

**ERASMUS+ Project “Online Choirs: How to carry out virtual choir
rehearsals with the help of digital tools”**

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R2.4: Online survey among choir members and choral conductors

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Abstract

This document R2.4 is part of Work Package (WP) 2 (Creation of a common understanding of current state-of-the-art technologies, best practices, and challenges in online choir rehearsals) of the ERASMUS+ Project “Online Choirs: How to carry out virtual choir rehearsals with the help of digital tools”.

The activities in WP2 identified the state-of-the-art of online choir rehearsals from different perspectives. Informed by the findings from the market analysis of technology solutions (A2.2) and review of academic and non-academic literature (A2.3), in A2.4 a survey of choir singers and conductors was conducted to gain additional empirical insights into their experiences with online group singing and online choir rehearsals.

This document R2.4 describes the design and implementation of the questionnaire (R2.4.1) and the steps of data collection and analysis (R2.4.2). Furthermore, the main results (R2.4.3) of the online survey concerning the experiences of choir members and conductors with online choir rehearsals are presented.

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1 Introduction

The market analysis of technology solutions (A2.2) and the review of academic and non-academic literature on online choral singing (A2.3) have provided an overview of the drivers and barriers, the tools used, and the opportunities and challenges of online rehearsal. To gain a more comprehensive insight into online choral singing from the perspective of choir members and conductors, a survey was conducted in A2.4. This document describes the design and implementation of the online survey, the steps of data collection and analysis, and presents key findings from the survey, including tools used, musical aspects, social aspects, and perceived benefits and challenges of different technology solutions.

2 Overview of the questionnaire (R2.4.1)

A2.4.1 involved the design and implementation of a survey of choir members and conductors to gain insight into their experiences with online group singing and online choir rehearsals. The survey was designed based on the results of the market analysis of technology solutions (A2.2) and the review of academic and non-academic literature (A2.3).

In order to gain comprehensive insight into the experiences of each group, it was decided to create separate surveys for choral singers and conductors. An overview of the different parts, sample contents and related references of the survey for choral singers is given in Table 1 while the corresponding information for the conductor survey is shown in Table 2. As shown in Table 1 and Table 2, both surveys follow the same structure and have a similar flow. The parts “Experience in Conducting and Musical Background” and “Online Singing Experience (general)” of the conductors’ survey contain more questions than the corresponding parts of the choir members’ survey, in order to learn more about, for example, rehearsal techniques and support tools used in online rehearsals. The questions in the different parts are a mix of multiple choice, single choice, Likert scale, and open-ended questions (e.g., Schnell, 2019, pp. 65). The development of the questions was informed by related reviewed literature and existing scales (cf. Table 1 and Table 2).

The surveys were conducted in German and English using Qualtrics¹ which is widely used in academia for survey research and in industry to gain insight into customer and employee experience. Before the survey was launched, it was pre-tested by 10 people to ensure that the different parts and questions were clear and to identify errors in the questions and survey flow. This feedback was implemented before the survey was launched.

¹ <https://qualtrics.com/>

Table 1: Overview of the survey for choir singers

Block	Example contents	References
Welcome Screen (2 Questions)	<ul style="list-style-type: none"> Agreement to participate in the research project 	
Sociodemographic data (5 Questions)	<ul style="list-style-type: none"> Age Gender Country of residence Level of education 	(Henning & Vigl, 2021b)
Experience in (Choral) Singing and Musical Background (8 Questions)	<ul style="list-style-type: none"> Choral singing: e.g. age of joining a choir for the first time, number of choirs you currently sing in, number of years sung in choirs Musical background: Taking singing lessons, musical skills apart from singing (e.g. playing an instrument) 	(Henning & Vigl, 2021b)
Overview of your Choir (14 Questions)	<ul style="list-style-type: none"> Location of the choir Sponsor of the choir Repertoire Number of members Rehearsal mode 	(Henning & Vigl, 2021b)
Experience with Digital Media (7 Questions)	<ul style="list-style-type: none"> Use of the Internet Use of Web-Conferencing Systems Attitude towards technology and the Internet 	(Joyce & Kirakowski, 2015)
Online Singing Experience (branch) (3 Questions)	<ul style="list-style-type: none"> Digitally supported singing formats carried out 	(Daffern et al., 2021; Morgan-Ellis, 2021b)
Online Singing Experience (general) (14 Questions)	<ul style="list-style-type: none"> Rehearsal attendance Technology solution used Reasons for (not) attending online choir rehearsals Repertoire 	(Daffern et al., 2021; Morgan-Ellis, 2021b)
Online choir rehearsal (LLS+WCS) (10 Questions)	<ul style="list-style-type: none"> Low-latency software used Web-conferencing software used Features used Hardware used Perceived benefits and challenges 	(Daffern et al., 2021; Morgan-Ellis, 2021b)
Online choir rehearsal (WCS) (6 Questions)	<ul style="list-style-type: none"> Web-conferencing software used Features used Perceived benefits and challenges 	(Daffern et al., 2021; Morgan-Ellis, 2021b)
Non-participation in digitally supported singing formats (3 Questions)	<ul style="list-style-type: none"> Reasons of a choir / individuals for not joining digitally supported singing formats 	(Morgan-Ellis, 2021c)

Social Presence (4 Questions)	<ul style="list-style-type: none"> Perception of social interaction and social presence in online choir rehearsals 	(Weidlich & Bastiaens, 2017, 2019)
Temporal and spatial distance (3 Questions)	<ul style="list-style-type: none"> Perception of temporal and spatial distance in online choir rehearsals 	(Becker et al., 2021)
Closing (7 Questions)	<ul style="list-style-type: none"> Future potential for singing using digital tool Contact information 	(Boyd, 2022; Daffern et al., 2021; Morgan-Ellis, 2021a, 2021b; Morrison, 2021)

Table 2: Overview of the survey for choir conductors

Block	Example contents	References
Welcome Screen (2 Questions)	<ul style="list-style-type: none"> Agreement to participate in the research project 	
Sociodemographic data (5 Questions)	<ul style="list-style-type: none"> Age Gender Country of residence Level of education 	(Henning & Vigl, 2021a)
Experience in Conducting and Musical Background (14 Questions)	<ul style="list-style-type: none"> Conducting: e.g. number of choirs you currently conduct, years of experience as conductor Musical background: music degree, music-related profession, choir conducting training, played instruments 	(Henning & Vigl, 2021a)
Overview of your Choir (12 Questions)	<ul style="list-style-type: none"> Location of the choir Sponsor of the choir Repertoire Number of members Rehearsal mode 	(Henning & Vigl, 2021a)
Experience with Digital Media (7 Questions)	<ul style="list-style-type: none"> Use of the Internet Use of Web-Conferencing Systems Attitude towards technology and the Internet 	(Joyce & Kirakowski, 2015)
Online Singing Experience (branch) (3 Questions)	<ul style="list-style-type: none"> Digitally supported singing formats carried out 	(Daffern et al., 2021; Morgan-Ellis, 2021b)
Online Singing Experience (general) (31 Questions)	<ul style="list-style-type: none"> Rehearsal attendance Technology solution used Reasons for (not) attending online choir rehearsals Repertoire Rehearsal technique (e.g. elements in online rehearsals, supporting tools) 	(Daffern et al., 2021; Morgan-Ellis, 2021b)
Online choir rehearsal (LLS+WCS) (14 Questions)	<ul style="list-style-type: none"> Low-latency software used Web-conferencing software used Features used Hardware used 	(Daffern et al., 2021; Morgan-Ellis, 2021b)

	<ul style="list-style-type: none"> ▪ Perceived benefits and challenges 	
Online choir rehearsal (WCS) (8 Questions)	<ul style="list-style-type: none"> ▪ Web-conferencing software used ▪ Features used ▪ Perceived benefits and challenges 	(Daffern et al., 2021; Morgan-Ellis, 2021b)
Non-participation in digitally supported singing formats (1 Question)	<ul style="list-style-type: none"> ▪ Reasons of a choir / individuals for not joining digitally supported singing formats 	(Morgan-Ellis, 2021c)
Social Presence (4 Questions)	<ul style="list-style-type: none"> ▪ Perception of social interaction and social presence in online choir rehearsals 	(Weidlich & Bastiaens, 2017, 2019)
Temporal and spatial distance (3 Questions)	<ul style="list-style-type: none"> ▪ Perception of temporal and spatial distance in online choir rehearsals 	(Becker et al., 2021)
Closing (8 Questions)	<ul style="list-style-type: none"> ▪ Future potential for singing using digital tool ▪ Contact information 	(Boyd, 2022; Daffern et al., 2021; Morgan-Ellis, 2021a, 2021b; Morrison, 2021)

3 Data collection, preparation, and analysis (R2.4.2)

The survey data were collected in different rounds and with different samples (cf. Table 3). The first round took place in September 2023 with members of the Online Laboratory of the Christmas Project (n=35). While the singers participating in the projects of the Online Laboratory Choir were asked to fill out regular feedback surveys during the rehearsal phases (cf. A4.3), the survey designed in WP2 served as an initial survey for this group before the start of the respective rehearsal phases. The aim was to gain a comprehensive insight into the previous experiences of this group with online choral singing in order to be able to make comparisons with their experiences with the Choir@Home Online Laboratory Choir. Members who joined the Online Laboratory Choir for the Choir@Home 2.0 project were also asked to complete the survey in February 2024 (n=14). As for Choir@Home 3.0, this survey was not completed because no new singers joined this project.

Table 3: Data collection rounds

Survey	Sample	Time	#Participants	#Exclude	#Participants incl.
Choir members	Members of the Christmas Online Laboratory Choir	08.09.23-27.09.23	35	2	33
Choir members	Members of the Choir@Home 2.0 Online Laboratory Choir	02.02.24-21.02.24	14	1	13
Choir members	Choir members (open)	12.04.24-02.07.24	106	3	103
Conductors	Conductors (open)	12.04.24-22.06.24	35	3	32
Total			190		181
			#Choir members		149
			#Conductors		32

To gain insights from a broad user base and to reach the target number of 150 respondents, the survey was also publicly distributed and completed by choral singers and conductors not associated with the Online Laboratory Choir. To this end, links to the survey were shared through various channels, including social media platforms (e.g. Facebook, Instagram, LinkedIn; cf. Figure 1), via websites and mailing lists of choral associations in various countries (including the Fürstlich Liechtensteinischer Sängerbund, the Verband Deutscher Konzertchöre, the Chorverband Österreich, the European Choral Association; cf. Figure 2), Facebook groups related to choirs and (online) singing and music making (e.g. Chor.at, Chor-Netzwerk, Choir Directors, Jamulus Choral Community, Jamulus Official Group, Soundjack Group), online choirs (e.g. Sofa-Singers, Got2sing, Home Choir, Choir of the Earth, Viral Choir, Jamulus Chamber Choir), choirs (e.g. Frauenchor Dehcibelles, Philharmonischer Chor Nürnberg), research

institutions and universities (e.g. Stella Musikhochschule Feldkirch, Musikhochschule Leipzig), as well as with researchers identified in the literature review as prominent in the field of online singing. To specifically address conductors, the call for participation was also shared and disseminated through the World Choral Conducting Network (WCCN) and the Choir Directors Facebook group (Figure 3), for example.

In order to comply with applicable data protection and privacy regulations, participants were informed about the data processed in the survey and their rights on the welcome screen of the survey and were asked to agree to participate in the research project. A total of 155 people participated in the survey of choir members, 49 of whom were members of the Online Laboratory Choir and 106 of whom were not associated with the Online Laboratory Choir. The conductor survey was completed by 35 people. After excluding responses from participants who only started the survey, 181 valid responses remained (149 responses from choir members and 32 responses from conductors).

Further steps in data preparation included downloading the data from Qualtrics and merging the different data sets from the choir member survey into an Excel spreadsheet. The conductor survey data was also imported into an Excel spreadsheet. Answers to quantitative questions (e.g. multiple choice and Likert scale questions) were analyzed in an Excel spreadsheet, while qualitative open-ended questions were analyzed in a Word document from a technological, choral pedagogical, and socio-technical perspective.

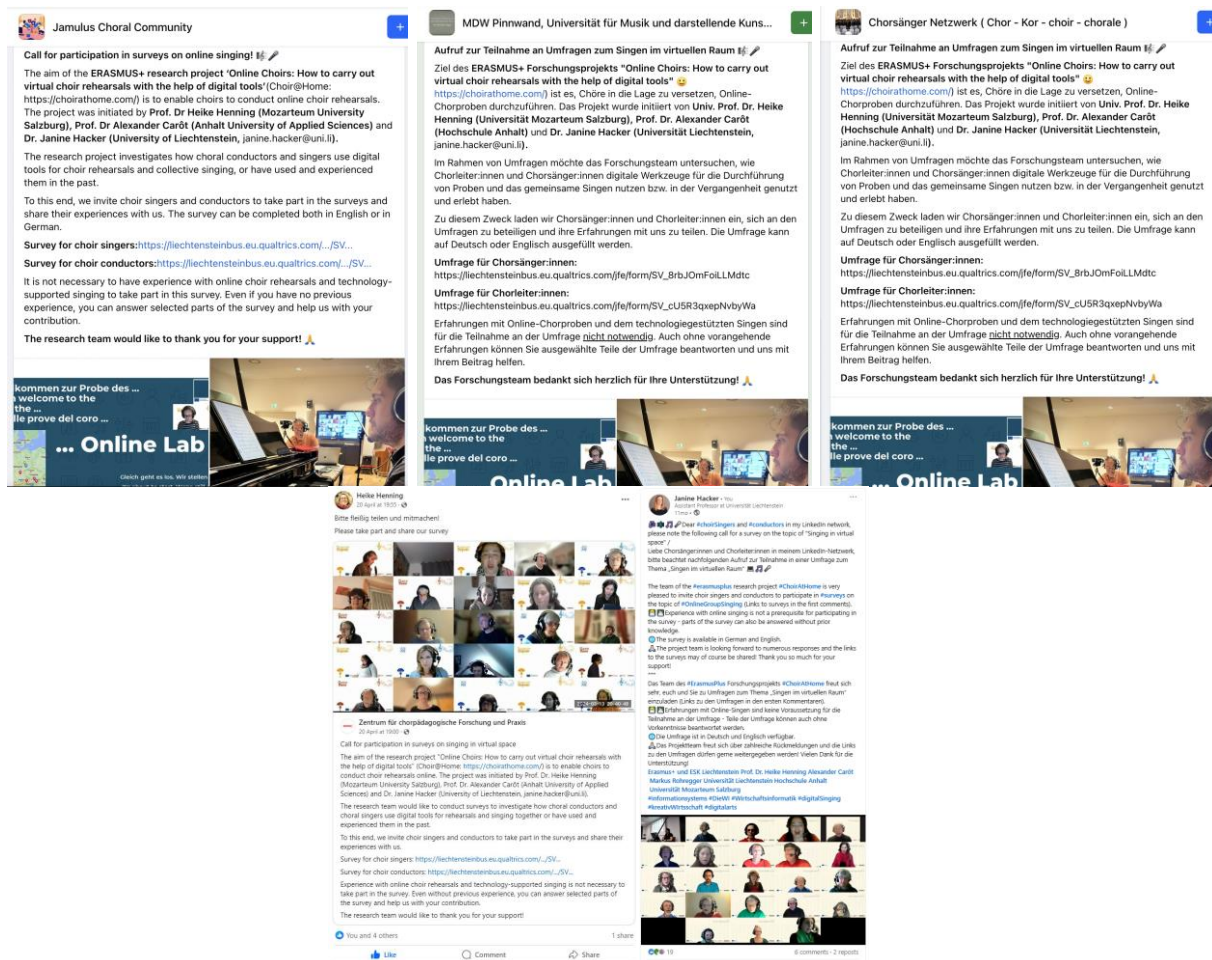


Figure 1: Social media postings of the call for participation in the survey of choir members

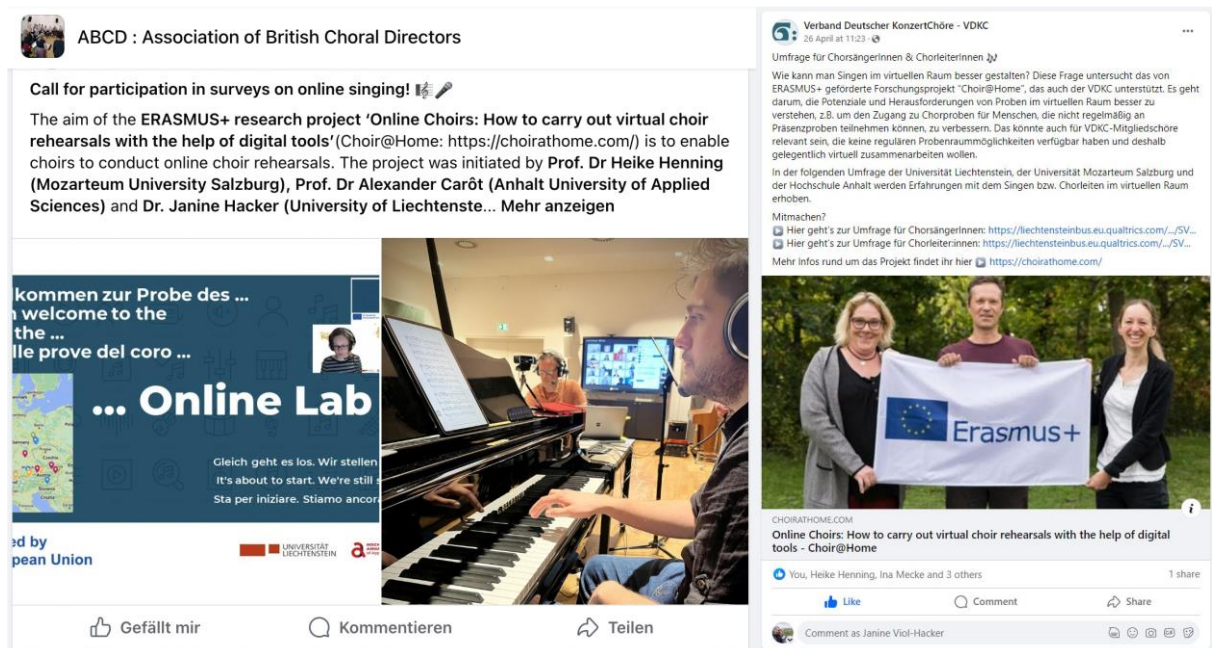


Figure 2: Social media postings of the call for participation in the survey by choir associations

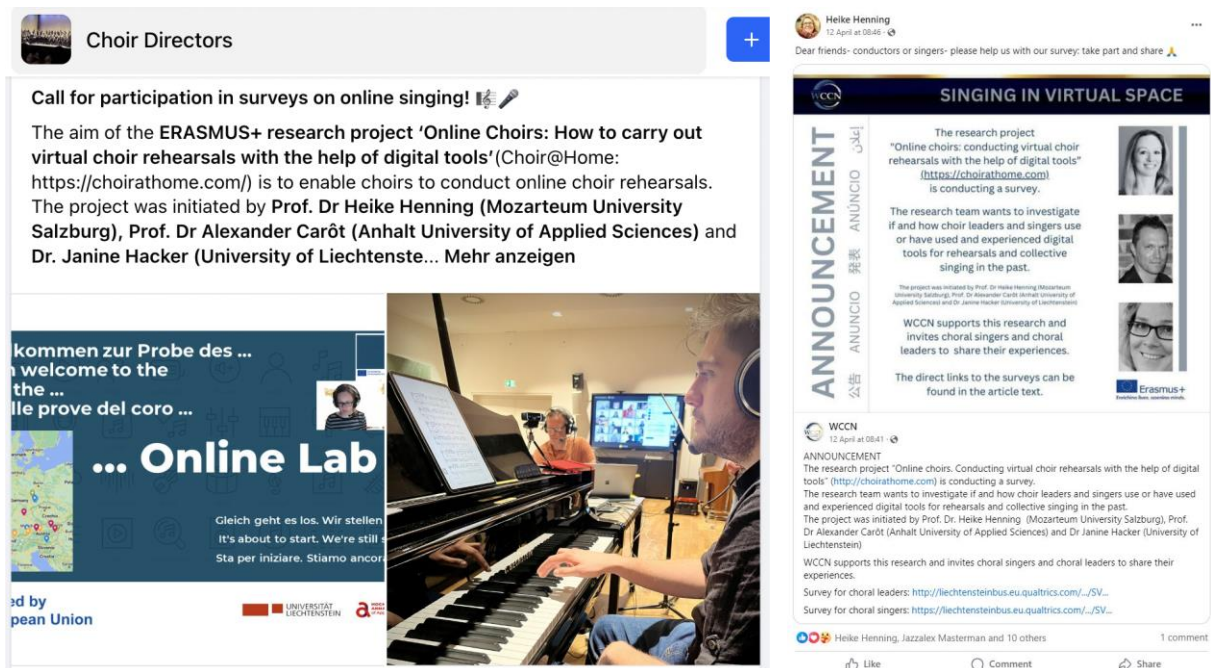


Figure 3: Social media postings of the call for participation in the survey of conductors

4 Findings of online survey among choir singers (R2.4.3)

This chapter presents the main findings of the survey of choir members. To provide an overview of the survey participants, sociodemographic data are presented in section 4.1. The results of the different parts of the survey are presented below, including participants' experience with choral singing, experience with digital media, and experience with online singing.

