



The musical development of visually impaired learners: A case study of a special needs secondary school

Phineas Magwati¹ & Philemon Manatsa²

¹Midlands State University, Zimbabwe

²University of Zimbabwe

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Abstract

Exceptional musicality in visually impaired musicians raises the challenging question on the existence of a link between blindness and musicality. This qualitative ethnographic case study informed by Ockelford's theory on blind musicians and Gardner's multiple intelligence model undertaken at a special needs secondary school, explored the musical development of visually impaired learners. Data collection was made through observations, semi-structured interviews and document analysis. Thirty-five [35] visually impaired learners, fourteen [14] boys and twenty-one [21] girls were purposefully sampled for exceptional musicality in choir, guitar, keyboard, marimba ensemble and solo mbira. Sixteen [16] low vision, eight [8] legally blind, and eleven [11] totally blind informants were purposefully sampled for their virtuoso performance on select African and western instruments. Evidence revealed that, audiation, kinesthetic and tactile knowledge contribute significantly to learner development of music skills. An acute sense of hearing is an important contrivance for visually impaired learners to construct the meanings of the world around them. An individual who are visually impaired or suffer loss of vision at an early age, re-wire to other senses particularly that of hearing to establish the identity of individuals and objects. A low vision hereditary trait in some participants was established. However, the study focus was not on the causes of blindness. Formal education and the home environment are significant factors in the creation of favorable conditions for the development of music skills in learners with visual impairment. Further research needs to examine the integration of emerging technologies in the quest for a better understanding of the development of music knowledge by visually impaired individuals. Collaboration with neuroscience with its interest in music processing by the brain and may specifically focus on visually impaired individual's musicality.

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Introduction

Visually impaired learners' rights to a comprehensive education, of which music is part, are similar to those of their colleagues with normal visual acumen. Holistic education includes participating in art, music and sport (Wong-Ming, 2005). However, visually impaired learners are at risk of 'social exclusion' from access to quality music education. Krahé and Altwasser (2006) contend that visually impaired children face problems like isolation, frustration and dependency due to disability. The consequences of visual impairment determine individual opportunities to make useful contributions to the community (Metell & Stige, 2015; Krahé & Altwasser, 2006). Aesthetics, anthropological, philosophy, cognitive and neurobiological sciences and numerous other fields provide reasons for the human need for music regardless (Gruhn, 2005; Reimer, 1995; Blacking, 1969).

Music is an inherited biological predisposition; unique to the human species (Blacking 1973:7). Coleman (2017) posits that music plays an important role in the education and development of not only able-bodied but critically more for visually impaired children. Empirical evidence lends credence to the positive effects of active participation in music on the cognitive, intellectual, personal and social development of children and young people (Wilde *et al.*, 2016; Welch and Ockelford, 2015; Hallam, 2010). Studies in the field of visual impairment confirm the use of the sense of hearing in place of that of vision by individuals born blind or who develop complications that lead to loss of vision (Castle, 2019; Park *et al.*, 2015; Molloy- Daugherty, 2013). Brain reorganisation occurs in individuals born blind or those who lose vision later in life; sound information is developed into a compensatory mechanism for the absence of sight (Castle, 2019; Wiśniewska, 2018). A neurological study by Amdei (2005) confirmed brain plasticity as a reaction to vision loss; sight control rewired to new functions, resulting in new cognitive abilities relying on sound. Music as auditory medium is more accessible to the visually impaired in terms of its reception as compared to visual stimuli. Visual impairment complicates life for affected individuals. Against the historical context of formal education and musical arts, participation was particularly prejudiced when compared to able-bodied counterparts. Time has, however, helped to reshape the attitudes of communities and families towards visually impaired individuals' chances of meaningful contributions to societal well-being. There is a better understanding of the importance of auditory perception as a default meaning construction-making mechanism in the absence of vision.

