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Original Research Article

Explaining Polyphony in Interactive Arts

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Abstract

Introduction: Postmodernism serves as a dynamic foundation for the creation of new theories and forms that have brought about remarkable transformations across various fields. Some of these theories critique the very nature of modern art and pave the way for the emergence of new artistic expressions. Polyphony, as a novel approach in literature and art, was first introduced by «Bakhtin» and holds a significant position in the formation and development of specific postmodern theories. On the other hand, interactive art, as a progressive and innovative art form, presents a new definition of the author, the audience, personal experiences, and the process of artistic creation. This article aims to introduce and examine the relationship between the polyphonic approach and interactive art, seeking to answer the following question: «On what theoretical foundations is Bakhtin's theory of polyphony based, and how can it be employed as a framework for the analysis of interactive art?»

Research Method: This study is fundamental and employs a descriptive–analytical approach based on library research. The analytical framework is derived from Bakhtin's theory of polyphony, and the case study is conducted on three interactive installations.

Findings: Through its synchronization with technology, interactive art generates new experiences for the artistic audience. Based on the audience's participatory and interventionist actions, interactive artworks can be categorized into two types: First, works that are formed through the physical actions of the audience; second, works that are founded upon the audience's mental and sensory ideas.

Conclusion: The results indicate that interactive art, due to its inherent characteristics, provides a suitable ground for the coexistence and manifestation of the diverse ideas of audiences who engage with the artwork and accompany the original author in its process and completion. Therefore, most interactive artworks transform into polyphonic works that reflect the ideas of the interacting audiences as secondary creators of the piece.

Keywords

Postmodernism, Polyphonic Approach, Interactive Art, Audience Experience

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Introduction and Problem Definition

In the mid-twentieth century, when modern ideologies were witnessing their final days in the West, postmodern philosophy and movements laid the foundation for a new art form grounded in a critique of the rationalist principles of modernism. «Niche», in the late nineteenth century, was among the first thinkers to criticize the monolithic rationality of modernist thought, thereby undermining one of the core foundations of modernism. Following him, numerous theorists targeted the fundamental structures of modernity, leading to the emergence of the postmodern movement. One of the principal features of the postmodern approach is its «pluralism». Whereas modernism, in both thought and art, constantly pursued unity, postmodernism embraces multiplicity. Another defining characteristic of postmodernism is «deconstruction», and the concept of «polyphony» is one of the postmodern theories that maintains a close relationship with both of these features. Postmodern approaches gradually gave rise to new art forms that, in both structure and essence, were grounded in theories such as Roland Barthes' «Death of the Author», Bakhtin's concepts of dialogism and chronotope (space-time continuum), and the notion of intertextuality, among others. Among these emerging forms, interactive art, through the integration of creativity and technology, has provided a unique ground for the manifestation of such theoretical perspectives. Fundamental research in these domains is essential for identifying the philosophy of contemporary arts, as it contributes to understanding their nature and potentialities. This study aims to analyze the relationship between interactive art and Bakhtin's theory of polyphony. Interactive art, as a medium that fosters intercultural dialogue and the production of shared meanings, possesses remarkable potential for the coexistence of multiple voices. Meanwhile, Mikhail Bakhtin's theory of polyphony serves as a powerful analytical tool for uncovering the deeper layers of this artistic phenomenon. To identify the relationship between this theory and interactive art, the research seeks to answer the following central question: «On what theoretical foundations is Bakhtin's theory of polyphony based, and how can it be used as a framework for analyzing interactive art?» To address this question, several examples of interactive artworks have been examined, which leads to the secondary question: «How is Bakhtin's concept of polyphony manifested and realized in the selected case studies?» It appears that in specific interactive artworks, the grounds for dialogue and the expression of diverse ideas and viewpoints are clearly present; hence, this study focuses on exploring this significant aspect.

Research Method

This fundamental research is a qualitative case study conducted through library-based data collection, employing a descriptive-analytical method. The statistical population consists of interactive artworks produced in various countries over the past three decades. The sampling method is purposive, involving the selection of three prominent examples that have been published and disseminated through digital media platforms. The first part of the study elaborates on the theoretical foundations of the polyphonic theory, with particular emphasis on the views of Bakhtin, the primary founder of this concept. In the next stage, the study introduces interactive art by describing its nature and features related to interaction and dialogism. Finally, the manifestation of polyphony in three well-known interactive artworks is analyzed qualitatively. The analytical framework applied throughout this study is based on Bakhtin's theory of dialogism.

