musical intelligence, but overall this came across as a mix of notational abilities and musicianship.

Finally, the question about how a framework for the development of musical intelligence might support piano teachers was addressed, and I argued that the lack of awareness of pedagogical theories in the literature, a lack of understanding of how some individuals can learn by ear, the demonstration of an entity theory of learning on the part of some teachers, and the lack of confidence to embark on an ear playing beginning to a pianist's journey might justify the offering of such a framework. This could also help to address the effects of the isolation of many piano teachers (Cathcart, 2013, Jorgensen, 1986).

7 Research contributions

Here I have set out the pertinent contributions I believe I am offering to the field of piano teaching:

1. The development of a framework for musical intelligence to support musically intelligent teaching.

2. Acknowledgement and understanding of different musical learning strengths.

3. Active introduction of specific mental strategies to be used for teaching individuals to read and play piano notation.

1. The development of a framework for musical intelligence

An important aim of the research is to make it understood that the concept of musical intelligence is not restricted to the ability to read and play notation simultaneously. Rather my definition of musical intelligence draws heavily on the intelligence demonstrated by the Puluwat sailors (see Glossary) which was brought to my attention by Gardner (2004), and I argue that a framework for musical intelligence rests on a deep engagement with, and understanding of, the instrument and everything within and surrounding it. I argue that musical intelligence is underpinned by an ability to think in sound and be at one with the instrument, which is underpinned by solid aural, proprioceptive, kinaesthetic, tactile and musical-spatial intelligences, together with strong musicianship, also underpinned by the interpersonal and intrapersonal intelligences suggested by Gardner (2004) work, gathered into a deep engagement with, and understanding of the craft of playing an instrument, here, a piano.

These skills need to be developed thoroughly before the notation is introduced, which promises to be challenging, perhaps, for some piano teachers who have learnt to play from notation from their very first lesson, who may not be confident in teaching these skills, and above all, who will probably be challenged by parents and learners alike for not introducing the notation early enough for them. Whilst my framework for the development of musical intelligence is not an exhaustive, I have attempted to outline a possible way forward in terms of piano pedagogy, and to include areas that were not suggested by the teacher participants or the literature, particularly in the form of an introduction of musical-spatial awareness and the use of Gardner's (2004) interpersonal and intrapersonal intelligences which also arguably underpin musicianship and musical understanding.

2. Acknowledgement and understanding of different musical learning strengths

I have taken Gardner's (2004) belief that individuals possess a range of intelligences and applied it specifically to learning to play musical instruments, in this case the piano, asking music educators, individual learners, parents and guardians to acknowledge the existence of at least two different and equal musical intelligences, notably ear-playing and notation reading. I have suggested that players are generally much stronger in one ability than the other, that usually the two strengths do not naturally co-exist, although Priest (1989) and Harris (2014) suggested that the two could be developed simultaneously from the beginning of learning. Whilst this observation of different strengths was consolidated to some extent in the data, the concept of different musical strengths or intelligences was only touched upon in a short sentence by McPherson (1993) and Odam (1995), and did not seem to appear from my reading of Gardner's 2004 work, which is interesting and perhaps a little surprising since he mentioned having played the piano quite seriously as a young person. Green (2010) and Varvarigou and Green (2015) suggested that learners demonstrate different learning styles from their findings of the Ear Playing Project, but these learning styles are linked to playing by ear, and to the specific form in which their participants were engaged, rather than linked to learning to play a

musical instrument from the beginning. However, if Green's (2010) definition of learning style can be compared favourably with my concept of an intelligence in terms of different musical strengths, then the fact that they argue that little work has been done in relation to learning styles in music may mean that my concept of different musical strengths or intelligences might offer a pertinent contribution in this area. Indeed they recommended that further research be undertaken to try to establish how the new understanding that they developed in the Ear Playing Project (2015), that different learning styles had been observed in terms of playing by ear, and perhaps this is where my research may be placed.

As already argued, the acknowledgement of two different musical strengths is important for not writing off, as musically unintelligent, individuals who prefer to use their ear to learn rather than attempt to cope with the notation when they find that difficult. I argue that this is akin to individuals demonstrating different strengths to the traditional areas assessed by the IQ test, yet still being successful in life. Sternberg's (1999) theory of successful intelligence also comes into play here if it is agreed that an individual uses his or her own strengths to achieve success in what he or she sets out to do, and what is important to them. If the individual wants to learn to play the piano, it may not matter to them which way they accomplish it. However, if the individual goes to piano lessons with the belief that learning to play means learning to read notation, and finds that their strength lies elsewhere, it is vital to help them to understand the positive nature of their aural strength as well as agreeing to use this to help build the notation reading. Natural aural learners absolutely must not be made to feel that they are inferior to natural readers, and must celebrate their strength, which I have suggested lies at the foundation of musical intelligence. It is important to convey to individuals, parents and guardians that the aural strength is more important from the beginning, and that these aural learners already have a possible advantage.

3. Active introduction of specific mental strategies to be used for teaching individuals to read and play piano notation.

I urge teachers to take note of the sophisticated mental strategies demonstrated by McPherson's study participants (1993, 2005), in which the students used strategies that they already knew, based on mental skills they already possessed, to give themselves the best possible chance of success in the tests he had set and which, McPherson believed, was what set apart those who succeeded and those who did not. This is similar to Dweck's (2016) findings, in which her study participants used strategies that they had already learnt from the solving of previous problems to solve new problems, which demonstrated an incremental and metacognitive approach to learning. I also draw upon my own learning experience in terms of playing the piano, having observed that I have developed the ability over the years of knowing how something will feel in my fingers to play, while simultaneously observing the written notation, before playing it. I believe that knowing how something is going to feel reduces the cognitive load of learning to play a new piece (Martin, 1965, in Gardner, 2004, see Glossary regarding kinaesthetic thought). Knowing how something is going to feel to play is also linked with the findings of Brodsky *et al* (2003, 2008) and Zatorre and Halpern (2005), in that hearing a piece internally from the notation (notational audiation) triggers the supplementary motor area of the brain into imagining not only the sound of the piece, but the physical movements required to play it, thus priming the body in advance. Only one of my study participants (#T50a) based much of her teaching around the tactile nature of playing the piano, and very few mentioned the idea of hearing the piece internally. Thus, I feel that a deliberate focus on mental strategies could improve the learning of reading and playing notation simultaneously, and indeed this active engagement forms part of my framework for musical intelligence.

8 Implications of the research findings

Initially focused on understanding the reasons why some learners find the simultaneous reading and playing of notation difficult, the research was intended to seek and implement strategies to improve the students' learning in my own practice, and create a definition or framework for musical intelligence to support piano teachers in this endeavour, and with a view to disseminating the findings to a wider audience of piano teachers. However, from a narrow research focus, a much wider understanding blossomed of what actually underpinned this area of making music, all of which has claimed its right to be part of a foundation for the development of an overall musical intelligence, not solely in terms of reading notation.

The aim of the research now is to disseminate the findings, and the notion of a framework for musical intelligence, to busy piano teachers. An important aim is to raise awareness of certain music pedagogical theories which exist in the literature, but which were not forthcoming from the data, and make these accessible to piano teachers. The aim is also to share concepts and beliefs which arose within the data, and all of these aims are in order to try to develop musically intelligent teaching, not only for piano teachers, but for other instrumental teachers where possible.

The isolated piano teacher

> As a music teacher, and especially as a Kodály music teacher, I often felt anxious and alone. I wished I had someone to bounce ideas of. To reassure me I was doing the right thing. Deep in my heart I knew I wasn't the only one who craved that support. (Russell, Doremi Connect, 2023).

This is from a Kodály teacher, who teaches differently from what is regarded as 'traditional' piano teaching, however Russell expresses the same isolation felt as perhaps many piano teachers might, and this research has the potential to address

the arguments of Cathcart (2013) and Boyle (2021) in terms of piano teaching being an isolated profession, where teachers rarely interact with other teachers to gain insight into how they are all teaching particular aspects. Even though there do exist some piano teaching courses in the UK, Boyle (2021), Cathcart (2013) and Jorgensen (1986) have pointed out that piano teaching is an unregulated profession, and there is no requirement for qualifications or attendance on courses in order to teach. Boyle talks about 'the diverse, unregulated nature of practice in this field, where individuals are able to teach with no need for prior training or qualification, in a range of contexts', (2021, Loc 403[4]). Both are purely voluntary, and of course depend on financial and time constraints (Boyle, 2021, Upitis *et al*, 2017). In addition, there exists no agreed syllabus for teaching piano students to read and play the notation simultaneously, nor for how to develop their musicianship. In general, piano teachers are compelled to create their own curricula (Jorgensen, 1986), which may risk the inadvertent omission of chunks of development, for example the vitally important focus on training the ear from the start (Gordon, 1993), whilst entity theories remain un-noticed and unchallenged (Dweck 2016). Cathcart found that many teachers in her study said that they 'fell into' piano teaching (2013, p.284), herself included, because they were asked by friends who knew that they could play. Williams also suggests that many individuals find themselves teaching 'due to a personal contact, perhaps a neighbour who "found out" they played the piano', 2017, p.7). The lack of a recognised teaching curriculum arguably means that teaching piano successfully can seem daunting to new music educators, a fact which is supported by Participant #T7b who, in response to the question asking how teachers helped to nurture the skill of looking mostly at the notation rather than at their hands constantly, left this remark:

> I am very new to teaching and haven't yet come up with an answer to this. I tell them to look at the music!! (#T7b)

[4] ebook

Awareness of pedagogical theories

The findings showed that the study teachers were mainly unaware of the pedagogical theories in the literature, particularly in terms of aural skill development, and which were suggested to underpin the teaching of individuals to play the piano with notation. If it is assumed that an important part of piano lessons will continue to be learning to read the notation, it is vital that piano teachers avail themselves of the pedagogical work of, for example, Gordon (1993) and McPherson (1993, 2005), and also of Cathcart's more recent and ground-breaking findings (2013) which are extremely important to the world of piano teaching.

Understanding learning by ear

It was also found that most of the study teachers could not understand how individuals could learn long pieces of repertoire by ear or rote rather than using the notation. This lack of understanding may have been born from the fact that all of these participants had been taught to play straight from notation themselves, with barely any opportunity for ear playing or creative activities. It is therefore important to educate these teachers in the area of teaching and learning by ear and that, even if they find it challenging to understand how individuals can naturally achieve this, the need is for the teachers to accept it and use it as part of their teaching, since it underpins musical intelligence.

Confidence for piano teachers

Understanding this, and how to teach by ear, using some of the pedagogical theories in the literature, might then equip teachers to be able to defend their use of the non-traditional methods confidently to parents or guardians and students and explain that learning to play the piano, or any other musical instrument, is not just about reading and playing from notation.

Understanding different strengths

The acknowledgement of different strengths, and in particular a deep respect for aural skills could help to avoid dropout.

Increased student motivation

With a greater variety of activities in the piano lesson, perhaps teachers could improve pupils' motivation through activities such as inviting them to choose a piece they would like to play by ear, encouraging them to play along with songs (similar to Green's Ear Playing Project, 2010), asking them to work out a favourite song by ear, encouraging the musical imagination through painting a picture through a composition, and of course training the pupils to engage in their playing through the tactile and aural senses, and equipping them with appropriate metacognitive strategies for learning.

Fostering an incremental approach to learning

It is hoped that this research will also encourage piano teachers to embrace an incremental theory of intelligence, particularly in the area of the development of new skills. Similarly, it is hoped that my research might encourage piano teachers to reflect upon their own teaching practice, and perhaps challenge them to learn new skills themselves (Cathcart, 2013, Dweck, 2016, Kinney, 2018, Lowe, 2008, McPherson, 2005, 1993) and perhaps implement some positive changes.

Beginner piano tutor books

This research may also have the potential to influence the producers of beginner piano tutor books, which could perhaps contain pages throughout dedicated to non-notation activities. An extensive list of suggested songs to learn by ear could be added, which would include songs which young children might already know, or could learn easily due to their predictable patterns, for example. There could be

pages throughout which offer improvisation and creativity. This could go a long way to developing the ear and an engagement overall which then leads into the notation reading when a deeper understanding has been reached.

9 Limitations

It is extremely important to note that my research has focused on a small sample of piano teachers, particularly when compared to the study by Upitis in Canada in 2017, which captured 1468 respondents, and Cathcart's in 2013, which gathered 595 respondents. In addition, most of my participants were clearly committed to their craft, which is also the reason that this sample self-selected. This could be argued to constitute bias, and this factor was also found by Cathcart (2013) during her questionnaire research. Indeed, having sent the questionnaire initially to professional groups, since it was difficult to know how to locate and therefore contact all the piano teachers across the UK generally (Cathcart, 2013), this has undoubtedly biased the research results somewhat because it has not been possible to ascertain the beliefs of the many hundreds of other piano teachers who may not be as committed, or may hold different beliefs. Perhaps this could be addressed with future research. Upitis *et al*'s research (2017) also found that their teacher respondents were committed to their craft and keen to develop this: 'their engagement in pedagogical issues was also evidenced by their interest in the survey itself', (2017, p. 181), and this could also be due to similar bias in terms of the teachers who self-selected for the questionnaire being committed and interested teachers.

My teacher sample size may also have been limited since some of the contacts approached were not willing to share the questionnaire, due to perceived privacy issues, and in the case of one professional body, the link was disseminated only as part of a newsletter, not as a general request, the latter which could possibly have had more effect and attracted more attention from the large number of its members.

Of the groups that I contacted, there were seventy-two individuals who kindly responded to my questionnaire, and it cannot be assumed that those who chose not to respond are less committed to improving their teaching, perhaps teach always straight from notation, or perhaps do not engage in other enriching activities to support learning. It is simply not possible to know. There are numerous reasons why people do not take part in research, including time constraints or general lack of interest in this kind of activity. This means that my current study data will be biased to some extent in favour of those who have wide and varied teaching techniques and beliefs, and therefore the results are not necessarily representative of the wider population of piano teachers.

