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The Visual Evolution of Korean Documentaries Using CG in the 1990s

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Abstract: *Since the 1980s, the active participation of domestic broadcasting companies in producing Korean documentaries has significantly transformed the field. This shift has led to the creation of programs that explore a wide range of local topics, establishing documentaries as essential tools for conveying knowledge and cultural values. The advent of digital technology has further changed the visual presentation of documentaries, enabling the integration of computer graphics (CG) and animation. These innovations have made complex scientific concepts, historical events, and intricate information more accessible and understandable, thereby enhancing their educational function. This study examines the impact of digital technology, particularly CG, on Korean documentary production since the 1980s. It explores how CG has been employed for information delivery and historical representation, improving both the viewing experience and the social role of documentaries. With advancements in CG and virtual studios, documentaries have evolved from simple records into immersive visual experiences that amplify their social impact. This paper highlights how these technological advancements have transformed documentaries into powerful mediums for education and cultural storytelling, thereby increasing their influence and value in society.*

Keywords: Computer Graphics; Documentary CG; Digital Technology; Historical Reproduction; Korean Documentary

1. Introduction

The early 1990s marked a significant period of technological and institutional transformation in South Korea's documentary broadcasting environment. As the industry entered a transitional phase from analog to digital systems, domestic broadcasters began to adopt high-resolution imaging equipment and digital editing platforms. However, despite these advancements, production infrastructures continued to face substantial limitations, particularly in terms of budget constraints, technical resources, and skilled labor.

At that time, CG had already demonstrated considerable potential through international use cases. Nevertheless, the integration of CG in South Korea remained highly limited due to the prohibitive cost of equipment, the scarcity of trained professionals, and minimal budget allocations. The documentary sector, in particular, was considered a lower funding priority compared to drama and commercial production, resulting in greater institutional and production-level barriers to CG adoption.

Despite these challenges, several broadcasting organizations in the early 1990s began to experiment with CG in documentary production, initiating notable changes in the visual language of the genre. Notable examples include The Korean War (KBS, 1990) and 30 Billion Years of the Korean Peninsula (KBS, 1998), both of which employed 3D animation, infographic elements, and virtual studio technologies to visually reconstruct historical events and geological phenomena. These productions moved beyond the traditional reliance on factual narration and interview-based storytelling, offering viewers a more immersive and sensorially engaging experience. Such practices may be understood as attempts to establish a new visual aesthetic within the genre, grounded in the expressive potential of emerging digital media.

However, academic research on the introduction of CG in this period remains largely absent within Korean media scholarship. In response to this gap, the present study poses the following core research question:

How did the introduction of CG technology in the early 1990s transform the visual composition, narrative structure, and viewer perception of Korean documentary media?

This broader inquiry is further articulated through the following sub-questions:

(1) In what ways did CG bring about aesthetic shifts in the audiovisual representation of factual content?

(2) How did CG influence viewer immersion and modes of cognitive engagement?

(3) To what extent did CG contribute to the expansion of narrative structures and genre boundaries?

This study specifically focuses on the period from the late 1980s to the mid-1990s, during which CG was first integrated into Korean documentary production. This phase represents a critical moment when technological experimentation and aesthetic transformation were closely interlinked. As broadcasting technology became increasingly digitized, viewer expectations for visual sophistication also evolved. In turn, the documentary genre was pushed to deliver more persuasive and affectively resonant forms of storytelling, beyond the conventional framework of information dissemination.

Methodologically, this study undertakes a case analysis of representative broadcast documentaries, focusing on the ways CG technologies were deployed, how visual styles shifted, and how viewer engagement was restructured. The research draws on theoretical approaches from documentary studies and visual culture, examining how CG contributed not only to visual embellishment but also to the credibility of historical reconstructions, the affective depth of viewer experience, and the redefinition of genre conventions.

The scholarly contributions of this study are threefold:

First, it offers an empirically grounded examination of the early implementation of CG in Korean documentaries, contextualized within the technological and institutional dynamics of the time.

Second, it explicates how CG influenced developments in visual realism, narrative form, and audience reception, thereby illuminating the evolution of documentary aesthetics.

Third, it moves beyond linear technological histories to construct a theoretical understanding of how CG enhanced the documentary's educational and cultural persuasiveness, thereby establishing the study's originality.

In conclusion, this article seeks to demonstrate how the adoption of CG in the early 1990s redefined the visual expression and generic identity of Korean documentary media. This research offers a foundational perspective for understanding the aesthetic transformations of the documentary form during Korea's transition to digital media.

2. Korean Documentaries using CG in the early 1990s

Since the 1980s, the direct participation of domestic terrestrial broadcasting companies in documentary production marked a significant advancement for Korean broadcasting companies. This participation led to the production of various documentaries covering diverse topics, fulfilling a critical role in delivering knowledge and cultural values to viewers. In particular, the development of digital technology brought revolutionary changes to documentary production methods. Through the use of CG and animation, it became possible to visualize abstract or complex concepts and to express visual effects that were challenging to achieve through conventional filming techniques. This technological incorporation enriched the viewer experience by offering more comprehensive information and visual experiences in various fields such as science, technology, history, economy, and environment.