4.1 Sociodemographic data

The following figures provide an overview of the socio-demographic data of the respondents to the online survey of choral singers. As can be seen in Figure 4, most respondents are between 45 and 65+ years old. Furthermore, more than 60% of respondents are female (Figure 5) and most respondents have a Master's degree (Figure 6). In terms of country of residence (Figure 7), most respondents live in Germany, Austria and Liechtenstein. At the same time, people from several other countries, including Australia, Switzerland, the United States and the United Kingdom, participated in the survey and contributed to a diverse sample of respondents.

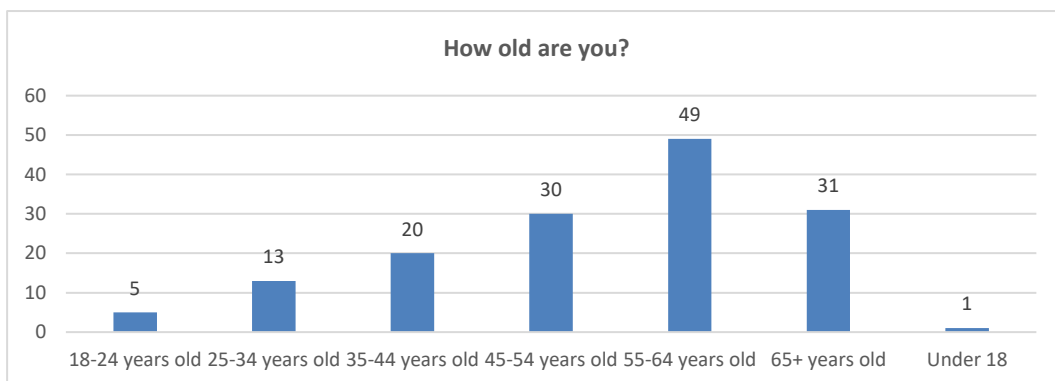


Figure 4: Age distribution (Choir members)

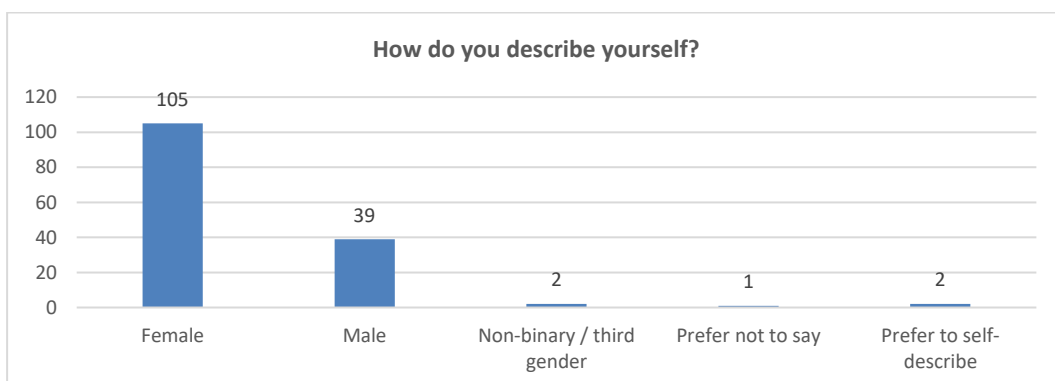


Figure 5: Gender (Choir members)

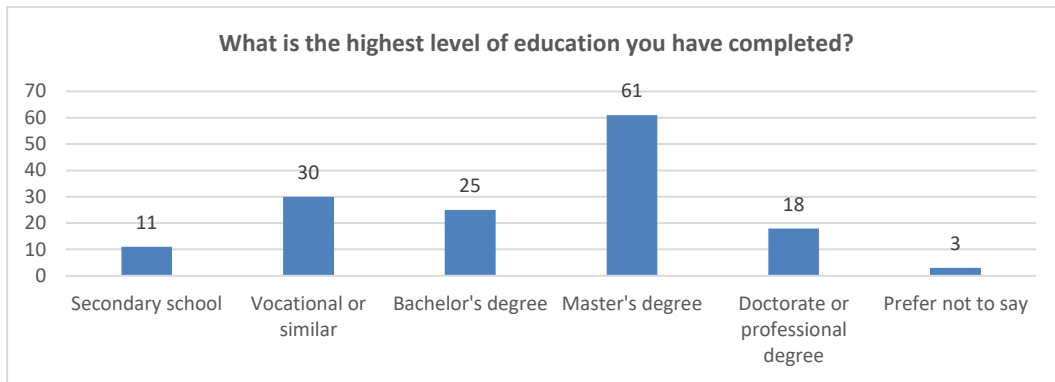


Figure 6: Highest level of education completed (Choir members)

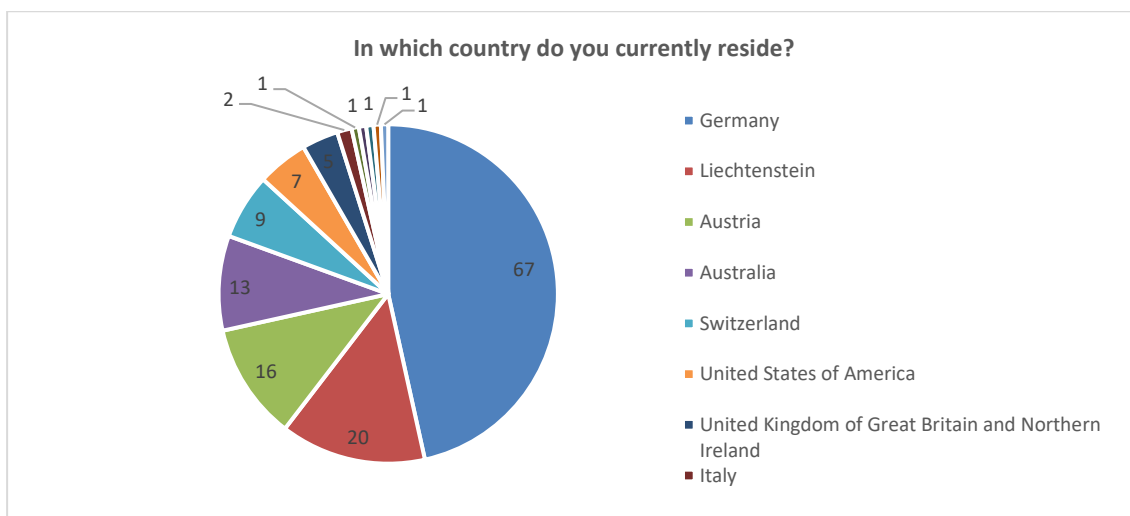


Figure 7: Country of residence (Choir members)

4.2 Experience in (choral) singing and musical background

This section of the survey asked respondents about their choral singing experience and other musical skills. As can be seen in Figure 8, most respondents currently sing in one or two choirs. Furthermore, most respondents joined a choir as a young child or teenager (Figure 9) and therefore have a long time experience of choral singing (Figure 10). Respondents also reported a wide range of musical skills beyond choral singing (Figure 11). Many mentioned piano as an instrument, with varying levels of proficiency ranging from basic knowledge to Diploma level qualifications. Other commonly mentioned instruments include guitar, including classical guitar, as well as flute, recorder and ukulele. Some participants play several instruments, such as piano, guitar, flute and ukulele in combination. In addition to playing an instrument, around a third of respondents are involved in solo singing and around 17% have conducting experience.

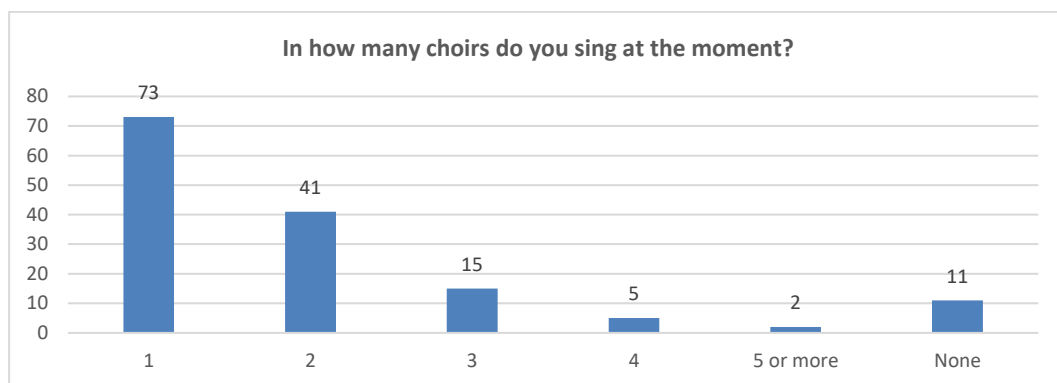


Figure 8: Number of choirs in which one currently sings (Choir members)

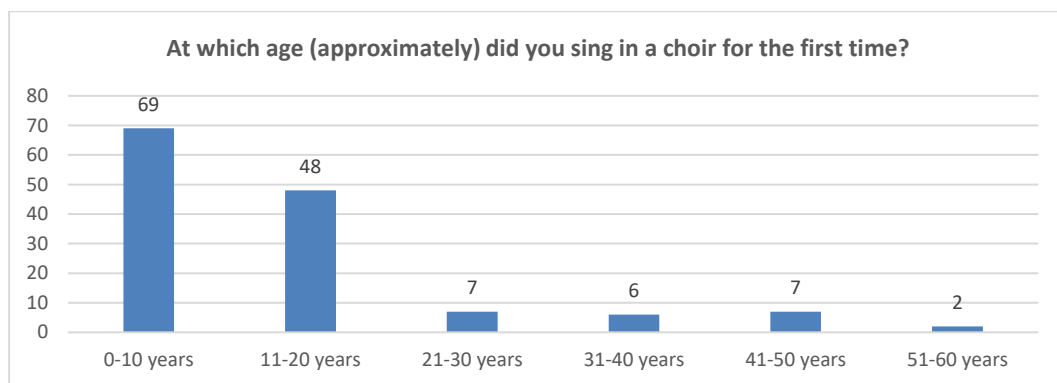


Figure 9: Age at which one sang in a choir for the first time (Choir members)

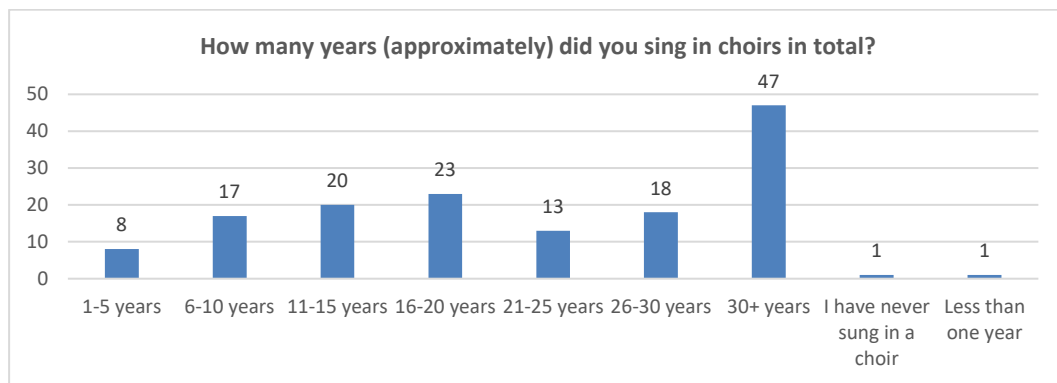


Figure 10: Number of years sung in choirs in total (Choir members)

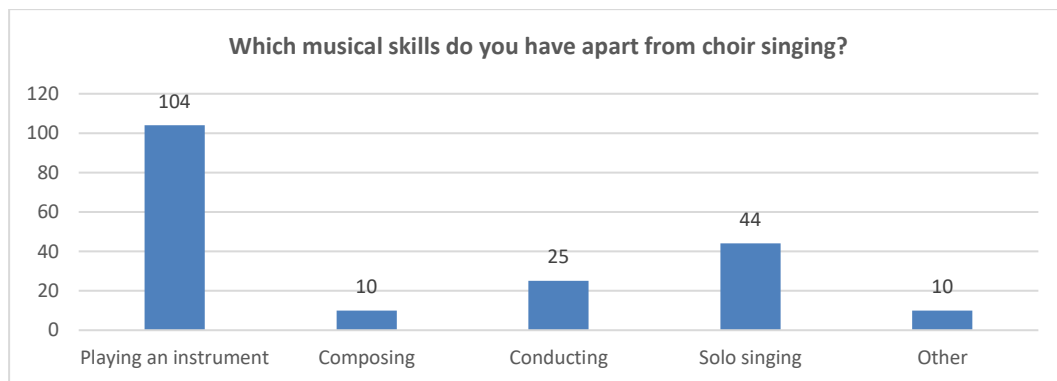


Figure 11: Musical skills apart from singing (Choir members)

4.3 Overview of your choir

This section gives an overview of the choirs of the respondents. As can be seen, most choirs are located in large cities or towns (Figure 12). More than half of the respondents' choirs are member-supported choirs, followed by church choirs (Figure 13). About 68% of the choirs are open to beginners, i.e. no or little singing experience is required (Figure 14). In terms of musical style, most choirs sing sacred music, classical music and pop music (Q64). Around 80% of choirs rehearse once a week (Q67). Almost half of the respondents have been singing in their choirs for more than 10 years, followed by 3-4 years (24%) and 5-10 years (16%). Figure 15 gives an overview of the respondents' motivations for singing in their choir. For most respondents, the most important motivation for singing is the joy of singing. This is followed by social motives, as well as the desire to improve singing skills, to improve physical and/or mental well-being, and to learn/sing a particular repertoire.