Similarly, due to time limitations, my sample of piano pupils was limited to eighteen out of about forty that I taught, and, as I mentioned in the findings section, it would have been illuminating to have been able to interview a selection of the students of each of the teacher participants, in order to enrich and triangulate the data, and obtain a fuller account of learning to read and play piano notation simultaneously. However, this would have required additional and possibly complex ethics approval, and would have been quite arduous to organise, as well as generating an exceptional amount of data, for which the time for analysis was not available in respect of this thesis. On the other hand, I had originally planned for my students to keep a practice diary throughout the research. I found this difficult to motivate, thus this aspect of the data gathering fell by the wayside. It could have provided additional insight from the students, and could provide a recommendation for any future research.

One item which might have offered slightly more insight into the research could have been a table which contained more data on the samples. For example, like the student interview sample table, which indicates ages, gender and time spent learning to play the piano, it could have been illuminating to ask the approximate ages of the teacher participants, perhaps through a graded box in the questionnaire, with the offer to decline to answer if needed, as well as how long they had been

teaching the piano, and how many students they taught at the time of the study. The ages and time accrued teaching might have shed some light on their beliefs and experience teaching, but would certainly have provided a more graphic description of the sample and placed it in context. Additionally, I could have asked the teachers specifically about the tutor books they used, if they were members of professional groups, whether or not they included improvisation and composition in their lessons, made sure that I received answers to the question about whether or not their students were mostly successful readers, beliefs on practice, and a little more on their preferred way of learning new pieces. I could have been more rigorous about ensuring I received answers to other questions where there are gaps in the profiles by having a table of these areas already prepared, and following it more rigorously.

I have acknowledged that my own positionality as a natural reader of notation necessarily biases my view and my abilities and understanding of learning to read and play piano notation, and I am unable to comment from the perspective of a natural ear-player. Thus, I can only offer what I have discovered in the literature and uncovered in the data in this respect, and my growing experience in ear methods over the years that the thesis has been ongoing. Likewise, although personally I find engaging in the tactile element of playing the piano to be a useful learning tool, this may not be feasible for all students, despite my own findings that my students often understand this concept. Therefore, it is not possible to guarantee or even to imply that, if piano teachers follow the recommendations in my study, their students will learn to read and play notation competently beyond a doubt. This is also because all piano teachers are individuals and will still take their own unique approach to teaching, which will of course include different method books and different repertoire amongst other details. Equally, each student is an individual with unique skills in all areas, not just in terms of a reading or aural strength, but in terms of how much they are able and willing to practise, how they structure their practice, and with other time constraints themselves, how much they are able to understand, and myriad other ways that they are all different, in addition to the individual mix of teacher and student combined. And of course, my methods may not be entirely workable solutions for

everyone. Thus I now turn to elements of my research study which I would improve going forward.

10 Critical review of my thesis

It could be argued that beginning my questionnaire by asking the piano teachers about their beliefs regarding the difficulties of reading and playing piano notation simultaneously constituted a leading question, making assumptions that the activity was indeed difficult. It could also be argued that this may have set a negative tone for the study. However, the literature and my student interview findings had already provided evidence to support the claim that learning to read and play piano notation simultaneously is complex and can be laden with difficulties. If I had simply asked the questionnaire participants about their thoughts about teaching and playing the piano with the notation, I might not have elicited information regarding the specific areas about which I wanted to understand. In a face-to-face interview situation, a more open approach might be easier to achieve, because the interviewer can ask a more general question and then use prompts if the required information is not immediately forthcoming. Questionnaires do not allow for this, as the respondent is not able to be managed in this way, however questionnaires can reach a large section of the population and generate a large amount of data reasonably quickly. The main reason for embarking upon this research project was to attempt to understand why some of my own students did find the simultaneous reading and playing of notation difficult, and what might be done to help them to succeed, therefore some form of confirmatory data from other teachers was a valuable starting point for the rest of the study, which is why this question was asked and, from there, the scene could be set for further questions in interviews at a later stage.

I believe that I could have streamlined some of the questionnaire questions, particularly in terms of those about students who looked at their hands constantly, and asking the teachers what their strategies were for some areas. In hindsight I would certainly have devoted a larger section of the research, both in the

questionnaire and in the interviews, to asking the participant teachers more about how they themselves were taught to play the piano, to ascertain if what their own teachers did supported the literature about many teachers teaching straight from notation at the first lesson. I would also have been more specific with the questions in the questionnaire about whether this had influenced their own teaching, and whether this meant that they had begun their own teaching career by introducing notation at the first lesson and basing the majority of their teaching on notation. This might have provided useful data to support my later conviction of the value of an aural foundation as part of a framework for musical intelligence, which was derived from the literature (Gordon, 1993, Luce, 1965, McPherson, 1993, 2005, Odam, 1995, Priest, 1989). It might also have supported some anecdotal evidence from recent teaching that I had undertaken, where I found that none of the children had been taught to play by ear or by rote by previous teachers, but had been taught straight, and solely, from a method book, and without any creative activities.

As well as asking them their beliefs regarding rote and ear teaching, I would have asked if the teacher participants had learnt pieces by rote as well as reading, and whether they were taught to play by ear, although some of this information was still forthcoming from some of the interviewees. However, I think it would have been better had I been more specific about what I asked. That said, it is still often preferable not to ask too many questions because sometimes it is possible to learn much from what is not said, for example the lack of discussion of theories in the literature, and a lack of use of the term 'mental strategies' in terms of learning to read and play notation. This lack of use of terms implies that the teachers do not know about certain theories, or that they do not use them, or even that they have not thought about them.

The concept of specific mental strategies, in terms of encouraging students to actively engage in the physical feeling of playing patterns of piano keys, arose in my mind after I had constructed and issued the questionnaire, so I was able to ask the teacher interview participants whether or not they taught their students to use any mental strategies (McPherson, 1993, 2005), but, had it been included as part of the

questionnaire, there might of course have been more data. It was even later that I realised that the act of notational audiation could also constitute a mental strategy (also McPherson, 1993, 2005), so this did not form part of my questionnaire either, although I included it in the interviews. Despite there seeming to be a small amount of literature based on mental strategies and learning music, and apparently none on learning to read piano notation, I would like to have spent more time on this, so perhaps it could form a recommendation for future research, since it has been deemed a predictor of academic success generally, and of musical success according to McPherson (2005).

11 Further research

Anecdotal evidence from my own observations and those of other members of groups of professional piano teachers to which I belong suggests that many teachers outside of my research do not teach rote pieces or encourage their students to play by ear, improvise or engage in harmonisation. This, and my research, suggests that many piano teachers build their lessons solely around the ability to read and play notation from the first lesson. Despite this having been my initial approach when I started teaching in 2006, and it having formed the essence of my thesis, my research has taught me that alternative initial approaches may be preferable, along with a mix of musical activities in each piano lesson, not only for enjoyment and the provision of a balanced musical education, (Cathcart, 2013, McPherson, 1993, 2005) but for the benefits these other elements may provide in the development of notation reading skills (Gordon, 1993, Luce, 1965, McPherson, 1993, 2005, Priest, 1989).

I acknowledged, in my limitations section, that my research results are most probably biased because most of the participants belonged to a group of piano teachers strongly committed to their craft and its development, therefore, it would be extremely useful and enlightening to find a method of conducting much wider research into more piano teachers' approaches. Although Cathcart's (2013) research examined the UK Piano Teacher in the 21st Century, exploring the

construction of 595 questionnaire participants' piano lessons, further research is needed with a particularly distinct focus on whether teachers use rote and ear-playing in order to specifically develop their students' notational literacy, or whether they teach notation from the very first lesson without other supporting or enriching activities towards its development. It could be enlightening to include in this research specific questions about notational audiation and use of any form of metacognitive or mental strategies. Similarly, wide-ranging interviews with beginner and early-intermediate piano students may have the potential to develop a richer account of the experience of learning to play the piano, which might also offer increased validity and generalisability to research in piano teaching. It may also prove enlightening to probe teachers' own learning preferences further, to ask whether their preferred method of learning repertoire influences how they teach, as well as understanding if they still teach as they themselves were taught.

Further research in the area of the theories discussed in my study would be ideal, if somewhat large-scale, time-consuming and possibly difficult to measure. For example, it would be extremely interesting to firstly replicate the work of Luce (1965), McPherson (1993, 2005) and Priest (1989) in terms of how ear-playing correlates positively with sight-reading, in order to fully understand this as a piano teacher, and then to organise a longitudinal and intensive study to attempt to establish whether or not a positive correlation exists also between ear-playing and learning to read the notation in the same way. Similarly interesting would be a longitudinal, detailed and intensive study on how notational audiation might benefit the learning for beginners.

Yet more exciting would be an effort to develop the concept of mental and metacognitive strategies into a teaching strategy for beginner piano students, in terms of active engagement of the tactile and aural senses, to study the effect on progress and achievement. If the studies on ear-playing, notational audiation and the style of metacognition and mental strategies which engage the physical and aural senses did indeed imply success in reading, this might then usher in a requirement for training for piano teachers to be able to learn the skills and how to teach them.

Any further large-scale research in this area would need to be brought to the attention of piano teachers as a real-world, up-to-date and current study, as opposed to those studies which already exist, in smaller form, and in less than accessible and past research journals, and this could be both motivational and beneficial to teachers if they could be persuaded to become involved in the research simultaneously as an ongoing project to improve piano teaching universally. This could of course potentially benefit the students, and perhaps more students would continue learning successfully. It could also be very exciting for piano teachers.

To end my section on possible further research, there are two areas I would like to explore: one is to return to the concept of finding out whether handedness has any bearing on learning to play the piano. The second area of interest is to explore how beginner pianists make connections further along their pianist journey towards more complex repertoire if they follow a music education pathway with a thorough aural grounding introduced a good while before notation.

12 Conclusions

Having addressed the four research questions, the significant findings can be summarised as follows:

- Reading and playing notation simultaneously on the piano is complex, and is underpinned by strong proprioceptive, kinaesthetic and tactile skills, a reliable musical-spatial intelligence and above all a strong aural intelligence.

- All the study teachers believed, whether implicitly or explicitly, that it was important to be able to read and play from notation, therefore this was inferred to underpin part of their definition of musical intelligence.

- Musicianship was also regarded by the teacher participants as a central part of musical intelligence, and therefore the interpersonal and intrapersonal intelligences put forward by Gardner (2004) also form part of musical intelligence.

- Students appear to demonstrate different musical strengths, generally either an ability to read notation or an ability to play by ear and learn by rote, therefore both need to be equally developed during music education.

- The teachers demonstrated a lack of understanding of how some individuals are able to learn lengthy pieces of repertoire by ear, which seems to lead to a lack of confidence in introducing aural learning in piano lessons. This was evident also from their general lack of awareness of pedagogical research.

- Mental strategies for learning to read and play simultaneously were not understood or used by most of the teachers.

- Some teachers demonstrated an entity theory of intelligence.

- Many of the teachers had engaged in continuing professional development.

- A conclusive definition of musical intelligence is elusive, however it could be argued to be underpinned by the ability to think in sound and be at one with the instrument, thus requiring solid aural, proprioceptive, kinaesthetic, tactile and spatial intelligences, together with strong musicianship, as well as the interpersonal and intrapersonal elements of Gardner's (2004) work, gathered into a deep understanding of the craft of playing an instrument, here, a piano. The words that incorporate all of these elements of musical intelligence are 'deep engagement and understanding', in the same way that the Puluwat sailors demonstrate in their craft (see Glossary), but the ear rests at the heart of musical intelligence.

A more comprehensive definition based on a synthesis of the literature, the teachers' beliefs and the researcher's inferences and interpretations can be found in Appendix 22, 'A Framework for Musical Intelligence'.

Learning to read and play notation simultaneously on the piano is complex because it requires the concurrent execution of many cognitive and physical tasks, and as such presents difficulties for some students. Therefore, in acknowledgement of different musical strengths, and that the ear forms the foundation of learning to play an instrument, piano teachers need to teach in a musically intelligent way by beginning with aural activities which have been found to underpin not only the reading of notation, but an overall musicianship which is crucial to being a pianist.

The findings also suggested that some of the piano teachers in this study could not conceive of how some students in their cohort were able to learn to play repertoire of any length by ear or rote. This might be consistent with the finding that none of them demonstrated awareness of pedagogical theories in the piano teaching literature, and that most of them had been taught to play from notation from their first lesson, without any rote learning, ear-playing or creative activities such as composition and improvisation being a part of their lessons. These findings may also go some way to explaining why, although many of them said that they did not agree with teaching notation from the first lesson, most of the teachers in this study did in fact introduce notation after only two or three weeks, despite arguing that they used much rote teaching, which also suggests that they may lack confidence in other methods of teaching and learning.

My argument that the aural intelligence underpins all musical learning might contribute to a challenge for teachers in terms of convincing those parents or guardians of pupils who prefer to learn by ear that their children are already musically intelligent, despite the fact that they prefer not to read the notation and appear to find this difficult. The challenge may also be for teachers to defend any new methods of teaching that they introduced based on sound before symbol learning.

The findings indicated that only one of the teachers in this study used the type of mental strategies observed by McPherson during his 2005 study, approaches that could be argued to represent sophisticated metacognitive plans, which could also be used to develop the simultaneous reading and playing of piano notation.

It was also observed that some of the teacher participants seemed to demonstrate an entity theory of learning (Dweck, 2016) which saw them making decisions on behalf of their students in terms of what the latter would or would not be able to accomplish during piano lessons, thus possibly restricting their learning opportunities. Teachers need to develop a more open-minded and incremental way of learning and teaching.

In order for deep understanding to be taught and achieved, piano teachers need to become complete masters of their own craft, to become musically intelligent educators and be aware of, and understand, existing theories, and ideally be able to develop ability in certain skills themselves that maybe they currently do not possess, such as ear-playing and notational audiation.

It seems that many students and their parents or guardians need to be re-educated concerning what musical intelligence really represents, which arguably seems to be a strong aural intelligence, that notation reading is only a part of musical intelligence, the development of which rests on the above sound aural intelligence, in which some individuals are stronger, but which takes time to develop, and therefore the visual medium will be taught a little later and slowly and patiently.

