



Dance and Technology: Different Readings of the Technologically Mediated Body

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Abstract. This article investigates the relationship established between dance and technology in the contemporary artistic-creative scope, with special focus on the different poetic developments present in the body and dance in virtualized contexts. Such reflections seek to understand and deepen their modes and structures of creation, the different relationships established between movement, body, and technology, as well as their receptivity and interactivity with the public and / or spectator. As a methodology, the article focuses on the production of knowledge from the investigation and reflection on theoretical research developed in the area in conjunction with the practical analysis of works relevant to the proposed discussions. To this end, the research is based on theoretical studies on dance-technology (SANTANA, 2006; AMORIM, 2009) and screendance (ANGELI, 2020 and 2022; CALDAS, 2012), in addition to proposing the analysis of two Brazilian artistic works produced in this creative category and important for the reflections on dance and technology: the screendance *Unusual* (2018) and the artistic work *Interferences* (2022).

Keywords: Dance · Technology · Creation

1 Introduction

In the artistic field, the production of artistic works mediated by technology has become increasingly frequent, showing itself as a territory with great potential for expansion today, in which dance is included.

The dances are contaminated by stimuli present in their environment and, together with technology, find different ways of acting, causing ruptures in the boundaries between face-to-face and virtuality. As pointed out by Carvalho; Pronsato (2020), digital culture and technological mediations present in contemporary artistic productions have transformed the ways of thinking and doing dance, providing new ways to look at the body and movement and provoking transformations in spatial and temporal relations.

Initially, this article brings the reader a brief theoretical framework on the relationship between dance and technology from an immersive point of view, that is, considering that such languages are contaminated when placed in a state of creation, to the point of reconfiguring their structures. In this way, the body mediated by technology is also

highlighted in the discussion, precisely because it is subjected to a series of stimuli and interferences capable of transforming its qualities and abilities, enabling the creation of new conditions or expressive states, as well as offering new readings from its virtualized condition.

Finally, the article presents the analysis of two Brazilian artistic works that explore the relationship between dance and technology, the screendance production *Unusual*¹ (2018), created and directed by Diogo Angeli, and the artistic work *Interferences*² (2022), created by Ana Luiza Gomes Przyczny, Isadora Alonso Faustino, Maria Isabel Torres Dos Santos, Nicolly Karoline Moreno Lapa, and Rafaella Ferreira Costa. The chosen works dialogue with the purposes of this article by presenting situations and creative explorations of the body in dance and technology interesting to the discussions promoted.

Thus, the article seeks to investigate the relationship established between dance and technology in the scope of creation in dance in contemporary times, establishing a dialogue between the theoretical material and the practical productions in the segment, seeking to understand the possible consequences provoked to the body and dance in this type of creative condition.

2 Dance-Technology, an Immersive Context

Dance-technology is understood as the creations in dance mediated by technological devices, which promote the approximation between dance and digital culture (SANTANA, 2006). This approach can be explored in dance creations from different formats and intensities, in face-to-face, virtual or hybrid contexts, and may involve interactive, telematic, inter media, software, among other technological elements.

From the technological mediation, dance, body, and movement are seen under new frameworks and dimensions in relation to their poetic-expressive conjuncture, in the same way, different meanings are created from such readings and interpretations, because, once transformed into communicable media, different modes of perception and communication are created, which modifies the connections established between such elements with the environment and the spectator.

In this spectrum, it is understood that the relationship established between dance and technology is not limited to a simple overlapping of means or languages, but is an immersive relationship, permeated by transdisciplinary exchanges in which one medium is affected and transformed by the other, both regarding its structure and composition, as well as its communication, as Amorim corroborates:

Dance in interaction with digital media does not mean a composition format exhausted of human emotions and subjectivities. The electronic medium constitutes a new way of exposing the work and establishing a new dialectical relationship between the author and the spectator. This new environment must remain aware of its power to stimulate creativity and the entrepreneurial spirit and enhance its social applications as some of the building functions of the values essential to human development (AMORIM, 2009, p.1, our translation).

¹ Original title: *Insólitos*.

² Original title: *Interferências*.

