On-line vs. On-site Dance for People with Parkinson’s Disease: An Evaluation Study

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Abstract

Background: Dance for people with Parkinson’s disease (PD) has received much attention with studies showing its benefits in terms of physical and psychological changes. As people with PD experience barriers to participate in on-site activities, home-based telehealth interventions are becoming increasingly popular. This study examined the differences between digital and on-site dance for people with PD.

Methods: This evaluation study used a secondary qualitative analysis of focus group data from six participants with PD who had experience of digital and on-site dance, as well as two interviews with the dance teacher of both dance formats for people with PD. Thematic analysis was used to analyze the data.

Results: Both the dancers and the dance teacher reported how the social and artistic aspects of on-site dance are not present to the same degree in digital dance. These aspects were experienced as important for acceptance of oneself and PD.

Conclusions: This evaluation study demonstrates that the social and artistic aspects of dance are not experienced to the same degree within both types of dance. As these aspects were closely connected to acceptance of oneself and PD, this study encourages future efforts to focus on the social and artistic constructs within digital dance.

Keywords  
Parkinson's disease, dance, telemedicine, evaluation study, qualitative research, focus group

Introduction

Worldwide, there are approximately seven million people with Parkinson’s disease (PD), making it the second most common neurodegenerative disorder. PD is characterized by the core motor symptoms of slowness of movement, postural instability, tremor and rigidity (Kalia & Lang, 2015). However, a wide range of non-motor symptoms, such as cognitive deficits, pain, anxiety and gastro-intestinal symptoms, are experienced by the vast majority of people with PD (Rodriguez-Blazquez et al., 2021). Furthermore, as there is currently no cure for PD and its standard treatment is associated with cumbersome side effects over time (Huot et al., 2013), non-pharmacological treatment options have been described as an essential complement to medication (Bega et al., 2014; Sharpe et al., 2020).
One example of such a non-pharmacological intervention that has shown to bring about positive changes in the lives of people with PD is dance. Dance is especially interesting because of its physical, cognitive, emotional, rhymical, and social nature (Dhami et al., 2014), thus tackling several PD symptoms as well as the isolation and stigma that people with PD often experience (Maffoni et al., 2017). Dance for people with PD is part of a larger umbrella term Dance for Health, which The International Association for Dance Medicine and Science (IADMS) describes as “holistic, evidence-based activities for the individual to manage and adapt to physical, mental and social health challenges. In Dance for Health sessions, trained teaching artists engage people as dancers, rather than patients, in joyful, interactive, artistic activity” (IADMS, 2022).

During the past two decades, researchers have especially focused on dance’s ability to bring about changes related to wellbeing, as well as physical and cognitive health (Sheppard & Broughton, 2020), yet its artistic, aesthetic and creative contributions to health and wellbeing have received less attention (Chappell et al., 2021). The same pattern holds within the PD population, where numerous studies have reported that dance for people with PD leads to improvements in motor symptoms and functional mobility (Carapellotti et al., 2020; De Almeida et al., 2021; dos Santos Delabary et al., 2018; Kalyani et al., 2019). Furthermore, people with PD have described a sense of connection with others, as well as the experience of both positive and negative emotions during dance (Beerenbrock et al., 2020; Bognar et al., 2017; Rocha et al., 2017).

As people with PD experience barriers to participate in on-site physical interventions (Ellis et al., 2013), digital home-based interventions are becoming increasingly popular. Moreover, the COVID-19 pandemic has amplified such barriers for people with PD and led to higher levels of social isolation, which has been shown to aggravate both motor and non-motor symptoms (Hermanowicz et al., 2022). As a consequence, studies examining digitally based solutions to support people with PD during this trying time have become more popular and have led to a better understanding of the acceptability and effectiveness of digital interventions focused on physical exercise (Ellis & Earhart, 2021; Langer et al., 2021).

Recently, a 10-week digital dance intervention for people with PD in the Stockholm region in Sweden was shown to be feasible and safe, as well as demonstrating significant improvements in both self-reported depressive symptoms and quality of life (Walton et al., 2022). The study’s qualitative findings also showed that digital dance was experienced as joyful and brought about several mental and physical benefits similar to those observed in on-site dance. However, participants indicated some limitations to digital dance, such as its increased individual focus, issues related to the dance environment, and the lack of social contact. Participants noted how these constraints were associated with the artistic side of dance. In a world of continuous digitalization that enables increased societal participation for people who experience barriers to on-site activities, it seems important to understand the differences between such on-site and digital activities. Especially in terms of dance, which besides being a physical and cognitive activity, also encompasses emotional, social and artistic aspects, the question remains if such aspects of on-site dance also translate into the digital world.