In the literature, exceptional musical aptitude in blind popular musicians in Zimbabwe and internationally is well documented (Magwati, 2013; Ribowsky, 2010; Tobin, 2010; Wan *et al.*, 2010; Evans, 2005; Gougoux *et al.*, 2004). The prevalence of accurate or absolute pitch among the visually impaired is confirmed in some studies (Wiśniewska, 2018, Dimatati *et al.*, 2012). Reimer (2003) cautions about the hazards of creating a definition of musicality that imposes "rigidity," preferring "musical intelligence" instead. In his words, a definition was important as "tools for thought, then a prescription to be followed slavishly" (2003. p. 203). Musical intelligence theory was proposed by Gardner (1983) among the other seven human intelligences. Ockelford's (2006; 2009) research on children with different visual impairment conditions established high levels of interest in music and aptitude in improvisation and singing. In a two-year study of the musicality of blind students, Welch (1988) concluded that greater hearing aptitude development in this group resulted from superior sensory sensitivity. Blind musicians have been prominent throughout history (Wiśniewska, 2018; Park, 2017). The development of high-level musical aptitude in the visually impaired occurs in different environments. Musical aptitude is recognised as an auditory structuring ability comprising exceptional tonal and rhythmic cognition (Karma, 2007; Gordon, 1998). Historically, children with special needs attended designated schools administered by missionaries or voluntary organizations. Chimedza (1994) observes that the Catholic Dominican Sisters; the Dutch Reformed Church (now Reformed Church of Zimbabwe) established the first special needs schools in 1947 focusing on the



deaf. The latter, later opened Margaretha Hugo School for the Blind, commonly referred to as Capota in 1927 (Zvobgo, 1990); the site of the study. It is important to acknowledge the historical milestone marked by these developments in missionary activities aimed at providing education for people with disabilities. However, this approach perpetuated a foundation based on academic segregation (Darrow, 2015). A shift to inclusivity has since developed to allow learners with special needs to learn with able-bodied peers. Special needs education (SNE) is designed to meet the needs of exceptional learners (Hallahan and Kauffman, 1994). This study treated visually impaired learners as exceptional due to their low vision or total blindness. This condition contributes to a deficiency in the affected learners' ability to successfully complete schooling and everyday activities (Spungin, 2002; Panda, 1997). While these limitations may be experienced in other curriculum subjects, visually impaired learners are often not significantly hindered in developing music skills critical to meaningful participation in the discipline. These include composition, creativity, dance, improvisation, listening, instrument playing, and singing. Ockelford (2011); Gougoux *et al.* (2004) assert early blindness as a common factor in developing superior music skills. The home and school environment significantly support children born with special developmental needs like blindness. Burke & Sunderland (2004) emphasised the role of increased knowledge about disabilities; Rahi and Dezateux (1998) propose that knowledge about visual impairment as critical for planning, provision, and evaluation of educational and health services for affected children. A correlation between exceptional musical aptitude and musicality as compensation for visual impairment is confirmed in some literature (Rorem & Ahissar, 2009; Wan *et al.*, 2010). Research interest in the existence of a link between visual impairment and musical development has increased over time.

This study sought to explore and describe strategies applied by visually impaired learners to develop music skills. Research findings draw tentative conclusions and make recommendations for future investigation.

Method

This qualitative ethnographic case study involved interaction with visually impaired learners at a special school for the blind in Masvingo Province. Growth and display of exceptional musicality by visually impaired learners comprised the case. Document analysis, observations, and semi-structured interviews were used for data collection. Primary and secondary learners combine music theory lessons and ensembles at the institution. The playing of instruments was the main skill used to assess exceptional musicality. This term refers to musical sensitivity and talent in terms of both aptitude and training effects of visually impaired learners. Reimer (2003) cautions about the hazards of creating a definition of musicality that imposes "rigidity," preferring "musical intelligence" instead. In his words, a definition was more important as "tools for thought than a prescription to be followed slavishly" (2003, p. 203). Musical intelligence theory was proposed by Gardner (1983) among the other seven human intelligences. Over four weeks, data were collected through active participant observation of learners during solo and ensemble performances on selected African and Western instruments and choral singing. This was done after we were given green light by the school authorities, with all ethical considerations observed.