Santana (2006) considers that the bodies and movements present in dance from the technological mediation are constructs of an expanded thought that do not dichotomize mind and body, nature and artificiality, reality, and virtuality, since they are seen as bodies in transformation, modified bodies, in the form of communicational media that are placed in constant exchange with the cultural and social perceptual environment. It is in this perspective that the environment-individual relationship is understood from a mutual implication, that is, technology – also a creation by humans – is seen as the result of an evolutionary path, that is, technology becomes inserted in the existential actions of the subject, transforming elements, means and relations.

Thus, the body is contaminated by the elements present in the environment in which it inhabits and dance with technological mediation emerges from these relations, resulting in the approximation of the body/dance with the digital culture. This approach reconfigures the body and technology, being understood no longer as complementary elements or in a state of relation, but as a new structure. This restructuring of the body creates hybrid products, reconfigured and armed with their own laws and principles, emerging from this virtualized state between dance and technology, which are configured in different formats. Such creations allow multiple readings of the world through dance, each with its specificities as a language, and this structure – dance/technology – has the potential to create different stimuli, bodily or technological, transforming the perceptions of the body and dance, broadening the notions of time and space, creating new relationships between organic and non-organic elements and with the perception and interactivity of the spectator.

There are numerous paths and possibilities of approach and interaction of technology with creative experiments in dance, which can be carried out in face-to-face or virtual contexts. Among them, we can mention:

- The use of technology associated with the creation of new expressive languages that have hybridity as a primordial condition of their nature, as is the case of screendance, a hybrid language that integrates knowledge from dance, cinema, and audiovisual.
- The use of technology as a tool of support and provocation in creative processes in dance, making it possible to experience other ways of understanding the body in movement through virtuality, generating new possibilities and creative experiences. The use of software for the creation and virtual manipulation of bodies and movement³ allows the exploration of such potentialities.
- The use of technology as an integral poetic component of artistic phenomena in face-to-face contexts. The use of cameras, images, sensors, projections, among other technological devices can integrate the face-to-face presentations to change the perceptions of the spectator in relation to the body, movement, space and poetics of the

³ In this way, one can cite software such as *Lifeforms* (today also known as *Danceforms* 1.0), a software that uses avatars for the creation of dance movements and *Poser*, another software that makes use of avatars in the creation of dance movements with possibilities that go beyond human anatomical abilities.

work. Telematic and interactive performances, for example, use technology to manipulate the body, movement, and space in real time, making use of sensors, software and programs for projection and composition of images⁴.

Technology, in this context, is understood as an idea or thought that is incorporated into an experience in dance with technological means, distancing itself from the simplistic idea that considers such an experience only from the use of technological artifacts, employed in a creation with such purposes. The intention is to make such devices act as mechanisms that manipulate information and create new methods, forms, and thoughts of creation in dance, a mediating interface between man's thought and technological means, since "virtuality only means another possibility of existence" (SANTANA, 2006, p. 110, our translation).

Thus, technology stands as a means that enables the construction of new relationships between artistic work, author, and spectator. Venturing into this universe requires the dance professional to develop new skills and technical and creative capabilities about the technological environment and its relationship with the processes of creation in dance, building new visions for the body and movement from its virtualized configuration.

3 The Technologically Mediated Body

When technology is used as a mediator in the creative processes in dance, the body also has its habitual creative condition displaced, becoming a means of communication, a media in itself. In the creative context, the body is crossed by various information, technological or not, and the information and technologies that make up such an experience, also become an integral part of the body. In the case of creations with the presence of technology, the information exchanged between the body and the technological environment alters their qualities and perceptions, providing that new skills and different forms of interpretation are achieved in this condition.

In virtuality, for example, the body finds different possibilities for the realization of its actions that allow it to expand its physical limits, that is, to break with the natural limits established by time and space. In relation to time, new speeds and cadences can be provided to the movement in virtuality, as well as new skills and capabilities that go beyond the boundaries of the "possible" in the face-to-face plane, such as gravitational changes, temporal displacements, accelerations and reductions in the speed of their actions, among others. With regard to space, in virtuality it becomes possible to create temporal windows that bring together distinct spaces or provoke the multipresence of the body. Thus, technology as a mediator of the body in the creative act, allows to expand the perceptions of the body, expand its relationship with time and space, as well as change

⁴ Examples of real-time image composition software include: *Isadora*, a software created by Mark Coniglio and Dawn Stoppiello that enables interactive performances in real time. From a camera attached to the computer, the software allows you to identify the movement and modify it, applying different effects to the captured videos; *Active Space* is a media collection system, organized in a network and in real time, that allows the creation of interactive environments from motion tracking technologies, carried out from cameras that capture movement. The material is processed by the system that enables the organization and projection of these images in several layers, being a resource widely used in shows that make use of telepresence; among others.

its expressiveness and understanding, providing new perspectives and relationships with physical, aesthetic, social and cultural contexts from its manipulated condition.