Research Background

The background of this study rests on two principal concepts: Dialogism and interactive arts. In presenting Bakhtin's theory of polyphony, «Todorov» (1984), in his book, endeavors to systematically articulate Bakhtin's key ideas, including dialogism, polyphony, carnival, chronotope, and the relationship between author and hero. He emphasizes that polyphony is not merely a literary device but an ontological and philosophical principle, reflecting Bakhtin's view of human beings and language. According to Bakhtin, the human being is inherently dialogic, with identity formed through interaction with others, and the polyphony found in the novel is an artistic reflection of this existential reality. «Morson and Emerson» (1990) produced one of the most comprehensive works on Bakhtin's ideas, aiming to trace the development and evolution of his thought. Their work explains the theoretical foundations of the polyphonic theory and the contexts from which it emerged, arguing that polyphony is deeply interrelated with Bakhtin's other key concepts, such as dialogism and the time-space chronotope. Among Persian sources, two significant works by «Namvar Motlagh» (2011), entitled «Dialogism in Literature and Art» and «An Introduction to Intertextuality», are prominent. The first includes specialized essays on polyphony in literature and the arts, examining interrelations and dialogue among texts, discourses, and viewpoints. Three of its articles specifically explore polyphony in the visual arts, demonstrating that the theory can effectively be applied to analyzing visual works and recognizing the multiple voices and meanings within them. A section of the second book introduces Bakhtin's theory of dialogism as one of the foundations of intertextuality, explaining that a single text may contain multiple voices, perspectives, and ideas in dialogue; voices that may originate from other texts, cultures, or ideologies. «Shahkolahi and Fahimifar» (2021) examined the concepts of polyphony and dialogism in the miniature paintings of Reza Abbasi. Their objective was to identify the capacity of Iranian miniature painting for interpretation and adaptability based on contemporary philosophical and theoretical concepts. Their analysis reveals that Reza Abbasi, through his works, represented the conflicts between society and the court, giving expression to the non-dominant voices of his time, particularly through depictions of dervish figures. In the field of interactive arts, «Manovich» (2001) produced one of the seminal works on new media theory and digital art, discussing concepts such as interactivity and algorithmic structure. His book aimed to establish a framework for understanding both the technical and conceptual dimensions of interactive art. Manovich's analysis of the structural characteristics of new media and interactive artworks provides a basis for identifying dialogic frameworks and the expression of plural ideas within such works. Similarly, «Bourriaud» (2002), in his influential book, examines art forms rooted in human relations and social interaction. His work emphasizes «relation» and «interaction» as the essence of the artwork; concepts that closely overlap with Bakhtin's notion of dialogue. In his book, «Edmonds» (2018) focuses specifically on interaction design in art and other domains. His goal is to identify the design and structural aspects of interaction within artworks. The results of this study contribute to understanding how and why an interactive artwork becomes a platform for polyphony. Among Iranian researchers, «Rahbarnia and Kheiri» (2011) analyzed interactive art and compared it with Roland Barthes' theories of the textual world and the «Death of the Author». They aimed to demonstrate how, in an interactive artwork, the discourse of ideas emerges through audience participation, media choice, and interactivity, transforming the artwork into a textual space and diminishing the authority of the original artist. This discourse analysis of the idea conceptually aligns with the theoretical foundations of polyphony. In another study, «Rahbarnia and Mafitabar» (2015) examined

embodied experience in relation to a specific interactive artwork. Their research aimed to explain the phenomenological-hermeneutic basis of interaction in installation art. The findings affirmed the validity of the viewer's perception and their essential role in defining the meanings of interactive art. Likewise, «Sabeti» (2022), in his article, analyzed the interaction among the artist, the artwork, and the audience, seeking to interpret interactive art from a philosophical perspective beyond conventional aesthetics. His case analyses show that the fundamental distinction of interactive art from other art forms lies in the role of the audience's reaction; the mode of engagement that produces differing meanings within the artwork. In the present study, the focus is specifically on examining the capacity and realization of the concept of polyphony within interactive artworks, using the well-known piece «Norma Jeane» (2011) as a case study.