Observations of nine participants were undertaken during marimba ensemble playing. Performances were based on arrangements of three Shona folk tunes *Chemutengure*, *Manhanga* and *Taireva* Interviews conducted during lessons with the music teacher sought advice on appropriate language during conversations and knowledge of pedagogical issues; with the learners the development of insight into the participants' sentiments on musical knowing. Document analysis was carried out to saturate the data from which an understanding of policy provisions and implementation issues would be developed. Zimbabwe Education Act [Chapter 25: 04], Disability Act [Chapter 17: 01], The Primary



Music Syllabus [2003] and teachers' records made up the set of documents analyzed. Transcriptions of data from the observations, semi-structured interviews and document analysis were used to explore the existence of a link between visual impairment and exceptional musicality. Data was analysed based on themes built from intersecting areas drawn from observations, interviews and document analysis. This included key and note, identification, playing skills and level of musicality demonstrated by visually impaired learners.

Results

The results suggest that explaining the significant prevalence of exceptional musicality in individuals with visual impairment is plausible. The absence of sight at birth or loss at some point in life induces a process of reconfiguring the brain. An acute sense of hearing takes over as a mechanism for developing knowledge of the world. Research has provided insight into this argument. Audiation, environment, creativity and improvisation, kinesthetic/ tactile sense, and musicianship emerged as significant themes indicative of the musical development of a group of visually impaired learners. The melodies of these tunes act like an organic cell. Arrangements and adaptations are created from this cell; the soprano marimba surrogates the melody while tenors play harmonic variations, and the baritone and bass provide accompaniment. Sopranos and tenors started by playing the C major scale ascending and descending using the rolling technique; baritone and bass established the tonic, subdominant and dominant notes. Observation of the participants focused on performance techniques, improvisation and variations.

The performance of the tunes by the participants did mirror high levels of music skills, with nine demonstrating slightly superior musicianship. Marimba and mbira arrangement pieces are rooted in oratory; their transmission from generation to generation has been through rote learning (Wade, 2004, Campbell, 1991; Nketia, 1982). The melody provides a point of departure on the marimba in developing infinite variations. Audiation, a term coined by (Gordon, 1989, 1971), means mentally hearing and comprehending music; also described as 'inner hearing'. This is a designated part of the brain carries out a cognitive process which research has shown. Two participants, John and Hastings, playing soprano and tenor, demonstrated greater dexterity and quicker ability to create and improvise their own variations while managing to return to the theme melody. This was interpreted as an enhanced ability to audiate, a cognitive process of assimilation and comprehension of music (Gordon, 2007a, 2006).

Further performance observations extended to solo *nyunganyunga* mbira exhibitions by Enock and Hastings. Picking octave notes before playing a piece exposed knowledge of pitch as an important element of music by the latter. Hastings illustrated exceptional musicianship by performing his adaption of *Mahororo*, a piece from the Mbira *nhare* repertoire. Absolute pitch cognition is confirmed in (Wiśniewska, 2018; Ockelford, 2013; Dimatati *et al.*, 2012); the prevalence of the phenomenon is reported in (Wiśniewska 2018; Ockelford *et al.* 2011). Chords for harmonic construction and melody lines can be played on marimbas and mbira. Performances on both instruments demonstrated that participants understood the use of both elements in creating variations, improvisation and assertion of musicality. Sustained use of broken chords or split notes was a dominant preferred technique Tafadzwa used to create interlocking melodic lines on marimbas in his performance.

Kinesthetic and tactile sensibilities were evident in the performance on both African and Western instruments. Guitar performances by Hastings and keyboard by John and Ownster were advanced and skillfully presented. Realising that the guitar was out of tune before playing and quickly tuning the instrument, was an act Hastings executed with confidence and a show of music knowledge. Tuning the guitar with or without a tuner is a serious problem for many aspiring players. Pitch cognition is a critical skill to achieve accurate tuning (Gordon, 2007a, 2007b). Ockelford (2013)



concluded that, sound was an important channel for collecting information, communication, learning and recreation. Kinesthetic and tactile senses were noticeable in selecting corresponding tuning pegs for the out-of-tune strings. A better illustration emerged with the playing and moving the left hand on the guitar arm to different positions. Precise note-picking and coordinated strumming by the right hand demonstrated musicianship. Singing was added to guitar and keyboard accompaniment with considerable ease by the participants. Participants held and felt the black and white keys on the keyboard, eventually leading to a knowledge of intervals, pitches and scales. Brothers Ownster and John and Enock were outstanding to virtuoso level on the keyboard, playing block chords and their arpeggio forms.

