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Mind the technology gap: A case study of music engagement during the COVID-19 pandemic

Ana Vernia Carrasco[1] and Victoria Tischler[2]

[1] Universidad Jaume I, [2] University of Exeter

Article Info.	Abstract
	People aged 65 and older outnumber children under the age of five across the globe. Data from the United Nations indicates that the growing aging population is not living better. Conditions such as dementia, stroke and Parkinson's disease are increasing with few effective treatments available. Psychosocial approaches to improve care are therefore urgently needed. Use of music in the care of older people is becoming common with a growing evidence base indicating positive outcomes such as reduction in anxiety, elicitation of memories, and improved communication. During the COVID-19 pandemic technology has provided the primary means of communication and service provision. This research used a case study approach to explore the impact of using WhatsApp during the pandemic (March - May 2020) to send daily videos and songs with and without musical accompaniment, plus tutorials for writing and singing songs. 27 people aged 60-87 years in Castellón, Spain took part. Of those, 12 were interviewed using a semi-structured approach. Data was analysed qualitatively using *QuestionPro* software. The results indicated the importance of musical activity in their lives and the difficulties experienced in using technologies including WhatsApp and GoogleMeet. Whilst participants valued the WhatsApp sessions they were not able to replicate the advantages of performing musical activities in person. In conclusion, technologies can help older people to remain connected to musical activities however training and support is required to facilitate effective engagement. This is likely to be an issue beyond the pandemic, for example for those who are geographically isolated or frail and unable to attend music activities in person. Nevertheless, new technologies support pseudonormality in musical activities for older people, providing an interactive platform when in-person contact is not possible.

1. Introduction

This study builds on a growing body of work documenting the potential of the arts to impact positively on health and well-being (APPG, 2017; Fancourt & Finn, 2019) and considers this in the context of the COVID-19 pandemic where the use of technology has replaced face-to-face methods of delivering arts and health activities. This section addresses three topics: the use of technology by older people; the advantages that technologies provide to this population; and, thirdly, the benefits of musical activity in older people.

2.   A technological gap - older people

Research indicates that social isolation and loneliness have a negative effect on health and wellbeing among older people (Khosravi, Rezvani, and Wiewiora, 2006).

According to Maya Álvarez (2008), the digital gap is understood as the difference in access to the internet, social networks and other technological tools such as mobile phones or computers, and their relationship with socioeconomic differences. This concept of a digital divide represents the differences between people who can access technology and those who cannot. The concept of digital literacy is also important, referring to competencies, skills or abilities for the management of technology.

Regarding the types of digital divide, Maya Álvarez (2008) identifies 3 types: a gender gap where differences in access to technology are established between males and females; a territorial gap, where there are differences in usage between rural areas, municipalities and large cities; and, a generation gap where differences are manifested by age, with the youngest citizens being the most connected to technologies, decreasing as age progresses.

As Morales Romo (2016) points out, there is much research related to older people and quality of life. The conditions that facilitate a good quality of life include functional skills, economic conditions, activity, social and health services, the quality of one's home, satisfaction with life, and cultural and learning opportunities. New technologies are integral to achieving these conditions. Therefore, it is considered that people who cannot access technology also have less opportunity to create the conditions required for improving the quality of their lives. This creates a digital divide, indicating technological inequality between people that can be exacerbated by living in geographical areas such as rural locations where access to technology is more difficult, for example, people in rural areas may have poor internet access.

A study by Mitzner et al. (2018) identifies that older people require skills and resources, without which they will face different impediments or barriers. These authors refer to technology as an important source of support. The strategy for aging in the 21st century in the UK, according to Godfreya and Johnson (2009) promotes active citizenship, with new technologies required to improve access to information and to increase social networks. They point out that interactive online media can create new forms of exclusion for some older people. A recent report (Centre for Ageing Better, 2021) noted that skills and confidence in use of technology must be considered, alongside access to it.

López Moraleda (2014) identified that the digital divide will be a new cause of exclusion for older people. Through the different studies cited by this author, the importance of new technologies for older people and the need for their digital literacy can be better understood. Although it is said that older people are not interested in technologies, we do not know if this is due to a lack of training or information or their own abilities and capacities to use them. Furthermore, Millward (2003) explained that the lack of internet skills in older people appears to be just one reason for their lack of interest.

Studies such as that of Lorence and Park (2006) reveal the inequality between young people and older adults regarding the use of the internet to search for information, for example, as a potentially effective health resource. Also, the work of Van De Watering (2005) reveals positive impacts such as a decrease in loneliness when using e-mail, as well as protecting individuals against cognitive decline while working on the computer.