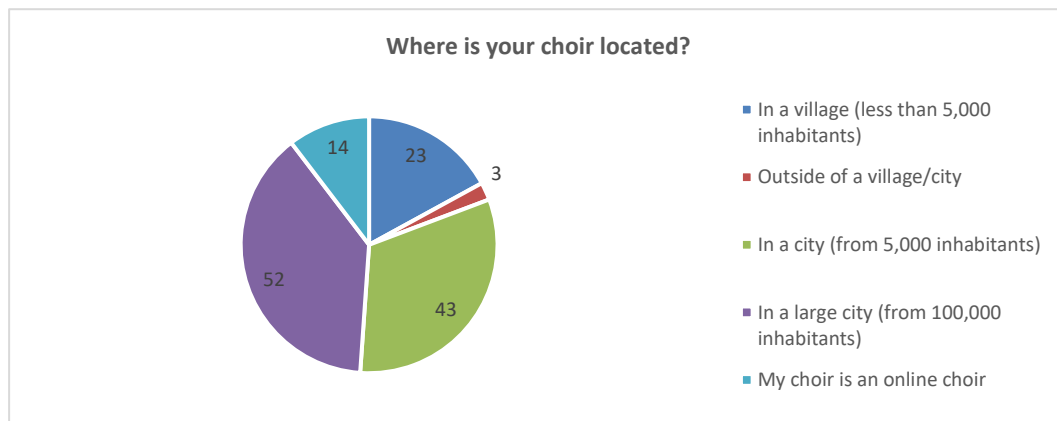


Figure 12: Location of the choir (Choir members)

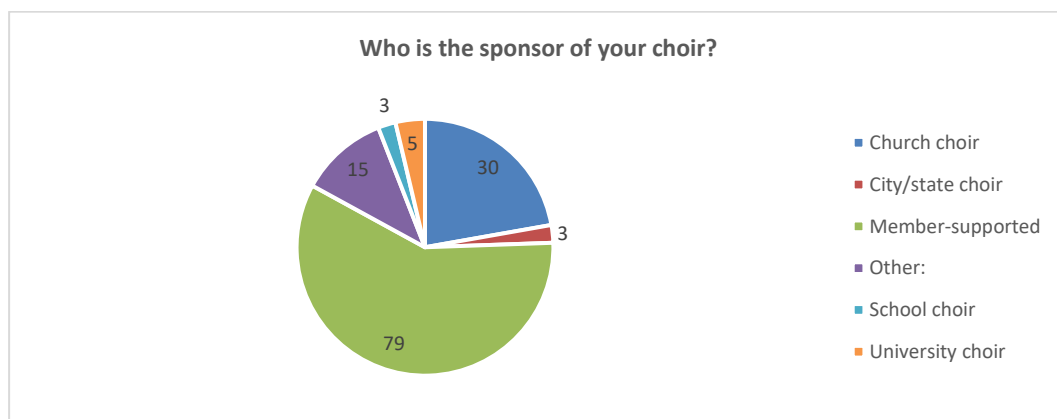


Figure 13: Sponsor of the choir (Choir members)

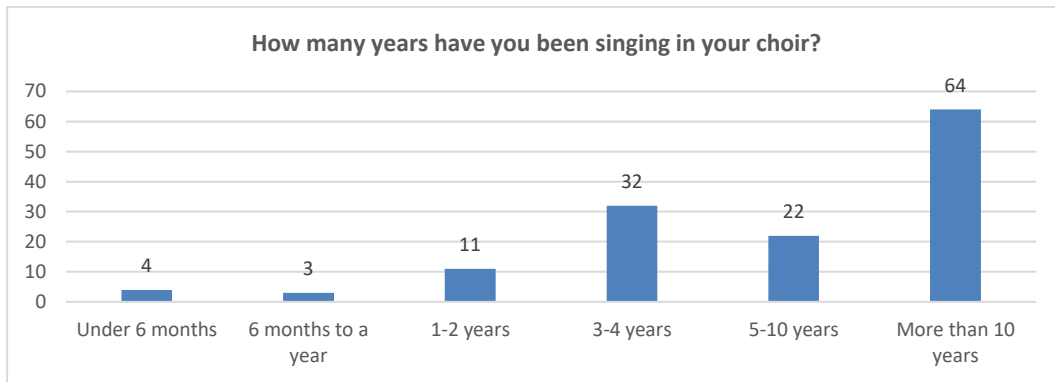


Figure 14: Number of years sung in the choir (Choir members)

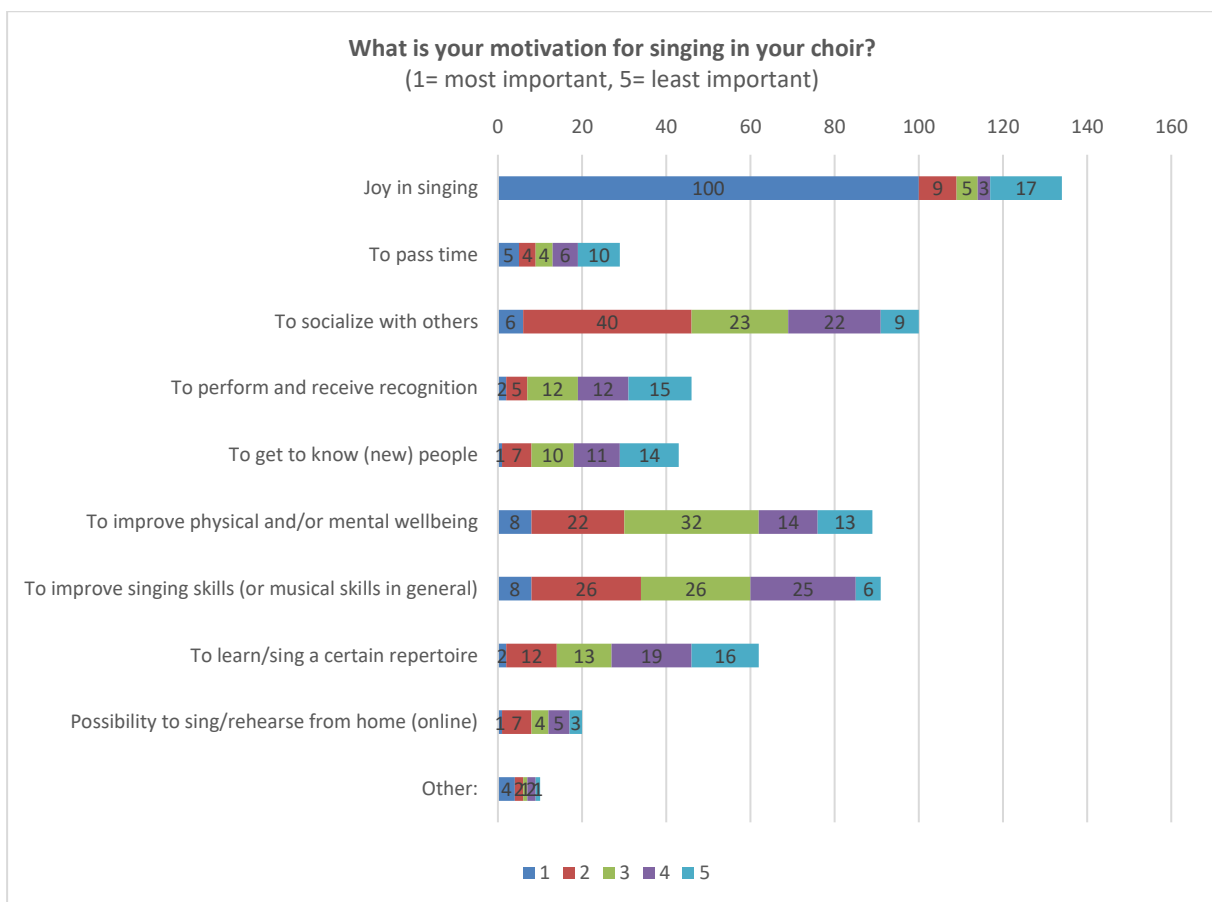


Figure 15: Motivation for singing in the choir (Choir members)

4.4 Experience with digital media

This section provides an overview of the respondents' experience of digital media. As shown in Figure 16, more than half of the respondents use the Internet more than two hours a day or between one and two hours a day. In contrast, respondents use web conferencing systems infrequently, i.e. once a month or less or once a week. In terms of respondents' attitudes towards the Internet and technology in general (Figure 17), most respondents have positive attitudes towards the Internet and technology, indicating for example that they are comfortable using the Internet and like to try out new devices. Finally, in terms

of respondents' experience with digital singing (Figure 18), more than half have participated in online rehearsals, about 40% have made virtual choir recordings, and about a third have made individual recordings. About 20% of respondents have not participated in any kind of digital singing in the last five years.

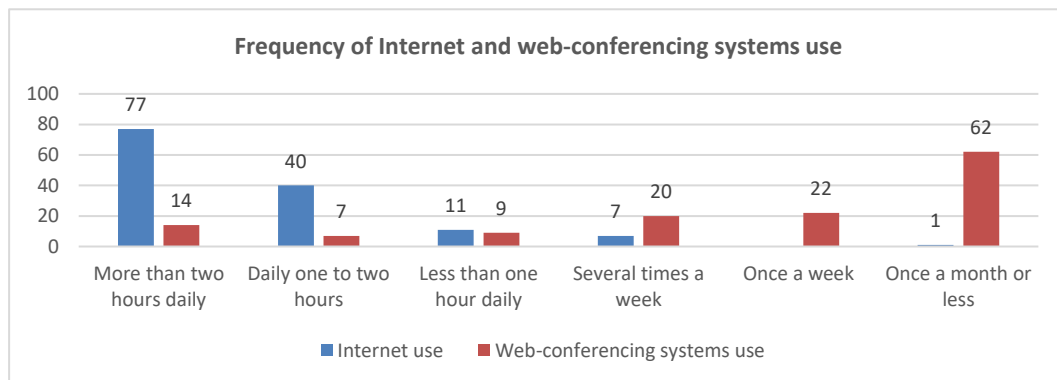


Figure 16: Frequency of Internet and web-conferencing systems use (Choir members)

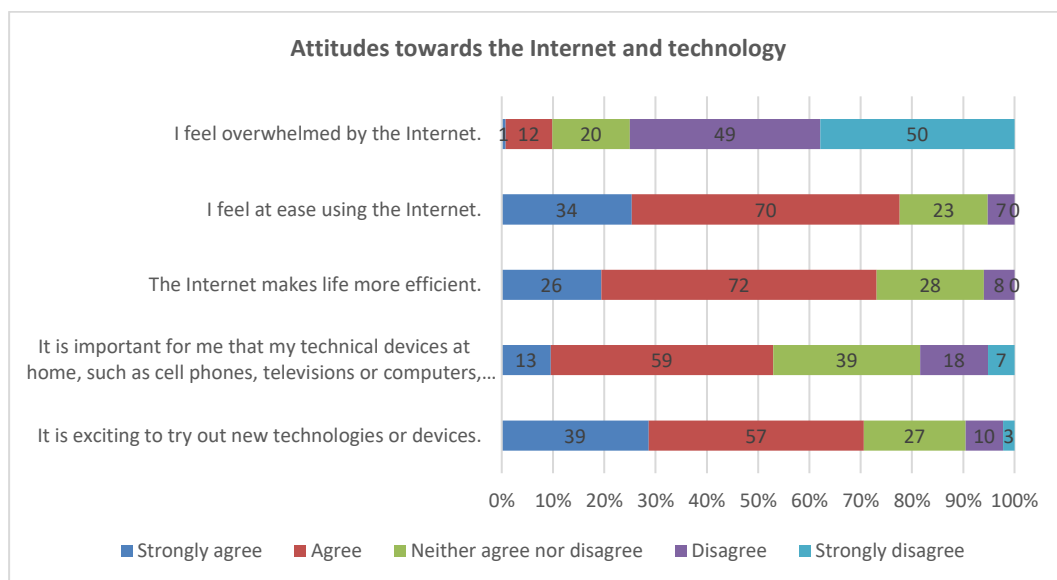


Figure 17: Attitudes towards the Internet and Technology (Choir members)

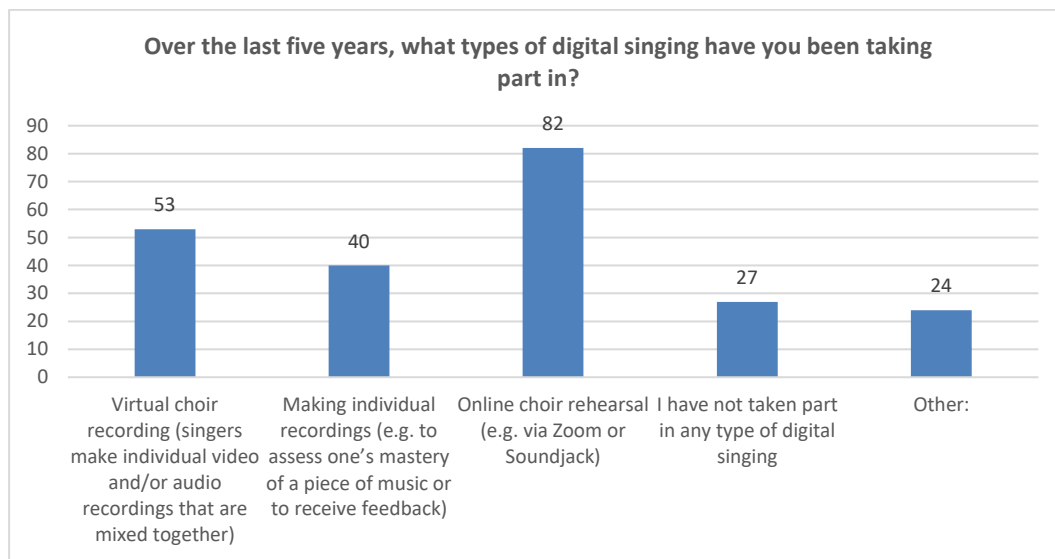


Figure 18: Types of digital singing one has been taking part in (Choir members)

4.5 Online singing experience

In this part of the survey, respondents provided general information on online choir rehearsals carried out by their choirs. The questions in this part of the survey were answered by 60 to 80 respondents, which corresponds to the number of survey respondents who have participated in online choir rehearsals (Figure 18).

As can be seen in Figure 19, the choirs of around 65% of respondents have used web-conferencing systems to conduct online rehearsals, followed by combinations of low-latency software and web-conferencing systems (around 20%). The dates of the first online rehearsals of the respondents' choirs correlate strongly with the beginning of the COVID-19 pandemic in March/April 2020, as well as with higher incidence rates in autumn 2020 (Figure 20). The last online rehearsal attended by respondents, however, does not show a clear trend, with dates spread over the last few years (Figure 21). 50% of respondents have attended at least 16 online rehearsals and 20% have attended more than 30 online rehearsals (Figure 22). About half of the respondents in this section report that their choirs now only hold face-to-face rehearsals. At the same time, 42% of respondents indicated that their choir still conducts at least some online rehearsals, such as online or hybrid rehearsals (Figure 23).

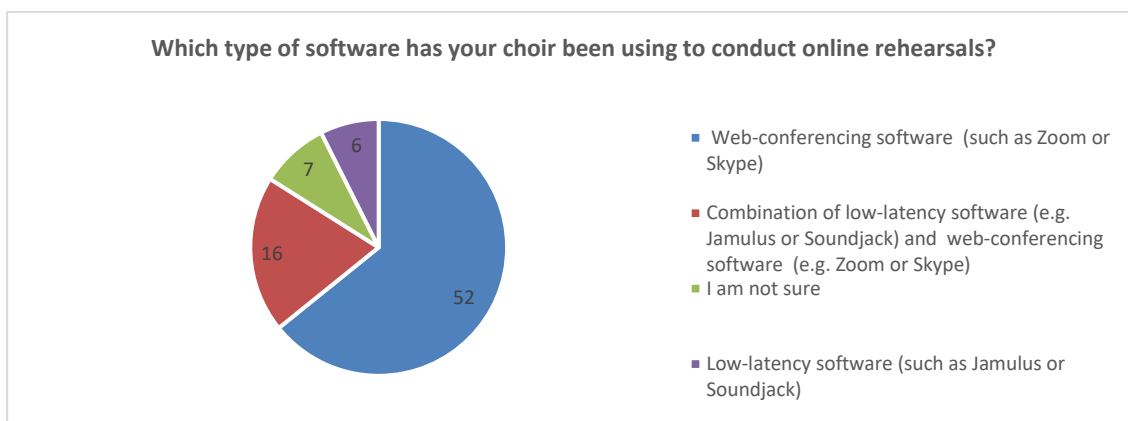


Figure 19: Type of software used to conduct online rehearsals (Choir members)

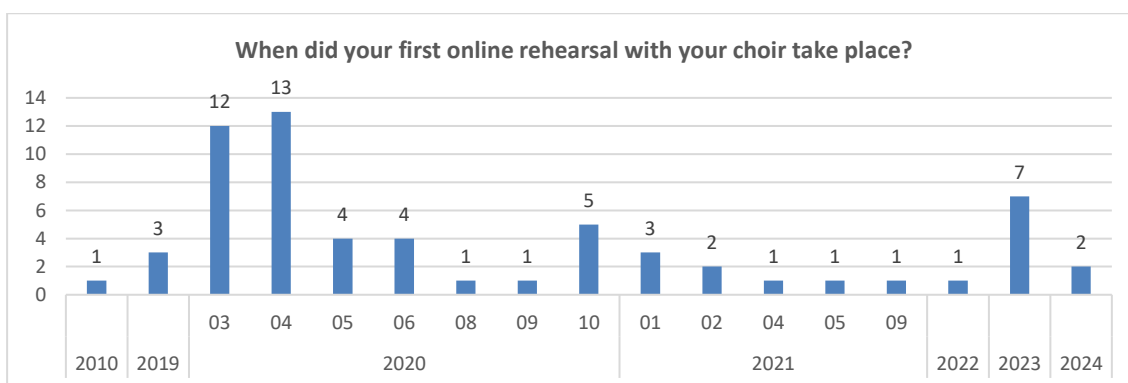


Figure 20: Date of first online rehearsal (Choir members)

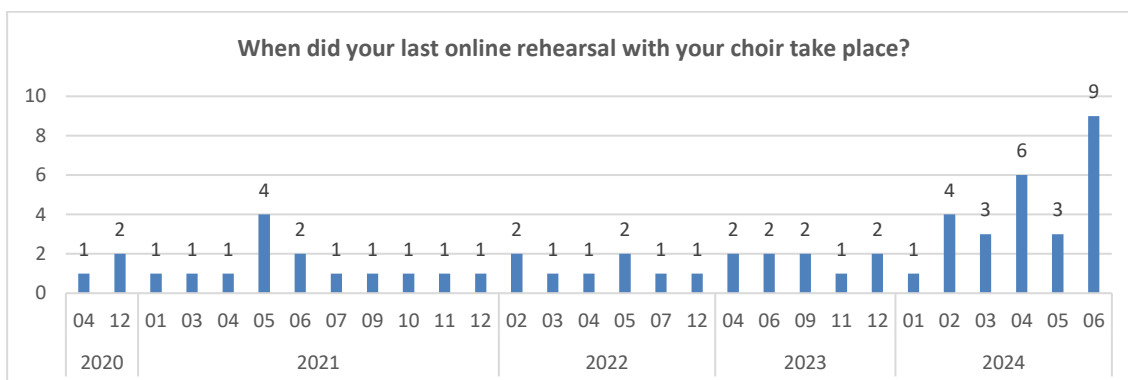


Figure 21: Date of last online rehearsal (Choir members)

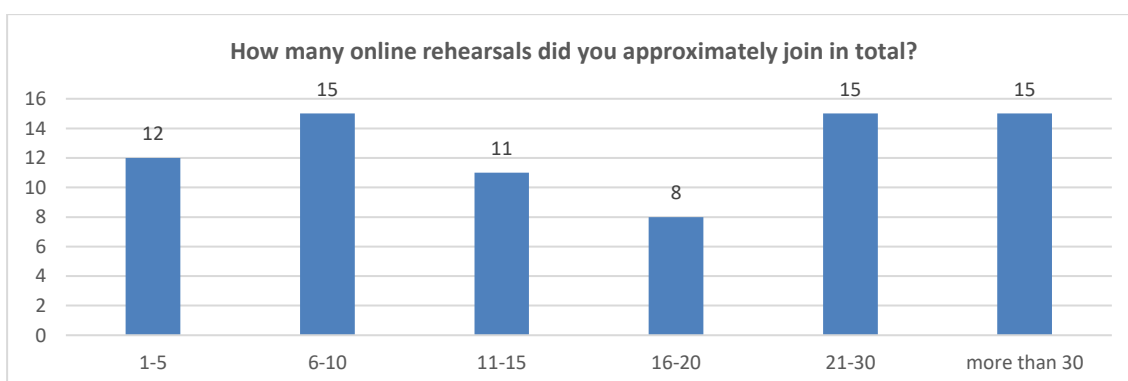


Figure 22: Number online rehearsals joined (Choir members)