Theoretical Structure

The concept of polyphony in its modern sense was first defined by Mikhail Bakhtin (1895–1975), the Russian philosopher and literary critic, in the early twentieth century. His ideas gave rise to new modes of thought across the fields of culture, the humanities, and the social sciences. The origin of the notion lies in literary and artistic criticism, and Bakhtin employed this term in his studies of the novels of «Dostoevsky» and «Rabelais». Before Bakhtin, the term polyphony had been used in music to describe the simultaneous combination of multiple independent rhythmic and melodic layers within a single composition (Polihofer, 2007, 317). It also referred to «a kind of music in which several voices are present simultaneously within a performance» (Namvar Motlagh, 2011, 7). Instruments capable of producing multiple tones at once were likewise called polyphonic instruments. From Bakhtin's perspective, Dostoevsky's novels, unlike those of «Tolstoy», which focused exclusively on the aristocracy and were thus monologic and rationalist, granted expression to the diverse dimensions of common life. The voices of various social groups were audibly present within a dialogic structure. Through his creation of polyphonic novels drawn from real life, Dostoevsky, in Bakhtin's view, ended the reign of the monological European novel. As «Ducrot» notes, Bakhtin recognized texts «in which several voices could speak simultaneously, without any one voice being superior to the others or judging them» (Namvar Motlagh, 2011, 18). This characteristic, which Bakhtin considered a distinctive feature of Dostoevsky's novels as opposed to the traditional monologic novel, soon became one of the hallmarks of the modern novel (Bakhtin, 1970, 18) and gradually extended beyond literature to other artistic domains. Scholars such as «Tzvetan Todorov», «Julia Kristeva», «Oswald Ducrot», «Laurent Jenny», «Emmanuel Levinas», and «Paul Ricoeur» played essential roles in the subsequent development of Bakhtin's theory. Polyphony is closely linked to Bakhtin's other key concepts, including hybridation, chronotope (time–space), and dialogism. In essence, polyphony signifies the presence of multiple, distinct, and independent ideas that coexist on equal footing within an artwork. In other words, an artwork may be called polyphonic when, within its entirety, not a single idea but multiple ideas are simultaneously present, interacting with one another in a dialogic relationship (Balkhari, 2011, 356). Accordingly, there exists a deep connection between dialogism and polyphony; as «Samoyault» observes, «polyphony, in which all voices are represented equally, gives rise to dialogism» (Namvar Motlagh, 2015, 68, citing Samoyault, 2005, 11). In polyphonic works, unlike monologic works that express the stages of a single unified consciousness, there exists an artistic field of coexistence and structured interaction among multiple worlds. From Bakhtin's standpoint, in Dostoevsky's novels, the worlds of characters and plots, though differentiated by tone and register, do not follow one another

as sequential stages of a single evolution but instead coexist and interact on an equal plane (Namvar Motlagh, 2015, 76). By defining dialogism within polyphonic works, Bakhtin continually connected the text to its context and author(s), employing a set of interpretive notions that laid the groundwork for text theory. Later, «Kristeva» introduced the term intertextuality in her examination of Bakhtin's ideas. In her essay «Word, Dialogue, and Novel», she praised Bakhtin for freeing the text from fixed meaning through his conception of intertextual relations. Kristeva regarded the indeterminacy of meaning in intertextuality as stemming from «the multiplicity of factors involved in the production of a text; factors that release the text from the exclusive authority of the author» (Namvar Motlagh, 2011, 14). In summary, polyphonic works can be divided into two general categories: 1. Single-author works, in which a single author expresses the voices of multiple individuals; that is, they embody polyphony within one creative consciousness. 2. Multi-author works, in which the voices of several creators are simultaneously heard within one piece. In all such works, a dialogic environment for diverse voices is established; however, the formation of meaning depends on the audience's reception, as well as on the context and other textual factors perceived by the viewer or reader.