Taking into account the above evidence, without a digital gap the quality of life of older people would be improved if loneliness could be alleviated and cognitive stimulation provided, for example by engaging with tools that support contact with others remotely. This involves new learning that can improve social and personal relationships through being connected via digital media. Reducing the digital gap for older people is therefore important, not only to address social and educational exclusion, but also because of the benefits and advantages technology can provide to its users.

3.   Benefits of technologies for older people

The work of Nikou (2015) indicates a clear need to understand the role of mobile phones to improve the lives of older people with challenges in usage linked to physical and psychomotor issues. Abascal and Civit (2001) report the importance of mobile phones to facilitate communication in older people, as well as providing access to vital services, enabling security and autonomy.

Technology is considered an important tool in the context of gerontology (Grande et al. 2008). In their research, these authors point out that difficulty in using technology increases with age. This is due to a lack of interest, physical conditions such as poor vision, poor hearing, and poor manipulation skills due to joint or motor problems, and lack of training. Factors such as education, income, gender or professional occupation also influence use. Therefore, information and training, as well as easy-to-use design, should be priorities in enabling older adults to use technology effectively.

García and Rabasco (2016) indicated that new technologies can improve self-esteem and facilitate social integration. The authors propose that technologies can improve integration and communication in older people.

The use of online social networks, especially Facebook, has been noted to improve quality of life, reduce loneliness, and maintain family contact (Bell et al, 2013). However, these authors point out that use becomes more difficult as age increases.

Communication technologies such as mobile phones can help to improve the quality of life, socialization and independence, as well as the inclusion of older people, although it is reliant on technology training (Klimova, 2016). Further, Chopik (2016) considers that technology can improve and enrich the lives of older adults by facilitating personal relationships. Although there are few studies that directly assess the relationship between the use of technologies for social and physical and psychological health reasons, Chopik's work showed that the use of technologies was associated with greater well-being in older people.

4.   The impact of music on older people.

Music, beyond entertainment, can be very beneficial for older people. Hsin Chu et al. (2014) indicated that music can be viewed as a non-invasive and inexpensive therapy to reduce depression in older people, in addition to delaying the deterioration of cognitive functions, especially short-term memory. Along these lines, the work of Heui-Chuan et al. (2011) states that music, including group music interventions using percussion instruments, can be an effective and cost-effective approach to reducing anxiety and agitated behaviours in people with dementia and can improve their psychological well-being.

Raglio, et al. (2015) used music to reduce psychological and behavioural disorders related to neurological disorders and improve functional recovery. In their work, it is highlighted that music can reduce depression and anxiety, as well as improving emotional expression, communication and interpersonal skills, self-esteem or quality of life.

The work of Clair and Memmott (2008) shows how music can help reduce symptoms such as low mood, insomnia, anxiety and agitation. Additionally, music can provide physical and emotional stimulation; aid in the rehabilitation of people with heart disease, Parkinson's disease, and stroke-related disabilities; help in pain management; facilitate social integration, communication, and expression of feelings, related to anger and pain; and relieves the stress and tension associated with caring for older adults. Kemper and Danhauer (2005) concluded that music is widely used to improve well-being, reduce stress and distract patients from unpleasant symptoms, exerting direct physiological effects during experiences of e.g., pain or end-of-life care.

The subjective well-being of adults can also be modified using music, as a study by Jenkins (2011) reveals, in which music, among other arts, improved well-being in people aged 50 years or older.

Mammarella, et al. (2007) note that listening to Vivaldi's music was associated with improvement in the cognitive performance of healthy older adults, especially in two tasks of working memory, compared to others who were not exposed to music.

People with Alzheimer's disease were compared with healthy people in a study carried out by Palisson, et al. (2015). They reported that sung texts were better remembered, both in the long and short term, concluding that music facilitates learning and retention, highlighting the power of music as a mnemonic technique. Trombetti, et al. (2011) used Dalcroze's musical pedagogical methodology, in a randomised controlled trial (RCT), for 6 months, with the hypothesis that the rhythmic gait exercises used in Dalcroze, could reduce the falls of older people. Currently the Jaques Dalcroze Institute collaborates with a team of doctors, who prescribe rhythmic sessions for older people with psychomotor problems.

