

Use of a Tele-fitness Program for Seniors during the COVID-19 Pandemic: Excerpts of the Usage Analysis of the Movinsi! Project

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Abstract: From December 2020 to June 2021, the Movinsi! project conducted its field test to evaluate a tele-fitness and mobilization program for seniors from Austria (Hermagor) and Italy (Tolmezzo, Paluzza). Initially conceptualized as an offline program, the field trial had to be rapidly converted to an online format due to the COVID-19 pandemic. Its goals were adapted accordingly and finally consisted of motivating individuals to exercise more through targeted interventions such as exercise videos and instructions, provision of health information, and a chat to connect with other project participants across language barriers. In total, 45 people from Austria and Italy took part in the seven-month trial. Results of the quantitative usage analysis show that 31.1% of participants (n=14) used the Movinsi! platform until the end of the field test, 62.5% made use of the chat function (albeit mostly once), and the majority (73.1%) used their computers to watch the exercise videos, despite the initial conceptualization for mobile devices. The qualitative analysis of participant feedback revealed that many participants disliked the audiovisual presentation of the exercises, some would have preferred to (also) meet face-to-face, and the health-related information provided through the Movinsi! platform was overlooked by most.

1 INTRODUCTION

Physical exercise and mobilization are important building blocks for the general health of all. The University of Udine, together with the Carinthia University of Applied Sciences, the social association ALSOLE (Hermagor, Austria) and the social service of the municipalities of Carnia developed a mobilization or physical activity program in the project Movinsi! and tested it together with seniors from Italy and Austria.

2 BACKGROUND

Rural areas in Europe are struggling with a decline in population (EPRS, 2019). Especially younger generations are migrating to cities because of, e.g., more attractive education and job opportunities. (Leibert, 2014, p. 25). Consequently, the number of

older people among the population remaining in these rural areas is disproportionately high (EPRS, 2020).

Two such communities are at the center of a project realized by Italian and Austrian researchers and members of non-profit associations in the Italian-Austrian border region, which wants to increase feelings of social connectedness among older adults in these communities. This was to be achieved by inviting people to take part in a fitness training program with accompanying social activities, including cross-border meetings and exchanges, a way which has proven successful in reducing feelings of social isolation (e.g., Pels & Kleinert, 2016; Brady et al., 2020; Sebastião & Mirda, 2021).

However, a few months into the project the COVID-19 pandemic began. At first, the previously planned 3-month test run was suspended, as it was thought that the program could then be started in on-site units as planned. In mid-summer 2020, the project consortium evaluated the overall situation and

finally came to the decision to drastically change the project implementation. As a result, the concept of in-person training and meetings had to be overhauled drastically in the shortest possible time. This led to a change in the intended target group in terms of their affinity for or acceptance of technology. Initially, people with a low level of technology acceptance were included as participants in the study - in order to determine possible changes in acceptance, an evaluation of these would have been planned. Because on-site support was not possible during the project test period, these persons were excluded from the test group and a minimum level of acceptance and operating expertise was assumed. The completely offline study was changed into a completely online training program. The mobile monitoring platform initially planned became a web technology-based platform restricted to project participants (Movinsi! platform), videos of exercises were shot, voice-over instructions recorded (Italian and German) and added to the exercise videos, and a seven-month online training plan was devised (December 2020 to June 2021) which was disseminated through the platform. In addition, the platform featured weekly posts on topics deemed relevant for older adults, mostly from the areas of health and fitness (e.g., nutrition, sleep, ergonomic movement). Finally, the Movinsi! platform also included a chat function with an automated translation feature in the background. Participants from Italy and Austria were thus able to chat with each other while still using their own languages.

Physical activity programs making use of apps, web-based or other digital solutions aimed at older adults have been implemented in the past with promising results (e.g., Irvine et al., 2013; Steinert et al., 2018; Gonçalves et al., 2021). However, delivering physical activity interventions to people aged 65 and older in a web-based format can also lead to issues of exclusion and attrition (Boekhout et al., 2019). The Movinsi! project tried to include measures to try and counteract these issues. One is the aforementioned chat function to try and improve participants' engagement with the program (Alley et al., 2018). In addition, a physiotherapist was part of the project in Italy and Austria acting as a first contact point for participants, as an expert to assess changes resulting from the program and, in general, to increase participants' feelings of accountability (Geraedts et al., 2021). The addition of physiotherapists also circumvented the reliance on self-report measures by participants which run the risk of being subject to social desirability bias (Irvine et al., 2013).

In general, the physiotherapists were central to the project. They assessed participants before and after

the training program, collected verbal feedback at the end of the field trial and were accessible at all times via the website's chat function or by phone.