Final note…

Harris writes about the 'myth of difficult' (2014, p.52.) He says that one will often label something as 'difficult' because one cannot do it, yet the term 'difficult' is quite arbitrary and, in his words, 'meaningless' (ibid.). He argues that, just because he himself cannot fly a plane or speak Icelandic, he cannot say that these are difficult to do, it is simply that he does not know how to do them. He argues that if an

individual learns and engages in understanding how to do these things, they may be possible, however a good teacher is required, together with the learner's willingness to engage and practise. With this study I hope to have sown some seeds to encourage piano teachers to reflect on their practice.

In terms of a comprehensive definition of musical intelligence, I believe that this is still elusive, however I offer my framework for musical intelligence in Appendix 22 and argue that the ear is always, and without doubt, at its heart. With this research I hope to have developed a framework that might provide piano teachers with the elements with which to furnish learners with the skills and deep understanding of the wonderful craft of playing the piano in whichever way they choose.

Appendix 1: Résumés and Reviews of Tutor Books

Piano Time (Hall)

Piano Time is a Middle C approach, and Musicroom.com informs us that 'Piano Time 1 starts at the very beginning, with simple five-finger tunes for hands separately and together, many with duet parts. It gradually adds more notes and techniques to cover sharps and flats, simple scales and keys, and a range of dynamics and symbols'. The book begins by teaching Middle C and the full staff notation straightaway, however there is no inclusion of ear or creative activities in Book 1.

Easiest Piano Course (Thompson)

The inside cover tells us that, 'This course is designed to present the easiest possible approach to piano playing. Part One is devoted to developing fluency in **reading by note,** solving a problem that still seems to rate as 'musical enemy, number one' with most young students.' The book is presented in an academic way, and begins by presenting some basic theory and then teaches the pupil to read and play Middle C in both hands/clefs, first with semibreves, then minims and then crotchets. There is no ear-playing or creative work included in the book.

Chester's Piano Starters (Part of Chester's Easiest Piano Course) (Barratt)

Musicroom.com tells us that 'Carol Barret's Easiest Piano Course books have captured the imagination of young children everywhere! This Special edition incorporates sight-reading and warm-up exercises to enable the pupil to get to grips with these along the way. This fantastic piano method combines pictures, games and activities with clear tuition which really makes children want to get involved and learn.' Notation is introduced right from the start with this Middle C approach but does incorporate a small amount of composition work.

Alfred's Basic Piano Library (Prep Course for the Young Beginner) (Palmer, Manus & Lethco)

Alfred.com informs the teacher that 'Alfred's Basic Prep Course was written to answer the demand for a course of study designed especially for students who are five years or older. It takes into consideration the shorter attention span and smaller hands of a young beginner. Most pieces have duet parts that can be played by the teacher, a parent, or another student'. This Middle C and intervallic (eclectic) approach comprises a set of books including repertoire, technique, theory and listening. The listening work builds the ability to audiate, however there is no ear-playing included within the books. Notation is approached off-stave at the start.

Me and My Piano (Waterman and Harewood)

Musicroom.com tells the piano teacher that 'Me And My Piano Part 1 takes the young pianist step-by-step through the early stages of piano technique, first with separate hands, then with a sequence of very easy pieces for hands together. All use a constant five finger hand position in the key of C major.' This Middle C approach uses finger numbers for most notes at the beginning of learning, which can perhaps encourage students to rely solely on the numbers to play. The stave is introduced straightaway with a piece in Middle C. There is no ear or creative playing as part of the book.

The Hal Leonard Series (Piano Lessons Book 1) (Kreader, Keveren, Kern & Rejino)

Halleonard.com writes that, 'From the very first lessons in Book 1, students are making music as they explore the piano keyboard through fun improvisation pieces called *My Own Song*. The beginning of the book introduces finger numbers, the black-key and white-key groups, and basic rhythm patterns. Directional reading is taught first by finger number, then by note name, and then by interval (stop, skip, and repeat). Once the students are introduced to the staff, they learn reading

guides **Bass F** and **Treble G** and read by interval in several different hand positions'. This Middle C approach included one improvisation at the beginning of the book, although no ear or creative activities appeared in this book. The book begins introducing notation off-stave.

Bastien's Piano Basics (Bastien)

Methodbooks.com tell us that 'Bastien Piano Basics uses a gradual multi-key approach, with reading beginning in the C five-finger position. Five levels of carefully graded lesson material provide constant opportunities for reinforcing basic concepts. It's the smoothest, most heart-warming, most entertaining, most musical way to teach eager youngsters the joys of playing the piano. And comprehensive, page-by-page correlation makes Bastien Piano Basics remarkably easy to teach'. This method book does not include composition or ear-playing.

Piano Adventures (Faber and Faber)

Musicroom.com tells the piano teacher that 'Piano Adventures: Lesson And Theory Book - Primer Level provides an integrated step-by-step approach to music reading. It features a wide range of musical styles, from jazz to classical. Piano Adventures teaches children analysis, creativity and musical expression'. The eclectic approach of this book does include some improvisation and composition opportunities.

The Suzuki Piano School (Suzuki)

The Suzuki Piano School, like the Yamaha method, is founded on the principles of learning a language, namely the mother tongue, and informs the consumer that 'just as every child has the potential to develop tremendous abilities in the mastery of his mother tongue, each child has been imbued with the potential to develop musical abilities' (2008 p.3). Suzuki's idea was to nurture skills as he did not believe that talent was innate, 'it is a mistake to think that your child's future is only a matter of heredity or inborn qualities…any child can be fostered to achieve a high level of ability' (2008, p.3). Just as Gordon, who came much later, Suzuki encouraged

extensive listening to the companion CD and argued that 'when students are familiar with pieces before they study them they are, in essence, developing internal abilities' (ibid). Suzuki pupils are not taught to read notation until they have completely mastered a piece by ear. Cathcart (2013) found that only 16 out of the 595 participants said that they used the Suzuki approach in their teaching. None of my own participants mentioned using this method.

The Yamaha method is not set out here as part of a discussion of method books, as it is not used by individual teachers, being only authorised for use by Yamaha Music School trained group teachers.

Piano Safari (Fisher and Knerr)

The authors write that 'compared to other methods, Piano Safari progresses deliberately in terms of reading yet quickly in terms of playing. This builds foundational skills while developing a strong ear and technique in the student'. (PianoSafari.com website). Audio tracks are part of the method, as well as rote pieces within the book and as a separate book, ensemble pieces, and supplementary materials such as sight-reading and technique cards.

This approach is eclectic and combines an intervallic approach, moving to a multi-key approach once the initial landmark notes of Treble Clef G and Bass Clef C have been established and absorbed. The first book contains rote pieces, reading pieces, technical exercises, sight-reading cards and some improvisation in the early stages. It also incorporates off-stave notation at the beginning, using some finger numbers but mostly depending on developing intervallic understanding.

Piano Junior (Hans-Gunter Heumann)

Musicroom.com tells us that this book begins by introducing the black notes and graphic notation, then gradually introduces white notes, clefs and time signatures, 'building towards a thorough understanding of music with quick, noticeable

progress'. This Middle C approach provides a chance for improvisation at the start of the first book, then notation reading is prioritised, beginning with off-stave notation and letter names.

Having searched for alternative methods to these in 2022, I discovered two other piano methods, namely *Music Moves for Piano* and the *Do Re Mi Piano* series, both of which focus on other elements of music making before introducing the notation. Information on *Music Moves for Piano* can be found separately in Appendix 2.

Do Re Mi Piano (Russell)

This method was first published in 2014, which provides a reason why it was not mentioned among Cathcart's (2013) participants. It has the Kodaly method at its heart, using singing games and movement away from the piano for a period before beginning to notate very short pieces on a mini stave and then introducing a full stave but without clefs. Like the Yamaha method, the Do Re Mi method uses solfege and again puts music at the heart of learning to play the piano rather than decoding notation as the main focus.

Appendix 2: Music Moves for Piano, Lowe

Marilyn Lowe, who has worked in co-operation with Edwin Gordon, states that 'Music Moves for Piano is a piano series written to apply Dr. Edwin E. Gordon's theories of audiation to piano instruction' (*Keyboard Games A&B Teacher's Lesson Plans*, 2020, p.1). The method is based on audiation, and Lowe argues that, 'in contrast with "reading-based method books," *Music Moves for Piano* provides a strong foundation for reading and writing music notation with understanding. Aural learning precedes learning from notation', (2020 p.1).

According to an administrator on the Facebook site, 'Introduction to Audiation-Based Piano Instruction and Music Moves for Piano', *Music Moves for Piano* began taking shape in the early part of the twenty-first century, and the Facebook group was conceived around 2015, which is quite recent. This method was also devised in the United States, which often results in later transmission to the United Kingdom, thus participants in both mine and Cathcart's (2013) studies might not have been aware of this blossoming method and way of thinking. The method has been mentioned in the teaching 'blogs' on the Curious Piano Teachers' group site (established 2015), however it does not at the moment seem to be widely used in the UK.

The method is underpinned by audiation, and developed using singing, chanting rhythms, active movement, improvisation and listening and imitating tonal and rhythmic patterns, and playing at the keyboard. At the same time, students are taught how to listen to music with intent.

In terms of learning to read music notation, Lowe argues that 'in music, we can only read and write with understanding what we know in the mind and fingers' (2020, p.1). She insists that the reading-based approach common to many teaching styles often results in students treating the reading of notation as a decoding exercise, during which musical understanding cannot be developed. She believes that the *Music Moves for Piano* method lays vital foundations for reading notation much later.

Appendix 3: Musical Intelligence within the literature

1. The table below sets out a brief historical overview and possible definitions that emerged from a literature search on the term 'musical intelligence'.

1938, 1967	Seashore	Musical ability, musical talent
1947	Springborn	Ability to play well by ear
1948	Wing	Musical ability, musical appreciation
1951	Mainwaring	Musicianship, the complete musician
1965	Luce	Musicianship
1966	Bentley	Musical ability (cited in Young, 1973)
1968	McLeish	Musical cognition
1973	Suzuki	Musical ability
1974	Freeman	Talented children
1985	Kohut	Musical literacy
1985	Hassler *et al*	Musically gifted. Performed on instruments for many years
1989	Priest	Kinaesthetic understanding
1993, 2005	McPherson	Proficiency, musicianship, ability to think in sound
1998	Howe *et al*	Exceptional abilities
1999	Shuter Dyson	Ability to audiate. Understanding of tonal, rhythmic and kinaesthetic abilities, pattern and structure. Spatial ability.
1999	Murphy	Musical thinking. A way of knowing.
1999	Wilson	Read music, perform, create and analyse music?
2008	Brodsky *et al*	Instrumental expertise, musical ability and competence, audiation, notational audiation
2009	Hayward & Gromko	Music achievement
2009	Visser	High musical achievement, innate musical talent and musical excellence, listening, performing, analysing, creating
2010	Gudmundsdottir	Gifted musicians
2010	Helding	Exceptional musical talent. Express empathy during playing
2010	Liu	Perfect pitch, musicianship, listening with understanding
2014	Benton	Musical excellence
2015	Demirbatir *et al*	Musical talent
2017	Branton Shearer *et al*	Instrumental, vocal, composing and appreciation
2017	Harper Hogans	Think in music, hear, understand and manipulate patterns
2020	Garabello	Perform, compose, appreciate musical patterns
2020	Sternberg	Musicianship, creativity, performance

2. The table below summarises the skills and abilities involved in a possible definition of musical intelligence that emerged from the literature:

- sensory abilities (visual, aural, kinaesthetic, tactile)
- musical-spatial abilities
- motor abilities
- deep musical understanding
- deep understanding of the instrument
- musicianship and expressive playing, musical imagination and imagery
- good sense of pitch, rhythm and timbre
- the will to succeed (practice)
- creative abilities such as composing and improvising
- ability to play by ear and think in sound
- ability to audiate and listen with understanding
- musical appreciation
- musical literacy, ability to read and write notation
- to have played an instrument for several years, instrumental expertise
- ability to recognise patterns and chunks
- possession of technical skill on the instrument

3. Where a possible longer definition of the term 'musical intelligence' has emerged, this information is found below in historical order beginning with the least recent.

<u>Seashore</u> (1938)

Seashore seems to have been the earliest music pedagogue to use the term 'musical intelligence,' in 1938. He linked it with general intelligence, which he defined as the ability to solve problems and argued that 'in predicting success in musical education, we must always take intelligence into account, (1938, p.33). Unlike Suzuki, who argued that he had 'come to know without a doubt that ability is not inborn' (2008, p.3), Seashore believed that musical ability was innate and that it

depended upon the individual's environment as to whether or not it was brought to fruition. He claimed that 'it is quite possible to make a fairly exhaustive classification of the essential traits of musical talent' (1915 p. 130), and put forward these 'fundamental capacities'. These were what he called Basic Sensory Capacities, which focused on the ability to hear music, to possess a sense of pitch, intensity, time and timbre; Basic Motor Capacities, which involved the ability to control pitch, intensity, timbre and rhythm; Associational Capacities, which covered an ability to understand music, and Affective Capacities, which implied an ability to feel music and express feeling in music. He also added 'mental powers, which are needed for the appreciation of musical sounds' (ibid., p.130). Seashore also argued that musical imagery was important. For him this included auditory imagery and motor imagery, which was later consolidated by the work of Brodsky *et al* (2003, 2008), Gordon (1993), McPherson (1993), and Zatorre and Halpern (2005) in the field of audiation.

Interestingly, Seashore also considered the will to achieve to be an essential component of musical talent, which aligns well with Dweck's beliefs (2016), and suggests a willingness to engage in ongoing self-improvement rather than giving up at the first obstacle. In the same way that Gardner (2004) dislikes a single number as representative of an individual's overall intelligence, Seashore eschewed the idea of a single score that would represent musical ability, preferring to see it as comprising several elements: 'to amount to anything, there must be a hierarchy of talents, sufficiently related to work together (1915, p.130), which suggests that this could represent his implicit definition of musical intelligence, and is supported by other writers including McPherson (1993, 2005).