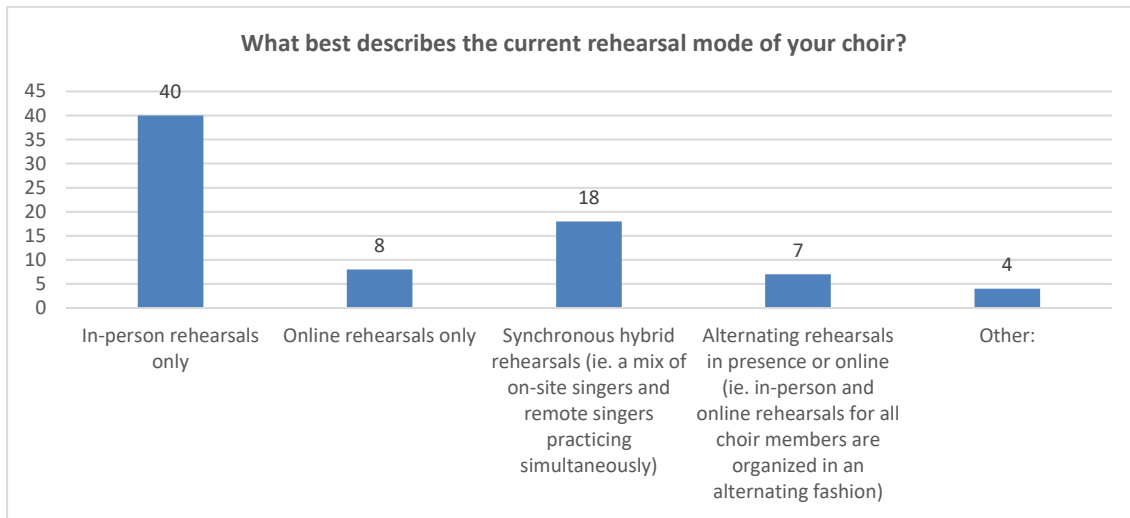


Figure 23: Current rehearsal mode of the choir (Choir members)

As can be seen in Figure 24, online rehearsals were generally joined by less members than face-to-face rehearsals. The reasons for not joining online rehearsals were analysed concerning choir-pedagogic/musical, technology, as well as socio-technical aspects.²

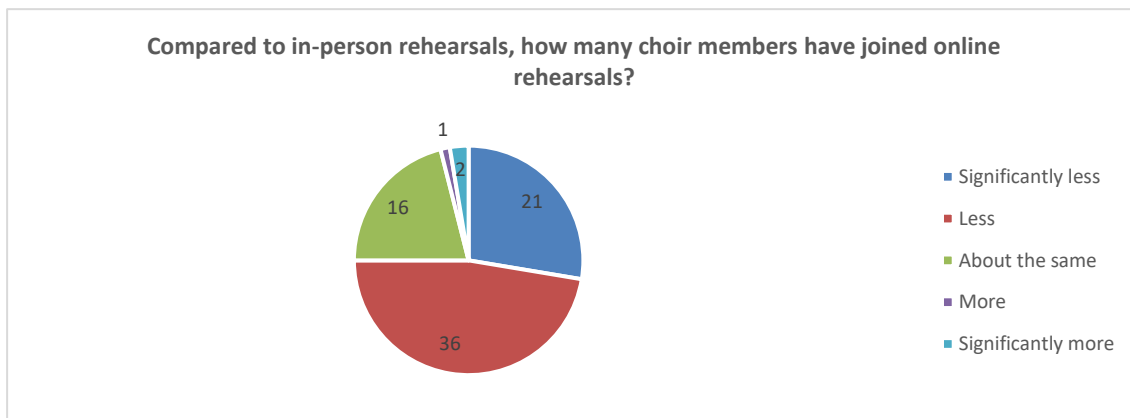


Figure 24: Number of choir members who have joined online rehearsals compared to in-person rehearsals (Choir members)

Concerning choir-pedagogic and musical aspects, respondents cited as disadvantages of (presumably WCS-enabled) online rehearsals the inability to hear other singers and the lack of direct feedback and corrections from the conductor. This leads to a limited sound experience and affects interaction between singers, ultimately making online rehearsals less enjoyable. Singers also mention that singing alone at home, without the support of a group of fellow singers, can be challenging and potentially demotivating.

² This section does not distinguish between the different technological solutions used (i.e. use of web-conferencing systems vs. use of low-latency software in combination with web-conferencing systems). Please refer to section 4.6 and section 4.7 respectively.

In terms of LLS-enabled rehearsals, being together on time and singing at the same rhythm can be challenging given the remaining latency. Respondents also reported limited ability to rehearse the dynamics of a piece and a lack of spatial sound.

With regard to technological aspects, respondents mention (non-specific) technical obstacles and problems, as well as the fact that technology or equipment was not available or inaccessible.

Regarding socio-technical aspects, respondents mention that the lack of physical presence of online rehearsals leads to a lack of social and musical interaction, making online rehearsals impersonal. Technology aversion or a lack of technology affinity or acceptance are also mentioned as barriers to participation. Lack of technical skills, fear of the unknown and screen fatigue were also mentioned. Other individual constraints include the lack of a suitable place to rehearse at home, disruptions at home and age. Overall, online rehearsals were not seen as a substitute for face-to-face rehearsals and were (at best) seen as a second choice when face-to-face rehearsals were not possible.

On the other hand, Figure 24 also shows that for some choirs online rehearsals were attended by more people than face-to-face rehearsals. Respondents explained the higher participation rate in online rehearsals with the fact that singers are physically dispersed and that online rehearsals allow people to attend when they are ill.

4.6 Online choir rehearsal using a combination of LLS and WCS

In this part of the survey, respondents reported on their experiences with online rehearsals made possible by a combination of LLS and WCS.

Figure 25 shows that Jamulus was the most commonly used LLS, followed by Soundjack and JackTrip. As most LLS do not have a high-quality video stream, they are often used in combination with a WCS. As can be seen in Figure 26, most choirs used the WCS Zoom, followed by Jitsi Meet and MS Teams. Figure 27 gives an overview of the WCS features used in online choir rehearsals. The most commonly used features include live chat, screen sharing, video, and session recording.

Respondents reported several aspects of online rehearsals that they liked and found beneficial. In general, it was mentioned that online rehearsals helped to maintain the choir and allowed a distributed group of singers to participate in rehearsals. The ability to rehearse from home was cited as saving time and money, as singers did not have to travel to a rehearsal venue. In addition, online and hybrid rehearsals allowed for the participation of singers who were ill. Concerning choir-pedagogic and musical aspects, respondents appreciated the possibility of configuring an individual sound mix (i.e. the volume of one's own voice compared to other voices) and the possibility of recording individual tracks. It was also mentioned that online choir rehearsals are good for sectional rehearsals, i.e. rehearsals with individual vocal groups, and well suited for learning new pieces.

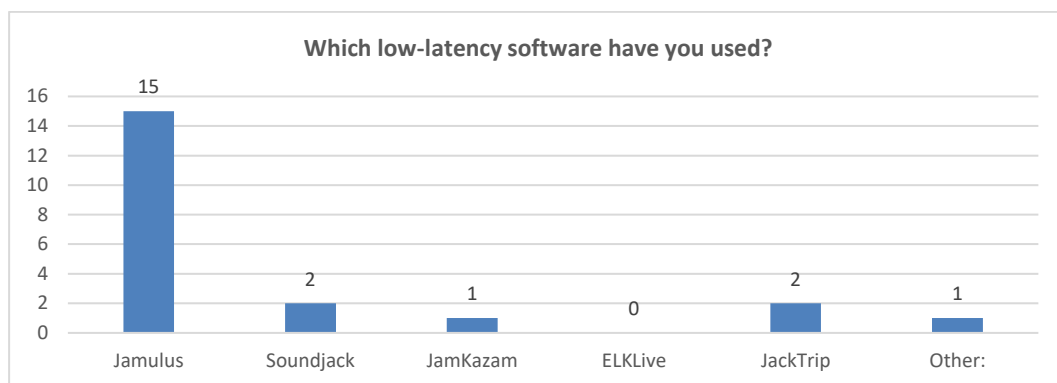


Figure 25: Low-latency software used (Choir members)

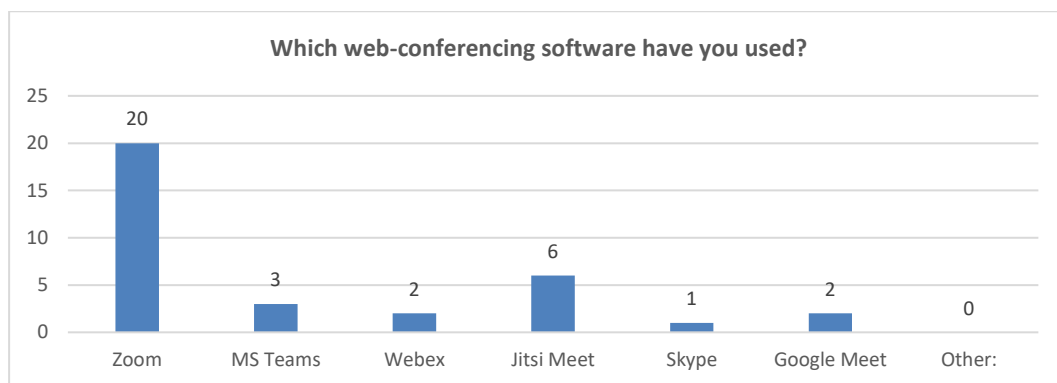


Figure 26: Web-conferencing software used (Choir members)

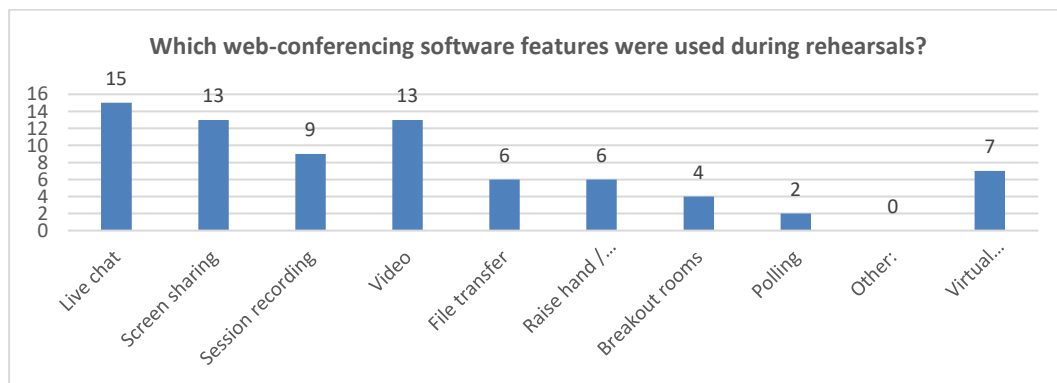


Figure 27: Web-conferencing software features used (Choir members)

On the other hand, respondents reported on challenges experienced in online rehearsals (Figure 28). The top 3 challenges reported were problems with their own internet connection, lack of knowledge on how to set up equipment, and lack of appropriate equipment. Respondents were also asked what they did not like about online rehearsals.

In terms of technological aspects, the (remaining) latency of the audio stream and the latency of the video stream compared to the audio stream, i.e. the video lagging behind the audio stream, were mentioned as disadvantages. Non-specific technical problems, the effort to set up the technology, the effort to troubleshoot, and problems with Internet quality were also mentioned as challenges.

In terms of choir-pedagogic and musical aspects, the latency of the video stream leads to the problem that conducting (as in face-to-face rehearsals) and thus visual guidance by the conductor is not possible in online rehearsals. The latency of the audio stream also makes it difficult to sing in sync and at the same time. Musical subtleties, such as dynamics and different tempos, are difficult to rehearse, even though singing together in (near) real time is possible. The lack of spatial sound and reduced interaction with the conductor and other singers were also mentioned as disadvantages.

In terms of socio-technical aspects, the lack of physical presence and (social) interaction, including the inability to engage in bilateral conversations, were reported as disadvantages. Respondents also reported that differences in singers' digital skills and equipment were a challenge, and that online rehearsals required a great deal of discipline on the part of participants.

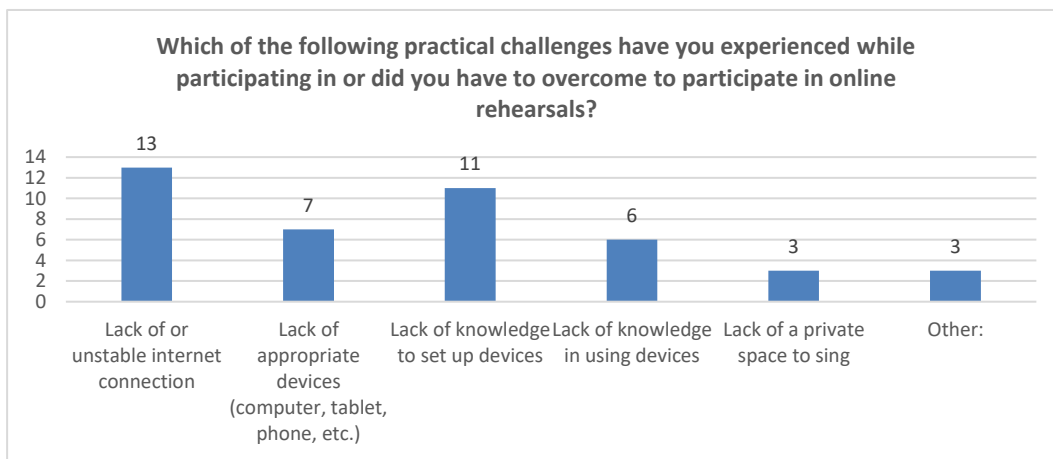


Figure 28: Practical challenges experienced during online rehearsals (Choir members)

4.7 Online choir rehearsal using WCS

This section of the survey asked respondents who had participated in WCS-enabled rehearsals about their experiences.

As with rehearsals enabled by a combination of LLS and WCS, Zoom was the most commonly used solution in WCS-enabled rehearsals (Figure 29). In terms of WCS features used, Live chat, screen sharing, raise hand, video and virtual backgrounds were frequently used (Figure 30). The relatively high number of mentions of the raise hand feature may be explained by the fact that choir singers are muted in WCS rehearsals (as opposed to LLS rehearsals) and therefore used this feature to provide immediate and silent feedback. The most common challenges experienced by participants in WCS rehearsals include an unstable internet connection, a lack of a private space to sing, and a lack of knowledge about how to set up equipment (Figure 31).

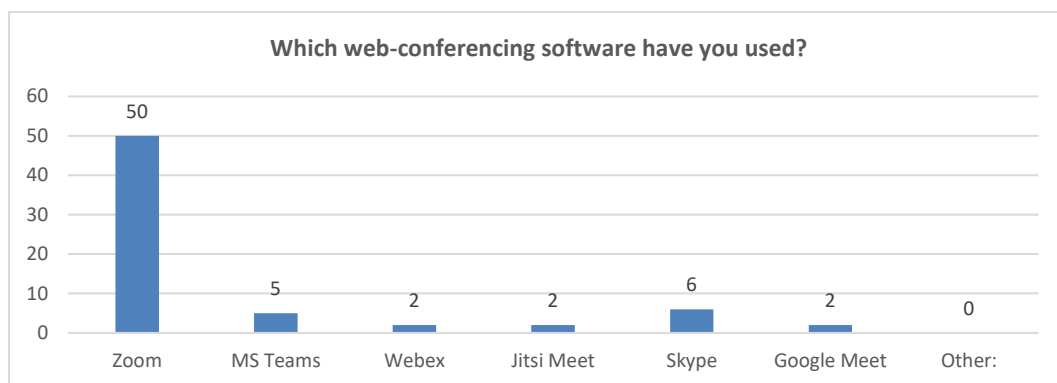


Figure 29: Web-conferencing software used (Choir members)

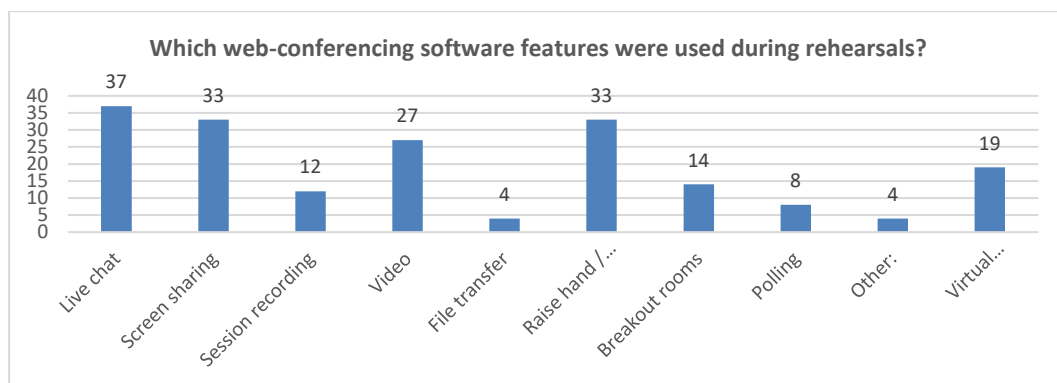


Figure 30: Web-conferencing software features used (Choir members)

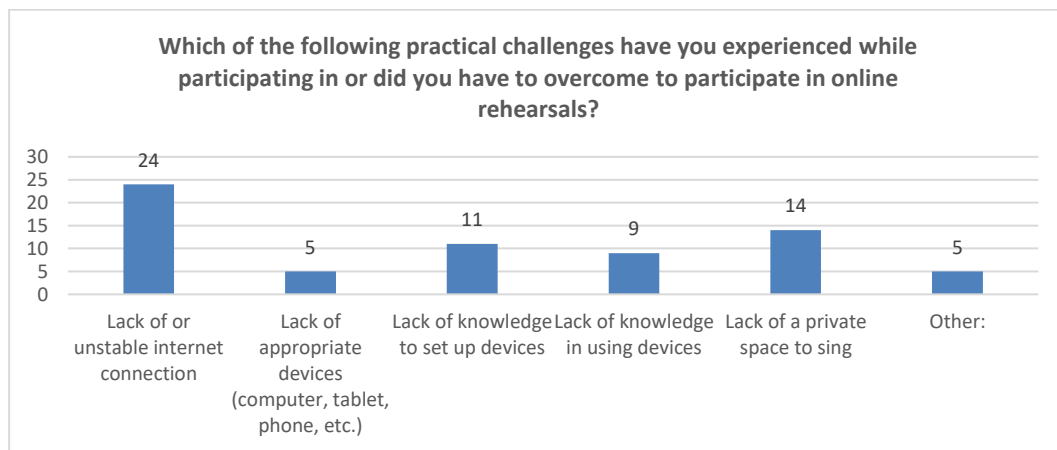


Figure 31: Practical challenges experienced during online rehearsals (Choir members)

Respondents were also asked for feedback on they liked about WCS rehearsals.