As Baird and Samson (2015) explain, there is clear evidence that people with dementia enjoy music, responding positively, even in later stages of the condition; therefore, it is considered that musical skills can help combat cognitive decline. In this sense, musical activities can be viewed as a non-invasive, non-pharmacological treatment.

In summary, a review of the existing literature indicates that the digital divide increases as we advance in age, although not all older people are excluded from use of technology. For older people experiencing a technology gap, social and educational exclusion is more likely. Therefore, effective use of mobile phones, social networks, or even being connected with family and friends is likely to improve the quality of life for all, especially for those who may be at risk of experiencing loneliness or isolation.

A number of authors highlight technology as an important resource for older people. In this sense, technology can facilitate access to active cultural participation such as musical activities, use of which has a range of benefits to older people's health and quality of life.

Although the study of Burcu and Emre (2020) was aimed at students and not older people, it was concluded that web-based distance education is not as efficient as face-to-face education. Especially in applied courses, the connection and technical problems experienced during the courses negatively affect the education process. It was demonstrated that there should be attendance requirements for distance education courses, that students with limited opportunities should be provided necessary technological support, and that students want to continue their education face-to-face in the post-pandemic period.

5.   The COVID-19 pandemic

The current study sought to address multiple issues. Firstly, older peoples' lack of access to and mastery of technologies; secondly, the impacts of changes in family contact; and, thirdly, the impact of interruption to their daily routines including cultural pastimes, especially activities like music that bring them direct physiological and psychological benefits.

5.1   Study Aims and Objectives

This study aimed to explore the opinions, attitudes and actions of a group of older people who had their regular musical activities interrupted by confinement due to the COVID-19 pandemic. The study aimed to address gaps in knowledge related to older people, quality of life, music and technology, in the context of the pandemic. The research took place in Spain, a country with the second oldest population in the world (González García, 2017). The individuals taking part had previously enjoyed regular participation in a musical group. The study supported remote access to regular music activities. It aimed to facilitate social interaction, as identified by Vaportzis, Giatsi Clausen and Gow (2017), and to

strengthen digital literacy in this group. It also aimed to identify any unmet needs for access to and training in technologies in older people.

The *objectives were to detail how technologies are used by older people in the context of creative practices, to describe the value of remote musical activity in older people, and to propose strategies that incorporate technologies in a musical group with older people.*

5.2   Design/method
Yin's case study design (1994) was used to explore a contemporary phenomenon within the current pandemic context. The case study is descriptive, using numerical data and free-text responses which were analysed using Excel.

5.3   Setting/Participants
Participants were drawn from a group of older people in Castellón, Spain who regularly participate in a vocal and instrumental ensemble, using the voice, some musical instruments (guitar, harmonica, accordion, bandurria and small percussion), and including movement and body expression for singers.

Before the pandemic, participants attended a weekly session in the Castellón region of Spain. This included musical expression, including bodily expression, music reading, singing, musical performance and composition, each one within their capability and adapted to the rhythms of processing in learning, skills and abilities of the participants.

When it became impossible to meet in person due to the COVID-19 pandemic, the participants were invited to attend adapted online music sessions (see Table 1) through WhatsApp.

WhatsApp was chosen as the platform, because participants indicated that they did not know how to use computers, did not have access to the internet, nor adequate Wi-Fi. Only a few participants (n= 4) were able to use computers and had a strong enough internet connection to access Google Meet. Most, however, used mobile phones; therefore, this was the only possible platform to maintain contact and share activities during the pandemic. Although some participants (very few) used facebook or Google Meet to stay in touch.

All agreed to participate, but as the project progressed, it became clear that some of them had difficulties using technology. The group therefore had to adapt to the change in activities caused by the pandemic. See Table 1 for adaptations to facilitate remote delivery.

5.4   Procedure
The study took place during the COVID-19 pandemic during March-May 2020, a period in which the participants had little or no access to new technologies therefore only a few could access virtual activities or contact the rest of the group. Observation and contact took place via WhatsApp, and only four participants were able to connect also by Google Meet. This arrangement supported continued interaction with the participants. A questionnaire was designed and administered by the lead author (described below), with 10 questions. Additionally, a semi-structured interview containing five questions was conducted by the lead author.

The questionnaire had two sections. Section 1 explored access to technologies. This included Wi-Fi, internet, WhatsApp, Skype, social networks, and computers. The second section explored any training, abilities or skills that the participants considered they had related to technologies.