Gardner (2004)

Gardner's *Frames of Mind, The Theory of Multiple Intelligences* (2004) was the piece of literature that stimulated some of the thought processes in this thesis and seemed to offer some form of support to my observations of individuals appearing to demonstrate different forms of musical strengths in their learning. Since the book contained a chapter entitled Musical Intelligence, and Gardner had stated that 'it is

helpful to think of the various intelligences chiefly as sets of know-how – procedures for doing things' (2004, p.69), there seemed to me to be a promise of some form of understanding of learning to play an instrument. However, just as Wilson had found that 'Gardner is unclear about musical intelligence, in both his definition and his lack of explanation about developing musically' (1999, p.20), I also found it challenging to interpret this chapter and to find a succinct definition of musical intelligence within it.

Like some of the writers at the start of this chapter, Gardner (2004) seems to use the expression 'musical intelligence' interchangeably with the terms 'musical competence', 'musical achievement' and 'skill' in this work, adding to the difficulty in developing a clear definition. He uses the term 'musically talented' to describe those individuals who can recognise and recall a good number of melodies and are able to pick out by ear a tune on an instrument, and who possess the ability to 'sing back flawlessly' any piece heard, (2004, p.100). Here Gardner (2004) proposes that aural intelligence is innate and develops from birth, although it needs nurturing to keep developing.

Gardner suggests that a good auditory sense is crucial to musical intelligence, an appreciation of structure, key centre, cadence, pitch recognition and discrimination, dynamic sensitivity and ability to internalise a melody.

Gardner (2004) seems to regard 'musical competence' as having two main components. One is an intuitive approach to processing music where the individual's excellent aural skills enable him or her to know instinctively whether a set of sounds will work together, to understand rhythmic patterns and know when the piece is about to come to an end. The other side of musical competence, according to Gardner, is the 'formal' side of music, where the individual learns to read and play from notation. Gardner adds that 'ultimately, any individual in our culture who would wish to gain musical competence should master formal musical analysis and representation' (2004, p.111).

Gardner also draws attention to the tribes of the Anang, Venda and Griots, whose interpretation of musical intelligence, he suggests, is woven into the importance they attach to teaching their children music, rhythmic dancing and drumming as early as possible, no notation involved. McPherson (1993) asserted that, in several non-Western cultures, improvisation and ear-playing are considered extremely important, which could indeed constitute a view of musical intelligence as being dependent upon culture. Much rote teaching and playing is also predominant in other cultures (Odam, 1995).

Gardner equates 'musical achievement' with the ability to play instruments 'extremely well' (2004 p.112) and quotes Suzuki violinists, and the excellent performances he has heard from Russian Jewish violinists and Balinese gamelan players. He does suggest, however, that this achievement is reached by training, implying that this area of musical intelligence is not necessarily innate.

Gardner argues that 'a musician in our culture… must be able to interpret music, to glean the composer's intentions, to realise and project one's own interpretations, to be a convincing performer' (2004, p.114), suggesting a high degree of musicianship, dependent mainly on strong aural discrimination, a heightened sense of creativity and intuitive behaviour, the ability to play a musical instrument well, and possibly a certain amount of ability to read notation.

Finally, Gardner argues that the highest form of musical intelligence is to be found within composers and claims that their ability to create is an innate skill. He discusses their natural state of constantly having tones, rhythms and patterns circulating in their minds as a natural representation of musical intelligence. He talks about individuals instinctively experimenting with their repertoire pieces, changing them in terms of patterns, pitches and rhythms, and generally rewriting, or 'decomposing' the pieces (2004, p.114).

Wilson (1999)

Wilson investigated how certain schools understood and tried to use musical intelligence, and found a definition 'difficult to verify' (1999, p.19). She believed that 'for many educators, musical intelligence is often regarded as a talent derived from natural ability, or a gift that only certain people possess' (ibid., p.17). Her own definition seems to be couched in her overall need to establish a definition for what she calls 'musical growth', which she sets out as 'the progress of a student's ability to read music, perform music, create music and analyse music' (ibid., p.13).

Liu (2010)

Liu defines musical intelligence thus:

> Musical intelligence involves skill in the performance, composition, and appreciation of musical patterns. It encompasses the capacity to recognise and compose musical pitches, tones, and rhythms. In the most primitive sense, musical-aural intelligence involves all skills and capacities by which one perceives, stores and recalls auditory information and images. The ability to encompass a tune, to have emotional responses to a tune, and to recall a tune are all examples of this intelligence at work. Musical intelligence deals with all things "aural" or "musical" in the human experience, and specifically, with one's ability to process this content cognitively. (2010, p.16).

She also associates rubato, accurate rhythm, exceptional inner hearing, and spatial-visual intelligence with musical intelligence.

Garabello (2020)

Garabello declared that the definition of musical intelligence was 'not at all clear' (2020, p.4), and set about rectifying this as follows:

> musical intelligence is the ability to perform (play and sing), compose, and appreciate musical patterns, including recognition of pitch, tone, harmony, timbre and rhythm (ibid., p.9).

Garabello continues,

> I define musical intelligence as the transformation of a musical input into any output through a process that happens in the brain with either conscious or unconscious cognitive or creative elaboration, (ibid.) (Italics Garabello's).

She then adds that

> listening to and performing music are at the same time expressions of musical intelligence and contributors to its growth. Ultimately, when we listen to music, we do not just hear sounds passively, but our musical intelligence processes it through pattern recognition, searching for familiar combinations (drawing on our previous experience and cultural background) and preparing for the perception of meaning (2020, p.59).

Sternberg (2020)

Part of Sternberg's definition of musical intelligence is that it:

> encompasses the set of skills involved in musical composition, performance, and appreciation, among other aspects of music; it includes within its purview those skills involved in processing pitches, patterns and rhythms (2020, p.1775).

His definition also includes creativity, within which he situates the creation of new musical genres, for example South Korean K-pop, which he defines as gathering together elements of gospel, jazz, rock and hip-hop, as well as Afropop, which combines elements of blues, jazz, rumba and salsa.

Sternberg (2020) claimed that his definition of musical intelligence combined Gardner's theory of multiple intelligences (2004) and his own theory of successful intelligence (1999, 2004, 2020), stating that 'musical intelligence may be understood

as at an intersection of Gardner's (1983, 2011) theory of MI and Sternberg's (1997) theory of successful intelligence' (2020, p.1783). Sternberg's concept of successful intelligence and intelligent behaviour is represented by 'creative, analytical, practical and wisdom-based skills' (2020, p.1776), although he did not actively define these in terms of instrumental learning or music overall. His concept of practical-based skills seems to lean more towards securing a place in a string quartet or a good musical career. Similarly, Sternberg's concept of wisdom-based skills seems to infer 'using one's skills and knowledge toward the attainment of a common good' (2020, p.1782).

On the other hand, Sternberg's concept of analytical skills seems to mean the ability to manipulate the instrument, and having a good understanding of rhythm, as well as the individual knowing when he or she is playing the piece incorrectly, and how to rectify it, which also includes, and is underpinned by, intelligent listening, which is supported by the work of Gordon (1993), for example.

Appendix 4: Musical testing and music aptitude

Drake wanted to develop 'some reliable measure of musical talent… in the hope that some clue to the essential nature of musicality will be disclosed' (1933, p.136). The literature revealed the existence of copious batteries of musical tests including, but not limited to, Seashore's Measures of Musical Talent (1919), Gildersleeve's Music Achievement Test (1926, cited in Luce, 1965), and tests by Kwalwasser and Dykema, (1930, 1953, cited in Luce, 1965). Most of these tests examined the participants' aural skills in terms of, for example, discriminating between higher and lower sounds, timbre, other differences between sounds, tempo and texture, chord analysis, pitch and melodic memory, appreciation of rhythm, harmony, intensity and phrasing, supplying an answering phrase, continuing to tap a steady beat. Serafine (1988) constructed some very complex tests including the ability to identify a theme when transformed, or when it occurs in a different context. Most of these tests were heavily reliant on memory and therefore arguably may not necessarily have demonstrated musical talent.

Many musical tests seemed to be assessing music aptitude, which meant determining whether or not individuals possessed particular skills and the necessary abilities for success that the testers believed necessary for them to be offered music lessons. Most definitions in the literature seem to be underpinned by aural acuity, and since aural understanding and ability seems to underpin the beliefs of many music pedagogues in terms of learning to play an instrument (Gordon, 1993, Kinney, 2018, Luce, 1965, McPherson, 1993, 2005, Priest, 1989, Varvarigou, 2017, to name but a few) it could reasonably be argued that these aural aptitude skills form an important element of musical intelligence.

The terms 'music aptitude' and 'music ability' are also often used interchangeably within the literature, and Hallam (1998) asserts that, historically, music ability has always been regarded as related to aural ability and aural acuity, and one musician in her study, who was not an educator, made the significant remark that that music

ability comprised the ability to hear music in one's head, which aligns well with Gordon's (1993) music learning theory (audiation) and McPherson's concept of an ability to think in sound (1993, 2005).

Gordon (1993) defined music aptitude as measuring an individual's potential to learn, and this was dependent upon the possession of good aural perception, kinaesthetic musical feeling and musical expression, tonal imagery (which includes melody and harmony), rhythmic imagery (which covers tempo and metre) and musical sensitivity (which includes phrasing, balance and style).

Gordon believes that 'audiation is the basis of music aptitude and music achievement' (1993, p.13), that it is the 'foundation of musicianship' (ibid., p.3), and thus it could be argued that this might be part of his implicit definition of musical intelligence. Overall, Gordon's implicit definition of musical intelligence could be argued to be underpinned by the ability to audiate and engage with music with understanding.

Appendix 5: Ethics information sheet for student interviews

PhD Research Project:

Developing and applying Howard Gardner's Theory of Multiple Intelligences in an attempt to understand and overcome the difficulties seemingly encountered by early and intermediate piano students in reading and playing piano notation simultaneously.

Information for Participants and their Parents/Carers

Please would you help me with my research for my Doctorate? This leaflet tells you about my research. I would be pleased to answer any questions you may have.

Research Project Outline

I am researching what challenges are involved in developing the skills required to play piano from notation, that is being able to look at the music and play simultaneously. In a nutshell this means finding out how students approach their piano practice, what they find easy or difficult.

The Theory of Multiple Intelligences

To summarise briefly, Howard Gardner has put forward a theory that not everyone learns in the same way, and that individuals have their own strengths. I am investigating this theory with the hope of being able to improve my own piano teaching.

Details of Data Gathering

This stage of the data gathering involves conducting individual interviews with my piano students. I would also like to audio-record the interviews, so that I may be sure of capturing as much information as possible. This will then be transcribed, and you may see a copy if you wish.

Participation

It is not compulsory to take part in this phase of the research, and any student or their parents/carers can choose to opt out at any time. This is fine and will not make any difference to their piano lessons. The lessons will continue as normal, and I will be as supportive and enthusiastic as I always am.

Anonymity and Confidentiality

Anonymity will be strongly observed. That means that individual names or other identifying details will not be written anywhere in my work. Anything students do or say will be

anonymised. All answers will be kept confidential and safe, and I will be the only one to look at the data. I will use the results for research outputs only, including my thesis, possible conference presentations, and academic and practitioner publications.

Will taking part in the research benefit you?

I hope that you will enjoy helping me in my research. The research aims to help piano teachers, now and in the future, to support their pupils with their learning.

Research Funding

The research is being funded by myself.

When you have read this information, please do contact me to ask any questions. If you are happy to take part, please would you sign the attached consent form, so that I may have everything in place before I start gathering the next batch of data?

Thank you for reading this leaflet.

Lorraine Chapman
May 2017

Appendix 6: Consent form for interviews with students

Leading education and social research
Institute of Education
University of London

Consent form

Developing and applying Howard Gardner's Theory of Multiple Intelligences in an attempt to understand and overcome the difficulties seemingly encountered by early and intermediate piano students in reading and playing piano notation simultaneously.

Start April 2013 - Estimated Completion 2020

_____ (pupil) and

_____ (parent/carer if pupil under 18)

I/We have read the information leaflet about the research. ☐ (please tick)

We agree to participate in the following:	PUPIL	PARENT/CARER
Interview with Lorraine Chapman (please tick)	☐ (please tick)	☐
I/We agree to the interview being recorded (please tick)	☐ (please tick)	☐

I/We also understand that I/We have the right to withdraw from the research at any time.

Name _____
(Pupil)

Signed_____ Date_____

Name_____
(Parent/Carer)

Signed_____ Date_____

Researcher's name_____

Signed_____ Date_____

Appendix 7: Student interview questions

1. What is it like to learn to play the piano?

2. What do you like/dislike about learning to play the piano? (Why?)
   (What are your favourite/least favourite things)
   (Scales, pieces, exercises, sight-reading)

3. What things are easy/difficult? (Why?)
   (Try to talk about fingering)
   (Rhythm)

4. How do you learn a tune/piece?
   (What sort of things do you need to do?)
   (How do you know what to do?)
   (Do you like to read the 'music' or prefer to copy the teacher?)

5. Which part is easiest to learn, the left or right hand part?

6. Do you like to play from a piece of music or from memory? (Why?)

Appendix 8: Piano teacher questionnaire letter

Dear Piano Professional,

As committed piano teachers, we strive to provide our students with a well-rounded musical education. This may include playing piano from notation, learning pieces by ear, memorizing, or a combination of all methods. These are all valid ways of enjoying the piano.

My research focuses specifically on learning to play piano pieces from notation, which I consider to be an important initial stage of developing fluency and competence, and a platform from where students may indeed decide to memorise a piece.

Within my research I define the term "playing from the notation" as the ability to play the piano while simultaneously keeping one's eyes fixed mainly on the notation, (the score), with the occasional glance down at the hands to find certain keys. This is opposed to mostly looking down at one's hands instead of at the piece of notation, or trying to memorise a piece before one is ready, i.e. before the notes, rhythm and structure of a piece have been completely assimilated.

Despite much excellent research and writing about the benefits of playing by ear and memorising, playing piano from the notation is a skill that is clearly highly prized by the examination boards, as evidenced by the inclusion of a sight-reading test in the grades. It is arguably also a desirable asset for accompanists to possess, and for other careers within a musical field.