Creativity and improvisation were shown in the performance on all the instruments. Gordon (1989) contends that creativity cannot be taught. Relevant instruction and the quality of the musical environment are important factors in developing musical aptitude. Improvisation, a creative activity (Azzara, 2010), was evident in observations of performances on different instruments in ensemble and solo contexts. The two brothers' creative and improvisation skills can be attributed to a conducive and supportive environment. Both inherited their visual impairment condition and had early exposure to music performance from their father, a known keyboard player. Early experiences in a musical environment may explain the two brothers' exceptional musicality. However, Wan et al. (2010) in their study expressed some scepticism on the notion of superior auditory capabilities in visually impaired individuals being explained by early musical experiences.

On the other hand, Enock's skills and levels of musicality were not linked to early exposure; instead, it appeared more as a sign of a link between visual impairment and music talent. Overall, male participants demonstrated advanced performance techniques on guitar, keyboard and marimba as individuals. The observation exposed the need for improved coordination and refinement of ensemble performance, particularly on the marimba. At a time when gender equity has become a topical issue, the girls in the study preferred choral singing to the other instruments. Whether this reflected traditional cultural attitudes towards girls' participation in musical activities was an issue, the study did not probe. Gender differences and preferences in instrument performance have been the subject of some studies (Hallam *et al.*, 2008; Agak, 2004).

Interviews with the music teacher, multi-instrumentalist brothers, John and Ownster, and Hastings assisted in establishing insights into learners' musical development. The process was also important to clarify issues not adequately answered by the observations. Asked about the approach to teaching of instruments, the music teacher offered the following response: *"I make use of the demonstration method on a one-on-one approach. It is rote; the school does not have Braille music software."* The answer helped to reinforce the importance of audiation on the part of learners for them to cope. At the same time, it exposed the need for specialised equipment and technology to mitigate skills development among learners (Agbenyo, 2021). Knowledge of scales on the different instruments was seen as critical in developing musical sound. Resources were another key area where the interview sought to understand the institution's role. The teacher expressed these sentiments: *"Music instruments are very expensive. Only the school can afford these. At the moment, there are enough instruments for the solo and ensemble activities."*

Learners were allowed to provide insight into the development of their music skills. John, earlier seen as exhibiting exceptionally advanced musicianship on keyboard and marimba, shared his development trajectory: *"I am partially blind, born with low vision like my father. Also, my two brothers and sister."* Asked how he could play marimba so well he responded: *"I used to play keyboard at home, this helped me to understand how an instrument produces musical sound. I first play the scale, the arrangement on*



the marimba is similar to the keyboard." Comments by John reinforced the significance of both the home and school environments in nurturing music talent.

Hastings, born with partial vision, lost sight after developing some complications, explaining his guitar skills, saying: *"I used to play an improvised guitar at home when I was still very young. When playing the guitar, I rely on sound or string arrangement."* The comments align with findings by Ockelford (2013); auditory instincts play an important role in developing music skills in visually impaired children.

These policy documents, the Zimbabwe Education Act [Chapter 25: 04] and Disabled Persons Act [Chapter 17:1], make provisions for the education of people with disabilities from early childhood to tertiary level. The education act states, 'every child in Zimbabwe shall have the right to school education; not be discriminated against by the imposition of onerous conditions regarding admission to any school' on any grounds. The analysis revealed that the disability act was focused on the terms of reference for the director of disabled persons. However, items 8, 9 and 10 reinforce the provisions of the latter act. Prohibition of denial of access to and discrimination against disabled persons on any matter are offences. Participation of disabled persons in education, including music education, is a constitutional right. The primary school music syllabus further reinforces the rights of quality music arts education. All the policy documents have created a good environment for the development of music skills by all learners. However, the syllabus's curriculum does not provide for learners with special needs. Teachers are tasked with determining appropriate content and activity specifications for learners with various disabilities, such as visual impairment. Analysis of the teachers' schemes and plans revealed shortcomings in the statement of robust and realistic aims and objectives, complemented with appropriate content and activities. The lesson plans repeatedly stated the oral-aural approach to teaching and developing learners' musicality. The effectiveness of oral transmission of musical arts has been a cornerstone in African music for generations.