Through digital technology, invisible phenomena or complex scientific concepts could be visualized, allowing viewers to understand and empathize with the subject more easily. This enhancement has significantly strengthened the role of documentaries as an educational and informational medium. According to Oh Chun-ho [1], the application of cutting-edge technology like CG in documentaries covering historical subjects vividly reproduced past events, capturing viewers' interest. Such attempts were showcased in documentaries like Special Sunday: The Top 10 Cultural Heritage Sites (KBS), A Promise 700 Years Ago (MBC), and The Secret of the Royal Road (SBS). Furthermore, Han Jeong-seok [2] observed that with audiences possessing heightened visual literacy and sophisticated aesthetic standards, recent documentaries have shown a tendency to emphasize advanced CG technology. However, he critiqued that despite the abundant use of advanced CG in KBS documentaries such as Moving Image Restoration of Hwangryongsa Temple, The Seven Mysteries of the Tomb of King Muryeong, and The Secret of 3 Billion Years on the Korean Peninsula, these elements alone may not sufficiently enhance the fundamental value of documentaries. Media Today [3] reported that documentaries face the challenge of maintaining truth and authenticity while pursuing a balanced aesthetic in visual expression through CG. Similarly, Paul Ward [4] noted that documentaries are ultimately in a form that claims or requests

truth about the real world and the individuals within it. Through this, he emphasized the issue of how documentaries should navigate the boundary between fact and fiction.

Jeong Hyeon-mok [5] analyzed that documentaries, which were once regarded as dull and rigid, have transformed into engaging moving image content with the incorporation of cinematic techniques, with CG playing a pivotal role in this change. He noted that CG facilitated the adoption of animation and reproduction techniques, forming a genre of infotainment that extends to metaphysical subjects in addition to scientific domains. Such changes and attempts began in the mid-1990s, marking an important turning point as documentaries evolved into a new format that not only conveys facts but also provides viewers with enjoyment and engagement. In conclusion, the introduction of digital technology and CG has transformed documentaries from simple records into innovative and varied educational media that offer new dimensions of visual experiences.

Accordingly, this study selects as its primary case studies broadcast documentaries produced from the mid-1990s to the early 2000s, a period when CG technology began to be actively implemented. The selected works are limited to those in which public broadcasters were directly involved in both the planning and production processes, and in which visual reconstruction played a central role in addressing historical, scientific, or cultural subject matter. These selection criteria aim to identify critical inflection points where CG functioned not merely as a supplementary device but as a transformative element that significantly influenced documentary narrative structures and modes of audience perception.

2.1 Integration of Visual Graphics for Effective Information Communication

The initial adoption of CG in Korean broadcast documentaries marked a significant turning point in the visual transmission of complex theoretical and informational content. Early uses of CG enabled the transformation of abstract or technically dense concepts into accessible visual formats, thereby overcoming the limitations of traditional narrative-based exposition. By employing visual elements such as infographics, CG contributed to the intuitive simplification and clarification of intricate data and ideas. This visual mediation not only enhanced the documentary's capacity to convey information with greater clarity and impact, but also offered viewers a more immersive and engaging experience. As a result, the integration of CG played a pivotal role in expanding the expressive scope and communicative function of the documentary genre.

2.1.1 The Korean War (KBS, 1990.06.18.~1990.06.29.)

In the late 1980s and early 1990s, advancements in 3D animation software marked the beginning of Korea's exploration into using this technology for documentary production. Prominent 3D animation software of this period included workstation-based programs such as Alias, Wavefront, and TDI Explorer, as well as PC-based software like Topaz. Emerging CG companies, like Cinepix, adopted Softimage software on Silicon Graphics platforms to produce and integrate 3D CG for KBS's documentary The Korean War. This was recognized as a pioneering application of CG in educational programming, providing visually effective results on a relatively modest budget [6]. KBS formed a dedicated team in 1987, spending approximately three years to produce The Korean War, which became a significant cultural endeavor documenting Korea's historical and national events. This documentary not only conveyed factual information but also held historical significance by commemorating the 40th anniversary of the Korean War. In 1990, it received the 17th Broadcasting Awards, highlighting its social impact and production quality, further cementing the documentary's social value and educational importance [7]. Notably, this documentary utilized 3D CG to reconstruct scenes of warfare and military operations, thereby moving beyond a mere verbal recounting of historical facts to facilitate a visually immersive experience for the viewer. This marked a significant turning point in Korean documentary practice, as it reconfigured factual representation through audiovisual means, enhanced emotional engagement, and expanded the delivery of historical narratives into the domain of visual storytelling.

2.1.2 The Secret of the Korean Peninsula's Birth: Land of the Equator (KBS, 1998.01.04.)

The KBS Sunday Special, The Secret of the Korean Peninsula's Birth, is a documentary that explores the formation and transformation of the Korean Peninsula through disciplines such as astronomy, geology, and geography. Utilizing CG and 3D modeling, it vividly visualizes the Earth's geological structure and tectonic movements.

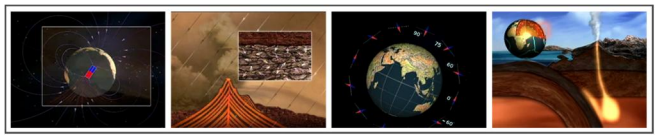

Figure 1. Land of the Equator

In Figure 1, CG is employed to illustrate the movement of continents and shifts in Earth's magnetic field. A specific sequence lasting around 20 seconds depicts the Earth's rotation and changes in the magnetic field direction, marked with arrows, for clearer visual comprehension. Furthermore, cross-sectional views of Earth in scenes that describe tectonic shifts and volcanic eruptions enable viewers to grasp the formative processes of the Korean Peninsula in a visually engaging and accessible manner. In this scene, the CG-rendered cross-section of the Earth is centrally composed to maintain visual focus, while the contrasting use of blue and red tones effectively illustrates tectonic heat flow and crustal activity. Such mise-en-scène design and color planning dramatize complex geological information, enhancing both viewer comprehension and immersive engagement.