I would be extremely grateful if you would consent to be a voluntary participant in my research, by completing this survey. Please rest assured that all responses will be treated with the utmost confidentiality, and that anonymity will be strictly maintained. If I use any of the data gathered from the survey in my PhD thesis, present papers at conferences, or publish articles in journals, no names or

identifiers will be used. Your permission is specifically sought here to include your original ideas into the thesis, if the occasion arises, with credit given to you, albeit again anonymously. You may omit any questions, and you can withdraw data by contacting me on the email address given below. You are also welcome to contact me to ask questions about the survey.

It might also be helpful to my research to explore some of your answers in detail, so, if you would be happy to engage in further correspondence with me via email or a telephone interview, please could you indicate this at the bottom of the questionnaire.

With grateful thanks.

Lorraine Chapman (+ email address)

Appendix 9: Piano teacher questionnaire

I used SurveyMonkey to construct and administer my questionnaire. However, for ease of reference here I have condensed it into a Word document, so that any checklists are given as a list following the appropriate question.

Questionnaire Questions

1. In your experience of teaching piano, what do you perceive as the difficulties that your students seem to encounter when learning to play piano and read the notation at the same time? (Please tick all that apply).

   Using both hands simultaneously (divided attention)
   Remembering and finding the notes (pitches)
   Rhythmic issues
   A busy score
   Direction (whether the notes go up or down the score/keyboard)
   Which fingers to use
   Matching the layout of the score to the layout of the keyboard
   Dealing with two staves
   Concern because cannot see where the hands are going
   Mixing up the clefs
   Other (please specify)

2. What skills do you believe are required to read and play piano notation simultaneously?

3. Do you have any students that use the following strategies when you are asking them to play piano from notation? (Please tick all that apply).

   Looking mostly at their hands

Trying to memorise a piece before they are ready (i.e. they don't know the notes or rhythm well enough yet).

4. If you have any students who look mostly at their hands or try to memorise a piece before they are ready, could you give a brief outline of why you think they do this?

5. If you have students who look mostly at their hands or try to memorise a piece before they are ready, what effect does this have on their learning of the pieces? (For example, does it slow down the learning process, do they make continual mistakes in pitch and/or rhythm, is a piece never completely satisfactory).

6. If you have students who look mostly at their hands or try to memorise a piece before they are ready, do you find that this has any effect on other elements of their development as competent pianists? (For example, sight-reading, aural skill, independent learning).

7. If you answered Yes to the last question, could you outline what areas you believe are affected?

8. We know that it is necessary to glance down at our hands from time to time while playing a piece. However, when learning a new piece from notation, would you say that it is preferable that students keep their eyes fixed mainly on the notation, and only glance down occasionally to check where their fingers are going?

9. Please would you say briefly why you think the students should or should not keep their eyes fixed mainly on the notation?

10. If you believe that students should look mostly at the notation when learning new piano pieces, please could you briefly outline what you have found helps to nurture this skill?

11. My work and my thinking has been influenced by Howard Gardner's multiple intelligences theory. If you are aware of this theory, do you use it in your piano teaching? (Please tick all that apply).

12. How would you define musical intelligence in terms of learning to play the piano?

13. Based on your definition of musical intelligence, how do you develop this within your piano students?

14. What is your own preferred method of learning new pieces?

    - do you learn best by ear and memorise as quickly as possible?
    - do you need the notation at all times?
    - other (Please specify)

15. On a scale of 1 to 5, where 1 is the lowest, how much do you believe that your method of teaching piano might reflect your own way of learning?

16. If you have any comments that you would like to raise, please feel free to add them in the box below!

17. Lastly! Thank you so much for taking part in this survey. If you would be willing for me to interview you by telephone about our piano teaching and your responses to this survey, please would you include your email address in the box below?

Appendix 10: Piano Teacher Interviewee Profiles

Teacher: #T3a

Method	Hal Leonard, Oxford Method, mixed.
Rote?	Only for tricky parts. Rote to note for this though. Implies that too much rote/ear playing prevents reading from developing. And negative in that they end up being able to play too far ahead of their extremely limited or non-existent reading ability.
Ear?	Not in terms of picking out piece. To #T3a it equates with aural skills, listening.
Proprioception/Tactile	Prefers them to have an internal visual image of the keyboard. "they have the keyboard as an image and not as feeling the fingers. They imagine it first."
Audiation development?	Encourages lots of listening.
Keyboard Geog/Spatial awareness	Yes. Active development of internal image of keyboard.
Rhythm development	Yes very much so.
Introduction of notation	After 3-4 weeks. "I want them to start listening first before reading."
Improvisation?	
Composition?	
Intervallic approach?	On a paper keyboard.
Active aural development?	Yes. Vehement that they must listen.
Chunking/Patterning	Yes from the start.
Preferred way to learn a new piece	
Strengths?	Yes, understands Gardner.
Musicality/Musicianship?	Yes. If they start with ear playing, it helps musicality. If they only read, "they become mechanical…it goes from notation to the fingers, and nothing comes."
Hand-lookers?	"doesn't encourage this"
Successful readers/sight-readers?	
Importance of practice?	
Use of mental strategies?	They have to have the score in their head.
Theory of Musical Intelligence <u>Interview</u> "It's a combination thing. It's not just one thing. I think it uses the whole brain. You have to have multiple intelligences to be a good musician." Asked to apply her thinking in terms of reading and playing the notation simultaneously, she said: "If you have a fantastic ear, sometimes, that's very rare, but you see people, they can hear something and play it instantly. So this kind of intelligence. I promote the reading also because if you want to play much more complex music, you need to read more. But I don't know what is musical intelligence. It's not one thing, I can't say it's one thing. A combination." <u>Questionnaire</u> "Musical intelligence is either there or acquired by correct training and practice. I go along with each student's abilities. Musical intelligence has nothing to do with one specific instrument."	
Member of professional group?	
Own teaching	Also body-kinaesthetic intelligence - unstiffening etc. The only one to allude to this intelligence.
How were they taught	
Do they teach as they were taught?	No.

Teacher: #T4b

Method	Piano Safari. Landmark notes. Intervals. Off-stave. Rote. Rhythm. Proprioception development. Improvisation. Different starting positions.
Rote?	Yes, lots.
Ear?	Not at start. Too frightening for young ones. Needs teaching. Appreciates older ones who do it off own bat. "Eventually" might do it. Playing by ear seems to come *after* the notation.
Proprioception/Tactile	Not specifically, but Piano Safari does this.
Audiation development?	Yes. Only recently.
Keyboard Geog/Spatial awareness	Yes.
Rhythm development	Yes. Very important. Active development early on. "If they can't think through the rhythm of the notes with the pulse going, they're not going to be able to play it."
Introduction of notation	Not for 3-4 weeks. Then Piano Safari. Too early notation leads to lack of fluency and pulse.
Improvisation?	
Composition?	
Intervallic approach?	Yes.
Active aural development?	
Chunking/Patterning	Yes.
Musicality/Musicianship?	Very much.
Preferred way to learn a new piece	
Strengths?	Ear playing may be a strength.
Hand-lookers?	Only a couple, of which one is Asperger's. Links it to underlying problems.
Successful readers/sight-readers?	Yes with current teaching methods.
Importance of practice?	Yes.
Use of mental strategies?	

Theory of Musical Intelligence

Questionnaire:

"The ability to make a musical 'performance' through whatever strategies possible."

Interview:

"It's getting that idea of it not just being note by note, like the way you read a sentence is not the same when you understand the sentence, as like how a five year old, who might be able to sound out the words, they don't read that with any intelligence necessarily, so it's that I think. It's being able to read and play but in phrases, in units that make musical sense. …Yes, so it's getting them to do it, but in a meaningful way, not like how you'd train a chimp to do." When I asked, "so you're talking more about musicality and expression as a musical intelligence?" She said "Yes, and their understanding of it as well, even if they lack the technical facility to bring it off in a way that would necessarily express it well, that there's an intention there to do that at least."

Member of professional group?	Yes.
Own teaching	Began with notation as was taught. "I didn't know any better when I started out". But being member of Curious Piano Teachers has radically changed this. Now active development but not just telling them, discovery learning too.

How were they taught	Notation.
Do they teach as they were taught?	Began with notation as was taught. “I didn’t know any better when I started out”. But being member of Curious Piano Teachers has radically changed this.
Successful outcome of students?	Yes, seems so.
Interesting comments	“Initially when I did reading notation from the very first lesson…sometimes they could read but their heads were ahead of what their hands were capable of and so it was really difficult for them to get fluency.”

Teacher: #T10a

Method	Piano Adventures. Landmark notes (not Piano Safari)
Rote?	Yes. A small amount "it can be very useful."
Ear?	Yes, because people like it.
Proprioception/Tactile	
Audiation development?	No – not easy for her and doesn't teach it.
Keyboard Geog/Spatial awareness	
Rhythm development	
Introduction of notation	6-8 weeks. Don't rush in the early stages.
Improvisation?	Yes.
Composition?	
Intervallic approach?	Yes. Via Piano Adventures not Piano Safari.
Active aural development?	
Chunking/Patterning	
Preferred way to learn a new piece	Notation, learn bits by memorising.
Strengths?	"Some of my pupils seem to take to note learning really quickly and others just don't." "Often if they struggle a lot with notation, they're actually very good at aural skills or improvising." "I find that people like to play by ear".
Musicality/Musicianship?	Yes.
Hand-lookers?	Yes.
Successful readers/sight-readers?	Non-committal.
Importance of practice?	Yes.
Use of mental strategies?	Standard sight-reading prep.

Theory of Musical Intelligence

Interview

"That's a tricky one because I don't really think that musical intelligence is always related to note reading."

"I think that musical intelligence is about playing in a really beautiful way rather than strictly reading the notes correctly, so I might have a pupil who can read the notes really correctly but doesn't actually play as beautifully as someone who possibly has a better ear and better technique." Asked whether for her musical intelligence is representative of musically, she answered, "Yes, I think so, and playing with expression, giving a good performance, a certain ability to read notes, I mean that is really important, and the confidence to go through a piece without lots of stops and starts, the overall effect I think." She also added that, "A really good ear [is important], the ability to listen to themselves and think, 'actually that's not right, how can I make that better'. And I also think a willingness to listen to lots of music outside the lessons as well". A good aural senses is important to her. She also mentioned that she believed good technique is an important part too.

Questionnaire

"Using a combination of skills (aural, rhythmic, note reading) consistently to make connections and create a pleasing performance."

Member of professional group?	Curious Piano Teachers and has done piano teachers' course.
Own teaching	Landmark notes. Flashnote Derby app.
How were they taught	Notation.
Do they teach as they were taught?	No, was notation based.

Teacher: #T10b

Method	Get Set Piano
Rote?	A bit.
Ear?	Yes – own devised method – very good.
Proprioception/Tactile	
Audiation development?	Tries a bit. Links it with singing. ("You can't internalise sound unless you can sing it".)
Keyboard Geog/Spatial awareness	Yes. Both by developing ability to see where everything is going to go in a piece before you play it; and by developing the ability to move about the piano without always looking.
Rhythm development	Yes.
Introduction of notation	Between 6-12 wks, following his own introduction to elements, and his own development of ear-note on mini stave.
Improvisation?	
Composition?	Transposition.
Intervallic approach?	Yes – heavily, especially a joining the dots approach – get first note and then follow intervals.
Active aural development?	Yes.
Chunking/Patterning	A bit I think.
Preferred way to learn a new piece	
Strengths?	
Musicality/Musicianship?	
Hand-lookers?	Just one!
Successful readers/sight-readers?	
Importance of practice?	
Use of mental strategies?	A little, analysing the piece in entirety via rhythm, contour a little bit of pitch singing. Look at and internalise shapes.
Theory of Musical Intelligence <u>Interview:</u> "Well for me, it would be the ability to read a piece of music, no matter how slowly, and understand how it goes. Maybe to hear it in the head and have an understanding of how it goes, so that at least they're not afraid of it… So my thought of intelligence is, as we said earlier, to actually hear the music in your head." <u>Questionnaire:</u> "The ability to use the whole of the body to play the piano and the senses to understand the written music and the awareness of how it should sound before the keys are struck."	
Member of professional group?	Yes Curious Piano Teachers.
Own teaching	Sound before sight.
How were they taught	
Do they teach as they were taught?	Yes, intervallic approach.

Teacher: #T14a

Method	Piano Time sight-reading book. Fun for 10 fingers. Dozen a Day.
Rote?	Not really.
Ear?	Not really.
Proprioception/Tactile	Yes – mentioned in questionnaire.
Audiation development?	Yes.
Keyboard Geog/Spatial awareness	
Rhythm development	Yes.
Introduction of notation	First lesson. "Yes I think so, I don't see why not. I think that's why they've come to piano lessons."
Improvisation?	No.
Composition?	No.
Intervallic approach?	
Active aural development?	Yes via singing pieces.
Chunking/Patterning	
Preferred way to learn a new piece	
Strengths?	
Musicality/Musicianship?	Mentioned in questionnaire re musical intelligence.
Hand-lookers?	One or two.
Successful readers/sight-readers?	
Importance of practice?	Yes very much so.
Use of mental strategies?	
Theory of Musical Intelligence <u>Interview:</u> "I think it incorporates the whole, the different facets of your body from your hands to your brain and back down again, and musical intelligence requires you to facilitate both your hands to do something on a piano, which is really quite difficult, so I think musical intelligence is up there with the higher intelligences. If you can play a piano you're quite intelligent. To be able to just do that, to use both hands, and your hands to perform independently or together on sometimes quite involved pieces." <u>Questionnaire:</u> "Music must come from the heart as well as the head. An innate feeling for the rhythm and for the sound one makes."	
Member of professional group?	No.
Own teaching	Mainly notation based, but uses aural work and quite a lot of theory.
How were they taught	
Do they teach as they were taught?	No, although does still teach notation from Day 1. But from different angles, whereas own teacher didn't.