Table 1.   Music session adaptations during the COVID-19 pandemic

Session	Description	Changes
Weekly synchronization.	1. Body tuning (body expression and movement) 2. Tuning of the voice. Coordination of voice, feet and hands. 3. Vocal expression. Selection of songs: attentive listening work, vocal and rhythmic coordination (body movements), and memory.	Exercises performed via WhatsApp (WA)
Every 15 days	- Musical reading and writing. Musical concepts related to sheet music. - Memory work, attention, fine motor skills.- Activity of synchronization and rhythmic group coordination.	Scores, writing and reading exercises sent via WA.
Each session (once a week)	Teamwork: collaboration and cooperation. - verbal reflections - Song proposals	Reflections, feelings, needs, shared via WA

Participants were given full information about the study, with agreement to take part given virtually. Contact occurred once a week during the study. In general, contact was made in the early evening, which was the usual time for face-to-face music sessions pre-pandemic.

Field notes were collected primarily using WhatsApp. This included information about the actions and reflections of the participants. Google Meet and, in a few cases, the phone was used if WhatsApp was not available and participants lacked access to any technology that used the internet or Wi-Fi. A short, semi-structured interview (see Figure 1) was conducted with a sub-set of 12 participants. This aimed to explore the mood of participants during the pandemic and what role music played in their lives. This interview used the Q*uestionPro* tool available online and, therefore, was not suitable for participants without access to the necessary technology.

Figure 1.   Important things during COVID-19
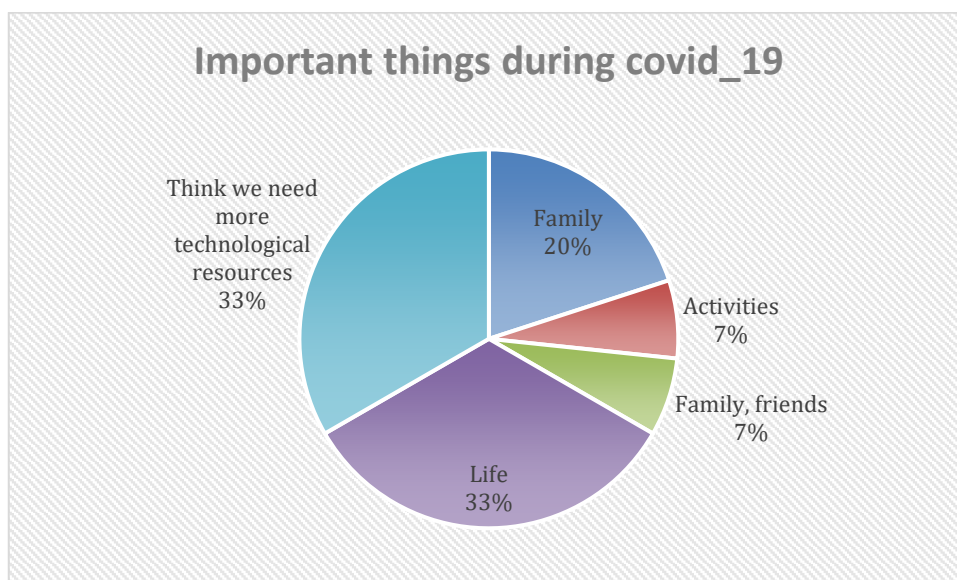
5.5   Sample

Our initial sample was n = 27 with ages ranging from 50 to 87 years and mostly female (21 women and 6 men). Of those, 12 attended virtual music sessions. This was due to the potential difficulties associated with virtuality and the lack of access to technology.

5.6   Results

The results indicate that there is a digital divide experienced by older people that prevents them from continuing their activities. As we can see in Figure 1, activities are 7% in importance, whereas the need to have more technology resources is 33%. Of the 27 participants, only 12 were able to answer the questionnaire. Half had access to WhatsApp and Wi-Fi, with only one having access to all technologies, see Table 2. None of the participants had received training to use technology. Most indicated that they required help to use the technologies, if available to them. Most only had access to a mobile phone, and in some cases found using this device complex.

Table 2.   Technologies available to participants

Number of participants	Type of device/platform			
	WhatsApp	Wifi	Computer	Facebook
1	0	X	X	0
2	X	X	0	X
6	X	X	0	0
1	X	X	X	X
1	0	0	0	0
1	0	0	0	X

Contact via WhatsApp decreased during the study. In the latter stages (last 3 weeks), participants tended to share their feelings and emotions, also sharing videos, images or music.