Interactive Art

Interactive art emerged in the 1970s, influenced by the ideas of pioneers such as «Marcel Duchamp» in Europe. Due to its compatibility with contemporary theoretical frameworks and alignment with technological advancements in media, it gradually gained a prominent place in the field of art. The most significant feature of interactive art is its audience-centered nature and its encouragement of audience intervention in completing the artwork. In this form of art, «the artistic process is not controlled by the artist; rather, the artist becomes a participant in the creation of the work. In this sense, the traditional position of the artist as the sole author disappears. Nevertheless, the initial idea still belongs to the artist, who retains his or her role as the initiator of the process» (Rahbarnia & Kheiri, 2013). Unlike some postmodern art movements that aim at deconceptualization, interactive art seeks to engage the viewer in the discovery or reconstruction of meaning. The questions that arise during the interaction between the viewer and the artwork draw the participant into reflection on the subject of the work and may even open new perspectives (Dehghani, 2008). Today, interactive art has assumed diverse forms. «From early computer-based systems to advanced digital technologies, new media have created an entirely new class of interactive art» (Mesbah & Rahbarnia, 2011). Indeed, the multimediality of contemporary art has opened new avenues for the manifestation of a greater variety of ideas, enabling a more dynamic relationship between the interactive audience and the artwork (Rahbarnia & Kheiri, 2013) and paving the way for the creation of novel artistic forms. One of the major branches of this field is interactive installation art. These works are often presented in public spaces, and «since such a creation cannot be complete without the intervention of participants, the artist cannot finish the work alone in the studio. Therefore, during the exhibition period, the direct or indirect participation of audiences plays an essential role» (Rahbarnia & Mafitabar, 2015). Other examples of interactive works include interactive sculptures and paintings. As noted by «Mesbah and Rahbarnia» (2011), «In an interactive artwork, both the observer and the objects are engaged in a dialogue, producing a complete and unique artistic experience for each viewer. Although all viewers encounter the same visual framework, each one interprets the artwork differently, resulting in distinct, individualized perceptions». Thus, in interactive art, the artist functions primarily as the

originator of the concept and designer of the structure, while the artwork itself becomes a platform for the emergence and sharing of the audience's reactions, ideas, and creativity.

Polyphony in Interactive Works

As previously discussed, the foundation of interactive artworks lies in the audience's participation, and the manner of their engagement in the process or completion of the artwork defines the very form of interactivity. Therefore, in studying how polyphony is manifested in interactive works, two general types can be identified based on the nature of audience participation: 1. Works that are based on physical participation of the audience. 2. Works that primarily require the mental or cognitive participation of the audience.

1. Works Based on Physical Participation: The essence of participation in most of these works is founded on performance or the expressive movements of the audience. A large number of these works belong to the category of digital interactive art, which compel the audience to engage in physical reactions in response to the interactive medium. These include interactive screens or panels that change their form, light, or color according to the viewer's movements or gestures. Two examples of such works are discussed in this section:

Work No. 1: This interactive piece, entitled «This Interactive LED Light Floor Moves with You» (2010), was created by the «Media Tak» Group and exhibited at the Generative Interactive LED Floors Exhibition (Fig. 1). In this interactive installation, a flat digital surface composed of infrared and pressure-sensitive sensors was designed to respond to the movement and speed of viewers as they walked across or around it. Depending on the user's gestures, the panel produced dynamic displays of multicolored light. Walking around or across the surface, or even moving one's hands, caused bursts of light and diffusions of color across the display. This, in turn, stimulated the audience to experiment with different movement patterns, discovering how variations in motion would produce distinct chromatic and luminous effects. Such interactive surfaces can be adapted for use in hotel lobbies, cultural venues, or public gathering spaces, where the audience's participation becomes the key to activating and transforming the work.



a. Creative Diffusion of White Light through Audience Interaction with the LED Floor



b. Creative Diffusion of Colored Light through Audience Interaction with the LED Floor

Fig 1. Interactive Animation entitled «This Interactive LED Light Floor Moves with You», 2010.
Source: Author, adapted from video documentation of the work.