Teacher: #T16a

Method	Piano Time, Pauline Hall.
Rote?	No. Negative view.
Ear?	Yes, very much, but not for building notation, just as an asset. And transposition. Ear to note.
Proprioception/Tactile	Not really.
Audiation development?	No. (But thinks ability to know how something's going to sound comes into a theory of musical intelligence – but that is very possibly because I talked about it).
Keyboard Geog/Spatial awareness	Not specifically.
Rhythm development	Yes.
Introduction of notation	After 2-3 weeks.
Improvisation?	Yes. And transposition.
Composition?	Yes.
Intervallic approach?	Not mentioned.
Active aural development?	Some – play Twinkle Twinkle by ear and then transpose it.
Chunking/Patterning	Yes. Chords.
Musicality	Yes definitely.
Preferred way to learn a new piece	Notation, listening, lead sheets.
Strengths?	Not really mentioned.
Musicality/Musicianship?	Yes
Hand-lookers?	Yes.
Successful readers/sight-readers?	Not mentioned.
Importance of practice?	Yes if they want to get on.
Use of mental strategies?	Normal sight-reading strategies.

Theory of Musical Intelligence

Questionnaire:

"The best students in music can seem to apply learning skills across a wide variety of activities and seem to have a particular and similar approach to everything. Practical, analytical, patient, willing to stick at something."

Interview:

"I don't know, it's difficult to put into words I think. It's, we're trying to give our students the level of intelligence that enables them to want to read a piece of music perhaps for the first time, and take it further, and play it in a satisfying way for them. And if you want to call that intelligence, yes, and even develop that. And if you take it back to the sight-reading examples we were talking about just now, I guess that's the skill of being able to look at something and either be able to hear it or be able to have an appreciation of what that's going to sound like, how it should be played. So it's the ability to read the musical language, I suppose, if we're talking specifically about notation, I guess."

Member of professional group?	Doesn't seem like it.
Own teaching	Encourage a sense of discovery rather than rote/parrot fashion etc.
How were they taught	Notation, ear and lead sheets.
Do they teach as they were taught?	Yes, but this was notation and ear and lead sheets. Is mainly notation though.
Successful outcome of students?	Not specified.
Interesting comments	He teaches them little pieces by ear (this may be rote, but it may not) then often shows them what the notation

	looks like. So that they can marry the two. This actually may develop their audiation skill. Despite him saying he doesn't teach them to hear it off the page.

Teacher: #T18b

Method	Piano Safari. Blitz rote pieces.
Rote?	Yes – extended – 12 months. Rote to note too with Blitz.
Ear?	A tiny bit.
Proprioception/Tactile	A little with hands covered and eyes closed. Maybe in terms of what she says about chords, knowing what it "will be like". The eyes closed also develops confidence in knowing which finger is which.
Audiation development?	Yes. Seems to feature in her definition of musical intelligence. Blitz Rote helps with this too.
Keyboard Geog/Spatial awareness	
Rhythm development	
Introduction of notation	After about a year.
Improvisation?	
Composition?	
Intervallic approach?	Yes. Piano Safari.
Active aural development?	
Chunking/Patterning	I think so, knowing what a chordal pattern "will be like".
Preferred way to learn a new piece	Hear it, sight-read through it, learn it in chunks from score.
Strengths?	Notes that some find ear easier than others.
Musicality/Musicianship?	
Hand-lookers?	Yes – a lot. Perhaps restricted to young beginners though. Maybe needs to be on top of it more.
Successful readers/sight-readers?	
Importance of practice?	
Use of mental strategies?	I think so, knowing what a chordal pattern "will be like". Also very comprehensive analysis/prep before they sight-read. Including audiation.

Theory of Musical Intelligence

Interview:

"I think it's about understanding what it is they're hearing, and in some ways being able to internalize it and replicate it, but also if they're reading some music, being able to hear it in their heads." By internalizing I think she means playing it by ear, picking it out on the piano.

Questionnaire:

"Having a good understanding of the music they are playing, they can hear it in their heads when they are not playing it. A good awareness of rhythm, pitch, notation and aural."

Member of professional group?	Yes Curious Piano Teachers.
Own teaching	Taps into learning styles.
How were they taught	
Do they teach as they were taught?	Started off like it but not any more since courses and Curious Piano Teachers membership.

Teacher: #T21b

Method	Piano Safari.
Rote?	Yes.
Ear?	Yes. Is part of her own individual method. Very good.
Proprioception/Tactile	Not developed specifically but acknowledged.
Audiation development?	Yes - implicitly via own method, but extremely keen on getting them to sing it so they know how it goes in their heads. Very active development of it.
Keyboard Geog/Spatial awareness	
Rhythm development	Yes. Very much so. Learn separately from pitch.
Introduction of notation	After quite a few weeks of own method of singing/rote/ rhythm work.
Improvisation?	
Composition?	Yes.
Intervallic approach?	Yes.
Active aural development?	Yes.
Chunking/Patterning	
Preferred way to learn a new piece	Learning by heart.
Strengths?	Implicitly. Has a student who works out tune by ear then prefers to write it down to play it rather than keep playing it by ear, working it out each time. i.e. preference for notation over ear.
Musicality/Musicianship?	
Hand-lookers?	Yes a few.
Successful readers/sight-readers?	"My students are pretty good sight readers because I teach all the elements separately."
Importance of practice?	
Use of mental strategies?	

Theory of Musical Intelligence

Interview:

"I don't know if there's such as thing as musical intelligence, surely it comes form your music education what you know about music. From your own experiences, you know, it has to be taught, it can't really come out of nowhere."

She seems to hold teachers' methods as responsible for their students' musical intelligence: "Well that's just down to the teaching, isn't it, you know, if students can't read notation it's the teachers' fault. …one [student] was on John Thompson Book 2, he didn't even know the note Middle C, but we can't say that he hasn't got any musical intelligence, he was just very very badly taught. I've gone in straightaway with the landmark notes and steps, and he can now read steps on the stave. I suppose he's smart, but he had to have the right input to be able to pick it up."

Questionnaire:

She hadn't understood the question and assumed it was about a rounded musical education.

Member of professional group?	Yes, Curious Piano Teachers.
Own teaching	Mini stave. Notate before reading. Notate songs they have learnt to sing. Tiny songs at first.
How were they taught	Notation. Meaningless.
Do they teach as they were taught?	No!

Teacher #T24b

Method	Piano Safari, but also spending more time on the letter names, being able to find the groups then individual notes.
Rote?	Yes quite a bit at first, prolonged.
Ear?	I think so
Proprioception/Tactile	Yes – more so in terms of the tactile responses needed for technique and particular rhythm chunks. But equally the need for strong proprioceptive skills to aid playing without needing to look at the hands.
Audiation development?	Yes, quite comprehensive and intense and very much actively developed over many aspects, including both rhythm and pitch.
Keyboard Geog/Spatial awareness	Yes
Rhythm development	Very much so – does a whole year of rhythm work, a pre-instrument stage. Very detailed, expects internalisation of chunks of rhythms etc. "I expect 4-bar rhythm reading capability to be secured before they start piano."
Introduction of notation	Don't rush.
Improvisation?	More transposition.
Composition?	Scoring a part eg the LH of a unison piece that the RH already exists.
Intervallic approach?	Yes – Piano Safari.
Active aural development?	Yes, very much so.
Chunking/Patterning	Yes
Preferred way to learn a new piece	Notation.
Strengths?	Yes "you can't tell which ones are great readers and which ones are great rote players or grate improvisers, they just learn to play in a different way".
Musicality/Musicianship?	Yes
Hand-lookers?	Only one or two, but attributes to Asperger's/Dyspraxia
Successful readers/sight-readers?	Yes
Importance of practice?	
Use of mental strategies?	

Theory of Musical Intelligence

Interview:

"In my opinion, the following are the traits of someone who has musical intelligence:

1. Pick up a piece of unknown music (say in a book/shop/library) and is able to read/hum/hear it in the head and therefore make a decision on whether they'd be interested in it – without having to play/hear it played first.

2. Listen to a piece of music and be able to recognise enough musical characteristics, to discuss and draw conclusions by associating to known music (e.g. "This reminds me of this piece composer, mood, style, etc.").

3. Draw on own skills to perform musically (be it by ear, improvised, or from notation) without injury to anyone or to the instruments.

"It's when they can independently look at a new piece of music and that they can interpret it without help from me."

Questionnaire:

"Specifically to 'notation', Musical Intelligence is about being able to study a set of musical score and deriving the components of that work so that one can match the right strategies to the right sections in order to interpret the score to the intentions of the composer or own musical intentions. However, it is important to note that 'notation' is only a slice in the elements that make up Musical intelligence."

Member of professional group?	Yes, Curious Piano Teachers.
Own teaching	Very thorough preparation before notation.
How were they taught	Everything marked up. No discovery. Aural was separate and it only came out in exam prep. Many have said this.
Do they teach as they were taught?	No. Discovered rounded approach through teacher training.

Teacher: #T26a

Method	Alfred – this has a variety of books, lesson and solo, theory, but important it has a specific activity and aural training book. Not a huge amount of stuff in the ear bit, but it does encourage listening to how many claps, or whether the music is going up or down. But this is only Book 1.
Rote?	Yes, and a little bit rote to note. Rote duet, then have the music open. But also rote in terms of getting them to play pieces of a higher standard than they're reading.
Ear?	Yes.
Proprioception/Tactile	Admission that lack of good proprioception slows them down and causes looking down.
Audiation development?	That it emerges and is not taught specifically.
Keyboard Geog/Spatial awareness	
Rhythm development	Very much so.
Introduction of notation	After about a month.
Improvisation?	Yes.
Composition?	
Intervallic approach?	
Active aural development?	Yes.
Chunking/Patterning	Yes, very big, especially chords/inversions.
Preferred way to learn a new piece	Away from piano first. Learn small bits. Eventually memorise.
Strengths?	
Musicality/Musicianship?	Very important yes. "My priority is to create musicians." "I'm always looking to develop their musicality."
Hand-lookers?	Yes. Persistent hands covered for as long as it takes.
Successful readers/sight-readers?	Think so.
Importance of practice?	
Use of mental strategies?	Yes, chords/patterns. Harmonies. Ability to predict.

Theory of Musical Intelligence

Interview:

"In terms of reading, musical intelligence would be identifying patterns." "I think it's the ability to conne something that is visual and make it aural, and to do it almost instantaneously…The trick is to play what you see instantaneously and that's incredibly difficult, and to do it musically." Again his focus is on musicality. "It's about the right balance between the right and left brain. I think that emotional side and that technical side, they must be married, and if one overwhelms the other, you can get either an unmusical performance, or perhaps that's musical but looks …not very consolidated, and I like a balance between the too. I like a very effective structure, but very inventive and creative sounds/sound world – I like that kind of music. So that tends to be what I favour in my teaching strategies as well."

Questionnaire:

"The ability to coordinate multiple sensory perceptions into a unified purpose of creating organized patterns of sound."

Member of professional group?	Yes Curious Piano Teachers.
Own teaching	Analyse piece, take it apart. Very big on chords. Rote. Musicality.
How were they taught	Not creatively. Traditionally. Notation.
Do they teach as they were taught?	No.

Teacher: #T31a

Method	Bastien & Get Set Piano. One which introduces one note at a time. "That looks like that and it means this." More linked to a letter or key name possibly than actual physical response to it.
Rote?	Maybe a tiny bit.
Ear?	No because she can't do it herself.
Proprioception/Tactile	In questionnaire said the ability to "feel your way on the keyboard is important. In interview, is really only mentioned for chords, trains strict finger pattern for these.
Audiation development?	No. Assumes it develops by itself.
Keyboard Geog/Spatial awareness	A little in terms of practising jumps.
Rhythm development	Not specifically, but likes short duets to help.
Introduction of notation	More or less straightaway, generally off-stave. "…they're getting used from the very first lesson, to looking at something in front of them, playing…" Flashcards.
Improvisation?	
Composition?	
Intervallic approach?	
Active aural development?	
Chunking/Patterning	Yes but not relying on it in general, but definitely for chords.
Preferred way to learn a new piece	Reading.
Strengths?	Yes (implicitly like most). Also talks about those who are "willing to accept the reading" and those who avoid it as being wilful. Also about ear players – "…I don't very naturally do that, but I can see other people can." But: "I wouldn't make someone feel stupid because they couldn't do it."
Musicality/Musicianship?	A little, in terms of it's difficult if they don't look at the notation.
Hand-lookers?	More in terms of memorising pieces before they are ready, just committing to memory.
Successful readers/sight-readers?	
Importance of practice?	Yes
Use of mental strategies?	

Theory of Musical Intelligence

Interview:

Is quite vague, she talks about what she believes she can tell about each student from their trial lesson: "And generally I can tell – some have definitely got a talent, some maybe not so talented but have got determination, and some, you think, they're probably going to give up quite soon or they're not going to come back."

Then when asked to be more specific about what musical intelligence meant to her: "Well I think people can be trained to do that, and it's often those who are often just more intelligence generally that can cope with that more easily. And will apply themselves to doing it."

Questionnaire:

"Ability to read note pitches and rhythms accurately or reproduce them by ear and to understand accenting and expression in performance to achieve expressive playing. It is also certainly about dividing the attention."

Member of professional group?	Don't think so.
Own teaching	Quite long winded one note at a time, spelling words out on the piano etc. Associate symbol with letter name. Flashcards.
How were they taught	Notation.
Do they teach as they were taught?	I think so – she teaches according to her own strengths. "I tend to teach what I know."

Teacher: #T34a

Method	Piano Junior book. Does some rote on black keys. Then CDE in bass and treble clefs. So a note by note type approach.
Rote?	Little bit.
Ear?	Said not really, but in questionnaire she gets them to work out tunes for themselves, which is what ear playing is. Maybe she's thinking more of rote.
Proprioception/Tactile	Yes a bit. Trust that fingers will move without looking at them. Finger games, the fingers have numbers, touch your nose etc. Also to recognise shape of chords and fingering to use.
Audiation development?	No.
Keyboard Geog/Spatial awareness	Yes.
Rhythm development	Rhythm notation before CDEF.
Introduction of notation	After 5 weeks.
Improvisation?	No.
Composition?	No.
Intervallic approach?	Yes.
Active aural development?	Not until exam time.
Chunking/Patterning	To recognise shape of chords and fingering to use.
Preferred way to learn a new piece	Notation.
Strengths?	"Some you can explain it and they get it. Others learn by imitation and pretend they've got it"
Musicality/Musicianship?	
Hand-lookers?	Yes, some.
Successful readers/sight-readers?	Not sure.
Importance of practice?	Not mentioned.
Use of mental strategies?	No.
Theory of Musical Intelligence <u>Interview:</u> "Understanding phrasing, breathing, where the music is going." (Musicality). <u>Questionnaire:</u> "Ear & aural memory directs fingers, understanding chord shapes and tonality."	
Member of professional group?	No.
Own teaching	Teach Middle C then each line is alternate note. FACE and All Cows.
How were they taught	
Do they teach as they were taught?	
Successful outcome of students?	Think so.