As a subject, the virtualized condition of the body can establish different perspectives and relations with the spectator's reality, with multiple readings arising from the same context. The body, when mediated by technology, presents itself as a type of media, with different possibilities of organizing information because, in the condition of image, the body finds other ways of acting, thinking and expressing messages.

Once body and movement are transformed into images, visual perceptions and imagery representations begin to compose their meaning. In this situation, Peirce (2005) emphasizes that the reading of an object from its image, triggers a set of associations and interpretations – signs – that remain connected to the form of the elements represented and to the sensitive universe of its observer.

A Sign, or representation, which refers to its object not so much by virtue of any similarity or analogy with it, nor by the fact that it is associated with general characters that this object happens to have, but rather by being in a dynamic connection (spatial inclusive) both with the individual object, on the one hand, and, on the other hand, with the senses or memory of the person to whom it serves as a sign. (PEIRCE, 2005, p. 74, our translation).

The insertion of the body-image in the artistic experience expands the poetic possibilities of the body, allowing the construction of different expressive relations from the imagetic and technological universe that, in dialogue with the studies of semiotics, also expand its perception and reading. Thus, new metaphors can be created due to the experiences and transformations resulting from the interactions of the body with the technological universe.

The vagueness inherent in the concept of sign is responsible for establishing multiple connections, amplifying their meanings due to their subjective nature. The composition of the images of the body considers the stimuli and references present in the work and external to it, creating signs that allow to potentiate their perceptions, promoting different readings and metaphors due to the imprecision present in its structure. This condition allows the body mediated by technology to find different ways of expressing or defending poetic, artistic, social, cultural, or political points of view. Technology, including computers, videos, projections, sensors and images, allows to reproduce, and amplify the symbolic productions created by the body and dance. By allowing hybridization between these languages, it is possible to modify and incorporate new references to dance, as well as explore real and virtual elements in synergy. The construction of signs in a dance with technological mediation, in addition to carrying such universes in its composition, also involves the viewer's perspective in this equation, because the interpretation of their meanings passes through the universe of the recipient of the work, bringing together the medium and subject, which allows to evidence social, economic and political aspects present in this reality. In this way, the understanding of technology in conjunction with the concept of sign proposed by Peirce offers new perspectives to understand the body as a media that interacts with life, the social world and culture.

In this way, technology is seen as part of the process of creating the body, and not as the result, because its presence makes it possible to organize creative information

in different ways, integrating the intentions of creators, by exploring different ways of presenting their poetics, with the desires to construct meanings and deal with creative complexities. The transformations that occurred in this case are related not only to the body, but to the structure of the artistic work as a whole, since the technology is developed together with the environment, modifying it and promoting different connections.

3.1 Technology in Favor of Narrative in Screendance *Unusual*

*Unusual*⁵ is a screendance produced in 2018 in Brazil and directed by Diogo Angeli. Its creation was part of the author's master's thesis developed at the State University of Campinas, UNICAMP-Brazil. *Unusual* has as its theme gender identity, specifically bodies that are non-binary. It brings together through images, actions, narrative contexts and time-spatial manipulations of the body and movement, elements that enable different readings of the body to the spectator, questioning the decriminalization, conflicts and violence practiced to these bodies in society, in addition to exploring other poetic models of dance.

The language of screendance represents one of the possibilities of exploration between dance and technology, because as pointed out by Caldas, "new technologies do not stop tensioning dance in the direction of a reinvention" (CALDAS, 2012, p.240, our translation). The poetics of screendance brings together elements from dance, cinema, audiovisual and technology from a unified, interrelational and hybrid dialogue. Its creative process provides differentiated poetic conditions to dance, distinguishing itself from face-to-face productions. Once virtuality is established in the process, new ways of thinking about the body and movement can be produced, transforming the references of time and space, and finding different possibilities of expression and reception. According to Caldas (2012), it is from the manipulations of time and space in virtuality, from the ability to discontinue and resize them, that dancing the impossible becomes possible.