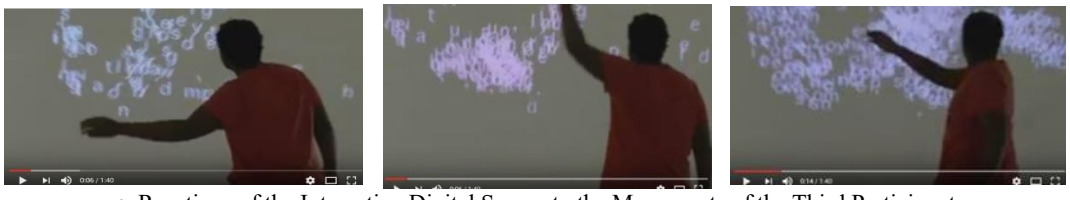
Work No. 2: Another example of this category of interactive artworks is entitled «Elicit» (2001), first exhibited in Johannesburg, with subsequent versions presented in later years, including 2013 (Fig. 2). The conceptual foundation of this series is derived from sign language, through which the artist explores the relationship between gesture, communication, and textual generation. In this installation, a vertical digital screen stands before the participant, equipped with motion-sensitive sensors that detect and respond to bodily movements. As the viewer moves before the screen, a sequence of letters and words appears, corresponding to the specific gestures performed by the individual. According to «Stern» (2011, 2), who has written extensively on interactive works based on bodily movement: «The body of each individual is a dense mass of tangible matter, carrying social marks, physical fragments, and behavioral signs of gender, race, class, age, and desire. It embodies a social spirit and a historical meaning». This artwork represents a form of continuity between body and text: Every physical gesture of the participant becomes a generative act, producing written language on the screen. The system's sensitivity to even subtle bodily movements allows for variable and unpredictable performances, as each set of gestures generates a distinct textual configuration. The software's responses materialize as dynamic textual displays that articulate a language of the body, inviting passersby to read or watch the unfolding script. Simultaneously, the multiplicity of emerging textual fragments, continuously generated and dispersed, creates a polyphonic field of meaning, in which countless overlapping «texts» coexist, rendering the process of interpretation both challenging and open-ended for participants and observers alike.



a. Reactions of the Interactive Digital Screen to the Movements of the First Participant



b. Reactions of the Interactive Digital Screen to the Movements of the Second Participants



c. Reactions of the Interactive Digital Screen to the Movements of the Third Participant

Fig 2. Interactive Animation entitled «Elicit» 2013. Source: Author, adapted from video documentation of the work.

In such artworks, the ideas and preferences of the audience, which determine how physical movements are performed, may be interpreted as the «voice of the audience». As noted earlier, in polyphonic works, the simultaneous and equal audibility of multiple voices is essential; «there is no dominance of one voice over another, and if such dominance exists, it is only temporary» (Nojoumian, 2011). In the aforementioned work, any participant who wishes to engage can stand before the digital screen without restriction. Each participant's bodily movements are visually manifested on the display, and every generated text or form is granted an equal opportunity for appearance. Thus, polyphony in this artwork is clearly realized: The screen becomes a platform for expressing the will, gestures, and creativity of diverse participants, all of whom contribute equally to the unfolding of the piece. The same phenomenon can be observed in Work No. 1. The screen's reaction to participants' gestures encourages them to move freely across the surface and perform various actions, creating an exciting display of colored light animations. These interactive panels thus resemble Dostoevsky's polyphonic novel, in which the interactive audience becomes both author and actor, entering the work through their own preferences and creativity. Since the screen's responses to participants' actions are pre-programmed and consistent, the influence of every viewer's movement on the visual outcome is equally weighted. The specific manifestation of each action, which may be described as the «symbolic code of the audience's voice», depends on the participant's individual ideas and creative choices. Therefore, these artworks create a defined environment for the appearance and coexistence of multiple audience voices, all positioned horizontally within the same artistic field, while maintaining a vertical relationship to the original author as the initiating creator. From Bakhtin's perspective, a polyphonic text emphasizes the process rather than the finished product (Makaryk, 2005, 101); a notion that is closely aligned with the essence of interactive art, in which the process of creation takes precedence over a completed, fixed outcome. Ultimately, in all such works, the artist, as the initial concept designer, facilitates the audience's entry into the artistic text by designing responsive digital feedback systems that encourage participation and presence. The resulting artwork thus becomes a hybrid composition of the physical presence and diverse behaviors of multiple participants, each contributing uniquely to the creative process. The equally coexistent voices of these participants are manifested through the digital display, giving visual form to the dialogic and polyphonic nature of interactive art.