Teacher: #T35a

Method	Learn one note at a time from method book – Piano Time.
Rote?	No – only for tricky bits. Otherwise learning whole piece by rote encourages mimicking and not learning to read.
Ear?	No – makes people lazy. Learning by ear means not learning to sight-read.
Proprioception/Tactile	Some very basic finger games at start.
Audiation development?	Nothing substantial. Interval of 3rd to hear only.
Keyboard Geog/Spatial awareness	
Rhythm development	
Introduction of notation	Around the third lesson.
Improvisation?	
Composition?	
Intervallic approach?	Listen to a 3rd.
Active aural development?	
Chunking/Patterning	
Preferred way to learn a new piece	Ear – memorise. Was accordion player.
Strengths?	Believes that all students have different strengths and different learning styles. Some people are good at memorising. She herself had a very good ear and preferred to pick out pieces by ear and memorising stuff from teacher. This may have been her own strength.
Musicality/Musicianship?	
Hand-lookers?	Yes, many persistent. Most. (She has 22 pupils).
Successful readers/sight-readers?	
Importance of practice?	Yes.
Use of mental strategies?	
Theory of Musical Intelligence <u>Interview:</u> Suggested that musical intelligence, in terms of reading and playing the notation simultaneously, might mean looking at pieces from about Grade 3 onwards and seeing the structure, seeing musical shapes before they start playing it, combining rhythm and melody in the right way, to do both. <u>Questionnaire:</u> "Too much to say here…" (which is why I probed in the interview and didn't get much more).	
Member of professional group?	Not apparently.
Own teaching	Notation–based. Learn one note at a time from method book. Long slow process and they continually forget. Seems very inefficient to me.
How were they taught	
Do they teach as they were taught?	

Teacher: #T50a

Method	Start off with Middle C and learn one note at a time if using a book. But supports their learning style and shores up weaker areas too.
Rote?	Yes.
Ear?	Is a strong ear player herself. Active encouragement of development of ear: "Go away and listen to something you really like and pick it out on the piano."
Proprioception/Tactile	This is of ultimate importance. They must know what everything feels like, intervals, etc too.
Audiation development?	Yes. "Most importantly, singing it…so that you attach the sound to the interval."
Keyboard Geog/Spatial awareness	"Knowing where things are so you don't have to look." Build an internal picture of the keyboard.
Rhythm development	Doesn't mention rhythm.
Introduction of notation	After a couple of lessons of exploring the keyboard and its geography.
Improvisation?	Yes.
Composition?	Yes.
Intervallic approach?	I think so. But only after each new note has been added and absorbed. Not like Piano Safari.
Active aural development?	Yes, very comprehensive ear-training programme. "I will play something without the student looking at the keyboard, and say, 'can you play that back to me?'"
Chunking/Patterning	Yes.
Musicality	
Preferred way to learn a new piece	Jazz – listen and work it out by ear. Classical – notation.
Strengths?	Doesn't specify anything or hint at anything.
Musicality/Musicianship?	
Hand-lookers?	Yes.
Successful readers/sight-readers?	Yes.
Importance of practice?	Yes
Use of mental strategies?	Yes, linked to the tactile development and keyboard geography.
Learning styles?	Believes in using visual, tactile and aural senses and emphasise the one the student is stronger in.

Theory of Musical Intelligence

<u>Questionnaire:</u>

"An open awareness to listening, not just to music but to the world at large. A felt sense of all the elements of music. Body awareness and engaging with the instrument in a very physical way. Ability to see, hear and feel patterns. Imagination. Confidence in the teacher. Willingness to make 'mistakes' and to experiment."

<u>Interview:</u>

"An ability to listen to and process sound, and to reproduce either form the music or from listening, along with an ability to create using sound."

"In terms of notation – An ability to take in small detail, and accurately translate it into physical actions on whatever instrument it is, the piano in this case. An ability to interpret what's written on

the page and to reproduce that or reinterpret it yourself such that a listener would call it music."	
Member of professional group?	No.
Own teaching	Developed through trial and error, other teachers and CPD events.
How were they taught	Doesn't really say.
Do they teach as they were taught?	Yes and No, but mainly No.
Successful outcome of students?	Mainly.
Interesting comments	

Appendix 11: Piano Teacher interview questions

1. What is your approach to helping your students to read and play from the notation simultaneously?

2. Do you introduce notation at the very first lesson? (age)

3. Do you teach your students to play by ear and rote? (age)

   Can you describe briefly how you start?
   What sort of length piece or section of piece do you give each time?
   How successful are the students at practising it correctly at home for the following week? i.e., how much do they remember?
   How do you make the connection with the notation?
   How far do you go before you introduce the notation for the pieces you are teaching by rote/ear?
   How difficult are the pieces that you teach by rote/ear? i.e., are they up to Grade 1 and above, or do they relate to beginner tutor books?

4. Do you have students who constantly look at their hands and try to memorise?

5. What do you do to try to avoid it happening in the first place?

6. Can you hear a piece internally from the notation?

7. What mental strategies do you encourage your students to use when they are learning a new piece from notation? (age)

8. Do you believe that you teach in the same way you were taught?

9. What do you believe musical intelligence is, in terms of learning to play piano and read notation simultaneously?

Appendix 12: Question 1 analysis

In your experience of teaching piano, what do you perceive as the difficulties that your students seem to encounter when learning to play piano and read the notation at the same time?

Difficulty	**No. of teachers mentioning this**
Using both hands simultaneously	55
Remembering and finding the notes	50
Rhythmic issues	44
Dealing with two staves	42
Which fingers to use	35
Direction	34
Cannot see hands	35
Mixing up the clefs	32
Matching layout of score to keyboard	26
Busy score	20

Appendix 13: Question 2 analysis

What skills do you believe are required to play and read piano simultaneously?

Code	Basic Description/Outline of the Code	Freq
Pr	Proprioception	25
	Dealing with the notation	24
Sp	Spatial awareness/Spatial ability	20
KbdG	Keyboard geography	18
K	Kinaesthesia/Kinaesthetic elements (also tactile)	15
C	Co-ordination	13
Aur	Aural ability and understanding	13
SpdPro	Speed of processing the notation	12
Patt	Ability to see patterns	11
MT	Multi-tasking	9
STM/LTM	Short and long-term memory ability	9
Int	Ability to understand intervals	7
Aud	Ability to audiate (not using this word, just the concept)	6
Aut	Automatic understanding/recognising notational elements	4
Ch	Understanding chords, shapes, tactile response, inversions	4
Int Kbd	Having an internal picture of the keyboard	4
Cont	Understanding contour and direction in the notation	4
Rh	Rhythmic competence and understanding	4
MM	Muscle Memory	3
Tr	Ability to track the notation while playing	3
BP	Understanding the “Big Picture” of the notation	3
Div	Dividing attention between the hands, hands and eyes	3
Pulse	Understanding and executing pulse	2
KS	Noticing and understanding the key signature	2
Ton	Awareness and understanding of tonality	2
Periph	Having good peripheral vision	2
H	Awareness of harmony	2
TS	Noticing the time signature	1
V.Sp	Visuo-spatial awareness – to read a large vertical space	1
2 staves	Ability to read two staves simultaneously	1
HS	Having a good hand shape	1
Dex	Having good dexterity	1
Sing	Ability to sing	1
W	Ability to read words	1
Inst	Familiarity with the instrument	1

Appendix 14: Question 4 analysis

If you have any students who look mostly at their hands or try to memorise a piece before they are ready, could you give a brief outline of why you think they do this?

Code	Basic Description/Outline of the Code	Freq
E	Easier than learning to read notation	31
Pr	Proprioceptive difficulties	19
	Problems understanding the notation and executing it	14
Ear	Relying on their ear to play the piece from memory	11
K	Kinaesthetic elements and difficulties	7
KbdG	Lack of confidence with keyboard geography	7
D	General difficulties with notation	7
L	Laziness in learning to read notation	6
Conf	Lack of confidence overall in notation and proprioception	6
MT	Difficulties with multi-tasking	6
B->F	Difficulties in brain to finger messages	3
Keys	Recognising position of fingers on keys	3
Ignore	Not taking the teacher's advice	3
Sp	Lack of spatial awareness and spatial ability	3
Imp	Impatience, try to learn pieces quickly in any way possible	3
Str	Strengths in either reading or playing by ear	2
Ear Neg	Negative effects of playing by ear (believed by the teachers)	2
Inst	Lack of familiarity with the instrument	2
Tech	Prefer to use YouTube and online tutorials	2
AurMem	Use good aural memory instead of reading	2
Prac	Practice/Lack of	2
T	Lack of tactile skill	2
O'Conf	Over confidence that they know what to do	2
Aur neg	Not hearing whether the piece is correct when playing it	1
Aur pos	Aural skills much better than notation reading skills	1
MS	Lack of motor skills	1
C	Co-ordination	1
MusMem	Having a good musical memory	1
Busy	Busy score	1
MM	Using muscle memory to learn	1
Dys	Dyslexia	1
Ins	General insecurity with note reading	1
Intern	Deliberately internalising the music/notation	1
Method	How they have been taught before coming to this teacher	1
Trad	Playing without notation is traditional and correct	1
IntKbd	Not having internalised the keyboard layout.	1
Level	Trying to learn a piece above their level generally	1
Periph	Not having good peripheral vision	1
Patt	Use of patterns on keys rather than in the notation	1

Appendix 15: Question 5 analysis

If you have students who look mostly at their hands or try to memorise a piece before they are ready, do you find that this has any effect on other elements of their development as competent pianists?

Code	Basic Description/Outline of the Code	Freq
Slow	Slow learning	36
Mem err	Memory errors	27
Err	General errors	19
Unf	Piece remains unfinished	14
Rhy	Rhythmic errors	11
Fl	Fluency	10
Dyn	Lack of dynamics/articulation	8
Bear	Bearings (lack of idea where they are in the notation)	6
F	Use of incorrect fingers	4
Begin	Start from the beginning each time a mistake is made	3
S.Corr	Inability to self correct	3
Pauses	Frequent pauses and hesitations	3
Frust	Frustration (student and teacher)	3
Unmus	Unmusical playing	3
Neg rote	Negative effect of rote after a certain level (c. Grade 2)	2
	Inability to read the notation	2
Rdg	Not reinforcing notation reading and learning	2
Quit	Students cease instruction	2
Pr	Leads to lack of practice	2
MM	Reliance on muscle memory fails	1
Indep	Inability to learn new repertoire independently	1

Appendix 16: Question 7 analysis

If you answered Yes to the last question, could you outline what areas you believe are affected?

Effect	Freq
Sight-reading does not develop	45
Independent learning cannot develop	28
Rhythmic understanding does not develop	7
General reading avoidance becomes inbuilt	6
Inability to see the bigger picture of any piece of repertoire	4
Positive elements e.g. development of ear and good memory	4
Fluency and continuity do not develop	2
Efficient fingering is not developed	2
Good technique is not developed	2
A good ear does not develop	1
Co-ordination does not develop	1
Proprioceptive, kinaesthetic and tactile skills do not develop	1
Players continually lose their place in the notation	1

Appendix 17: Question 9 analysis

Please would you say briefly why you think the students should or should not keep their eyes fixed mainly on the notation?

Code	Basic Description/Outline of the Code	Freq
Def note	Overall students should focus on the notation	31
K	To develop their kinaesthetic knowledge	8
Lose pl	They lose place in notation if they don't follow it	8
Fl	Develop fluency	7
Pr	Develop proprioception/move fingers without looking	6
T	Develop tactile skill especially for intervals	5
S/Rdg	To improve sight-reading	5
Sp	Develop spatial awareness through recognizing notation	5
Depends	Depends on the pupil and the repertoire piece	5
KbdG	Keyboard geography development	5
Acc	To be able to play a piece accurately	4
VK	Develop visual-kinaesthetic ability	4
Ahead	Develop ability to look ahead	4
BP	Ability to see the "bigger picture" in the notation	4
Glance	OK and necessary to do occasional glances down	3
Story	To know what's coming next to prime the fingers	2
Mem Neg	To avoid remembering the piece incorrectly	2
Quicker	That reading notation makes it quicker to learn a piece	2
Mix	Recommends a mix of looking at notation and the hands	2
Aur	Develops aural image of the piece while looking at notation	2
MM	Develops muscle memory while looking at notation	2
Str	Individuals have different strengths	2
Cont	Learning to follow the shape of the piece	1
IL	Reading to develop independent learning possibility	1
Read first	Better to read piece and then memorise from notation	1
C	To develop co-ordination	1
	Improve notation reading	1
Neg	When too much hand-looking is considered negative	1

Appendix 18: Question 10 analysis

If you believe that students should look mostly at the notation when learning new piano pieces, please could you briefly outline what you have found helps to nurture this skill?

Code	Basic Description/Outline of the Code	Freq
H/C & E/C	Cover their hands/ ask them to play with eyes closed	38
T/Pr/K/VK	Develop a tactile/proprioceptive/kinaesthetic approach	11
Int	Teach by interval	6
Games	Notation quizzes and games	4
Patt	Teach pattern recognition	4
Remind	Remind them to look at the score	4
Sections	Learning very small sections slowly and patiently	4
Easy Rep	Keep giving easy repertoire to reinforce notation learning	3
Duets	Easy 5 finger duets to develop reading and proprioception	3
Rote	Using small sections of rote first	3
MM	Actively develop muscle memory	3
Non Kbd	Practise things away from the keyboard	3
Analyse	Analyse the notation before starting to play	3
Comp	Composition activities	2
Rh	Separate rhythm work	2
Follow	Use finger or pointing device to track notation as they play	2
Apps	Apps to develop note reading skills	2
S/Rdg	Use sight reading to develop notation fluency	1
Questions	Ask questions about the score	1
Naming	Ask students to name notes out loud	1
F/Cards	Using flash cards to develop notation recognition	1
Mem Game	Look at a part of the score then cover it and play	1

Appendix 19: Question 12 analysis and participant definitions

How would you define Musical Intelligence in terms of learning to play the piano?