Presented in the next section are the quantitative and qualitative results of the platform's and training program's evaluations, based on the usage data/statistics and short conversations with participants post field trial.

3 EVALUATION

The Movinsi! interventions are designed for 65 to 80-year-old seniors from Upper Italy (Tolmezzo and Paluzza regions) and Hermagor in Austria. The persons should be able to walk at least 1km autonomously without any assistance from aids or other persons and they must be in possession (active use) of a smartphone or tablet. Exclusion criteria are mainly of a medical nature, so that persons with cardiovascular diseases (e.g., arrhythmia), respiratory diseases (e.g., BPCO), neurological diseases (e.g., ictus), uncontrolled hypertension (e.g., basal systolic pressure >174mmHg / basal diastolic pressure >100mmHG) as well as the use of psychotropic substances and medications that alter the metabolism were not allowed to participate in the study.

During the field test phase from the beginning of December 2020 to the end of June 2021 (seven months), a total of 45 people (Austria: 25, Italy: 20) were provided with a sports program twice a week with an average duration of 12 minutes (several individual videos with an average length of 34 seconds) that they were to complete. In addition to the videos with audio instructions, the participants had the opportunity to read through and use written instructions on the Movinsi! platform. Furthermore, there was an information channel on the Movinsi! platform which was played at the same rhythm as the sports program and contained information on health-related topics (e.g., healthy eating, exercise in everyday life). Finally, the participants were offered a chat function that made it possible to exchange information across language barriers (German – Italian) and to communicate through an automated translation. This Movinsi! function bundle was evaluated in a quantitative and qualitative way and the following sections describe the results after the field trial.

3.1 Quantitative Usage Evaluation

Since the conversion of the project content to a fully online version meant that technology affinity or acceptance was already given by the inclusion

criterion of technology ownership/use, the focus of the technical evaluation was on the active use of the Movinsi! interventions. The use of the Movinsi! platform as a whole, the use of the chat function and selected parameters of the use of the training program are presented below.

3.1.1 Movinsi! Platform Usage

As can be seen in Table 1 from the absolute numbers of the Movinsi! platform use, after the end of the field test 31.1% (n=14) of the initial 45 registered participants were still active and eight people of the total group even asked for continued use. Separate consideration of the genders represented in the project, female and male, does not yield any added value or allow any significant trends to be derived regarding the frequency of use.

Table 1: Movinsi! platform user development across the field test (absolute numbers).

	Total	Austria		Italy	
		f	m	f	m
Registered for field trial	45	20	5	10	10
Started field trial	40	16	4	10	10
Active participants after 1 month	33	12	2	10	9
Active participants after 2 months	29	11	2	7	9
Active participants after 3 months	24	9	1	7	7
Active participants after 4 months	22	8	1	7	6
Active participants after 5 months	17	7	1	5	4
Active participants after 6 months	14	6	0	4	4
Active participation until end of field test (7 months)	14	6	0	4	4
Use beyond field test	8	4	0	1	3

A further analysis of the usage figures at the regional level (Hermagor, Tolmezzo, Paluzza) does not show any differences, probably also due to the geographical proximity to each other. While in Italy the distribution was ten participants per region at the beginning, five persons from Tolmezzo and three persons from Paluzza finished the field test as active participants.

3.1.2 Chat Function Usage

The chat function offered to enable participants to communicate across language barriers was hardly used. During the entire field test, 25 bilingual chats were conducted, with none lasting beyond a brief "hello". Of the 40 active participants, 25 people used the chat function at least once (62.5% of active participants). Of these, nine people recorded one-time use, and seven others used the chat two times. Of the total group, there was only one person who used the chat more often to get in touch with other participants.

3.1.3 Physical Training Platform Usage – Overview

In total, the Movinsi! training platform recorded 11,112 views of the training units (playlists) during the field test (at least starting a playlist). The participants were provided with 56 training units in German and the same 56 training units in Italian (112 training units in total); this means that each training unit was viewed an average of 99 times. Looking more closely at the individual sessions, some were viewed significantly more often than others: Most prominent are session one in Italian with 975 views (8.8% of all views in total), session 1 in German with 457 views, session 3 in Italian with 347 views, but also later sessions such as session 18 in German with 206 views. In contrast, some sessions received only very occasional views, e.g., session 9 in Italian with 4 views (week of training: December 30 – January 5) or the German version which was played ten times in the same period.



Figure 1: Numbers of daily playlist calls in total.

The graph in Figure 1 shows the total daily number of calls across the sessions available at the respective times. It can be seen that over the duration of the seven-month field test, the total usage slowly decreased, but even towards the end of the field test, 51 calls (18.06.2021) per day could be recorded.