2.1.3 The Secret of the Korean Peninsula's Birth: The Age of Fire (KBS, 1998.01.25.)

The Age of Fire episode delves into the geological structure and formative processes of the Korean Peninsula, using CG to enhance viewers' understanding.

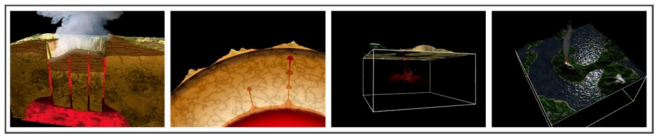

Figure 2. The Age of Fire

Figure 2 presents a computer-generated animation that visualizes the geological layering and the formation of the Korean Peninsula. This sequence exemplifies how CG enhances the documentary's visual storytelling by transforming complex geological phenomena into accessible visual information. The mise-en-scène is carefully constructed through cross-sectional views and three-dimensional spatial depth, allowing viewers to intuitively grasp tectonic movements and stratigraphic flows. The strategic use of dark backgrounds and high-contrast color palettes emphasizes the dynamic nature of each geological layer, functioning as both an informative tool and a narrative device that strengthens viewer immersion.

Documentaries utilizing CG have emerged not merely as audiovisual supplements but as powerful tools that integrate complex academic concepts into visually structured narratives. This approach establishes a new paradigm of "storytelling-based information delivery." Visual elements such as infographics, 3D animations, and simulation models enable the representation of scientific principles and historical reconstructions that are otherwise difficult to convey through conventional footage. These visually driven narratives not only enhance cognitive understanding but also foster emotional engagement among viewers. Thus, CG functions as a narrative device within the documentary genre, serving as a crucial medium that simultaneously ensures clarity of information and an immersive viewing experience.

2.2 Recreation and Restoration

By the mid to late 1990s, CG technology had become widely integrated into broadcast and media productions, with various programs actively employing it to visually enhance the delivery of information. In particular, the precise reconstruction of historical scenes and cultural artifacts marked a significant turning point in documentary production. CG served as an indispensable visual medium for representing archaeological subjects or damaged relics that were otherwise inaccessible or impossible to film directly.

Such applications of CG allowed for immersive and intuitive viewing experiences without compromising the historical authenticity of the subject matter. This, in turn, significantly enhanced both the communicative clarity and narrative persuasiveness of documentary content. Furthermore, CG evolved beyond a mere visualization tool to function as a "visual-historical interpretive medium," enabling the reconstruction of ancient artifacts and the spatial-temporal context of past civilizations. This facilitated a more comprehensive understanding of historical narratives and generated heightened viewer engagement and positive reception.

These efforts extended the realism of documentary beyond simple audiovisual recording, positioning CG-based representations as credible reconstructions shaped through audiovisual means. By mediating historical events and sites inaccessible to direct observation, such representations functioned as digital stand-ins for past realities.

Grounded in a visual epistemology the notion that "seeing is knowing" this mode of visual reconstruction strengthened the viewer's sense of authenticity and contributed to the documentary's educational and cultural persuasiveness.

2.2.1 The Mystery of Life: The Birth of Life (KBS·NHK, 1995.07.16.)

The documentary The Mystery of Life: The Birth of Life, a joint production between KBS and NHK, stands out as a significant work in Korean documentary history. This first episode of the series employed substantial production costs and advanced technology to visually reconstruct the processes of life's origin and evolution, garnering considerable attention upon its release. Through the use of computer animation and digital restoration of ancient fossils, the program delivered realistic and vivid CG recreations of early life forms. This visual approach left a powerful impression on viewers, effectively bridging the gap between abstract evolutionary concepts and tangible imagery.

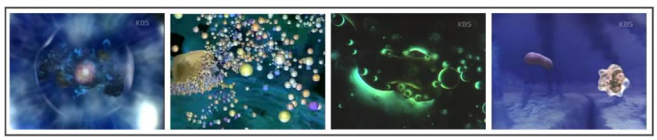

Figure 3. The Birth of Life

Figure 3 illustrates a 3D animation of a microscopic cell under 1mm in size, enlarged and rendered with vibrant colors and detailed effects, effectively conveying the dynamic movement of the cell. This CG representation offered an in-depth view of internal structures and cellular activity, satisfying viewers' scientific curiosity and enabling a vivid exploration of organisms usually beyond the reach of direct observation. The frame places the magnified cell at the center against a dark background, emphasizing the contrast between the static setting and the dynamic cellular movement while guiding viewer attention. The use of highly saturated, multicolored visuals enhances the internal dynamism of the cell and constructs an aesthetically immersive mise-en-scène that supports scientific interpretation. At the time, this program was lauded as an innovative work for its ability to visually depict the evolution and extinction of life forms through sophisticated CG technology, making complex scientific concepts accessible and engaging for a broader audience.