Code	Basic Description/Outline of the Code	Freq
Mus	Musicianship / Musicality	16
Holistic	Innate, understanding of all the elements of music as a whole. Instinctive	16
Don't know	Respondents do not know/are unaware/do not understand	13
Aur	Good aural sense	11
Pr/Kin/T	Body awareness. Engage physically with the instrument.	6
Patt	See, hear, feel patterns	6
	Understanding of notation	6
Rh	Understanding of rhythm	4
Aud	Ability to audiate sounds (not notational audiation)	4
Aware	Awareness to listening. A felt sense of all musical elements.	3
Ear	Ability to play by ear	3
Str	Preferred learning strength	3
Im	Imagination	3
Sp	Spatial awareness	2
MT	Ability to multi-task	2
Prac	Finding good ways to practice	2
C	Co-ordination	2
Th. Sound	Ability to think in sound (like McPherson *et al*)	1
Div	Divided attention	1
Dev	Can be developed by the teacher	1
Implicit?	Interprets the question as an all-round musical education	1

Following are the in-depth definitions given by the teacher interviewees: their questionnaire responses and their interview responses.

Ref	Definitions of musical intelligence
#T3a	Questionnaire 'Musical intelligence is either there or acquired by correct training and practice. I go along with each student's abilities. Musical intelligence has nothing to do with one specific instrument'. Interview 'It's a combination thing. It's not just one thing. I think it uses the whole brain. You have to have multiple intelligences to be a good musician." Asked to apply her thinking in terms of reading and playing the notation simultaneously, she said: 'If you have a fantastic ear, sometimes, that's very rare, but you see people, they can hear something and play it instantly. So this kind of intelligence. I promote the reading also because if you want to play much more complex music, you need to read more. But I don't know what is musical intelligence. It's not one thing, I can't say it's one thing. A combination."
#T4b	Questionnaire 'The ability to make a musical 'performance' through whatever strategies possible.' Interview 'It's getting that idea of it not just being note by note, like the way you read a sentence is not the same when you understand the sentence, as like how a five year old, who might be able to sound out the words, they don't read that with any intelligence necessarily, so it's that I think. It's being able to read and play but in phrases, in units that make musical sense. …Yes, so it's getting them to do it, but in a meaningful way, not like how you'd train a chimp to do.' When I asked her, 'so you're talking more about musicality and expression as a musical intelligence?' She said 'Yes, and their understanding of it as well, even if they lack the technical facility to bring it off in a way that would necessarily express it well, that there's an intention there to do that at least'.
#T10a	Questionnaire 'Using a combination of skills (aural, rhythmic, note reading) consistently to make connections and create a pleasing performance'. Interview 'That's a tricky one because I don't really think that musical intelligence is always related to note reading. I think that musical intelligence is about playing in a really beautiful way rather than strictly reading the notes correctly, so I might have a pupil who can read the notes really correctly but doesn't actually play as beautifully as someone who possibly has a better ear and better technique.' Asked whether for her musical intelligence is representative of musically, she answered, 'Yes, I think so, and playing with expression, giving a good performance, a certain ability to read notes, I mean that is really important, and the confidence to go through a piece without lots of stops and starts, the overall effect I think.' She also added that, 'A really good ear [is important], the ability to listen to themselves and think, 'actually that's not right, how can I make that better. And I also think a willingness to listen to lots of music outside the lessons as well'. A good aural senses is important to her. She also mentioned that she believed good technique is an important part too.
#T10b	Questionnaire 'The ability to use the whole of the body to play the piano and the senses to understand the written music and the awareness of how it should sound before the keys are struck'. Interview 'Well for me, it would be the ability to read a piece of music, no matter how slowly, and understand how it goes. Maybe to hear it in the head and have an understanding of how it goes, so that at least they're not afraid of it… So my thought of intelligence is, as we said earlier, to actually hear the

	music in your head'.
#T14a	Questionnaire 'Music must come from the heart as well as the head. An innate feeling for the rhythm and for the sound one makes'. Interview "' think it incorporates the whole, the different facets of your body from your hands to your brain and back down again, and musical intelligence requires you to facilitate both your hands to do something on a piano, which is really quite difficult, so I think musical intelligence is up there with the higher intelligences. If you can play a piano you're quite intelligent. To be able to just do that, to use both hands, and your hands to perform independently or together on sometimes quite involved pieces'.
#T16a	Questionnaire 'The best students in music can seem to apply learning skills across a wide variety of activities and seem to have a particular and similar approach to everything. Practical, analytical, patient, willing to stick at something'. Interview 'I don't know, it's difficult to put into words I think. It's, we're trying to give our students the level of intelligence that enables them to want to read a piece of music perhaps for the first time, and take it further, and play it in a satisfying way for them. And if you want to call that intelligence, yes, and even develop that. And if you take it back to the sight-reading examples we were talking about just now, I guess that's the skill of being able to look at something and either be able to hear it or be able to have an appreciation of what that's going to sound like, how it should be played. So it's the ability to read the musical language, I suppose, if we're talking specifically about notation, I guess'.
#T18b	Questionnaire 'Having a good understanding of the music they are playing, they can hear it in their heads when they are not playing it. A good awareness of rhythm, pitch, notation and aural'. Interview 'I think it's about understanding what it is they're hearing, and in some ways being able to internalize it and replicate it, but also if they're reading some music, being able to hear it in their heads'. By internalizing I think she means playing it by ear, picking it out on the piano.
#T21b	Questionnaire She hadn't understood the question and assumed it was about a rounded musical education. Interview 'I don't know if there's such as thing as musical intelligence, surely it comes form your music education what you know about music. From your own experiences, you know, it has to be taught, it can't really come out of nowhere.' She seems to hold teachers' methods as responsible for their students' musical intelligence: 'Well that's just down to the teaching, isn't it, you know, if students can't read notation it's the teachers' fault. …one [student] was on John Thompson Book 2, he didn't even know the note Middle C, but we can't say that he hasn't got any musical intelligence, he was just very very badly taught. I've gone in straightaway with the landmark notes and steps, and he can now read steps on the stave. I suppose he's smart, but he had to have the right input to be able to pick it up'.

#T24b	Questionnaire 'Specifically to 'notation', Musical Intelligence is about being able to study a set of musical score and deriving the components of that work so that one can match the right strategies to the right sections in order to interpret the score to the intentions of the composer or own musical intentions. However, it is important to note that 'notation' is only a slice in the elements that make up Musical intelligence'. Interview 'In my opinion, the following are the traits of someone who has musical intelligence: 1. Pick up a piece of unknown music (say in a book/shop/library) and is able to read/hum/hear it in the head and therefore make a decision on whether they'd be interested in it – without having to play/ hear it played first. 2. Listen to a piece of music and be able to recognise enough musical characteristics, to discuss and draw conclusions by associating to known music (e.g. "This reminds me of this piece composer, mood, style, etc."). 3. Draw on own skills to perform musically (be it by ear, improvised, or from notation) without injury to anyone or to the instruments. It's when they can independently look at a new piece of music and that they can interpret it without help from me'.
#T26a	Questionnaire 'The ability to coordinate multiple sensory perceptions into a unified purpose of creating organized patterns of sound. Interview 'In terms of reading, musical intelligence would be identifying patterns. I think it's the ability to connect something that is visual and make it aural, and to do it almost instantaneously…The trick is to play what you see instantaneously and that's incredibly difficult, and to do it musically.' Again his focus is on musicality. 'It's about the right balance between the right and left brain. I think that emotional side and that technical side, they must be married, and if one overwhelms the other, you can get either an unmusical performance, or perhaps that's musical but looks …not very consolidated, and I like a balance between the too I like a very effective structure, but very inventive and creative sounds/sound world – I like that kind of music. So that tends to be what I favour in my teaching strategies as well'.
#T31a	Questionnaire 'Ability to read note pitches and rhythms accurately or reproduce them by ear and to understand accenting and expression in performance to achieve expressive playing. It is also certainly about dividing the attention'. Interview Is quite vague, she talks about what she believes she can tell about each student from their trial lesson: 'And generally I can tell – some have definitely got a talent, some maybe not so talented but have got determination, and some, you think, they're probably going to give up quite soon or they're not going to come back'. Then when asked to be more specific about what musical intelligence meant to her: 'Well I think people can be trained to do that, and it's often those who are often just more intelligence generally that can cope with that more easily. And will apply themselves to doing it'.

#T34a	Questionnaire 'Ear & aural memory directs fingers, understanding chord shapes and tonality'. Interview 'Understanding phrasing, breathing, where the music is going' (Musicality).
#T35a	Questionnaire 'Too much to say here…' (which is why I probed in the interview and didn't get much more). Interview Suggested that musical intelligence, in terms of reading and playing the notation simultaneously, might mean looking at pieces from about Grade 3 onwards and seeing the structure, seeing musical shapes before they start playing it, combining rhythm and melody in the right way, to do both.
#T50a	Questionnaire 'An open awareness to listening, not just to music but to the world at large. A felt sense of all the elements of music. Body awareness and engaging with the instrument in a very physical way. Ability to see, hear and feel patterns. Imagination. Confidence in the teacher. Willingness to make 'mistakes' and to experiment'. Interview 'An ability to listen to and process sound, and to reproduce either form the music or from listening, along with an ability to create using sound. In terms of notation – An ability to take in small det and accurately translate it into physical actions on whatever instrument it is, the piano in this case. An ability to interpret what's written on the page and to reproduce that or reinterpret it yourself such that a listener would call it music'.

Appendix 20: Question 13 analysis

Based on your definition of Musical Intelligence, how do you develop this within your piano students?

Code	Basic Description/Outline of the Code	Freq
List	Listening	20
Sing	Singing	13
Mus	Developing musicianship	12
Aur	General aural work	7
Patt	Pattern recognition	7
Imp	Improvisation and composition	7
Rhy	Rhythm work	6
Str	Individual approaches – strengths, develop weaker areas	5
S/Rdg	Sight-reading	5
K	Kinaesthetic development	4
Ear	Ear playing	3
Aud	Audiation	3
	Notation development	2
Rote	Rote playing	2
Tech	Technique development	2
Chords	Develop understanding of chords	2
F	Use sensible fingering	1
Int	Internalising	1

Appendix 21: Question 16 analysis

Other comments added

Code	Basic Description/Outline of the Code	Freq
Tchr M	Comments about the teacher's method of teaching	11
Str	Comments on different strengths	8
Rote/Ear	Comments about rote and ear teaching	2
	Comments about teaching notation	2

Appendix 22: A Framework for Musical Intelligence

- Ability to think in sound (audiation), and a strong aural intelligence
- Ability to play by ear
- Sensitivity to pitch, rhythm, timbre and tone
- Ability to engage in active listening
- Ability to sing in tune
- Possession of excellent kinaesthetic, tactile, proprioceptive and spatial intelligences
- Musicianship and holism
- Ability to convey emotions and stories through imaginative playing
- intuition in terms of listening and understanding and for expressive playing
- Technical expertise
- A deep understanding or how to play the instrument in any way, either with notation, by memory or ear and make a beautiful sound
- Knowing and understanding the instrument well enough to improvise, create and harmonise
- Ability to transcribe an imagined melody and perhaps harmonise
- Ability to read notation
- efficient long-term memory

The words that incorporate all of these elements of musical intelligence are ‘deep engagement and understanding’, in the same way that the Puluwat sailors demonstrate in their craft (see Glossary), but the ear rests at the heart of musical intelligence.

Glossary

Audiation

A term coined by Edwin Gordon in 1975 and which he defines as taking place 'when one hears and comprehends music for which the sound is no longer or may never have been physically present' (1993, p.3).

Kinaesthesia

Relating to a person's awareness of the position and movement of the parts of the body by means of sensory organs (proprioceptors) in the muscles and joints (En.oxforddictionaries.com).

The ability to know where the parts of the body are and how they are moving (Dictionary.cambridge.org).

Kinaesthetic thought

Coined by Martin (1965, cited in Gardner, 2004, p.228), an internal feedback system or sense 'kinaesthetic thought', which Martin says is distinct from engaging in the physical act of conducting an activity because it relies on the memory of how that activity has been conducted before, and how it has felt within the body to execute the action. It is consolidated each time an action is executed, and then drawn upon when the action or a similar action is required to be completed in the future.

Notational audiation

Notational audiation is underpinned by having developed the initial ability to audiate and listen with understanding, and it refers to the ability to hear a piece of music internally whilst simply reading the notation, without someone having played it first.

Also defined as auditory imagery Brodsky *et al* (2003, 2008).

Also defined as 'the silent reading of musical notation resulting in auditory imagery involving kinesthetic-like phonatory processes' (Brodsky *et al*, 2003, p.610), where there is a concurrent physical sensation within the body, most likely the throat, which results from this form of imagination, and is somewhat like silent internal singing.

Proprioception

Knowing where the body is in space and how to move parts of it without looking at them first.

Puluwat Sailors (Intelligence of the)

I use here Gardner's excellent and succinct observation of the Puluwat sailors when he relates that 'The key to Puluwat navigation can be found in the arrangement of stars in the sky. To navigate among the many islands in their vicinity, the Puluwats must recall the points or directions where certain stars rise and set around the horizon. This knowledge is first committed to memory by rote, but then becomes absorbed into the intuition of the sailor as he spends many months traveling back and forth. Ultimately, the knowledge must be integrated with a variety of factors including the location of the sun; the feeling one experiences in passing over the waves, the alteration of waves which changes in course, wind and weather; skills in steering and handling the sheet; ability to detect reefs many fathoms down by sudden changes in the color of the water; and the appearance of the waves on the surface', (Gardner, 2004 p.202).

Rote teaching

Teaching a piece by imitation, without the notation, as opposed to ear-playing, which means playing a piece on the instrument without being shown visually, without

notation, simply relying on an internal aural image of the piece, either from an aural playing of something there and then or picking out a familiar tune on the instrument such as a folk song or seasonal piece.

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