The goal of this evaluation study was therefore to examine the difference between digital and on-site dance for people with PD according to the dancers and their dance teacher, by performing a secondary qualitative analysis of the data from this manuscript’s parent study (Walton et al., 2022), in line with the guidelines by Ruggiano and Perry (2019). Furthermore, we conducted two interviews with the dance teacher who had taught both dance formats.
In doing so, we aim to answer the following research question: How do digital and on-site dance for people with PD differ from each other according to the dancers and the dance teacher?

**Method**

**Design**

This study aimed to examine how digital and on-site dance classes differ from each other according to people with Parkinson's disease and their dance teacher. Its design encompasses an inductive methodology in order to remain as close as possible to the participants' experiences, after which the findings will be put in relation to previous research within the area. This study can be regarded as an evaluation study, as it is interested in understanding the view of the participants regarding a certain type of service (Wilkinson, 1998). Furthermore, the study is connected to a parent study that was performed by our team (Walton et al., 2022).

**Participants**

Nine participants partook in the focus group interviews (completed in December 2020), of which data from the six participants (five women and one man) who had previous experience of on-site and digital dance for PD was assessed for this study. These participants were spread out over the two focus groups, with three in each group. The participants were part of a larger group that had completed 10 one-hour weekly digital dance classes for people with PD (N = 23). That larger group of participants had a mean age of 70.4, 74% were women, mean years with PD was 8.3 years, and 57% reported being in good to very good health. More information about the larger group of participants can be found in Walton et al. (2022). Beyond the sex of the participants who are included in the current study, no other demographic variables are available.

A certified Dance for Parkinson's disease (DfPD) and experienced dance teacher was interviewed twice, that is, once by the second and third author (January 2021) to discuss the dance teacher's experience of digital dance for PD, and another time as a follow-up interview by the first author (December 2021) to shed light on the dance teacher's experience of the artistic side of dance in digital dance.

**Ethics approval and consent to participate**

Ethics permission was obtained from the Swedish Ethical Review Authority (Dnr 2020-00544). The research was performed in compliance with the Helsinki Declaration. Informed consent was given by all participants before participating in the focus groups and interviews. Information about the goal of the study and the rights of the participants was provided verbally to all participants. Participants were also made aware that they at any time could decide to withdraw their participation. Furthermore, information concerning confidentiality and data management was discussed before the interviews and focus groups started.

**Digital Dance Class**

The digital dance classes were held via Zoom, and followed the DfPD protocol, yet were adjusted to fit the digital format. The classes were scheduled once a week for 60 minutes, and consisted of 10 sessions taught by a certified DfPD and experienced dance teacher. More information on the set-up and safety regulations of these digital dance classes can be found in Walton et al. (2022). Furthermore, all participants had experience of on-site DfPD
that was provided by the same dance school. Experience levels varied between the participants, yet all had completed at least one 10-week cycle of on-site DfPD at the same dance school in the past.

Data Collection
All three authors of the current study were involved in the parent study, that is, they were responsible for the conceptualization, recruitment, data collection, data analysis, and manuscript. When conducting the parent study, our team recognized that an important research question concerning the difference between digital and on-site dance needed to be addressed. Therefore, a part of the current study made use of a secondary analysis of the dancers’ data from the parent study, and has followed the recommendations on such secondary qualitative analysis by Ruggiano and Perry (2019). Additionally, two semi-structured individual interviews with the dance teacher were analyzed to investigate the dance teacher’s perception of how digital and on-site dance differ. The research question that this study aims to answer can therefore be seen as a development during the parent study’s data collection.

The dancers were informed about and invited to partake in the focus group interviews by the dance teacher after the last dance class. Two focus groups addressing the experience of digital dance were held by the second and third author. Each group consisted of 4–5 participants, and was approximately one hour in duration. This time frame was decided upon beforehand, yet was experienced as a natural time to end. Participants were able to voice any additional information that had not been touched upon during a final question round. The dance teacher was asked to participate in the semi-structured individual interviews by one of the researchers. Beyond the relationship as researcher and research participant, the researchers had no other relationship to the participants. The researchers did not participate in or observe any of the dance classes.