2. Works Based on the Audience's Mental Participation: In a certain group of interactive artworks, the artist focuses on eliciting and expressing the thoughts and inner ideas of the audience, often around a particular central theme, while providing the context and tools for their manifestation. One of the most notable examples of this category is «Who's Afraid of Free Speech?» by «Norma Jeane», exhibited at the Venice Biennale in 2011 (Fig. 3). In this work, the artist placed a multilayered clay cube in the three colors of black, white, and red within a white, empty room, resembling the Egyptian flag. Through the provocative title, the artist invited the audience to express their personal opinions and emotions by manipulating the pliable material of the original cube. As viewers engaged with the piece, the initial volume of the cube gradually diminished, while the surrounding white walls of the space transformed into a surface filled with visual and textual signs; traces of the participants' inner thoughts and creative expressions. According to «Rahbarnia and Kheiri» (2013), «In this interactive work, none of the images created by participants possesses a singular or unified meaning within the artwork. The cultural and social codes of each participant contribute to forming a discursive environment. For instance, various words and phrases written in different languages can be observed on the walls of the exhibition hall; a

space shaped by intertextual and socio-cultural discourses that transform the artwork into an expanded text without a single, dominant author».



a. The Original Clay Cube (The Main Artist's Idea)

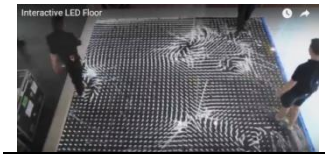
b. Audience Participation in Presenting their own ideas

c. Transformation of the Original Cube into the Ideas of Interactive Participants (Multiplicity of Ideas)

Fig 3. Interactive Installation entitled Who's Afraid of Free Speech?, Norma Jeane, 2011.
Source: Norma Jeane, 2011.

This work is one of the most significant examples of interactive art that clearly illustrates the transition from modernity to postmodernism. In its initial form, the artist presents a minimalist volume, representative of the complete and refined forms of modern art, within a pure, unmarked space, free from any distracting semiotic elements that might divert attention from the primary form. «A cube, when resting on one of its faces, is perfectly balanced» (Halimi, 2000, 108), and this sense of balance and stability symbolizes the pure rationality of modernism. Initially, the tri-colored cube is the only perceivable "voice" within this silent, discourse-free white space. As «Hosseini» (2011) notes, the essence of modernism lies in monophony and elitism, while postmodernism is characterized by polyphony and inclusivity. The artist's chosen title challenges the monologic nature of the initial cube, and as soon as a context for the emergence of multiple voices is created, modern unity gives way to postmodern plurality. As «Nozari» (2001, 54) observes, we now inhabit an era accustomed to diverse and multifaceted realities. In this pluralism, the ground is prepared for the audibility of different voices and the dialogic exchange of ideas among interactive participants. Accordingly, Norma Jeane's work beautifully expresses the shift from modern monophony to postmodern polyphony. Moreover, the color choice of the original cube—black, white, and red—appears to allude to the Egyptian flag, symbolically referencing the sociopolitical events occurring in Egypt at that time. As «Rahbarnia and Kheiri» (2013) suggest, «Given the recent events in Egypt, these colors serve as a semiotic indicator encompassing many political aspects and social attitudes of the country's transformations. Could the disintegration of this regular polyhedral cube not be an implicit reference to what is taking place there?» The Egyptian revolution can thus be viewed as a metaphorical context for the emergence of multiple voices, which collectively contributed to the collapse of the former monologic dictatorship. As «Namvar Motlagh» (2015, 66) observes, «From Bakhtin's perspective, language, art, and literature acquire greater authenticity and richness when connected to social and cultural realities». Accordingly, among the three works analyzed in this study, Norma Jeane's installation demonstrates the most pronounced realization of polyphony, aligning closely with Bakhtin's definition of the term. Table 1 presents a comparative analysis of how polyphony is manifested across the three artworks discussed in this article.

Table 1. Comparison of the Manifestation of Polyphony in the Three Interactive Works Analyzed in This Article. Source: Author.