In terms of choir-pedagogic and musical aspects, the fact that it was not possible to hear the other singers offered some advantages. It allowed singers to sing other parts (without being heard by others) and to practise their sight-reading skills. Singers could also play along with their own voice on the piano. Over time, participants developed more autonomy and also more security and confidence. Singing alone from home was also associated with fewer distractions and higher levels of concentration.

In terms of technology, WCS rehearsals were appreciated for being easy to set up, accessible and convenient.

There were also some general benefits of taking an activity that traditionally takes place in person and moving it online. This allowed singers to participate from anywhere and to sing with people who live far away. Not having to commute to a rehearsal helped individuals save time and money. It was also seen as an advantage that online rehearsals could be attended when it was not possible to attend in person (e.g. for singers who were ill) or for singers who did not want to take any health risks. Overall, WCS rehearsals helped to maintain a choir and were seen as a good alternative by some respondents. Other respondents considered WCS rehearsals to be a second-best choice, and some did not see any benefits at all in WCS rehearsals.

Respondents were also asked for feedback on what they did not like about WCS rehearsals.

In terms of choir-pedagogic and musical aspects, not being able to hear each other meant that it was not possible to sing together, so there was no musical interaction between the choristers. As a result, a choir sound could not be achieved, which also affected the group feeling of the choir. In addition, the details of a piece could not be rehearsed. The fact that the conductor could not give feedback/correction (because he or she could not hear the singers) also led to the problem that individuals had difficulty assessing their own performance. Respondents also mentioned that WCS rehearsals did not provide a physical experience and lacked non-verbal communication. Some respondents claimed that WCS rehearsals were less enjoyable because rehearsals were more about studying music than actually singing together, and the progress made by the group could not be experienced. Finally, some singers reported that they were unable to sing out loud at home and that it was difficult to concentrate with all the digital distractions.

In terms of technology-related aspects, respondents mentioned non-specific technical problems, internet problems, the high latency of the WCS, and poor sound quality.

In terms of general and socio-technical aspects, respondents criticised the lack of social interaction (e.g. lack of bilateral conversations) and the inability to develop a sense of community. Some found WCS rehearsals less enjoyable and more difficult to get involved in. In terms of WCS features, some also mentioned that chat comments disrupted the flow of the rehearsal.

4.8 Non-participation in digitally supported singing formats

In this part of the survey, we asked respondents about reasons for not conducting or participating in digitally supported singing formats. The free-text responses were analysed from a choir-pedagogic/musical, technology, as well as socio-technical point of view.

Q72 - Are you aware of any reasons why your choir has not yet conducted or offered digitally supported singing formats? Please list the reasons in order of their importance, from "most important" to "less important".

In terms of choir-pedagogic and musical aspects, respondents found the results of digitally supported singing formats unsatisfactory from a musical point of view, and also mentioned that their choirs were too large to use such formats.

In terms of technology, respondents mentioned technological limitations such as latency and poor sound quality, as well as a lack of equipment.

In terms of socio-technical aspects, respondents mentioned a lack of technical facilities, equipment and expertise. They also reported a lack of interest (on the part of the conductor) and time to explore or implement digitally supported singing formats. Finally, reasons such as a preference for face-to-face singing, the perception that social aspects suffer in online rehearsals, and the age structure of choirs (singers were mentioned as being too old) were reported as barriers to digitally supported singing formats.

Q118 - What prevented you from participating in digitally supported singing formats of your choir? Please list the reasons in order of their importance, from "most important" to "less important".

Respondents cited a lack of digital skills and equipment as a barrier to participating in digitally supported singing formats. They also highlighted the importance of social interaction and community spirit for musical interaction. No specific musical or technological barriers were identified.

Q119 - What prevented you from continuing to participate in online choir rehearsals? Please list the reasons in order of importance, from "most important" to "less important".

The responses to this question highlight the link between musical and social aspects, which seems difficult to replicate in online formats. For example, respondents mentioned that physical separation prevents or impairs the social and musical connection between singers and that choral singing is about being together, in a common space with good acoustics, to make music together.

Specific technological issues were not mentioned.

4.9 Closing

The final part of the survey asked about the potential of digitally-supported singing. As can be seen in Figure 32, the majority of respondents felt that digitally supported singing offered opportunities for new forms of musical expression and collaboration, and could widen access to music making. At the same time, respondents felt that digitally supported singing was not necessarily more inclusive than face-to-face singing. As shown in Figure 33, the majority of respondents indicated that digitally supported singing can complement rather than replace face-to-face singing.

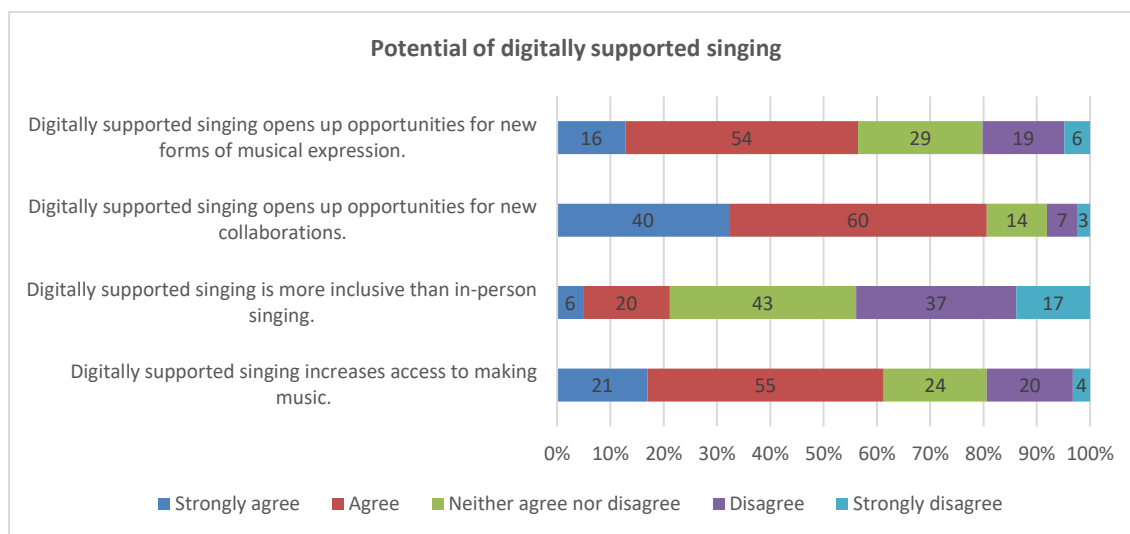


Figure 32: Potential of digitally supported singing (Choir members)

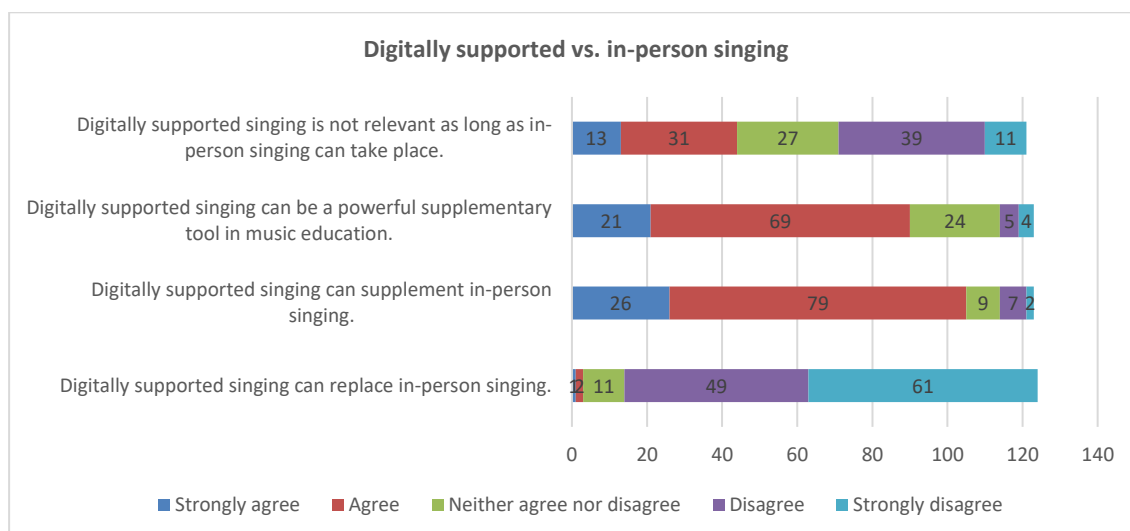


Figure 33: Digitally supported vs. in-person singing (Choir members)

In addition, respondents were asked what would make it possible or (more) worthwhile for them to (continue to) participate in digitally supported singing (Q114).

From a choir-pedagogic and musical perspective, respondents asked for a technological solution that would allow them to hear and see other singers in real time, so that they could actually sing together. Respondents also wanted a more sensory experience, allowing them to perceive a room, feel vibrations and perceive the audience. Intonation support was also mentioned as a new feature. Regarding the potential of digitally supported singing, respondents mentioned that online singing would allow choirs to prepare more intensively for concerts, to engage in international cooperation, to meet new choirs and conductors, to offer hybrid rehearsals for singers who cannot attend in person, and to try out new formats.

From a socio-technical perspective, some respondents commented that the "real experience" cannot be replaced. Correspondingly, many of the requested features mentioned above (such as perceiving the

room, seeing the emotions of other singers) are aimed at achieving an online singing experience that is closer to the physical experience. In addition, respondents explicitly asked for features that would improve social interaction and strengthen the sense of community, such as the possibility of bilateral conversations. As mentioned above, personal circumstances, such as limited individual mobility or an interest in singing with distant (new) singers, would also encourage some respondents to rehearse online. Other aspects mentioned include financial support, approval and support (especially from the conductor), information material and explanations, more awareness of relevant offers, more (digital) know-how and a higher level of acceptance of the technology.

In terms of technology, beyond the features already mentioned (such as hearing each other, audio-visual synchronisation, intonation support, sensory experience), respondents generally asked for mature technology with good usability and accessibility. This means, for example, that there should be an integrated software solution and that there should be no need for central support, Ethernet connection and other specific hardware. Respondents also commented that such a solution should have good audio quality and minimise latency. In general, technical problems should be reduced or avoided. One respondent asked for a native low-latency audio driver for Windows.

Respondents were also given the opportunity to make additional comments (Q117).

From a choir-pedagogic and musical point of view, it was mentioned that online rehearsals are good for learning new pieces, for sectional rehearsals, and that digital materials created during the pandemic are still useful resources.

Other general comments include that online rehearsals are a poor substitute for face-to-face rehearsals. However, during the COVID-19 pandemic they were helpful in maintaining social interaction. Some respondents commented that the use of online and hybrid rehearsals should be increased and again emphasised the possibility of increasing access to singing for people with certain limitations (e.g. health) so that these people could benefit from the positive effects of singing.

5 Findings of online survey among choir conductors (R2.4.3)

This chapter presents key findings from the survey of conductors. To provide an overview of the survey participants, socio-demographic data are presented in section 5.1. The results of the different parts of the survey are presented below, including participants' experience with choral conducting, experience with digital media, and experience with online conducting.

5.1 Sociodemographic data

The following figures provide an overview of the socio-demographic data of the respondents to the online survey of conductors. As can be seen in Figure 34, most respondents are between 35 and 64 years old. Furthermore, the distribution between male and female respondents is almost equal (Figure 35). Most respondents have a Master's degree (Figure 36). In terms of country of residence (Figure 37), most respondents live in Germany, Austria, Australia, and the United States of America.

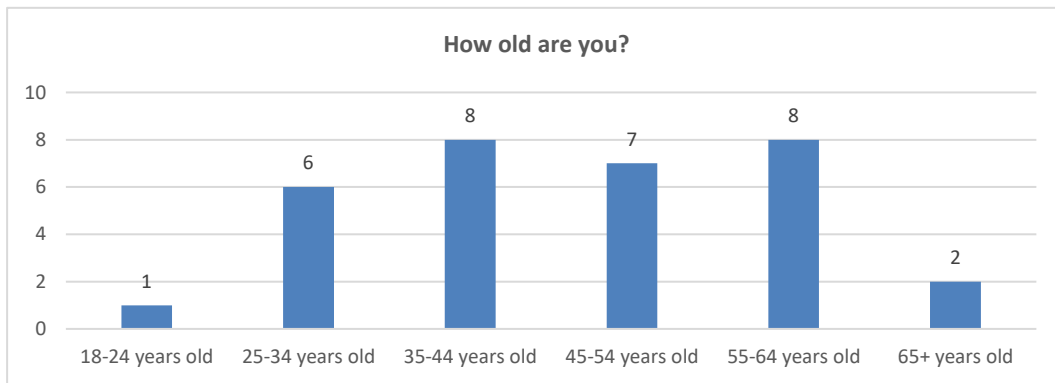


Figure 34: Age distribution (Choir conductors)

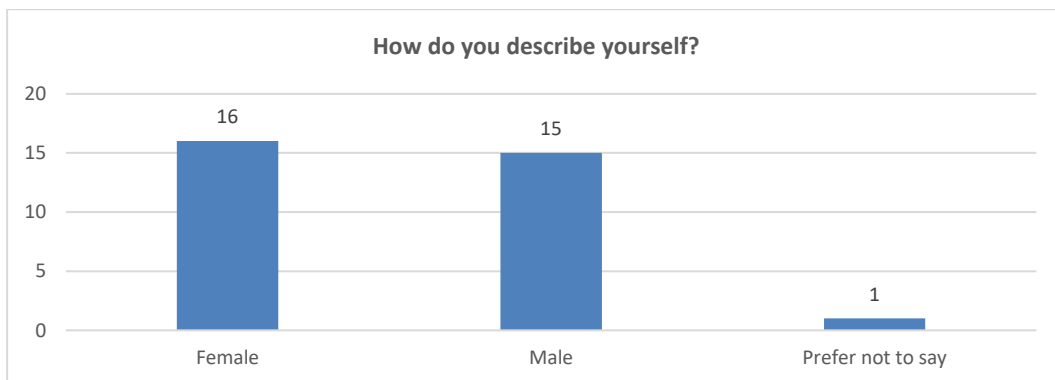


Figure 35: Gender (Choir conductors)

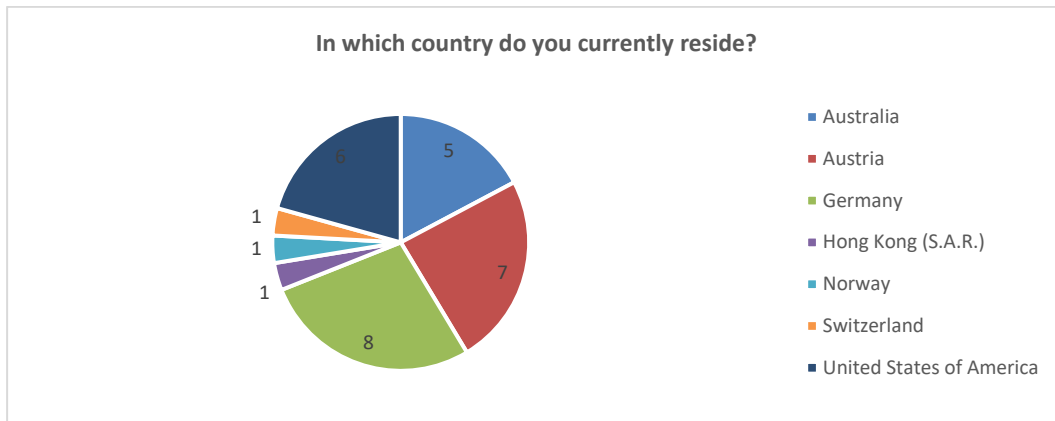


Figure 36: Country of residence (Choir conductors)

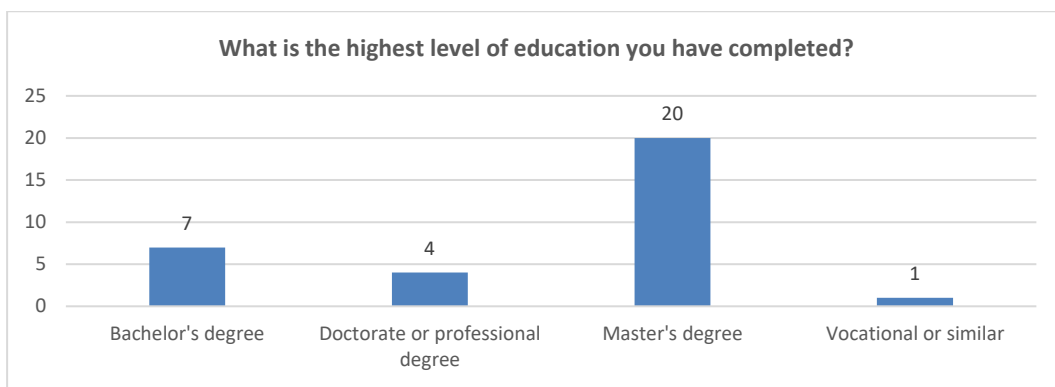


Figure 37: Highest level of education completed (Choir conductors)

5.2 Experience in conducting and musical background

In this part of the survey, respondents were asked about their experience in conducting and other musical skills.

As can be seen in Figure 38, most respondents currently conduct 1 or 3 choirs and the majority (around 60%) of respondents have between 6 and 25 years' experience of choral conducting (Figure 39). Around 60% of respondents have a degree in music from a conservatory or music university (Figure 40). In terms of their music-related professions, most respondents are choral conductors, singers, and instrumental or vocal teachers (Figure 41).