Data Analysis
The data was analyzed through an inductive approach according to principles of thematic analysis (Braun & Clarke, 2013), which allowed for an open-minded perspective to the analysis and ensured that the eventual themes were closely linked to the participants’ responses. The qualitative data analysis software NVivo 12 was used to analyze the data. The following steps of thematic analysis were performed. First, the two focus group interviews were transcribed by the second author, and the interviews with the dance teacher were transcribed by the first author. Transcription occurred in Swedish, and only the quotes selected for the publication were translated to English at a later stage. Data familiarization was conducted by the first author, through listening to the audio files and reading the transcripts multiple times. Preliminary codes were formed by the first author, and subsequently discussed with the other authors. Afterwards, a complete coding of the transcripts was performed by the first author, through using both latent and semantic codes. Emerging themes were then discussed with the second and third authors, and compared to the original data set. Additional subthemes, relationships between the themes, and alternative themes were discussed together within the group of authors. Rigor was ensured through using a recursive process of ongoing discussions between the three authors concerning how the original data relate to the emerging themes. Data analysis was completed when all three authors agreed upon the themes and the supporting quotations. Member checking was performed together with the dance teacher regarding the two interviews, while findings from the focus groups were presented for some of the participants at a conference organized by the dance school.
In doing so, the team aimed to ensure that the participants recognized the findings as representative of the data they had provided.

**Results**

**Themes related to the dancers’ experience**

In general, the below themes describe a two-sided process that occurred specifically within on-site dance and evolved as the classes progressed. Participants then contrasted this process to their experience of digital dance, in which some elements of on-site dance were found to be missing.

At first, participants experienced both the on-site and digital dance classes primarily as an exercise form, which was indicated as the main reason for attending. They expressed increased self-consciousness, feelings of shyness and insecurity, as well as concentrating on performing the dance steps correctly. However, within on-site dance, participants began to let go of the preoccupation with themselves and started to feel freer within their dance over time. This change of mindset is captured by the first theme **Becoming a Dancer.** Within digital dance, the participants did not experience such a change and instead reported ongoing self-conscious feelings and thoughts, as well as feeling limited to move freely.

*Zoom is great. But I think that you do move in a different way when you have everyone around you. You are a bit limited at home. It is a bit cramped and messy at my place, so I have to move things around. And I don't perform the movements properly, I think. I would like to move more (stretches our arms), to follow in a different way. (Participant 1)*

*You become freer the longer you keep at it [on-site dance]. Then you feel more like a dancer. You dare to live it up more. In the beginning, you are very stiff and you're afraid to make mistakes, but after a while, you don't care anymore. You do it in your own way, a way that works for you and for the movements you are able to do. It's a challenge, but it's very rewarding. (Participant 5)*

The second theme, which is called **Becoming a Community,** describes a sense of security and a deeper connection between the dancers that developed over time within on-site dance. The sense of community satisfied many needs, such as social contact, learning from others with PD as well as a form of social support. Within digital dance, participants indicated that such closeness between the group members was not achieved. Before the digital class, there was time dedicated to informal chat before the class started, yet it was not often used and the technical difficulties related to turn-taking in digital conversations were experienced as cumbersome.

*I truly miss the community, to be in the same room and to do. You really lift each other up also. You are physically present together and the social part, getting to know each other. It is hard in the beginning because you feel insecure, but you grow with it all and you are in the group. So, I miss that a lot actually. I think it will be really nice to go back to the physical part when it starts again. (Participant 5)*

*I have experienced that meeting others with PD, that that experience becomes stronger when you physically meet each other [on-site], even if we aren't allowed to talk about PD [during the dance class]. But, we see each other and feel each other in a different way there compared to the other group [digital dance]. It isn't the same holistic experience either. (Participant 2)*
By moving through these two themes of *Becoming a Dancer* and *Becoming a Community*, participants reported that they experienced on-site dance as an art form, an emotional outlet as well as a way to express their identity, almost a form of refuge. This is captured by the third theme *A Whole New World*. It focuses on how participants left their worries and daily hassles behind and became aware of a different way of being and thinking. Participants indicated how reaching the experience of *A Whole New World* forced their PD to reside into the background. The participants became dancers, as opposed to patients. Participants indicated that this artistic experience was more present within on-site dance compared to digital dance.