Artwork	Voice	Voice Expression by the Audience	Voice Manifestation in the Artwork
No. 1 	The idea and preference of the interactive audience in engagement with the artwork	Performing expressive movements in accordance with personal ideas by the audience	Transforming expressive movements into colored light animations
No. 2 	The idea and preference of the interactive audience in engagement with the artwork	Performing expressive movements in accordance with personal ideas by the audience	Transforming expressive movements into moving texts
No. 3 	The ideas and beliefs expressed by the interactive audience	Creating visual and textual codes expressing personal ideas with colored clays	Transformation of the original cube into signifying elements scattered throughout the white space surrounding the artwork

Undoubtedly, all three interactive works provide a context for the emergence of the audience's personal ideas, and the completion of each work is fundamentally based on the multiplicity of these ideas. In such artworks, the process of completion takes precedence over the finalized product, and they may thus be regarded as polyphonic, multi-authored works. A noteworthy aspect of Work No. 3 concerns the audibility and frequency of the various voices within it. In polyphonic artworks, the multiplicity of voices extends beyond the characters; it also includes the dialogue or conversation between the reader (audience) and the text, constituting a form of polyphonic and dialogic interaction (Nojoumian, 2011). In Norma Jeane's work, the white spatial background serves a dual purpose: It emphasizes the monophony of the initial minimalist form while providing a neutral field for the manifestation of multiple audience voices. However, as illustrated in Fig. 3, the codes created with red and black clay are more visually perceptible to the viewer than those made with white clay. In other words, voices that differ from their background or context are perceived as louder than those that share their color or tone. Symbolically, this means that in a white society, the red and black voices resonate more strongly; in a black society, the red and white voices are heard more distinctly; and in a red society, the white and black voices become more prominent. Nevertheless, as «Holquist» (1990, 18) emphasizes, within the logic of dialogism, meanings are relative, and the production of meaning arises from the interaction between two bodies that simultaneously occupy different positions. These bodies may represent a vast range, from the physical human body to political groups and ideological systems. Accordingly, the audience's interpretation of the background color and of the colors representing individual voices varies. Therefore, the frequency and audibility of each voice depend on the viewer's perception and their interpretation of the color relationships within the artwork, rendering the experience unique to each participant.

Conclusion

The analysis of the case studies in this research indicates that Bakhtinian polyphony can be identified in certain interactive artworks due to the specific capacities of this artistic form. The transformation from author-centered modern art to audience-centered postmodern art, especially when interactive participants are directly involved in creating the artwork, lays the foundation for pluralism and polyphony in artistic production. In all three interactive works analyzed, the artist serves as the initial conceptual designer, providing the conditions for the emergence of diverse audience voices. The completion of the artwork depends on the multiplicity of ideas generated by the audience, who act as secondary authors. Therefore, these works are multi-authored, as different participants contribute to their realization, and they are polyphonic, since each participant expresses their personal idea through interaction with the work. The various ideas coexist equally within the artistic structure, and the process of completing the work takes precedence over presenting a single, fixed, or finalized monologic artwork. Among the analyzed examples, Norma Jeane's interactive work demonstrates that voices contrasting with their background are perceived more distinctly than those that blend with it. However, according to the theory of indeterminacy of meaning, each individual's pre-text differs from another's, leading to unique perceptions of background and color. This means that each viewer's interpretation and perception of voices, or their frequency, varies. In specific interactive artworks, each participant also becomes the interpreter of the preceding participants' voices, and their response or form of engagement with the artwork depends on their interpretation of those earlier expressions. Consequently, some interactive works may be regarded as polyphonic compositions, wherein the interpretation of one voice contributes to the creation of the next, forming a chain-like intertextual process of meaning and creation. This distinction also clarifies the difference between Dostoevsky's polyphonic novels and polyphonic interactive artworks. Dostoevsky's works are single-authored, concluding within the author's creative domain and perspective, whereas interactive artworks are multi-authored, with each participant's voice influencing the next in the creative process. Each voice thus becomes a pre-text for the next, perpetuating an ongoing, chain-like intertextual creation that defines the dialogic and evolving nature of interactive polyphonic art.

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Conflict of Interest

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