The interviews indicated that most participants (n=10), considered that their family and friends were most important to them. They also expressed that music brought them life, motivation, joy, serenity, and made them feel better. All considered it important or very important to continue connecting with their music group partners during the pandemic. It was acknowledged that issues such as shared rehearsals required effective use of technology that limited participation. Regarding technological resources, all considered them necessary, and most indicated that they required training to use them effectively.

6.   Discussion

Almost half the participants could communicate using technology, the rest only had access by phone. Not all participants had internet access, with good Wi-Fi or sufficient knowledge about new technologies, which meant that for those, the adapted music programme was not effective. The only reliable method of interaction was WhatsApp via participants' mobile phones. Our findings reflect the barriers and impediments, and in some cases, the void that exist in older people's use of technologies (Maya Álvarez, 2008; Mitzner et al., 2018). It is possible that our participants' quality of life, and opportunities for culture and learning were limited due to poor access to technology, especially as they reside in rural environments or small cities (Morales Romo, 2016). Most of our participants were able to connect with the music group using a mobile phone, thus facilitating communication (Abascal and Civit, 2001).

With respect to music, aligned with other findings e.g., Hsin Chu et al. (2014), Huei-chuan et al. (2011), and Raglio et al. (2015), participants considered that music was beneficial to them. This was reinforced by their wish to keep in touch with their group or to continue with the rehearsals.

The study is limited as we were not able to carry out activities (rhythmic and body expression, for example, walking to the rhythm of music) such as those reported by Trombetti, et al. (2011). Since the Dalcroze methodology also uses corporal expression and although it was attempted, it was not possible to do this via the mobile phone

Building on earlier research including that of Morales Romo (2016), Nikou (2015), Grande, et al. (2008), and Chopik (2016), showing that technologies help older people to be connected and reduce social isolation (e.g., Khosravi, Rezvani, and Wiewiora, 2016), the findings will be used to expand remote delivery of music interventions. This requires training in the use of technological resources as well as access to them for older people. Without this, the technological gap for older people will widen.

7.   Conclusions

The study, although small in scale supports the use of new technologies that facilitate pseudonormality in musical activities in older people, so that they can be performed even when social distancing is necessary during a pandemic. It also confirmed that, in the face of difficulties or adversities such as the pandemic, remotely delivered music interventions can be important in supporting the quality of life of older people, especially those living in remote areas.

Future research should focus on increasing digital literacy for older people and more robust studies of remotely delivered music activities. This includes provision of economic and human resources that facilitate digital training for older people and skilled facilitators who can adapt activities to be delivered online. Artistic and cultural activities, such as music and singing, and their active practice need to be easily accessible for older people, thus avoiding exclusion in future adverse scenarios such as a pandemic, when older people may experience loneliness and isolation. The benefits of music in improving quality of life can be promoted using new technologies; however, the inclusion of the most disadvantaged can only be ensured if they are digitally literate, have adequate resources, and have easy access to these technologies. More studies are needed to evaluate the effectiveness of new technologies in this context.

A future planned project aims to minimize or reduce lack of access to musical activities for older people firstly, by instigating a training plan for use of technology with older people living in a variety of settings, especially in understanding and managing the tools to participate in virtual meetings, and, secondly, by implementing remote music groups and activities that include singing, movement, and the use of instruments.

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Appendices

Appendix 1: questionnaire
- I have internet at home
- I have Wi-Fi only on the phone
- I have a computer, internet and good Wi-Fi at home
- I don't know how a computer is operated
- I know how a computer is operated
- I control new technologies
- I need help to manage new technologies
- I have Facebook
- I have WhatsApp and Facebook
- I only have WhatsApp

Appendix 2: New technologies have helped me to:
- Spend time better, being only could be connected to family, friends and colleagues in the group.
- That we are still capable of learning something. With outside help.
- We can communicate with family and also with friends, but it is taking a long time.
- It has helped me to be able to see my children and grandchildren
- It is something very useful for everything, to communicate to you knowing what is published and if I knew how to use it for more, but without help I no longer get more. They explain things to me and when I go to do it I no longer remember.
- Have fun with my children and my grandchildren.
- This is for young people
- It helps me to have security, to be able to get in touch with my children, friends, the public force, and with all of you.
- New technologies have helped us to facilitate communication.
- Reduce distances and also to be more controlled

Appendix 3: Short interview
- What was most important to you during the COVID-19
- What does music bring you?
- It would have been important to stay connected with your music partners
- Do you think you need more technological resources
- If the COVID-19 lengthens, what do you consider most necessary to continue in the music project