There was something artistic about it all [on-site dance] too, that there was another layer to it and that was really fantastic. To just experience it and follow along. It’s also a lot of fun. You go off and sort of play with it. I don’t mean that it is easy or banal, but instead off you go, and it is as if you are leaving all of this and stepping into this artistic world, like you [the interviewer] said, as a dancer. It’s really wonderful. (Participant 2)

Furthermore, participants reported that the change from individual focus to a freedom in on-site dance was dependent on the group getting to know each other, thereby linking together the three themes *Becoming a Dancer*, *Becoming a Community* and *A Whole New World*. A visual depiction of how these themes may be related to each other can be seen in Figure 1.

![Figure 1](image)

**Figure 1.** Schematic representation of the relationship between the themes from the focus groups that describe the experience of people with PD during on-site dance and its differences with digital dance.

The below citation also exemplifies how the perceived artistic experience of on-site dance and its link to being present together was more difficult in digital dance as opposed to on-site dance.
And, it was this big dancefloor, and "Now you may improvise", and it finally felt like I could take something from within. And that is much easier in a room where the others are, compared to being in this square [digital dance]. Because, then I look at the person who I should be doing the same [movement] as. Instead of taking it from within, I try to take it from the outside. (Participant 6)

As a final theme, participants described that the experience of on-site dance as *A Whole New World* helped them to accept their PD, which is captured by the theme of *Discovering and Accepting Me*. It highlights the re-identification and acceptance that on-site dance brought about. For instance, they reported increased pride for having completed an activity that is beneficial for mind and body, yet also for being a dancer. They described a sense of wonder related to how on-site dance had led them to discover new aspects of their identity. Within *Discovering and Accepting Me*, participants explained that being present in the same room and seeing others with PD was an important pre-requisite for the experience of several emotions. Participants described a feeling of sadness and grief when seeing people with more advanced PD dance. Yet, the realization of one’s ability to grow and find adaptations for certain movements also evoked joy and a hope for the future. Such emotional experiences when dancing together with others with PD was related to acceptance of oneself and PD, as participants became more aware of their own abilities despite their limitations. Participants described that such a decreased focus on PD was more difficult in digital dance, as one is not present together in the same space.

There is a negative side to this too when you see each other and you see that some of the other dancers are in more advanced stages of the disease and are struggling. Then I always think, “Will it be like that for me too?” But if you then see that they can also manage, then you understand that you can do a lot even when you become worse. (Participant 4)

Live on the dance floor, I can see that the person two meters away from me, looking at the movements, is affected by the disease (PD). And then, I don’t think about what he or she can’t do. Instead, I think about what they actually do and that is a big difference of course. Because it becomes in some way not something to be shameful about, but an asset. (Participant 6)

Themes related to the dance teacher’s experience
One overarching theme and three sub-themes were identified in the interviews with the dance teacher, see Figure 2.

| Digital Limitations | Needing Creative Solutions | Development Over Time |

*Figure 2.* The theme Social and Artistic Challenges and its three sub-themes that were identified in the interviews with the dance teacher

The overarching theme *Artistic and Social Challenges* describes how the dance teacher experienced working with the social and artistic side of dance in digital dance as a challenge that demanded more time and energy.

And it is that that is the challenge for me. How can I reach each person? How can I make sure that each person, even though they are sitting at home, can feel some kind of freedom and security to express themselves?
The first sub-theme *Digital Limitations* captures the constraints of digital dance, such as limited space and being alone at home, making social contact more difficult. She highlighted that social contact consisted of both dance as a communication form and dance as a social activity, which were both limited in digital dance. Furthermore, she reported a lack of direct feedback from dancers, and less insight into the dancers’ experience during digital dance, especially due to the size of the screen and the difficulty in seeing the expression of the dancers. Lastly, the teacher indicated that an important ingredient to the artistic experience of on-site dance is being present together in the same room as the below fragment exemplifies.

I believe it is like a dynamic or some kind of magic that is created in the room in on-site dance. That everyone is concentrating and in on the same feeling. And then we are performing something that feels like something bigger.