2.2.2 Top 10 Cultural Heritage: Moving Image Restoration, Hwangnyongsa Temple (KBS, 1996.05.26.)

In 1996, KBS established a specialized visual production team and allocated 11 CG designers to undertake the ambitious <Hwangnyongsa> restoration project as part of its "Top 10 Cultural Heritage" series. This project aimed to recreate the Hwangnyongsa wooden pagoda, which had been destroyed by a Mongol invasion in 1238, using advanced CG technology. The 3D reconstruction brought the pagoda back to life, capturing its historical beauty and architectural detail in a visually striking way. The restoration sequence occupied 15 minutes of the documentary's 60-minute runtime, drawing significant public attention and appreciation for its successful depiction of the architectural splendor of this historic monument.

Figure 4. Hwangnyongsa Temple

As illustrated in Figure 4, the CG reconstruction of Hwangnyongsa Temple presents a sequential narrative from the moment of its destruction by fire to a fully restored visual state, creating a powerful emotional and visual impact on viewers. The use of 3D CG enabled the precise reproduction of architectural structures, roof ornaments, and tile patterns. The mise-en-scène was carefully crafted through a dark backdrop, dramatic red-

tinted sky, and a high-contrast color palette that intensified the atmosphere. Dynamic camera movements and shifting perspectives reinforced compositional coherence, guiding the viewer through a narrative progression from ruin to restoration. These visual strategies demonstrate that CG functions not merely as an illustrative aid, but as a critical storytelling device that enhances the documentary's historical authenticity and emotional resonance.

2.2.3 The Secret of the Royal Road (SBS, 1996.08.14.~1996.09.15.)

In Secrets of the Royal Capital (SBS, 1996), low-polygon style 3D CG was used to simplify complex landscapes and architectural structures, allowing viewers to more easily grasp the historical context. As the camera smoothly navigates across the simplified low-polygon terrain, it establishes spatial depth and visually emphasizes the hierarchical structure of the fortress during the transition to the interior. The use of muted color tones and minimalistic modeling directs viewer focus toward key architectural elements, creating a clear mise-en-scène that facilitates historical understanding without visual overload.

Figure 5. The Secret of the Royal Road

As shown in Figure 5, the program incorporates scenes where the 3D camera shifts from distant views to interior settings, exploring terrain and fortifications in detail. According to The Korea Economic Daily [8], the documentary realistically recreated the areas around Manchu Ji'an and the Han River using CG, enhancing the effectiveness of information delivery. By presenting historical geographies with accessible visuals, Secrets of the Royal Capital significantly improved viewers' understanding of the program's historical content.

2.2.4 The promise from 700 years ago (MBC, 1996.12.07.)

MBC's 700-Year-Old Promise utilized CG to recreate the Sinan shipwreck and artifacts, allowing viewers to engage with historical details more realistically.

Figure 6. The promise from 700 years ago

MBC's documentary A Promise from 700 Years Ago reconstructed the Shinan shipwreck and its artifacts using computer-generated imagery (CG), enabling viewers to access and understand historical heritage with a heightened sense of realism. As depicted in Figure 6, the CG visualization intricately rendered the wooden textures, assembly methods, and curved structures of the ship, showcasing the high precision of digital modeling. The mise-en-scène is constructed against a black background, isolating the ship and directing the viewer's gaze toward the historical object. The deliberate use of monochromatic lighting and centralized framing provides a composed visual rhythm. These cinematic strategies allow audiences to sensorially engage with temporally and spatially distant history, thereby enhancing both the informational clarity and immersive quality of the documentary.

2.2.5 Top 10 Cultural Heritage: Hwangnamdaechong Tomb of Silla (KBS, 1997.04.06.)

The KBS Sunday Special series Top 10 Cultural Heritages featured the documentary The Secret of the Golden Kingdom: Silla's Hwangnam Daechong, which employed CG technology to reconstruct the interior structure and burial artifacts of the Hwangnam Daechong tomb with a high degree of visual fidelity. This program garnered considerable academic and public attention upon its release due to its meticulous visualization of the tomb's treasures, which had previously been inaccessible to the general public. By utilizing CG to simulate the spatial configuration and material textures of the tomb's interior, the documentary offered an

immersive viewing experience that not only enhanced public engagement but also underscored the role of digital media in the preservation and interpretation of cultural heritage. This case exemplifies how CG-assisted reconstructions can serve as a vital epistemological and museological tool in communicating the historical and symbolic significance of Korea's Silla civilization. Moreover, the integration of storytelling with digital visualization allowed for a more affective and cognitively resonant engagement with the past, demonstrating the potential of CG as a narrative device in documentary media.

Figure 7. Hwangnamdaechong Tomb of Silla

In Figure 7, the scene depicting the restored golden ornaments of King Naemul and his queen is displayed meticulously against a black background, highlighting the intricate craftsmanship of Silla's royal artifacts. The placement of golden royal ornaments against a dark background maximizes visual focus, with CG-rendered reflections enhancing the texture and dimensionality of the artifacts. The symmetrical arrangement of the regalia and horse adornments contributes to a majestic mise-en-scène, underscoring the symbolic authority of the ancient Silla royalty. This detailed CG representation allowed for an exploration into the origins of Silla culture, illustrating its elegance and artistry. By employing virtual reality technology to restore these ancient relics, the program opened new possibilities for documentary and historical research. This approach not only revived the past but also showcased how advanced technology could bring historical artifacts to life, deepening the public's understanding and appreciation of Korea's rich heritage.