An even more precise insight into the use of the playlists is provided by the total playback time in hours, which amounts to 107.5 hours over the duration of the field test. If one considers this value with the average duration of 12 minutes per playlist, it results that on average approx. 538 playlists were played completely. Based on this number, the average total usage (playing all videos in their entire length) of each of the 112 playlists would be 4.8 times.

3.1.4 Physical Training Platform Usage – Subtitles, Devices and Operating Systems

Subtitles: During the training sessions, participants could use the subtitle function in addition to the audio output of the videos. Here, it can be seen that subtitles were mainly used in Italy (176 playlist views), even though the total number of uses was low. In Austria, the function was only used two times. If we look at the time of use, videos with a total duration of 1.5 hours were viewed with subtitles in Italy and <0.0 hours in Austria. This indicates that the use of the subtitle function was clicked on by mistake and then switched off again immediately.

Devices: According to the project proposal definition, the Movinsi! platform or the embedded platform for the training units was primarily intended for use by mobile devices. However, due to the technical implementation using web technologies, the platform could also be played or used on other devices, depending on the needs of the participants.

Table 2: Devices used to view the training sessions.

Technology	Calls	Playback time in h
Total	11,112 (100%)	107.5 (100%)
Computer	8,124 (73.1%)	80.6 (75.0%)
Smartphone	2,315 (20.8%)	19.5 (18.2%)
Tablet	563 (5.1%)	6.3 (5.9%)
Smart TV	74 (0.7%)	0.6 (0.6%)

As can be seen in Table 2, the participants mainly preferred the computer to play the training sessions. Smartphones and tablets were used much less frequently. This could be due to the better user experience through larger screens and thus larger and more visible videos. A low level of use was found for

smart TV devices, although their use was not intended at any time.

Operating Systems: Continuing with the different end devices, the types of operating systems used when using the training platform were also recorded. This makes it possible to draw even more conclusions about the technologies used by the seniors/participants.

Table 3: Operating systems (OS) used to view the training sessions.

OS	Technology	Calls	Playback time in h
Total		11,112 (100%)	107.5 (100%)
Windows	Computer	8,033 (72.3%)	79.8 (74.3%)
Macintosh		2,525 (22.7%)	23.2 (21.6%)
Android	Smartphone & Tablet	353 (3.2%)	2.7 (2.5%)
iOS		91 (0.8%)	0.8 (0.7%)
Chrome-cast	Smart TV	41 (0.4%)	0.4 (0.3%)
Tizen		31 (0.3%)	0.3 (0.2%)
Smart TV		2 (0.0%)	0.0 (0.0%)

As can be seen in Table 3, the platform-independent implementation of the Movinsi! functions enabled participants to use a variety of different systems, and this option was also taken up. In the case of the computer operating systems Windows and Macintosh, it is clear that Windows was used more often, but over 2,500 uses by means of an Apple system speak clearly for applications that are implemented browser-based. The same picture emerges for the use of smartphones and tablets. Here, Android devices were used by Movinsi! users about four times as often as iOS (Apple), but just under 1% of all calls were made using an iPhone or iPad. A broader spread can be seen with Smart TVs. First, two calls could not be assigned to any known system (see Table 3 Smart TV), 31 calls were made by means of a Tizen-based Smart TV (Samsung devices use the Tizen operating system) and with 41 calls, streams by means of Chromecast technology were used most frequently. These allow the screen of a smartphone, tablet or computer to be streamed to the larger TV screen.

3.2 User Feedback

At the end of the field trial phase, participants in Austria and Italy were asked to give short verbal feedback on the project activities. The following sections present the analysis of participant statements first from Austria, then from Italy.

3.2.1 Austria

In Austria, 22 participants gave feedback on the training program and other project activities, 18 of them female, four of them male, with a combined average age of 71.0 years. In total, participants gave 63 singular statements, which can be classified in ten categories.

The majority (13) of feedback statements by Austrian participants referred to their **use** of the training program. Five participants stated that they had enjoyed the training program and had used it regularly. An additional four participants said that they had also enjoyed the program very much but had had to stop participating due to unrelated health issues (e.g., accidents, injuries) or family issues. Another two had either used the program diligently at first and then lost some of their motivation or had partly used the program. One participant had used the program as a source of material for their own exercise group. Lastly, one participant stated that they had had difficulties with exercises that used weights but that they had then simply decided to do these without weights instead.