The virtuality present in this context is associated with the technological universe, linked to cyberculture and digital technologies, and, at the same time, connects to its creative and transformative potentiality, as emphasized by Levy (2001) when presenting the virtual as a transforming force, a creative power, capable of generating new modes of production and realization, that is, a medium in a constant state of creation.

Virtuality, therefore, is present in screendance from the elements that compose it as a language – such as the camera, the screen, the images, the editing process and the technologies involved –, as well as in its creative process and in the final format of its productions – the video –, influencing the relationships that the artistic work establishes with the audience, with space, with time and the other elements that relate to it. Thus, the creative process of screendance involves face-to-face and virtual moments in relation to the explorations carried out with the body and movement.

In this way, it can be verified in *Unusual* (2018) that the exploration of the body through virtuality promotes different expressivities to the work, constructed, in parts, from the imagetic signs and the time-spatial variations of the body and the movement in this context. About the dance-technology relationship, it can be highlighted that the virtualized exploration of bodies in screendance and the relationships established between

⁵ Screendance available at: <https://youtu.be/U7-B0rCN7QM>. Access in: 09 jul. 2023.

dance, images and imagery signs present in the work, alter the process of construction of movement in dance and the perception of its spectators from audiovisual technology. The body seen on the screen in *Unusual*, sometimes presents itself from temporal and spatial distortions, under qualities that extrapolate the physical limits of the body as matter, this due to the intentions and creative and expressive challenges present in the artistic work that, as stated by Angeli, in addition to reflecting on the theme of gender, “one of the challenges I embraced for the screendance *Unusual*, was to reconstruct the movement, expressiveness and narrative of the work, through the editing process and the time-spatial manipulations of the video” (ANGELI, 2020, p.133, our translation) (Fig. 1).

The manipulations applied to the bodies in *Unusual* were only possible due to the relationship established between dance and technology that, when explored in the work of screendance, brought new references for the process of creation in dance and for the reading of the body and movement by the spectator.

Technology as a mediator of the bodies that perform in *Unusual* interferes in the creative process in dance. In screendance, unlike dance productions performed face-to-face, there is an interaction of the body with different technological devices during its creative stages, such as the camera, computers, and image editing software. Such changes promote new paths for creators considering the dialogue between body, image, and technology. In *Unusual* these creative possibilities made it possible to establish different ways of relating time and space with the body and movement in virtuality, enabling the duplication or multiplication of bodies in space, making them occupy different places at the same time, as well as allowing several bodies to occupy the same space. It also allowed the realization of manipulations and physical changes in the bodies, transforming their compositional organization and creating variations of their physical structure as if, in some moments of the video, they did not have bones or carried limbs and body parts of disproportionate sizes. In addition, different velocities could be explored from the accelerations and decelerations of their actions.

The mediation of the technology present in the bodies in *Unusual* also modified the perception of the spectator in relation to the artistic work. The technology together with the imaginary universe explored by screendance, promotes new dialogues between body, image, and narrative. The presentation of the work in video format dialogues with the knowledge of semiotics that considers that “image is a message made up of iconic signs” (COVALESKI, 2012, p.89, our translation) and that sign “is that which, under a certain aspect or way, represents something to someone” (PEIRCE, 2005, p.46, our translation), that is, the composition of the images in the screendance – the organization and the relations established between the narrative elements in the imagetic plane – promotes the creation of different meanings to its receiver from the reading of these images, which present meanings connected to their visible content – their form – and their subjective and imaginary content. Regarding the reading of the images, Santos states:

The association of planes in a given sequence creates in the mind a meaning, which is determined by the verification of their connection, creating a need to mediate each plane and its relationship with the linear arrangement of facts/frames. Thus, this imputed order (one reads intentionality), from one plane to another,



Fig. 1. Bodies manipulated in *Unusual* (2018).

creates an interpreter responsible for causing the mind to infer and recognize these connections in a diagrammatic way and produce (effect) an understanding of the whole, or area of information. (SANTOS, 2013, p. 3, our translation).