2.2.6 The Secret of the Korean Peninsula's Birth: Land of the Equator (KBS, 1998.01.04.)

This moving image employs CG to visually represent the natural process by which cyanobacteria contribute to rock formation, thereby facilitating an intuitive understanding of complex ecological phenomena for the viewer.

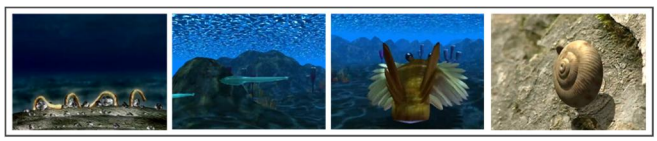

Figure 8. Land of the Equator

Figure 8 illustrates primitive organisms in a 3D virtual space, with repeated appearances that help viewers easily grasp complex biological phenomena. The deep cyan-toned seabed background evokes a mysterious and immersive ancient ocean atmosphere, while the repetitive placement of primordial creatures creates visual rhythm across the scene. Organic camera movements and a centered composition highlight the dynamics of biological evolution and reinforce viewer comprehension through visual storytelling. Kim Jae-soon [9] praised the program for leveraging contemporary CG technology to vividly recreate ancient seas, such as trilobite-rich ocean floors. Programs like these contribute to a deeper understanding and emotional resonance by using CG to realistically recreate historical and scientific subjects, enriching the viewer's experience with a sense of immersion and realism.

2.3 Virtual Space

Virtual studio and CG technologies have brought transformative innovation to the domain of television production. In particular, these technologies play a pivotal role in historical programming, where they enable creative visualization and facilitate audience understanding by overcoming the inherent temporal and spatial constraints of depicting the past. Virtual studios replace physical sets with computer-generated environments, thereby expanding the expressive autonomy of producers and allowing for the dynamic reconstruction of historically significant settings or events. This results in enhanced visual immersion for viewers.

Furthermore, CG technologies contribute to the vivid representation of historical figures and scenes that may no longer exist or cannot be physically reconstructed. By facilitating the experiential rendering of the past, CG enhances the audience's ability to engage with complex historical narratives in a realistic and compelling manner. As such, these technologies serve as essential tools for producers seeking to deliver historically grounded yet creatively enriched storytelling, thereby strengthening both the informative and aesthetic dimensions of historical documentaries. Kwon Ho-young [10] analyzed the production status of broadcast programs utilizing virtual studio technology and emphasized that creative planning and conceptualization become increasingly critical when employing such technologies. He asserted that a comprehensive understanding of the technical mechanisms, along with an awareness of the functional limitations of virtual studios, is essential. According to Kwon, these competencies in planning and production play a pivotal role in shaping the quality and effectiveness of media content in contemporary broadcasting.

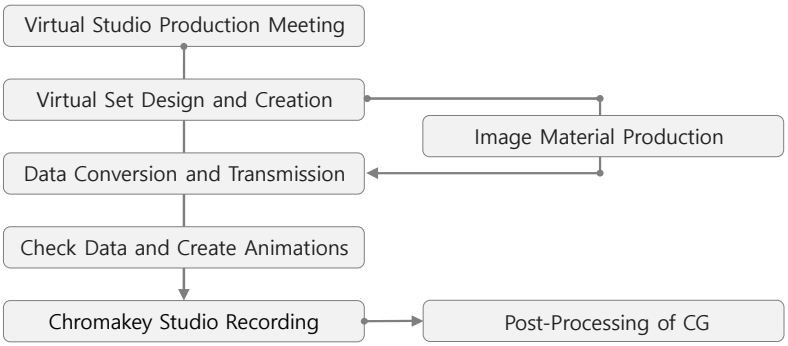

Figure 9. History Special (KBS, 1998.10.17.~2012.12.13.) Production Flow Chart

Figure 9 illustrates the production workflow of KBS's iconic program History Special from the late 1990s, showcasing how the program utilized virtual studio-based CG as its core production method. In this setup, CG designers and the graphics team played significant roles throughout the planning and completion phases, involving themselves deeply in the technical aspects of the production [11]. History Special made extensive use of virtual studios to recreate scenes from both the past and the future, visually presenting historical events in ways that enhanced viewer comprehension.

Since 1996, the use of virtual studios has rapidly expanded, leading to stories that integrate virtual spaces and objects with real filmed actors. This technological approach has allowed documentaries to evolve beyond monotonous, narration-heavy structures, transforming them into engaging experiences that spark curiosity and wonder. This shift has increased viewer immersion, with narrators appearing within virtual environments to provide explanations, creating the effect of being present in the depicted location. Such methods enhance the documentary's realism, fostering a deeper understanding and connection with historical sites and events among viewers.

2.3.1 The Mystery of Life: The Birth of Life (KBS·NHK, 1995.07.16.)

Figure 10. The Birth of Life

Figure 10 effectively visualizes the formation and evolution of life, making the origins of life more accessible and engaging for viewers. The program reconstructs scientific content through 3D CG and virtual environments, allowing viewers to grasp complex scientific knowledge easily and enjoyably. Through 3D graphics, the birth and evolutionary processes of cells are vividly rendered, offering detailed views of biological structures from multiple angles. This combination of CG and virtual spaces not only clarifies scientific themes for the audience but also enhances the educational value of the program.