In total, ten statements fell into the category '**presentation**', with all of the statements rating the presentation negatively. The overall tenor was that the videos had been boring, impractical, tedious, and had seemed to have been prepared with little care. Participants also noted that the videos had not been very motivating and had lacked joy. Finally, one participant had found the speed of the presentation too fast to remember all the exercise steps that were shown in the video.

In terms of participant feedback, the presentation of the exercises was closely related to the (**technical implementation**) of the training program. Overall, nine participant statements fell into this category. One participant stated that they had liked the format of the videos and instructions, but found it too bad that the program had been online. Four participants noted that having to press play and pause around every exercise in a single training session had been very inconvenient, with one of them adding that the recurring introductory portion of the videos had been annoying. The use of YouTube, its cookies, and especially its recurring advertisements were noted as having been unfavorable by three participants, one of whom went so far as to do the exercises without watching any videos and using only the written descriptions as instruction. One participant said that

they had tried to contact the physiotherapist via the chat function on the website but had never gotten a reply. Finally, one participant had missed the personal contact due to the online format and would very much have liked to get in touch with participants from Italy.

The category '**non-use**' comprised eight participant statements. In cases where participants had used the program at first but later had to stop, statements were also counted in the 'use' category. Two participants stated that they had used the program in the beginning but that they had had to stop due to health reasons. Two additional participants stated specific health issues, most likely as reasons for not having taken part in the training program after some time or at all. One participant said that they had begun with the training program but had had to stop due to a family emergency. Another participant had had a look at the program but had not taken part in it. Finally, two participants said that they had been unable to use the program at all because they had had very little time for themselves during the time of the field trial phase, both citing the large amount of snow and the corresponding work as the main reason.

The fitness program 'Fit with Philipp' (German: 'Fit mit Philipp'¹) was mentioned in seven statements as an **alternative** that participants had switched over to after trying out the project's program and not liking it. Fit with Philipp is presented weekdays on Austria's national public service broadcaster ORF and focusses specifically on older adults and people who have difficulties staying active. The 20-minute program has been on air since late March of 2020, won the Austrian television award for best lockdown format in 2021, and is highly popular among older adults. Two participants mentioned other alternatives to the project's program, among them riding their bicycle and swimming (summer) or snowshoeing and walks (winter). One participant stated that they had switched to something else without giving further details.

The **content** of the training program and platform was the topic of five feedback statements. Three participants liked the program and the exercises, another participant liked the slow build-up and increase in difficulty as well as the informative pieces of advice (presumably the complementary content posted on the website). Finally, one participant would have liked more variety in the exercises of the warm-up and cool-down sections.

In five statements, participants gave suggestions on **improvements** for the training program. The

¹ Online: <https://tvthek.orf.at/profile/Fit-mit-Philipp/13892249/episodes>

desire for more variety in the warm-up and cool-down sections has already been noted in the ‘content’ category but can also be seen as a suggestion for improvement. Two participants suggested that the structure of the program could be improved by first mentioning the aids (e.g., pole, weights) that were going to be needed for the exercises, and one of these participants added that presenting a continuous program for 45 minutes without advertisements would be much preferred. Another participant noted that the program should include enough time to perform the exercises presented in the videos. Finally, one participant stated that the training program could have been improved by being carried out in a gym once a week.

The **effect** of the training program was the topic of two statements, albeit from the same participant. For a start, the participant stated that they had profited from taking part in the program. In a follow-up statement, they then went into detail and said that their balance had improved due to the exercises. The results of the physiotherapist’s follow-up testing corroborated this subjective feeling.

In two statements, participants noted that they were interested in either a continuation of the existing program (including the use of existing exercises), or taking part in a new program if that program was offered in a face-to-face setting (**intended use**).

Lastly, two participant statements can be seen as **general** comments on the project. One participant stated that they liked the idea, presumably of offering an online training program. The other participant expressed their gratitude of having been able to take part in the project.

3.2.2 Italy

In Italy, participants were asked for their feedback in phone calls. In total, twelve participants were interviewed and asked to answer a series of yes-no questions and one open-ended question for suggestions and comments. Table 4 presents the results of the yes-no questions.

In addition to answering the yes-no questions, seven of the participants also gave **short statements** about the project and its activities. Of these, two noted that a training program works better if it is conducted in a group setting because being part of a group is more motivating and helpful. Another two participants stated that it would have been better had the exercises been presented in a continuous lesson instead of in pieces and one of these participants mentioned a fitness program on TV which they had preferred to follow because it presented the exercises

Table 4: Results of Italian feedback questions (absolute numbers).