With each different choice made in the combination between the images that make up the work in screendance, new ideas, looks or perceptions are also suggested to the viewer. Thus, Angeli adds that:

The association of the narrative elements, created from the editing and the imagery condition of the screendance, provokes in the mind of the spectator different ideas that expand their interpretation, since, when transformed into images and signs, the narrative elements create new perceptions and combinations, generating different layers of reception that articulate with the mind and the capacity of understanding of those who observe them in their totality (ANGELI, 2022, p.149, our translation).

In this way, the relationships established between the bodies and the theme proposed by the artistic work with the spectator were also affected by technology. The grotesque, the deformations and the multiplication present in the bodies in the screendance *Unusual* suggested different relations and perceptions to the spectator from their imagetic and manipulated condition, being at the discretion of the spectator to establish the relations between the images and their social universe, as well as to build the relationship of these images with gender identities and expressions and non-binary bodies. The deformation explored through the technology on the bodies in *Unusual*, for example, suggested their relationship with monstrosities, and in the thematic context about gender, such monstrosities could be seen as a prejudiced and discriminatory view placed onto to those bodies.

3.2 *Interferences, Experiments Between Sound, Body, and Technology*

Another experiment with bodies mediated by technology is present in the dance work *Interferences* (2022) created by students⁶ of the undergraduate course in dance of the State University of Campinas – UNICAMP / Brazil in partnerships with other artists on music and multimedia, advised by Professor Daniela Gatti.

Interferences proposes to integrate the languages of contemporary dance, music, new media, and technology, exploring possibilities of relations between body and technology, from the intervention of motion capture cameras in real time, telematics, image manipulation and projection software, motion reading sensors, among other experiments related to sound creation and scenic lighting. From the analysis of the body in this technologically mediated context, it becomes possible to visualize different creative strategies adopted by the creators in conjunction with technology, as well as different paths and poetic readings about the work.

⁶ *Interferences* (2022). Created by Ana Luiza Gomes Przsiczny, Isadora Alonso Faustino, Maria Isabel Torres Dos Santos, Nicolly Karoline Moreno Lapa and Rafaella Ferreira Costa. Musician-composer: Eduardo Koji Takeshita Junior. Imagery creator and responsible for interactive projections: Guilherme Zanchetta.

Among the experiments in dance and technology in the artistic work, some moments can be highlighted to broaden the discussions proposed by this article.

With regard to the exploration of space, *Interferences* combined real and virtual references, made use of telematics in the composition of the scene, experimenting with remote creations with multiple angles of the same space inhabited and revealed by the performers bodies, bringing to the audience different perceptions in relation to the internal and external spaces of the place of presentation, as well as about its face-to-face and virtual condition, questioning and reflecting on the potentiality of dance from the exploration of technologically mediated space.

Through cameras, positioned sometimes outside the performance venue and others in the scenic space itself, *Interferences* provided the audience with the interaction of face-to-face bodies and virtual bodies. The synergy present between the two spaces, face-to-face and virtual, established different relationships between the spaces, performers and audience, expanding the creative limits of dance from telepresence and instigating the audience to perceive and reflect on the creative potential of dance in virtuality and on the characteristics and differences present in such spaces, both in relation to their physical aspects, artistic, social, and cultural (Fig. 2).



Fig. 2. Exploration of Face-to-face and Virtual Space in *Interferences*

The artistic work also used motion sensors and the projection of images. More specifically the *Kinect* motion sensor and the *TouchDesigner* software that enabled the capture, manipulation, and projection of images. For the interaction of bodies and the

creation of imagens, the show experienced different possibilities of relationship between the interactivity of bodies and the composition of images.

The imagery projection present at the bottom of the stage, conceived from the junction of a multitude of small circles that together formed an abstract figure, was manipulated through the *Kinect* sensor and the *TouchDesigner* software. The sensor captured the movement of the performers on stage and, from the body stimuli recorded and the programming pre-established by the *TouchDesigner*, changed the background image, causing the circles to move according to the movement of the performers on stage. This experiment presented different possibilities of interaction between bodies and technology, as if bodies and images could dialogue choreographically, establishing a condition of creative partnership (Fig. 3).