2.3.2 Top 10 Cultural Heritage: Moving Image Restoration, Hwangnyongsa Temple (KBS, 1996.05.26.)

Figure 11. Hwangnyongsa Temple

As shown in Figure 11, Visual Restoration of Hwangnyongsa uses 3D CG to recreate the nine-story Hwangnyongsa Pagoda, allowing a narrator to explore the interior within a virtual space. The narrator navigates the CG-rendered Hwangnyongsa freely, moving through each floor and describing its structure. This immersive approach, where the narrator appears to actually "explore" the virtual environment, provides viewers with a highly realistic experience. The detailed 3D recreation of Hwangnyongsa's nine-story structure, including intricate interior features, enables the narrator to guide viewers up and down the stairs and through different levels. The seamless use of camera angles and perspective shifts gives viewers an immersive sense of exploring Hwangnyongsa themselves. This interactive presentation enhances the realism of the historical structure and significantly aids in delivering a deep understanding of cultural heritage to the audience.

2.3.3 Top 10 Cultural Heritage: Forgotten Land, Secret of Baekje 22 Dam-ro (KBS, 1996.09.15.)

Figure 12. Forgotten Land, Secret of Baekje 22 Dam-ro

Jeong Hyeong-mo [12] highly praised the CG technology used in The Secret of Baekje's 22 Provinces, noting that Figure 12 presents a realistic interaction where the narrator appears to pull a book from within the screen, creating an impression of real-life interaction within the digital space. This program is structured to feature a virtual environment where the narrator can freely navigate the space while explaining historical facts.

In the opening scene, a 3D-rendered Earth rotates on the screen, and the narrator steps into an infinitely expanding virtual universe. As the narrator moves through space, the expanding Earth and Baekje regions are described, combining historical information with visual elements to create an immersive viewing experience. The depiction of space expansion along the Z-axis enhances the depth of the screen, allowing viewers to intuitively grasp the information presented.

2.3.4 The Secret of the Korean Peninsula's Birth: Land of the Equator (KBS, 1998.01.04.)

The Land of the Equator illustrates the appearance of early Earth, addressing the origins of life while vividly recreating natural phenomena.

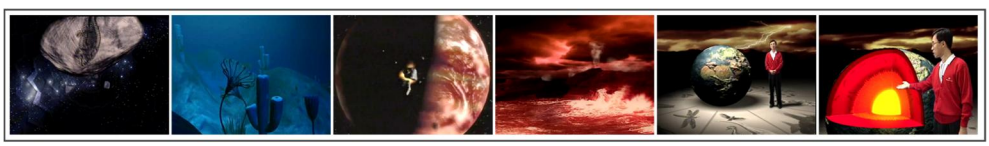

Figure 13. Land of the Equator

In Figure 13, the depiction of the cosmic environment showcases early Earth as a massive fireball, impressively conveying the planet before the advent of life. Planets appear to cascade toward the viewer along the Z-axis, majestically illustrating the formation of Earth. Flowing lava and lightning effects add to the realism of pre-life Earth, with the harmony of CG effects and narration enabling viewers to imagine the primordial environment of our planet.

2.3.5 The Secret of the Korean Peninsula's Birth: Dinosaurs' Paradise (KBS, 1998.01.11.)

This documentary vividly recreates the environment of dinosaurs and ancient organisms within a virtual space, bringing viewers into the age of dinosaurs.

Figure 14. Dinosaurs' Paradise

In Figure 14, the narrator is shown interacting with a virtual dinosaur, enhancing the realism through meticulous compositing, as the dinosaur's shadow is cast onto the narrator's face. This interaction was made more immersive by adjusting the relative positioning and perspective between the narrator and the dinosaur, offering an in-depth view of the dinosaur's ecosystem. The scene where the narrator explains from the dinosaur's eye level allows viewers to feel as though they are side-by-side with the creature, significantly enhancing the documentary's engagement. The projection of the dinosaur's shadow onto the narrator's face exemplifies the subtlety of CG technology, enabling realistic interaction within the virtual environment.

Figure 15. Dinosaurs' Paradise

Additionally, in this program, as seen in Figure 15, the narrator appears at key points throughout the storyline, connecting and integrating the program's structure and content. This approach facilitates smoother transitions between virtual spaces, allowing viewers to follow the program's narrative more easily. Since each virtual space conveys different aspects of the story, the narrator plays a critical role as a cohesive link. This method helps integrate various themes and subjects into a unified and engaging narrative. A similar technique was employed in KBS's Sunday Special: Top 10 Cultural Heritage series, specifically in the fourth episode, Exploring the Original Form of Seokguram (1997.01.05). In that episode, author Ko Won-jung utilized CG to transport viewers back in time, virtually entering Seokguram as it appeared 100 years ago, delivering a highly realistic and immersive experience that received much acclaim.

2.3.6 Moving Image restoration, Goguryeo comes to life at the Dance Center (KBS, 1998.10.17.)

The first episode of the History Special series, The Mural Tombs of Goguryeo Come Alive, utilized virtual studio technology to recreate the murals of a Goguryeo tomb with striking realism.

Figure 16. Goguryeo comes to life at the Dance Center

In Figure 16, the narrator appears within the virtual studio, moving into the tomb's interior to demonstrate the mural's formation process. This program effectively leveraged virtual spaces to vividly restore historical scenes, allowing viewers to experience the Goguryeo era firsthand. The virtual studio itself appears to move, creating the effect of the narrator entering the tomb and enabling viewers to visually experience the mural's formation process as if they were there. The smooth transition from physical to virtual space connected the past with the present, enhancing the storytelling. This approach not only guided viewers through the mural creation process but also maximized their immersion.