The second sub-theme *Needing Creative Solutions* describes how the teacher worked together with the dancers to overcome the differences between digital and on-site dance by implementing pedagogical adaptations. These aimed to encourage the artistic and social experience within digital dance, by for example asking the dancers to direct certain movements at each other, and by alternating between the views in Zoom during different parts of the dance lesson.

We have found solutions together. For example, cameras should be on. I say hello to each person by name and they greet each other too. In exercises, I have sometimes also tried, for example, that everyone with red clothes will dance now, and the others watch, and then the other way round. Then they get to know each other a little better.

To encourage awareness of the ongoing activity and to ensure that the dancers were not solely mirroring the teachers’ movements, the teacher verbally reminded the dancers to pay attention to their body and the surrounding space. She also reminded the group that they were gathering as dancers, and may experience emotions that arise during dance. Participants were thereby reminded that they were not just moving their bodies, they were dancing. Such reminders were also part of on-site dance, yet were a more common occurrence in digital dance.

We meet and dance in silence. We can look at each other and follow each other’s movements [in on-site dance]. In doing so, you get to know each other. In some way, it is a different type of social understanding… that we dance together with each other, together we create the magic. Digitally, I need to remind us all about that.

The last sub-theme, *Development Over Time*, captures the changes within digital dance after having taught digital dance for a year (at the time of the second interview). The teacher described that the social aspects of dance became more prominent in digital dance over time leading to an increased artistic experience. She saw this change as a journey during which both the dancers and the teacher paid increased attention to these social and artistic aspects.

It is important to meet before and have a cup of coffee and chat afterwards, and that is what one misses in digital dance. But those who have been participating in digital dance for over a year now, they are starting to talk more before the digital dance class. They have found a way to communicate, to get the social benefits of dance too.
Discussion
This study examined the difference in the experience of digital and on-site dance for people with PD according to the dancers and dance teacher. Previous work from our group has shown that digital and on-site dance were experienced as similar in many ways, that is, participants experienced physical, emotional and cognitive benefits of digital dance (Walton et al., 2022). However, findings from interview data with the dance teacher and a secondary analysis of focus groups with the dancers highlight numerous differences between on-site and digital dance. In general, both dancers and the dance teacher acknowledged that digital dance does not easily accommodate the artistic and social aspects of on-site dance.

The themes that captured the dancers’ experience described a two-sided process that developed over time in on-site dance where one becomes less preoccupied with oneself and performing the movements correctly (Becoming a Dancer), whilst also growing as a group (Becoming a Community). This two-sided process was central to experiencing the expressive and artistic side to on-site dance (A Whole New World), which was stated as an important aspect for increased acceptance of oneself and PD (Discovering and Accepting Me). The participants indicated that these social and individual changes, as well as the connected artistic experience of dance, did not occur in digital dance, as they experienced more self-consciousness and boundaries around participating in social contact. The themes related to the dance teacher’s responses also focused on the social and artistic experience of dance. Here, the sub-themes of digital limitations and the need for creative solutions described how the dance teacher was aware of and actively trying to work with these aspects that the dancers experienced as more difficult to achieve in digital dance.

Though several studies have examined the feasibility, safety and experience of digital dance for people with PD (Bek et al., 2021; Morris et al., 2021; Walton et al., 2022), this study adds to our understanding by contrasting the experience of digital dance with that of on-site dance in the PD population. Previous work has demonstrated that people with PD were positively surprised and thankful for having the opportunity to dance digitally even when barriers hindered them to participate in on-site dance classes (Kelly & Leventhal, 2021; Morris et al., 2021; Walton et al., 2022). This is important information, as people with PD experience such barriers to a higher degree than the healthy older population even outside the COVID-19 restrictions (Ellis et al., 2013) and a correlation has been observed between symptom severity and level of activity in this population (Song et al., 2020). Such findings strongly encourage the use of digital tools to reach a population that is often excluded from society, through safe activities that are beneficial for both body and mind. The current findings add to the understanding of such telehealth interventions through providing nuance in how the different components of on-site dance can be translated to a digital format. Furthermore, the findings encourage dance teachers to continue reflecting on various ways of including artistic and social aspects of dance in a digital format, which can thereby encourage acceptance of oneself and PD.