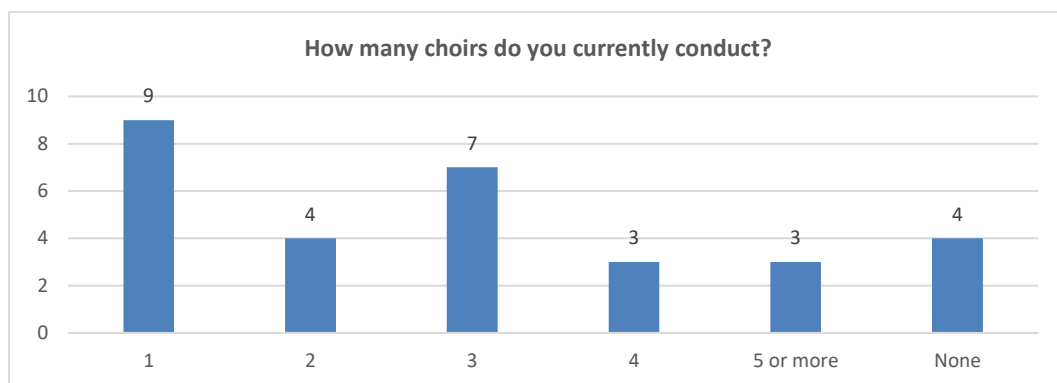


Figure 38: Number of choirs currently conducted

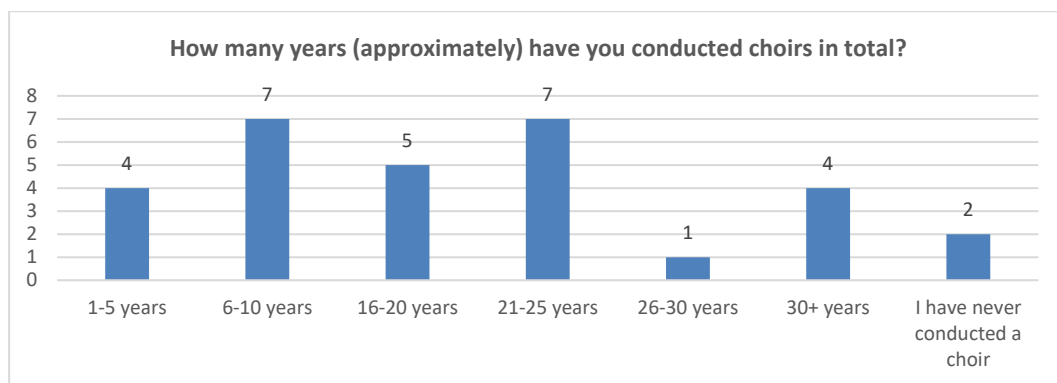


Figure 39: Years of experience as a choir conductor

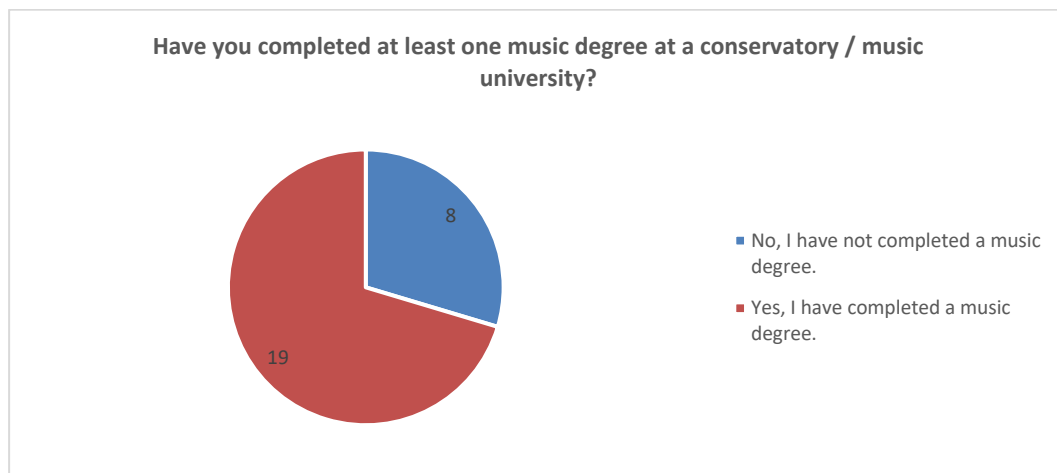


Figure 40: Completion of music degree

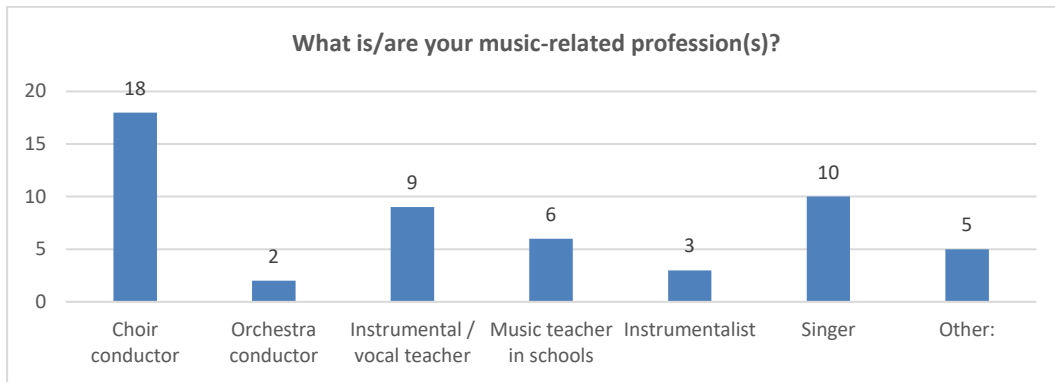


Figure 41: Music-related profession

As shown in Figure 42, most respondents rate their skills in conducting and choir management as extremely or moderately well. The skill 'conducting online rehearsals' shows the widest range, with only around 20% of respondents rating this skill as extremely well, and around 42% rating it as moderately well or not at all well.

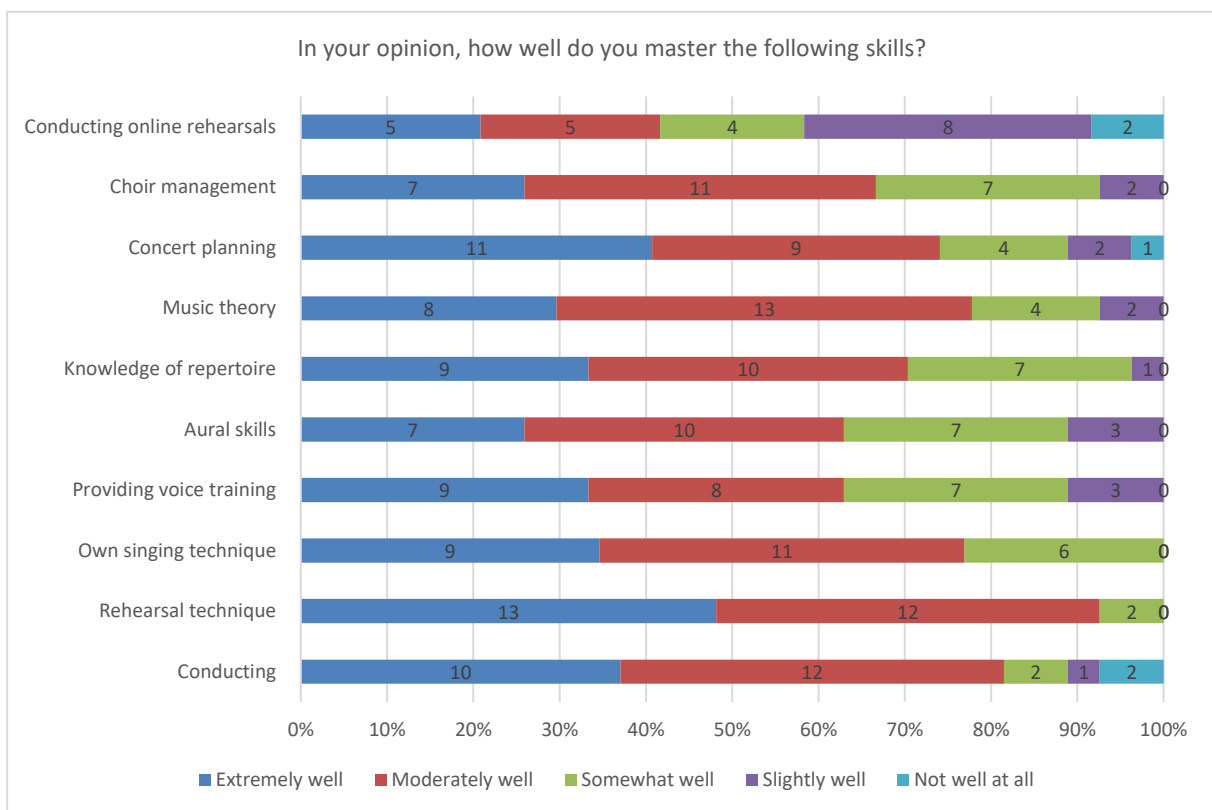


Figure 42: Mastery of skills related to choral conducting

5.3 Overview of your choir

This section gives an overview of the choirs directed by the respondents. As can be seen, most choirs are located in large cities or towns (Figure 43). More than half of the respondents' choirs are member-supported choirs, followed by school choirs (Figure 44). About 62% of the choirs are open to beginners, i.e. no or little singing experience is required (Q63). In terms of musical style (Q64), most choirs sing

classical music (16.41%), sacred music (12.5%) and pop music (12.5%). About 77% of choirs rehearse once a week (Q67). Some 42% of the respondents have been conducting their choirs for more than 10 years, followed by 5-10 years (31%), 3-4 years and 1-2 years (12% each) (Figure 45). Figure 46 gives an overview of the respondents' highest priority target areas in their choirs. For most respondents, the most important target areas are *Developing musically as a choir* (35%), *Delivering high musical results as a choir* (22.5%), *Development of vocal skills of the individual singers* and *Developing personality-related areas of individual singers* (14.3% each).

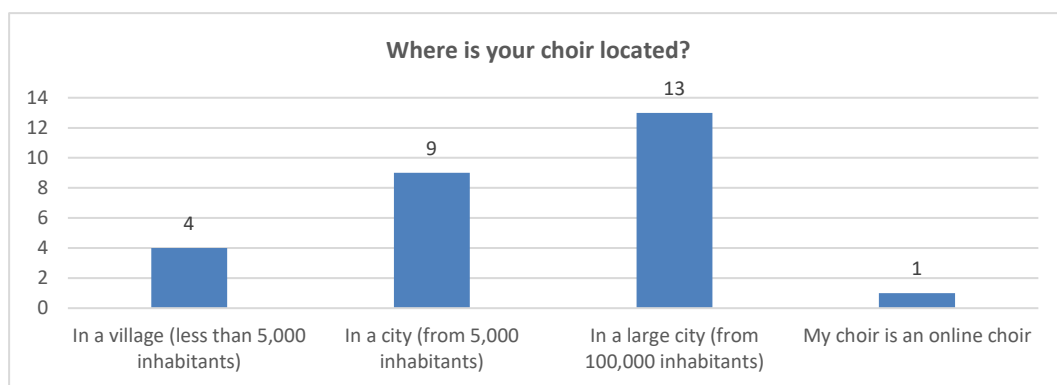


Figure 43: Location of the choir (Choir conductors)

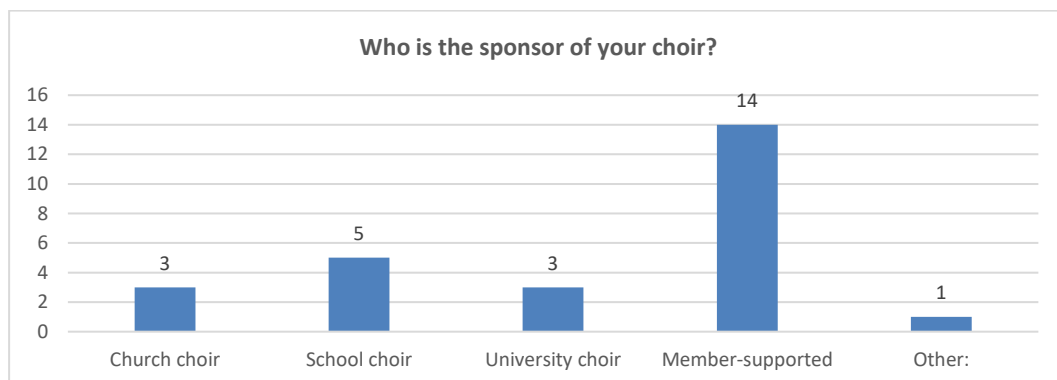


Figure 44: Sponsor of the choir (Choir conductors)

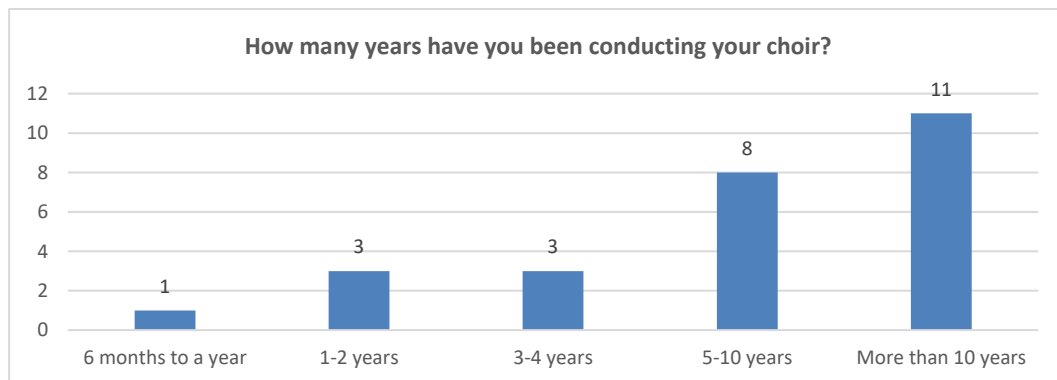


Figure 45: Number of years on has conducted the choir (Choir conductors)

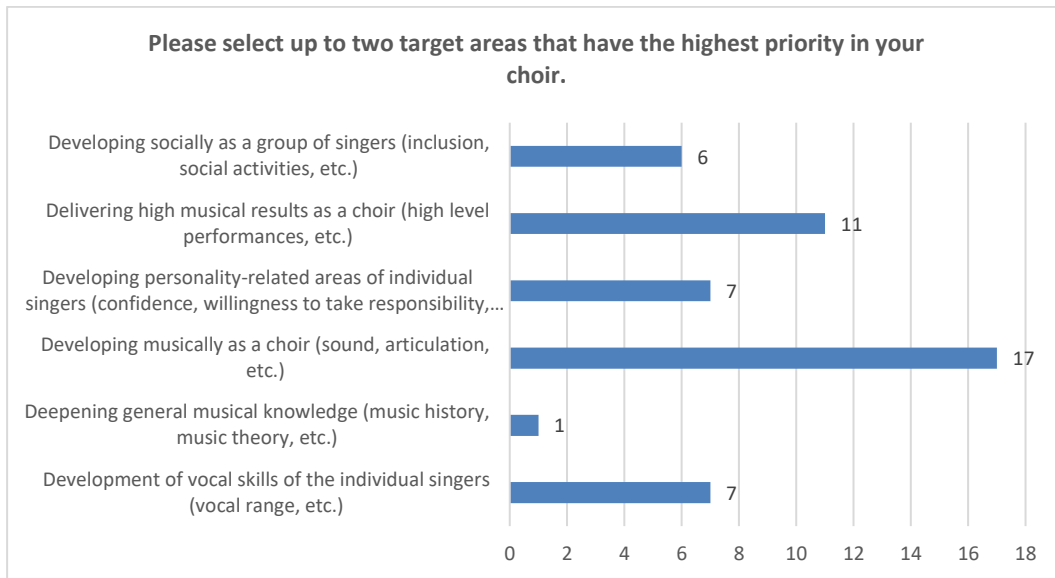


Figure 46: Target areas in the choir (Choir conductors)

5.4 Experience with digital media

This section provides an overview of the respondents' experience of digital media. As shown in Figure 47, around 77% of respondents use the Internet for more than two hours a day. On the other hand, 50% of respondents use web-conferencing systems only once a month or less, while around 27% use these systems several times a week. In terms of respondents' attitudes towards the Internet and technology in general (Figure 48), most respondents have positive attitudes towards the Internet and technology, indicating for example that they are comfortable using the Internet and like to try out new devices. Finally, in terms of respondents' experience with digital singing (Figure 49), around 73% have participated or led online rehearsals and around 65% have made virtual choir recordings. Only 8% of respondents have not participated in any kind of digital singing in the last five years.

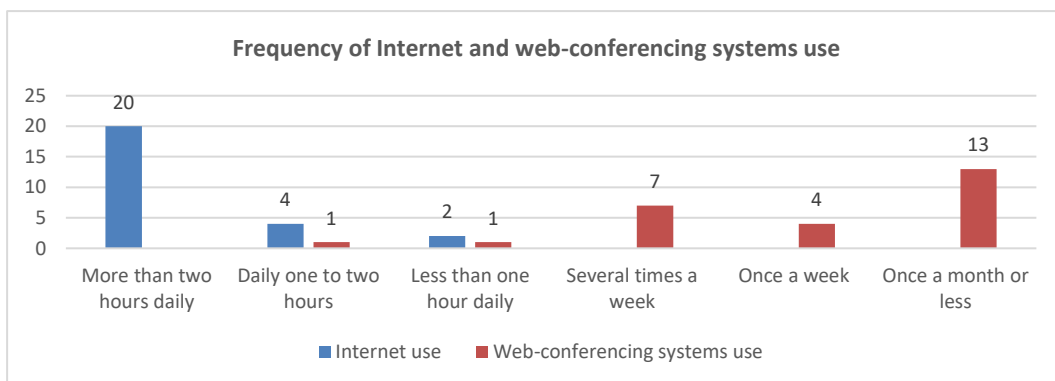


Figure 47: Frequency of Internet and web-conferencing systems use (Choir conductors)

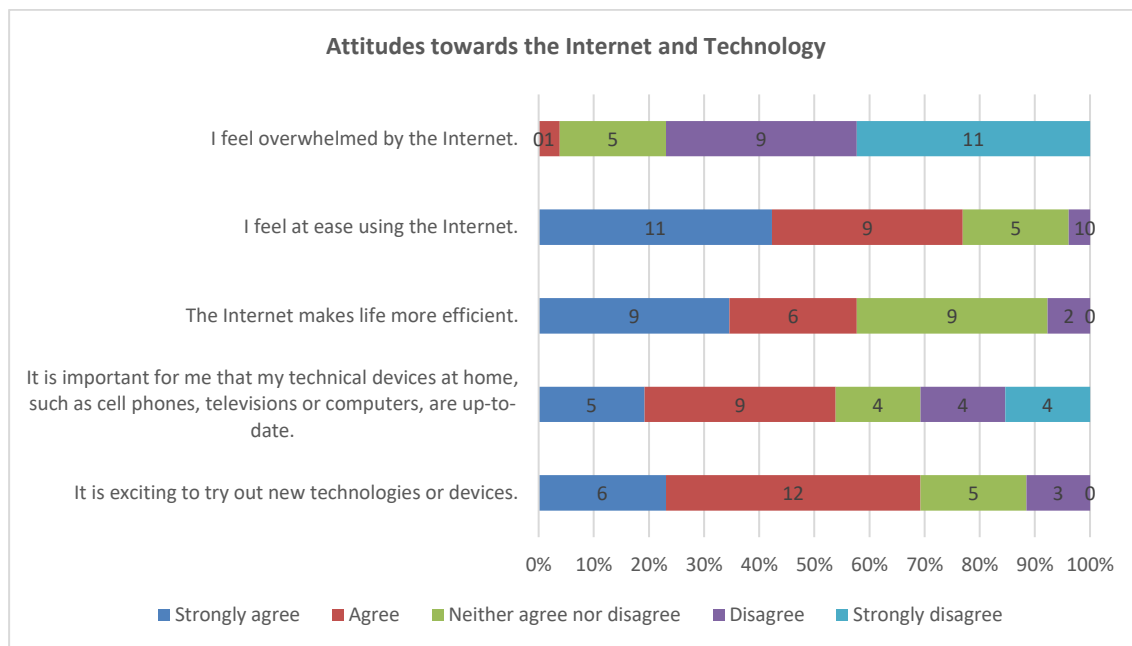


Figure 48: Attitudes towards the Internet and Technology (Choir conductors)

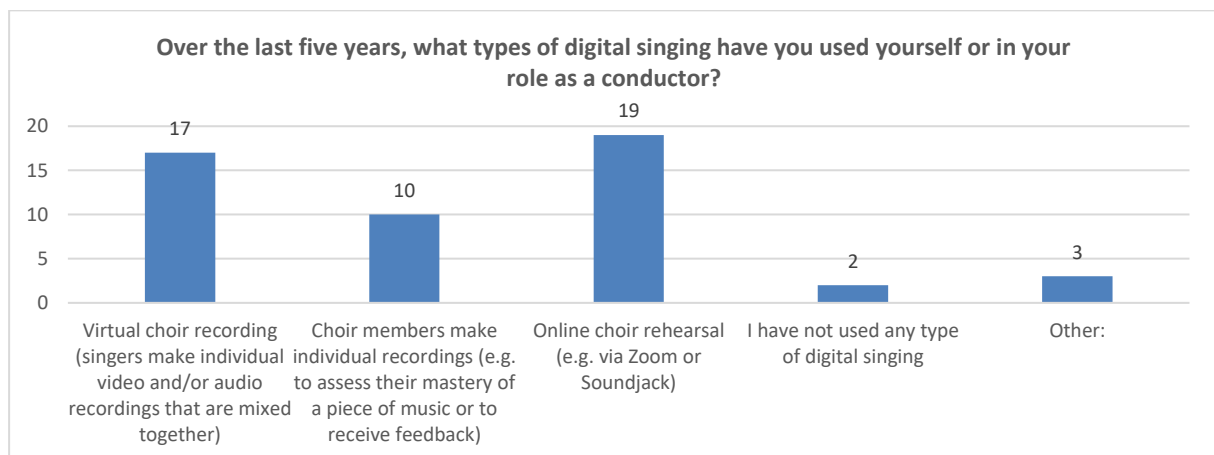


Figure 49: Types of digital singing one has used (Choir conductors)

5.5 Online conducting experience

In this part of the survey, respondents provided general information about their experience of conducting online. The questions in this part of the survey were answered by around 20 respondents, which corresponds to the number of survey respondents who have participated in online choir rehearsals (Figure 49).