Examples like these demonstrate how the development of virtual studios and CG has introduced significant changes to documentary production. Such technologies enhance the intuitive understanding of scientific and

historical information by delivering vivid visual experiences, thereby strengthening the documentary's power to convey information in a compelling and accessible manner.

2.4 The Use of Cinematic Techniques in Docudramas

TV documentaries primarily aim to explore truth based on objective facts. Alongside news and current affairs programs, documentaries fall under "factual programming," conveying social messages and issues with a journalistic rigor that is held in high regard. Such documentaries are rooted in reality, reconstructing events, objects, and people to communicate truth. Documentary creators, striving to maintain authenticity, focus on faithfully presenting reality without artistic embellishments [13]. In contrast, docudramas creatively reconstruct the daily lives, events, and contexts of real people by integrating resources such as news articles, animation, scripts, and documentary footage. Lee Un-seop [14] noted that the use of technologies like CG plays a significant role in distinguishing documentaries from docudramas. Jeon Kyung-ran [15] further emphasized that the use of digital imagery opens new possibilities for documentaries, allowing them to achieve a photographic realism and expressiveness similar to animation. The evolution of communication technologies, the media industry, and the creativity of producers have spurred transformation within the documentary genre, enabling diverse approaches to exploring and presenting truth.

2.4.1 The Mystery of Life: Blossoming Flowers and the Emergence of Giant Dinosaurs (KBS·NHK, 1995.08.06)

The fourth installment of The Mystery of Life series, titled Blossoming Flowers and the Emergence of Giant Dinosaurs, diverged from traditional explanatory formats by adopting dramatic storytelling techniques to present the evolution of life and nature in an engaging, immersive manner.

Figure 17. Blossoming Flowers and the Emergence of Giant Dinosaurs

In Figure 17, CG technology was used to showcase dinosaurs of various sizes and forms in three-dimensional realism. Advanced creature simulations provided a life-like portrayal of dinosaurs' movements, drawing inspiration from the cinematic techniques of Jurassic Park. This approach allowed the program to recreate the ancient ecosystems in a spectacular visual style, enabling viewers to feel as if they were experiencing the prehistoric world of dinosaurs firsthand. By integrating simulations with CG, the program successfully evolved documentary storytelling into a more cinematic and audience-friendly experience, blending scientific exploration with visual appeal.

2.4.2 The Secret of the Korean Peninsula's Birth: Land of the Equator (KBS, 1998.01.04.)

The Equatorial Land, part of the Secret of the Birth of the Korean Peninsula series, illustrates the environmental transformations that occurred on the Korean Peninsula 500 million years ago. Through a combination of matte painting and 3D modeling, this program vividly reconstructs the formation of land, sea, and coral reefs.

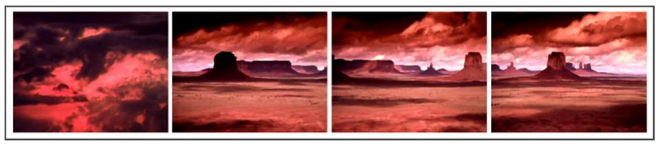

Figure 18. Land of the Equator

In Figure 18, scenes flow naturally from drifting clouds to emerging landmasses, showing the recession of seawater and the eventual exposure of coral reefs. This seamless transition not only captures the dramatic landscape but also reinforces the documentary's narrative depth and atmosphere. These visual techniques allow viewers to gain a clearer understanding of Earth's formative processes, making complex scientific concepts about early Earth both accessible and captivating.

2.4.3 The Secret of the Korean Peninsula's Birth: Dinosaurs' Paradise (KBS, 1998.01.11.)

Paradise of the Dinosaurs is a groundbreaking work that meticulously reconstructs the Mesozoic ecosystem of the Korean Peninsula through the use of specialized miniatures and motion control cameras.

Figure 19. Dinosaurs' Paradise

As seen in Figure 19, the program attempted a technical feat by integrating computer-generated dinosaurs with detailed movements, aiming to recreate the dinosaurs' behaviors and natural interactions. However, this ambitious use of CG technology faced limitations, as the quality of domestic CG at the time was not yet on par with global standards. Repeated visual sequences in certain sections may have contributed to a loss of interest for viewers, as the repetitive scenes lacked variety. Nevertheless, this experimental approach played a significant role in advancing the domestic CG industry, providing a foundation for future technological improvements.

As the first program in Korea to undertake character animation of this kind, it encountered occasional issues, with some scenes showing noticeable limitations in expression. For example, Kwon Hyuk-joo (1998) noted the issue in scenes where the dinosaur's feet appeared to hover above the ground without making contact, highlighting a flaw in CG rendering techniques. Director Hong Bo-seon mentioned that, due to limited time allocated for animation and compositing, some compromises in quality were inevitable. With additional time, the production team could have achieved even more vivid and lifelike sequences.