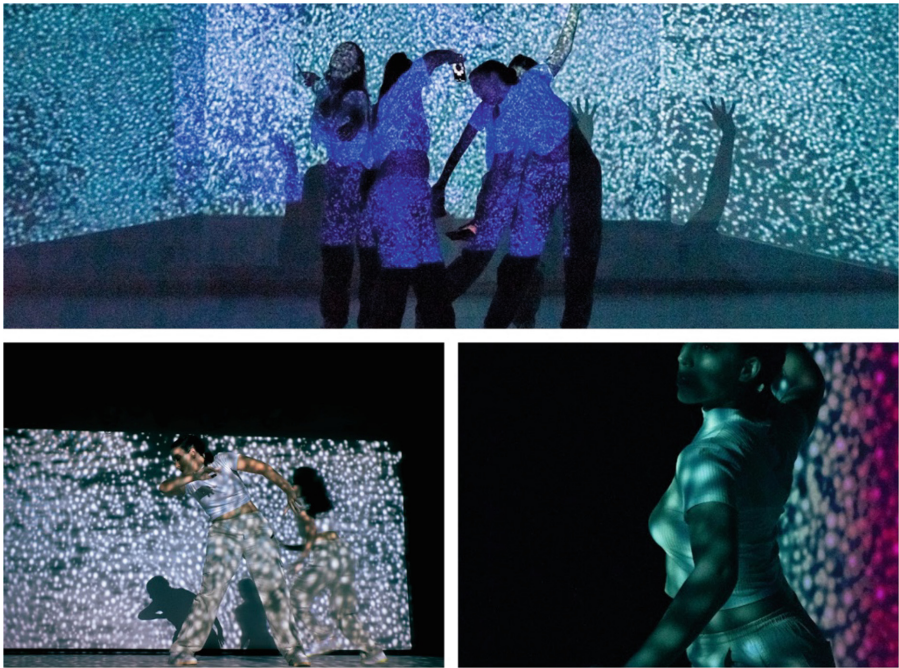


Fig. 3. Interactivity in *Interference*

The relationship among sound, bodies and technology was also explored during the presentation. The artistic work had the participation of a musician-composer, responsible for creating the live soundtrack, which was technologically modified by computer programs and by sensors and motion applications installed on the performers' cell phones (Fig. 4).



Fig. 4. Sound, Bodies and Technology in *Interference*

The show explored the relationship between sound, bodies, and technology under different situations. The *Movie Guitar*⁷ app, installed on the performer's phones, interfered in the music track, through the movement of the cell phones. *Movie Guitar* used the motion sensors in the cell phones to interfere in the soundtrack. In the scene, the movement of the cell phones was read by the app and transformed into sounds, allowing the creation of sound interference from the movement of the bodies that carried the cell phones. In addition, the music was also connected with the production of images through the *TouchDesigner* software, creating multicolored imagery landscapes from the sounds and movements produced by the musician.

4 Final Considerations

The creative paths trodden by dance in contemporary times have increasingly assumed interdisciplinarity as part of their explorations, that is, the availability to establish different types of relationships and experiences with other areas of knowledge, in which technology is present, influencing their creative processes and methods. In the examples analyzed by this article, it was possible to verify such an approximation and deepen such questions.

⁷ The application was created by Jonatas Manzolli, a professor in the music department of UNICAMP.

The movement and the body explored from the technological mediation in *Unusual* and *Interferences*, made it possible to integrate different paths to the creations in dance. In the *Unusual* screendance, the presence of the camera and the editing of the images incorporated new creative possibilities for the dance, adding virtuality as part of the creation process, with the ability to transform the material worked face-to-face. These strategies allowed for the distribution and exhibition of this screendance in the 15th Sans Souci International Film and Dance Festival in the USA, with screenings in the cities of Boulder and Lafayette in Colorado, USA (2018); 12th São Carlos Sreendance Festival (2018) in São Carlos/Brazil; 12th Mostra Curta Audiovisual in Campinas/Brazil. In addition, it allowed to direct the dance to new circuits of presentation, from the screen and cyberspace and, with this, also to add new audiences. Such explorations can also be seen in *Interferences*, whose process explored multiple relationships and readings of the body from the remote context, in dialogue with devices, sensors, and software that transformed its relationship with space, expanding the creative limits of dance. The experiments in technology also encouraged the viewer to question the interactivity among bodies, machines, and images, interacting reality and virtuality, pointing to technology as a powerful character in dance creation. Both productions questioned audiences about the construction of poetics from the relationship established between dance and technology, to the expansion of their perceptual field in relation to the body, movement, and dance, as well as the relations promoted by the mediation of dance by technology and how these reveal the social and political cultural aspects present in their existential reality.

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