As can be seen in Figure 50, around 68% of respondents' choirs have used web conferencing systems for online rehearsals, followed by a combination of low-latency software and web conferencing systems (around 5%). Technology solutions were used because of the possibility to see and hear each other (presumably LLS) and the sound quality. Other general factors influencing the decision to use a technology include availability familiarity, ease of use, and cost (e.g. free solutions). The dates of the first online rehearsals of the respondents' choirs correlate strongly with the beginning

of the COVID-19 pandemic in March/April 2020 (Figure 51). The last online rehearsal held by respondents, however, does not show a clear trend, with dates spread over the last few years (Figure 52). 68% of respondents in this section report that their choirs now only hold face-to-face rehearsals. At the same time, 24% of respondents indicated that their choir still conducts at least some online rehearsals, such as online or hybrid rehearsals (Figure 53).

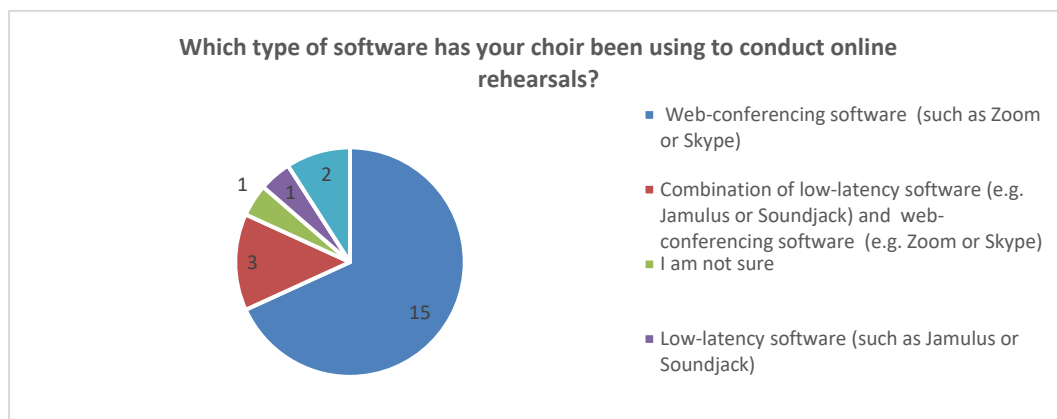


Figure 50: Type of software used to conduct online rehearsals (Choir conductors)

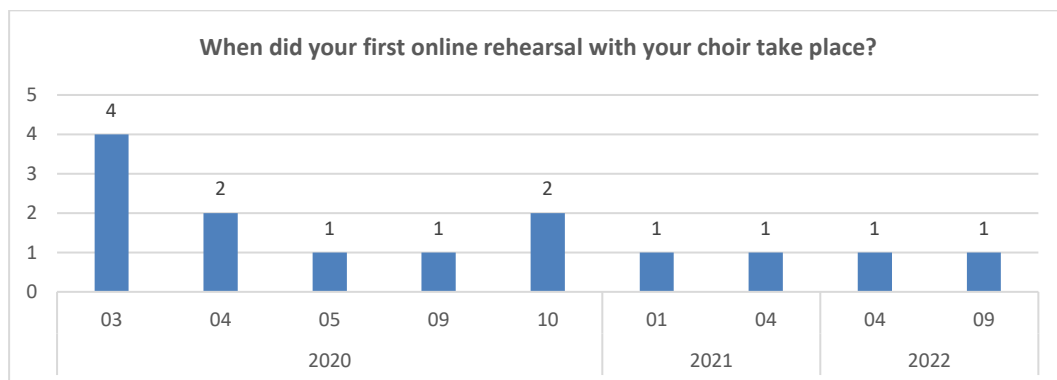


Figure 51: Date of first online rehearsal (Choir conductors)

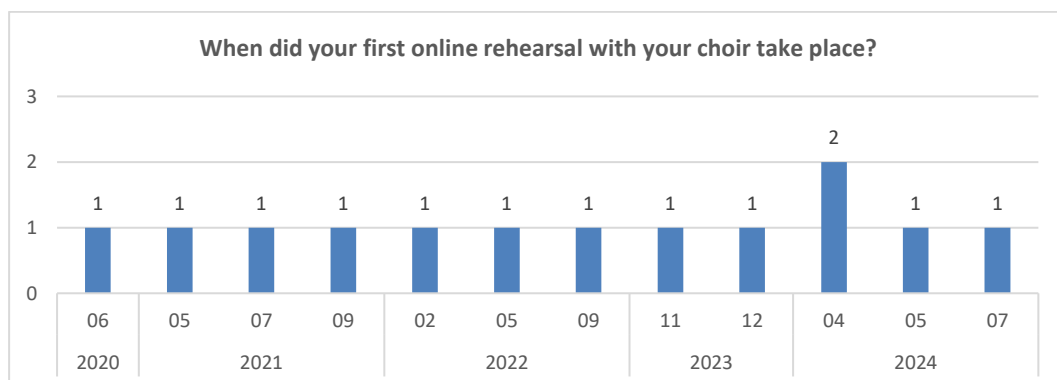


Figure 52: Date of last online rehearsal (Choir conductors)

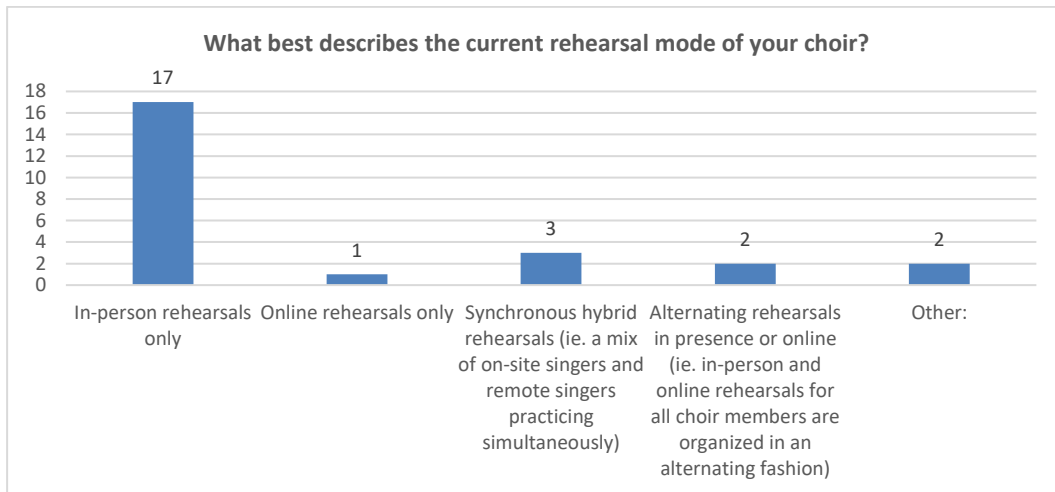


Figure 53: Current rehearsal mode of the choir (Choir conductors)

Concerning their conducting experience, some 53% of respondents have held more than 30 online rehearsals and a further 16% have held 16-20 online rehearsals (Figure 54). The most frequently mentioned elements of online rehearsals were vocal warm-ups, learning new repertoire, rehearsing old repertoire and social interaction (Figure 55). Rehearsing familiar and unfamiliar pieces and practising the lyrics of a piece were activities that the majority of respondents were able to do extremely or moderately well. On the other hand, practicing sight-reading, practicing the rhythm/timing of a piece, and rehearsing the musical details of a piece were less easily accomplished (Figure 56). As Figure 57 shows, conductors could generally not work well on aspects typically included in choral rehearsals. In particular, they could not work well at all on the aspects of choral sound, intonation and dynamics.

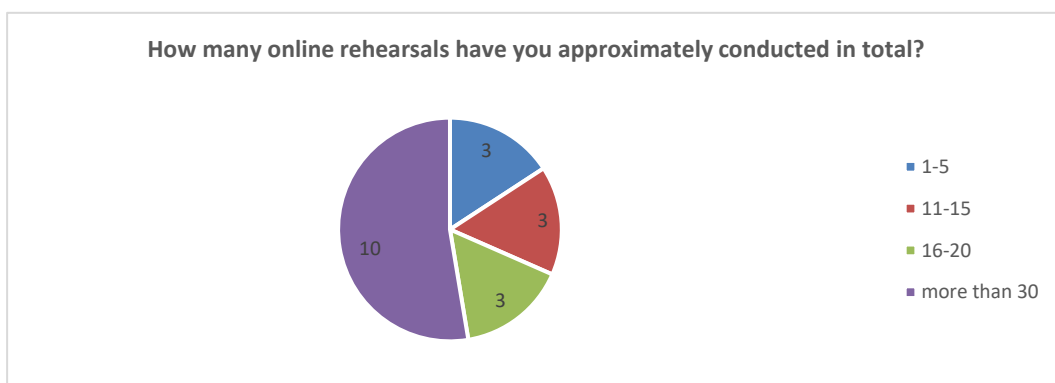


Figure 54: Number online rehearsals conducted (Choir conductors)

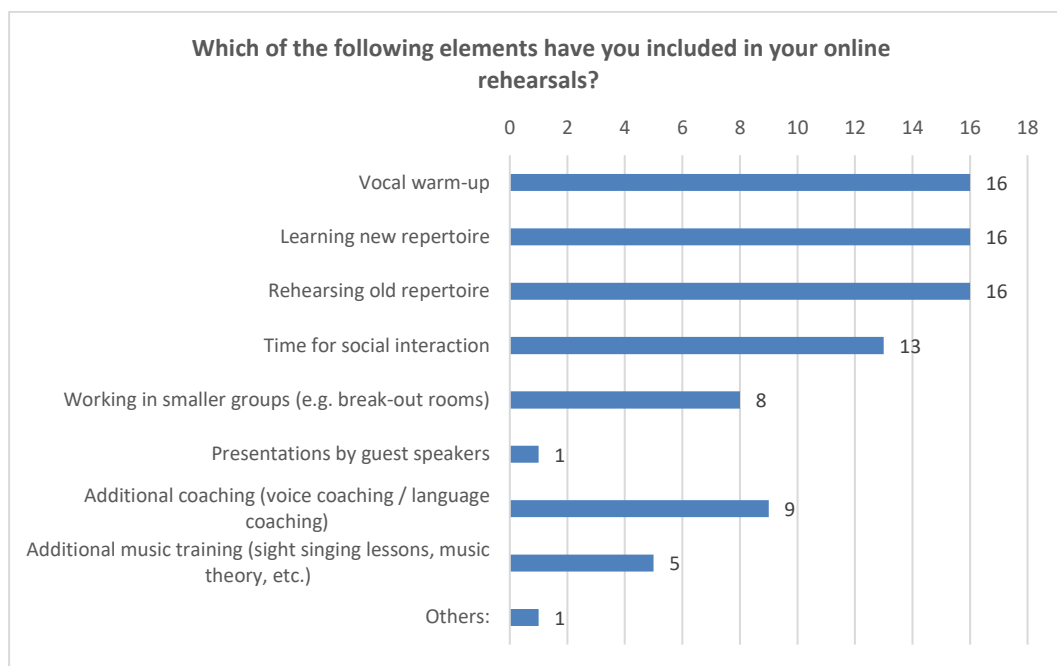


Figure 55: Elements included in online rehearsals

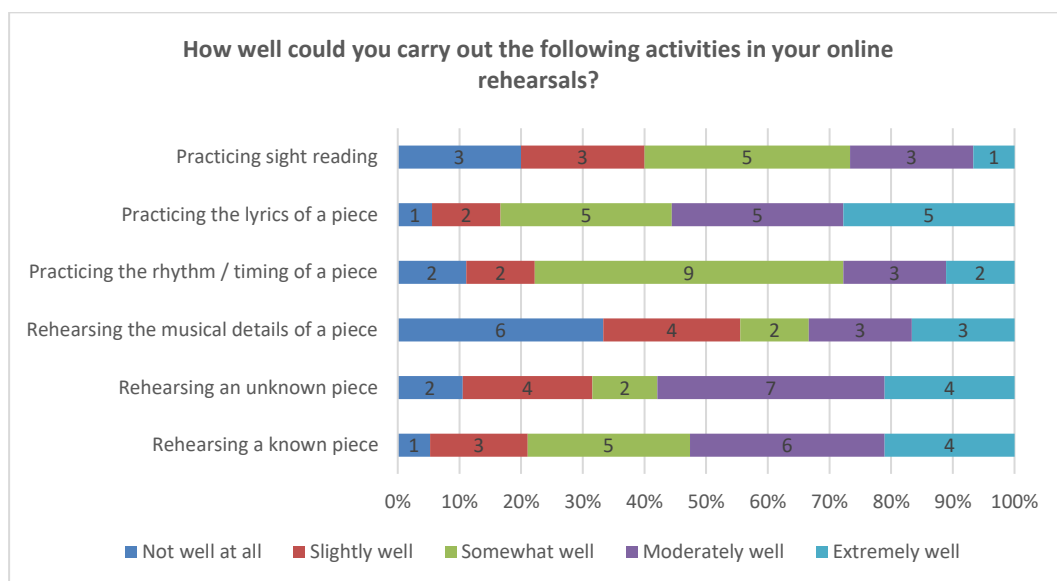


Figure 56: Extent to which activities could be carried out well in online rehearsals

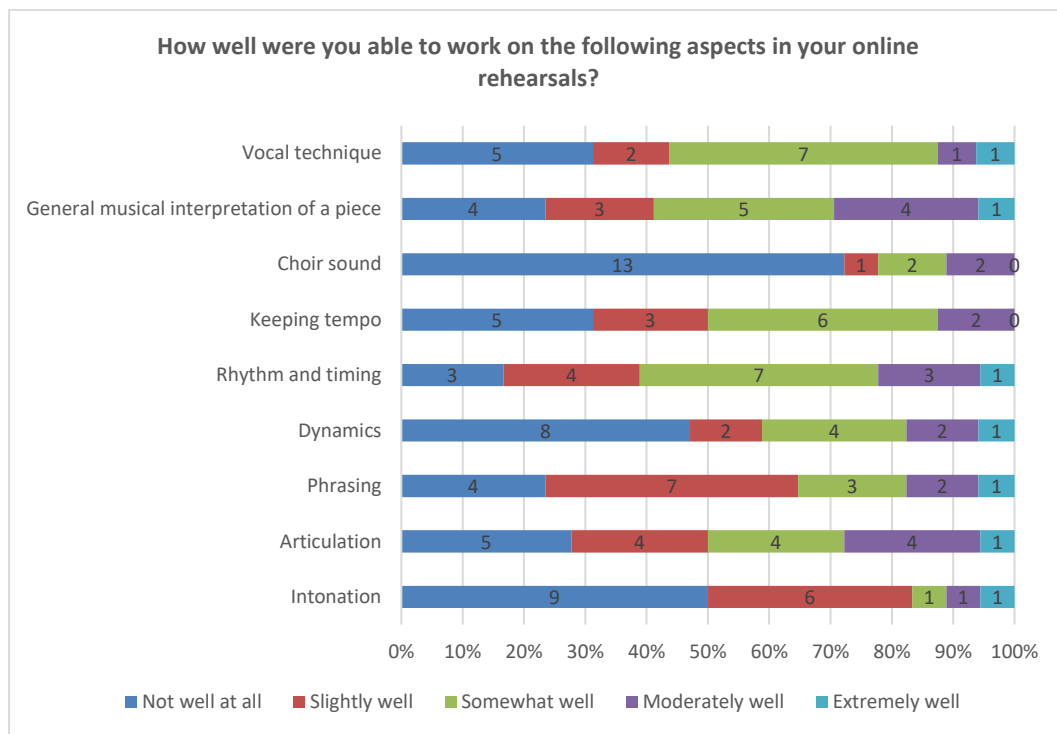


Figure 57: Extent to which aspects could be worked on well in online rehearsals

5.6 Online choir rehearsal using a combination of LLS and WCS

In this part of the survey, respondents reported on their experiences with online rehearsals enabled by a combination of LLS and WCS.