Even though the artistic aspect of dance has received less attention in research, one recent systematic review identified that dance is able to contribute to health and well-being through the processes of identity, belonging, self-worth, creativity, embodiment, affective response and aesthetics (Chappell et al., 2021). Other studies looking at dance within the PD population have also noted the importance of social contact and becoming a group within on-site dance (Bek et al., 2021; Bognar et al., 2017; Houston & McGill, 2013; Hulbert et al., 2020; Kunkel et al., 2017). Such themes are echoed in the current study, for example, the importance of belonging and its relationship to the immersion and escape (often interpreted as being part of embodiment) that dancers experienced in the theme A Whole New World.
Furthermore, the current findings show that the artistic and social aspects of dance were important for one’s ability to accept oneself and PD, as observed in Discovering and Accepting Me. Within this theme, participants indicated increased feelings of pride, and dance may thereby be acting as a tool for alleviating feelings of shame, which are common in people with chronic illnesses (Stage, 2022). Thus the social and artistic aspects of dance may play a prominent role in Dance For Health’s goal of supporting people in coping and adapting to physical and mental health challenges (IADMS, 2022). The question remains if some of the effects of dance in terms of health and well-being are reliant on such social and artistic qualities of dance, that is, can dance be experienced in different ways and still lead to the same health-related benefits? Our hope is that future studies will continue working with the identified differences between digital and on-site dance in order to implement strategies to boost the social and artistic experience of digital dance, and assess their impact on self-acceptance and other health-related outcomes.

Another noteworthy finding is the change over time that was observed by the dance teacher in the social and artistic experience of digital dance, which was captured by the theme Development Over Time. Such changes in how connected one feels to others in digital tools has also been reported in a meta-analysis on digital home-based support groups (Banbury et al., 2018). There, participants indicated that a sense of connection took longer to experience due to the online environment. Future studies could assess if it could be beneficial to first focus on the social aspects of the group, potentially through a (number of) session(s) purely focused on encouraging connection between the dancers through the usage of breakout rooms. Such pedagogical changes may influence the participants’ ability to experience digital dance as an artistic activity, as the current findings demonstrate the interrelation between these social and artistic processes.

Finally, several limitations of this study need to be raised. First, as in all research, yet especially within qualitative research, context matters. Beyond the fact that our participants are interested in dance and were highly motivated to complete the intervention, it is necessary to reflect on how the pandemic context may have influenced the findings. This confounding variable that is connected to the digital dance experience may have led dancers to reminisce about their experience of on-site dance, in the sense that one can think of the “good old days”. Furthermore, this secondary analysis was performed through using data with the main goal to capture the dancers’ experience of digital dance. A stricter focus on how digital and on-site dance differ from one another would have led to an even deeper insight into these differences. However, as all three authors were active in the parent study’s data analysis, there was suitable knowledge of context concerning the data. Therefore, the secondary qualitative analysis that is performed here can be seen as sprouting from our parent study, which led us to examine an additional research question on the difference between digital and on-site dance. Nevertheless, the sample size and restricted geographical location should be considered when reflecting on the generalizability of the findings. Finally, NVivo as digital software to analyze qualitative data has been debated, with some researchers claiming that it may lead to decontextualization of the data, whilst others voice NVivo’s ability to allow researchers to spend more time on the actual analysis instead of more logistics tasks, such as scanning through large text files (Hoover & Koerber, 2011). NVivo is able to organize codes and themes in a manner that is easily accessible to the researcher, yet researchers must ensure that all data is regarded within its larger context. As an aid, the iterative nature of thematic analysis, especially when performed as a group, encourages researchers to perform the analysis with an eye for both the details and the larger context.
In conclusion, this study aimed to evaluate the difference between on-site and on-line dance for people with PD and shows that on-site and digital dance for people with PD differ in relation to their social and artistic aspects. It thereby encourages further investigation into methods to make digital dance interventions more social and artistic. Besides the pedagogical adaptations that this study highlights through the dance teacher’s responses, another possibility worthy of examination is the use of virtual reality when dancing digitally. A recent qualitative study assessing the use of virtual reality in home-based dance, which allowed participants to dance together with others and see their dance partners in virtual reality, reported that participants experienced both the sense of community and the artistic outlet that the current findings highlight as missing in digital dance (Piitulainen et al., 2022). Future studies are thereby encouraged to examine if such virtual reality tools could be a possible solution to the limitations of digital dance that the current study describes.

Competing interests
The authors declare that they have no competing interests.

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