Discussion

Informed by Ockelford's "zygonic theory", which proposes Exceptional Early Cognitive Environments (EECEs), an inference from the results suggests that visually impaired learners in this study relied on sound to navigate daily activities and life obstacles. However, the intellectual capabilities of the blind are like their sighted counterparts; with the appropriate support, it is possible to develop their innate musical capacities. From this premise, sound discrimination is a pre-requisite skill for blind learners to relate and interact with their immediate environment. The results confirmed Ockelford's (2011) proposal on the realisation that the visually impaired process sounds in both musical terms of absolute pitch and musical structures on instrument scale arrangements. The tendencies were noted as the participants primarily identified the root or fixed home keynote and played scales on marimba, mbira, keyboard and guitar as arpeggios or broken chords and melodic surrogating. Improved pitch discrimination in visually impaired individuals is an important survival tool, contributing to the development of exceptional musicality. Ockelford (2011) points out that those blind children who largely experienced onset blindness early in life exhibited exceptional levels of pitch detection. Similarly, in this study, participants who developed these setbacks demonstrated advanced virtuosic performance skills and a greater understanding of musical sounds.

Visually impaired individuals develop a superior sentience of pitch to make sense of the world around them (Ockelford, 2011). The ears reconfigure such that the world is seen through the ears. Ockelford and Mattawa, 2009; Ockelford, et al 2006, note a proportionally high intuitive cognitive awareness of sound in blind children. Over reliance on audio or sound and tactile skills by the visual impaired learners makes the development of listening and manipulative skills a pre-requirement for survival (Sohlberg 2003; Shipp 2004; Kim 2012). Sensitive listening and tactile skills form the basis of making enormous contributions to the development of exceptional musician. The two brothers and a



colleague with advanced performance skills had a head start in musical experiences which allowed the growth of a deeper understanding of music. Singing and instrument playing both require good sound discrimination. Blind people rely on sound discrimination for their majority activities and life experiences. Gordon (2007b, 2007d) concluded that learning sequence activities were essential for tonal audiation and rhythm audiation development. Musical development hinges around improved and better audition. The exceptional musicality of visually impaired is also informed by Gardner's multiple intelligence theory. Levels of technical proficiency in the cohort help to establish an inextricable link between vision loss or low vision and musical intelligence. It also emerged that, spatial, musical and bodily-kinesthetic knowledge played a critical role in the musical development of the learners.

The results showed that the music teacher relied on rote learning one-on-one. In a way oral transmission resonates with the traditional African method; it has proven effective historically. However, this prevents learners from acquiring the ability to read music notation. | The unavailability of Braille music exacerbated this problem. Reading music is one of the goals of modern music education. The problem of lack of assistive sensory devices and other technologies is not peculiar to this institution but might be widespread in low- and middle-income countries.

Conclusion

This study, located in the context of music arts education, implies that the home and school environment reinforce the acquisition and development of music skills by all the young, including the visually impaired. All humans are endowed with an innate capacity to acquire music knowledge. Enculturation experiences can foster or prevent the realisation of musical potential regardless of the individual physical status. The application of auditory perception by visually impaired individuals to make meaning of the world around them is consistent with many research findings. Sound discrimination plays a pivotal role in the lives of the visually impaired. It works as a cognitive implement, compensating for the loss of vision. Blindness at birth or early vision loss has been associated with improved sound discrimination, hence significant musicality among this group. While the findings align with other studies' findings, some areas warrant further attention. First, since the investigation was confined to one special needs institution, future research studies must examine inclusive music education contexts starting from early childhood to the tertiary level. Educators at all levels require sufficient training in the latest pedagogies that blend traditional and technology-based approaches. Second, exploring alternative teaching approaches developed for the peculiar needs of visually impaired learners deserves some consideration. The ability to read music remains critical in modern music education it provides access to a wide range of music literature particularly on the Western canon. The study recommends exploring possibilities of acquiring and training in using Braille music and other alternative software through partnerships. Future research should collaborate with other disciplines that seek a better understanding of brain functions in individuals with visual impairment.

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