Figure 20. Dinosaurs' Paradise

Figure 20 showcases the cinematic techniques in Paradise of the Dinosaurs, particularly in a scene early in the program where the narrator appears in a live-action setting, suggesting a journey back in time as though aboard a time machine. The narrator, standing amidst real sedimentary layers, introduces the scene with the line, "If we travel back millions of years," which then transitions seamlessly into a computer-generated environment. The camera then explores a 3D-rendered ancient continent, presenting a detailed view of the ecosystem where dinosaurs once thrived. The documentary employs narrative voiceover combined with music and CG visuals to dramatize the interactions between carnivorous and herbivorous dinosaurs, heightening the tension in the chase scenes. Such cinematic techniques add an engaging layer of excitement and immersion, allowing viewers to experience the dinosaur era viscerally. Yang Won-hong [16] questioned whether the use of CG in documentaries could truly support realism and authenticity. However, he acknowledged that later documentaries such as Dinosaurs of the Korean Peninsula (2008) and Mammoths of the Korean Peninsula (2010) demonstrated that a narrative structure enhanced by CG could effectively establish itself within the documentary genre.

Figure 21. Dinosaurs' Paradise

Figure 21 highlights a sequence focusing on the intense chase between herbivorous and carnivorous dinosaurs. This 2 minute and 10 second sequence comprises 26 varied shots, each employing rhythmic editing techniques to enhance the cinematic tension. The camera captures a herd of herbivorous dinosaurs in a forest setting, who, upon hearing a distant sound, turn their heads just as a predator emerges from the trees, initiating the chase. The sequence builds tension through a range of shots and angles, creating a vivid, sensory experience for the viewer.

Although some animation, rigging, and texturing aspects reveal slight limitations, such as occasional unnatural movements, certain moments leave a strong impact. For instance, the scene showing blood dripping from a herbivorous dinosaur's neck, achieved through dynamic camera angles, is particularly striking. The use of an extreme high-angle shot showing a carnivorous dinosaur grasping its prey, combined with a low-angle shot capturing the predator's intense expression, powerfully conveys the raw brutality of the prehistoric world. In the background, the sight of a primitive bird, likely an Archaeopteryx, flying across the scene adds depth, fully realized through 3D camera work.

This approach amplifies the emotional resonance of the documentary, enriching the viewer's experience by adding a visceral layer to the narrative. The combination of varied camera angles and dramatic editing contributes to the sequence's immersive quality, leaving a lasting impression on viewers.

2.4.4 The Secret of the Korean Peninsula's Birth: The Age of Fire (KBS, 1998.01.25.)

The Age of Fire vividly reconstructs geological phenomena, such as the eruption of Mount Baekdu, using CG to communicate the grandeur and destructive power of natural events.

Figure 22. The Age of Fire

In Figure 22, the CG-rendered volcanic eruption scene immerses viewers in the explosive force of the event, seamlessly blending live-action elements with animation to enhance visual quality. The texturing and color consistency in the CG maximize visual realism, intensifying the authenticity of the volcanic landscape. This meticulous attention to visual detail helps deliver a more profound understanding of geological events, providing viewers with an impactful depiction of Earth's dynamic forces.

2.5 Beyond Documentation: Exploring New Dimensions

To convey documentary themes with heightened engagement and immersion, CG-enhanced docudramas have evolved beyond simple factual recordings, offering audiences experiences on a new level. Director Nam Seong-woo emphasized the importance of advanced technology, such as CG, particularly for enhancing less accessible or potentially tedious topics, seeing it as essential to elevating documentary quality [17]. The Sunday Special: Top 10 Cultural Heritage series, which used CG to enhance narrative comprehension, has been lauded as a program that merges both popular appeal and artistic value. Jeon Kyung-ran [15] further noted that CG introduces a fresh sense of realism to documentary production, presenting novel visual approaches that transcend traditional methods.

With advances in CG, documentaries are no longer confined to simply recording reality but are now open to exploring entirely new dimensions. For instance, in The Original Exploration of Seokguram (1997), CG was used to reconstruct the original form of Seokguram, adding depth to the story and enabling viewers to experience history vividly. CG has thus become a crucial tool for presenting challenging topics visually, expanding the genre's potential and reinforcing the documentary medium as a source of creative and innovative content.

3. Conclusion

The adoption of CG in Korean documentaries began relatively later than in other genres but rapidly evolved into a crucial tool for visual representation. Initially limited to simple infographics for informational delivery, CG became more widely used following programs such as The Eternal Mystery of Life, which marked a turning point in the integration of 3D CG and virtual studio technologies. These advancements enhanced the documentary's capacity for historical reconstruction and immersive storytelling.

Since the 2000s, the increasing sophistication of CG technology has driven both formal and aesthetic developments in the documentary genre. High-resolution simulations, digital restorations, and immersive media technologies such as virtual reality (VR) have enabled the simultaneous realization of factual accuracy and sensory engagement. These transformations suggest that CG now serves not merely as a supportive tool but as an essential element that shapes narrative structures and meaning-making in documentaries.

Future research should examine how CG technologies influence narrative construction and audience reception within documentary formats. It is also important to explore the integration of generative AI, real-time rendering, and extended reality (XR) technologies. Moreover, critical discussions on authenticity, ethical representation, and interpretability in CG-based reconstructions must be pursued in tandem.

In conclusion, CG has facilitated the diversification of expressive strategies in Korean documentaries, expanding their thematic and formal scope while enabling new modes of viewer engagement. As such, CG continues to serve as a pivotal force in the evolution of the documentary genre and holds significant potential for further innovation in digital audiovisual journalism.

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