Question	Yes	No
Did you like the project?	11	1
Were the exercises clear?	12	0
Were the exercises useful?	11	1
Did you have access to the app?	10	2
Did you have difficulties using the app?	3	9
Did you have the opportunity to read the contents written on the app?*	4	8
Did you find them useful?*	--	3
Would you like to repeat the experience in-person?	11	1
Would you be willing to have a face-to-face discussion?	11	1

*Many did not notice the section on the website.

in a more convenient way. One participant would have liked regular evaluations on their progress every two or three sessions to see if they had done the exercises correctly. Another participant expressed difficulties in working with video instructions because they had problems switching their focus back and forth between the video and themselves doing the exercise.

Finally, one participant gave a longer statement touching upon several points. They said that the program had started out well but that the exercises had been mechanical and, thus, not very attractive. They had also missed explanations on how not to get hurt. They found that carrying out the exercises with only the help of online video instructions had been difficult because this setting does not allow for pointers on how to do the movements correctly. Lastly, to this participant it seemed that the interests/problems of older adults had not been actually known but based on stereotypes.

3.3 Discussion

Even though several Austrian participants stated that they had enjoyed the training program, and some of them are still using the Movinsi! platform after the field trial, the main takeaway from participants’ feedback statements is that the presentation of the exercises was poor and the technical implementation challenging. The negative feedback on these two factors is not entirely surprising, seeing that the training program had to be changed rapidly from the initial face-to-face plan into an online format due to

the COVID-19 pandemic. Hence, planning and coordinating the videos and audio descriptions as well as setting up the online platform could not be done with as much attention to detail as it would have been had the training program been conceived as an online program right from the start.

Participant feedback statements also revealed that the fitness program 'Fit with Philipp' on Austria's national public service broadcaster ORF is a strong alternative, which other programs seem to get compared to immediately. Future tele-fitness programs implemented in Austria are going to have to take this into account.

Finally, participant statements showed a noticeable lack of references to the complementary content on the website, i.e., information on health relevant topics such as nutrition, ergonomics or sleep. This is a strong indicator that participants did not take notice of this section on the platform which points to a lack of communication and information about the existence of this content. This needs to be taken into consideration in future projects.

Overall, the feedback by Italian participants was more positive. They liked the project, found the exercises clear and useful, had access to the app and largely no difficulties in using it. They would like to take part in a similar training program if it was in-person and would be willing to have a face-to-face discussion. The two items in Table 4 marked with an asterisk (*), however, revealed the same issue which already became apparent from the Austrian participant feedback: The section on health relevant information and its weekly updates was hardly, if at all, noticed. This underlines the suspicion expressed in the discussion of the Austrian participant feedback in that communication about the existence of this section on the website was insufficient.

The verbal statements by Italian participants pointed to some of the main issues of the training program. Participants missed the group setting of an offline class and listening/watching online video instructions while at the same time doing the exercise can be difficult for some. The presentation of the content was seen as not very appealing and important aspects, such as explanations on how not to get hurt, were felt to have been missing. Finally, one participant made an important statement in that they felt that the needs of older adults had not been actually known but based on stereotypes.

The verbal feedback statements partly picked up topics expressed by Austrian participants. However, the difficulties of perhaps especially older adults with switching their attention between online video instructions and doing the exercise movements

themselves is an important and valuable new addition, which has to be taken into consideration when planning tele-fitness programs for this target group. The same is true for the statement which expressed the feeling that the needs of older adults were based on stereotypes instead of actual knowledge. This points to the general importance of a user-centered and participatory approach to developing digital (and other) solutions for specific target groups, e.g., older adults.

4 CONCLUSIONS AND OUTLOOK

The main lessons learned from the Austrian and Italian participant statements can be summed up as follows:

- A lot of care needs to be put into the presentation (video, audio) and technical implementation (no cookies or advertisements) of the training videos.
- The contents and functionalities of the platform in use (app, website, etc.) need to be conveyed adequately.
- Incorporating regular face-to-face meetings or sessions into the training program would be beneficial for older adult participants.
- Established training programs on other channels (TV, internet, etc.) are strong alternatives and need to be taken into consideration.
- Content needs to be conceptualized by involving members of the target group in order to learn about specific issues and needs.

While the low number of users at the end of the project and the constructively critical feedback from participants may seem to be a setback at first, they also motivate the project team to continue working on the topic of tele-fitness. Especially the aspects of user-centered design (ISO, 2019) and a hybrid version with a mix of online and offline training could help a follow-up project of Movinsi! to get more use. It is also important to better introduce participants to the platform's functionalities in the online setting. The platform-independent implementation approach, which allows participants to choose the end device freely according to their own needs (e.g., screen size), has proven positive. For follow-up projects in this research area, the main goal is to conduct an efficacy analysis, which requires randomization from a larger cohort of potential users as well as a control group.

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