Figure 58 shows that Jamulus was the most commonly used LLS, followed by JamKazam and JackTrip. As most LLS do not have a high-quality video stream, they are often used in combination with a WCS. As can be seen in Figure 59, most choirs used the WCS Zoom, followed by MS Teams. Figure 60 gives an overview of the WCS features used in online choir rehearsals. The most commonly used features are screen sharing and video. Three out of four respondents required additional hardware/equipment to conduct online choir rehearsals (Q108). This included an audio interface, headphones, microphone (3 each) as well as cables and a Raspberry Pi (2 each) (Q109).

Respondents reported several aspects of online rehearsals that they liked and found useful (Q102). They felt that online rehearsals provided a good basis for face-to-face rehearsals and appreciated that rehearsals did not have to be cancelled due to adverse weather conditions. On the other hand (Q104), it was mentioned that attending online rehearsals may not be possible for choir members lack the expertise to use the necessary software and hardware. Correspondingly, lack of knowledge about how to set up the equipment and lack of knowledge about how to use the equipment were cited as the main challenges (Figure 61). Furthermore, from a musical perspective, all respondents (4) reported that it was difficult for singers to keep the tempo during online rehearsals (Q180). To help the singers, conductors used a metronome (2) or instruments (1) (Q146).

In terms of satisfaction with online rehearsals using a combination of LLS and WCS, three out of four respondents were satisfied, while one respondent was undecided (Q150). 50% of respondents were very satisfied with their choir's musical development during online rehearsals, while the other 50% were not satisfied (Q152).

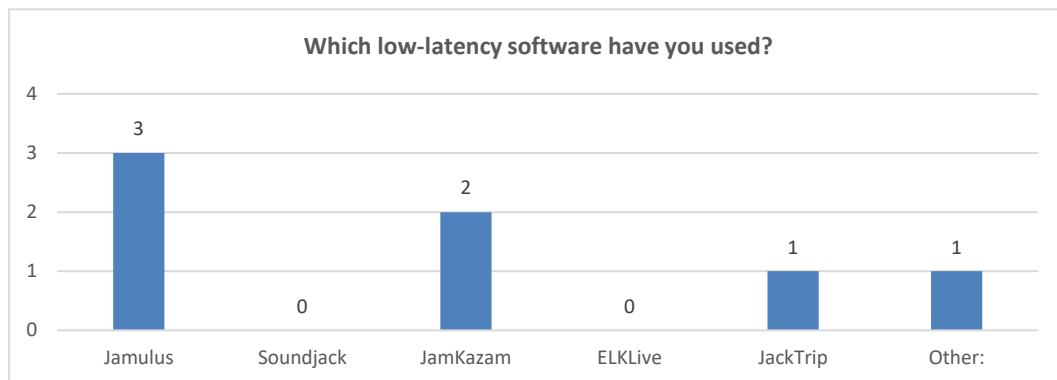


Figure 58: Low-latency software used (Choir conductors)

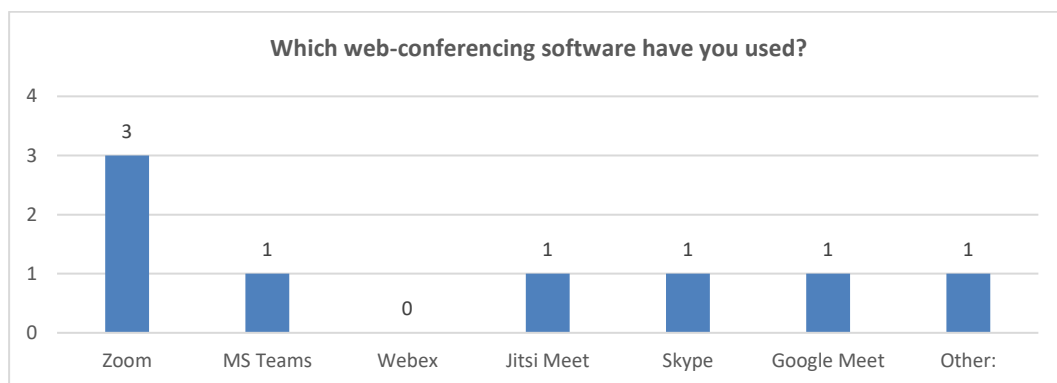


Figure 59: Web-conferencing software used (Choir conductors)

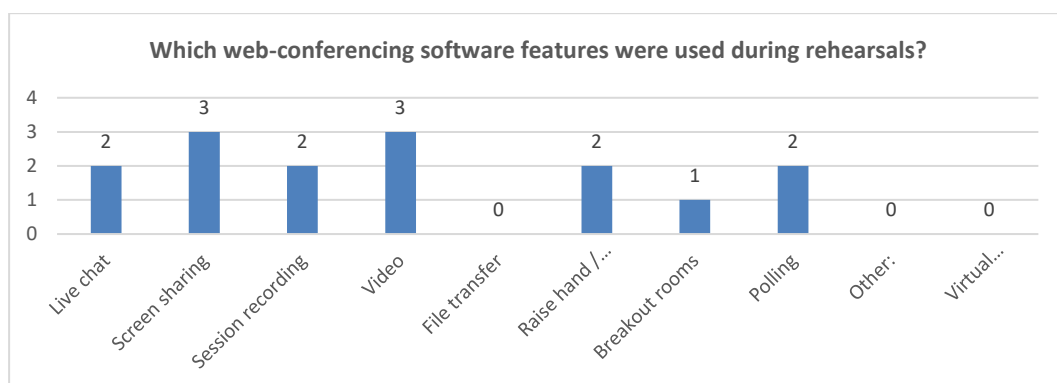


Figure 60: Web-conferencing software features used (Choir conductors)

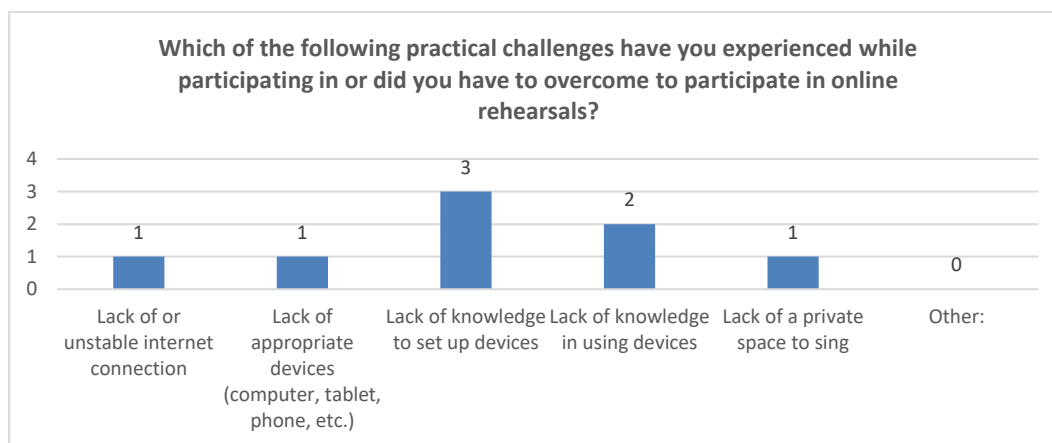


Figure 61: Practical challenges experienced during online rehearsals (Choir conductors)

5.7 Online choir rehearsal using WCS

This section of the survey asked respondents who had conducted WCS-enabled rehearsals about their experiences.

As with rehearsals enabled by a combination of LLS and WCS, Zoom was the most commonly used solution in WCS-enabled rehearsals, followed by MS Teams and Skype (Figure 62). In terms of WCS features used, Live chat, screen sharing, and raise hand/emoticons were used most commonly (Figure 63). The most common challenges faced by conductors in WCS rehearsals are an unstable internet connection, lack of suitable equipment, and lack of a private place to sing (Figure 64).

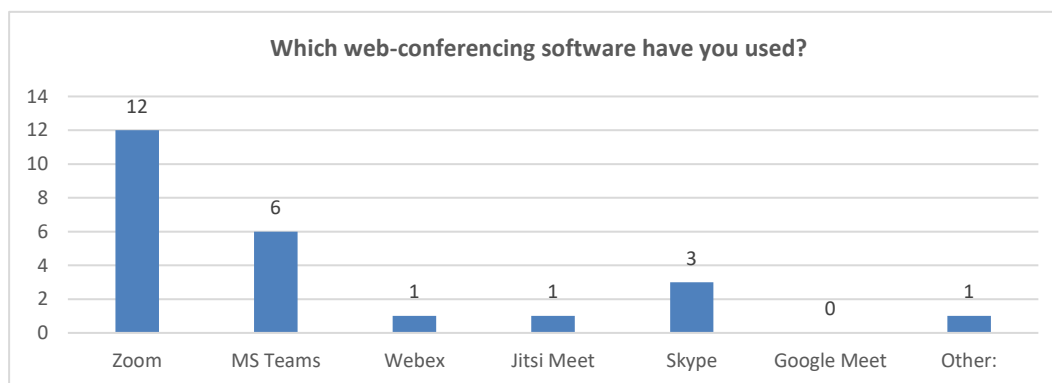


Figure 62: Web-conferencing software used (Choir conductors)

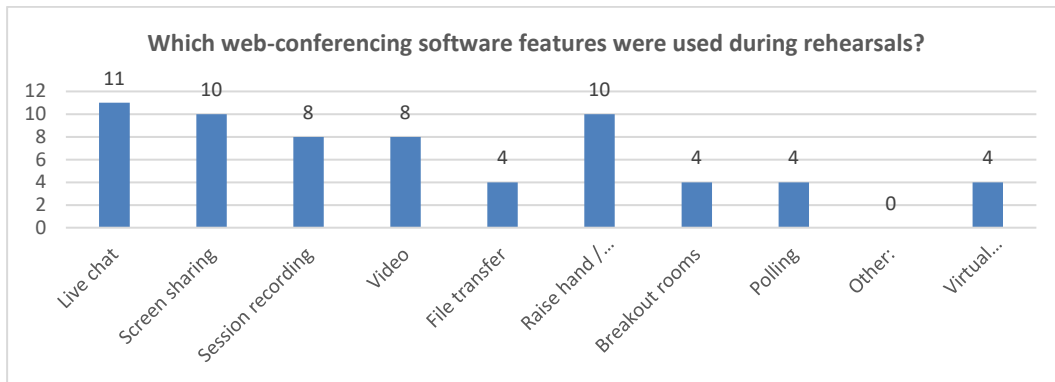


Figure 63: Web-conferencing software features used (Choir conductors)

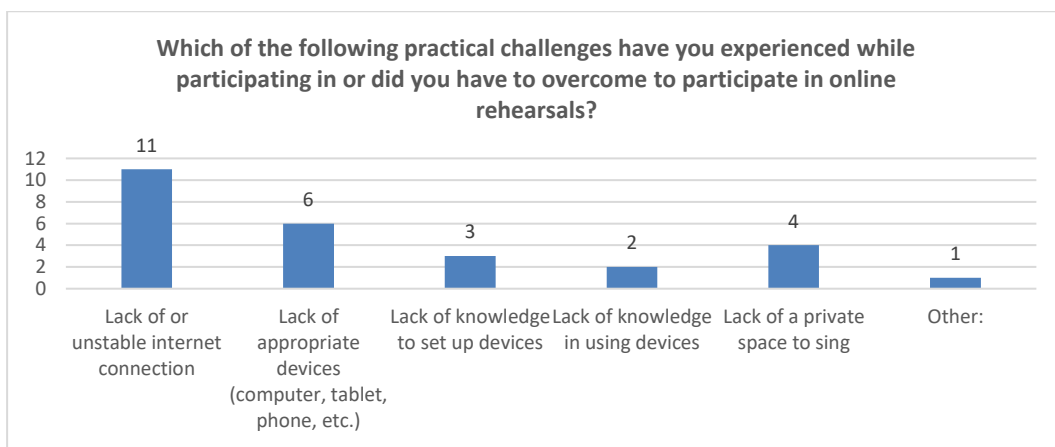


Figure 64: Practical challenges experienced during online rehearsals (Choir conductors)

Respondents were also asked for feedback on they liked about WCS rehearsals (Q25).

In terms of choir-pedagogic and musical aspects, respondents mentioned that WCS-enabled rehearsals allowed for better focus on the conductor and were more concentrated. It was also noted that the learning of individual parts worked better. Respondents also appreciated the ability to record rehearsals and share the recording with singers who were unable to attend. Other general benefits of online rehearsals were that rehearsals could continue during the COVID-19 pandemic, that singers who could not otherwise attend (e.g. due to illness) could attend, and that rehearsals were easier to organise. One respondent did not see any benefit from WCS-enabled rehearsals.

Respondents were also asked for feedback on what they did not like about WCS rehearsals (Q26).

In terms of technological aspects, respondents mentioned the inherent delay of WCS and the poor sound quality. As a consequence, from a choir-pedagogic and musical point of view, many perceived disadvantages relate to the inability of singers and conductors to hear each other and to sing together. It was noted that there is little feedback from the singers and no feedback from the conductor. Therefore, it is not possible to work on the sound of the choir. Conducting the choir is also not possible.

In general it can be said that WCS-enabled rehearsals result in a very different experience that does not meet the expectations of the singers / conductors. Nevertheless, satisfaction with WCS-enabled rehearsals gives a mixed picture (Q151). While 46% of respondents were dissatisfied with online rehearsals, 38% were satisfied. Similarly, 38% were dissatisfied or very dissatisfied with their choir's musical development during online rehearsals, while 38% were very satisfied or satisfied (Q153).

5.8 Non-participation in digitally supported singing formats

n/a

5.9 Closing

The final part of the survey asked about the potential of digitally-supported singing. As can be seen in Figure 65, the majority of respondents felt that digitally supported singing offered opportunities for new forms of musical expression and collaboration. About half of respondents strongly agreed or agreed that digitally-supported singing could widen access to music making. At the same time, respondents felt that digitally-supported singing was not necessarily more inclusive than face-to-face singing. As shown in Figure 66, the majority of respondents indicated that digitally supported singing can complement rather than replace face-to-face singing. About half of respondents also indicated that that digitally supported singing was not relevant as long as in-person singing can take place and the majority of respondents disagreed that online singing can replace in-person singing. At the same time, 75% of respondents agreed that knowledge of technical aspects and rehearsal approaches for online choirs should be part of the training of future conductors (Q159).

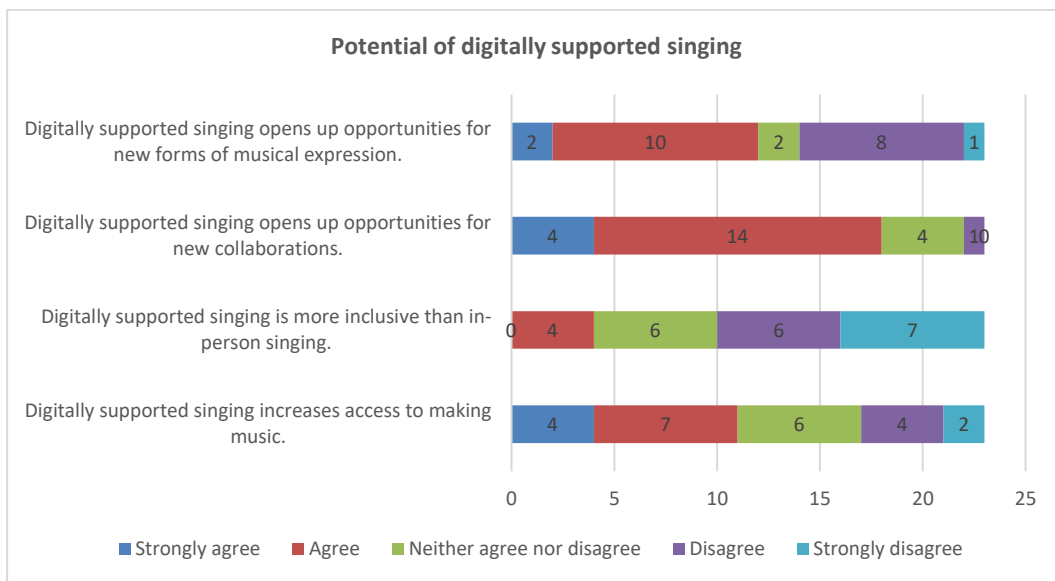


Figure 65: Potential of digitally supported singing (Choir conductors)

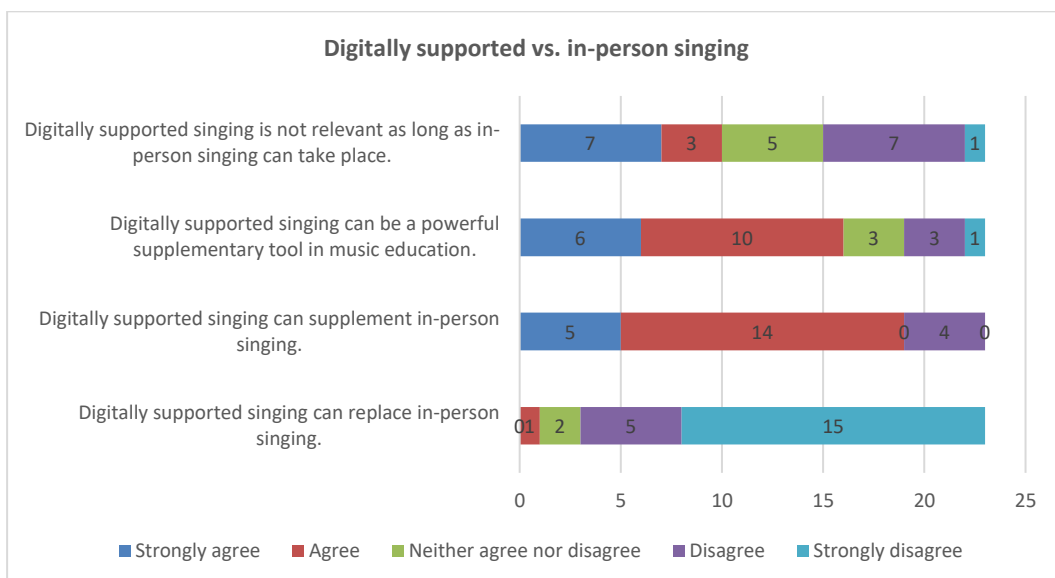


Figure 66: Digitally supported vs. in-person singing (Choir conductors)

In addition, respondents were asked what would make it possible or (more) worthwhile for you to (continue to) offer digitally supported singing activities (Q114).

From a choir-pedagogic and musical perspective, respondents asked for a technological solution that would allow them to hear and see the singers in real time, so that they could indeed conduct rehearsals online, provide feedback etc.

From a socio-technical perspective, the need to acquire new/digital skills (e.g. training materials) was mentioned, as was the need for space to make music at home.

In terms of technology, in addition to the features already mentioned (such as the ability to hear each other), respondents generally asked for accessible technology. The need for equipment and a good and stable internet connection was also mentioned.

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Abbreviations

LLS

Low-latency software

WCS

Web-conferencing system