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Proposal for a virtual museum with vertical aspect ratio for the convergence of metaverse and short-form content

Il-hyun Cho*

Visiting Professor, Department of Digital Contents, Sangmyung University, Korea
choilhyun@smu.ac.kr

Abstract

This study explores the convergence of metaverse and short-form content, proposing a new approach for viewing short-form content with a vertical aspect ratio on a metaverse platform and within a virtual museum. Short-form content has gained popularity due to the snack culture and is proving to be advantageous in e-commerce. By studying the relationship between vertical ratio screens and gaze, we confirm the effectiveness of vertical ratio short-form content in providing immersive experiences and fostering sharing and communication. The proposed virtual museum offers opportunities for innovative businesses to market through fandom. This research highlights the value of vertical proportion short-form content and its significance in the convergence of metaverse and short-form content. It aims to contribute to industry development, provide new creative directions, enhance personal visual experiences, and expand applicability in related fields.

Keywords: Virtual Museum, Short-Form, Vertical Aspect Ratio Screen, Metaverse, Convergence

1. Introduction

The development of wireless communication technology and personalized devices has created a contactless environment, making various content easily accessible. Short-form content has become popular in the "mobile- only" era, with auto-play functionality ensuring viewer engagement [1]. It has emerged as a powerful tool across industries, promoting product purchases and fostering a new networked economic structure [2]. As the importance of short-form business grows, there are rising expectations for its integration with the metaverse [3]. This study focuses on the convergence of metaverse and short-form content, proposing an innovative approach to showcase short-form content in vertical proportions on a metaverse platform. It aims to explore the relationship between aspect ratio screens and gaze, evaluate the effectiveness of short-form content, and propose strategies to enhance the viewer's emotional experience, contributing to expanding marketing business applications.

2. Understanding the Metaverse

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Corresponding Author: choilhyun@smu.ac.kr

Tel:*** _ **** _ ****

Visiting Professor, Department of Digital Contents, Sangmyung University, Korea

2.1. Concept and Evolution of the Metaverse

Metaverse platforms are rapidly gaining traction across all industries, becoming more accessible to our daily lives. In its 2007 report, ASF categorized the metaverse into augmented reality, virtual reality, life logging, and mirror worlds. Initially, this categorization was widely understood by the public.

However, these concepts are thought to emphasize the experiential aspect of the metaverse [4]. Gradually, as the metaverse platform develops, there is more interest in creating value connected to reality than in the experiential aspect of the metaverse, and ASF also predicts that the four types of metaverse will interact and develop into a fusion and convergence form in the future [5].

2.2. Metaverse platform features

Recent metaverses have shifted their focus from the concept itself to enhancing user experiences, interactions, and virtual asset monetization. As a result, the metaverse is expanding its presence in all industries and exploring partnerships with existing service platforms [6]. In the metaverse, users can explore and interact through avatars, accumulating personal experiences that serve as marketing tools, much like the approach of Short-form platforms. However, a key difference is that in the metaverse, users can test products through their avatars, trying on clothes, shoes, or experiencing virtual spaces firsthand. This "digilog" psychology reflects users' desire to express analog feelings in the virtual realm, akin to offline experiences [7]. Strategic design of the metaverse platform should leverage user experiential factors, including vertical ratio content consumption behavior, to achieve positive outcomes.

2.3. Expanding the Metaverse ecosystem

As Figure 1 shows, the metaverse is increasingly integrated into our daily lives, providing unique services across a variety of industries. However, platform incompatibility remains a challenge. To address this, the Metaverse Standards Forum was established to develop open standards and facilitate service linkage between metaverse platforms [8]. This study proposes the convergence of metaverse platforms and short-form content as a valuable approach to expand the ecosystem and create connections between multiple metaverses and short-form platforms.

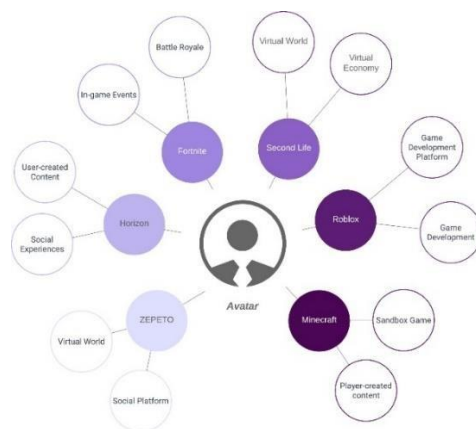


Figure 1. A unified metaverse ecosystem in one avatar

3. Understanding Short-form Content

3.1. Short-form content concepts and evolution

Short-form content, consisting of short videos lasting from 15 seconds to 1 minute, is designed for quick and easy consumption of information and entertainment. Initially popular among the MZ generation, short-form content has now expanded to various age groups. In the metaverse era, the MZ generation engages with content differently, actively expressing themselves, participating in communication, and sharing content. They have a strong interest in creating and modifying content that reflects their individuality and enjoy one-person media activities, where they independently shoot, edit, and upload content. Short-form platform services enable creative content generation without the need for expensive equipment or professional editing skills, fostering a play culture and unique communities beyond traditional social media [9]. In response to the changing content consumption behavior, large companies are actively entering the short-form platform business. The most active platforms include TikTok, YouTube Shorts, and Instagram Reels. Additionally, other providers like Snapchat, Naver Moment, Twitter, Netflix, and Spotify have joined the short-form business. Companies with expertise in their fields can provide differentiated short-form platform services, promoting diverse and creative content consumption [10].

3.2. Short-form Content Business

Short-form content is no longer just for killing time, but has become a key part of the business world, with many companies, including large corporations, actively using it as an advertising and marketing tool. The trend-sensitive MZ generation has begun to be attracted to short and impactful short-form content that is frequently exposed on social media, which naturally leads directly to consumption activities such as purchasing. In addition, the public's consumption activities have turned consumers into marketers themselves, further expanding the scope of influence within the short-form platform [11]. In the past, it was common to use celebrities to secure recognition and promote products, but in advertisements using Short-form, ordinary people appear to stimulate the desire to buy by using the familiarity of everyday life. This can be seen as a psychological factor that makes advertisements by ordinary people more relatable than high-end advertisements featuring celebrities, and it is meaningful in that it can lead to high consumption with low advertising costs for companies. Specific success stories of advertisements featuring ordinary people include, first, Hyundai Motor's "World's Quietest Taxi" advert, released on YouTube in June 2019, which developed a touching story based on the Audio-Tactile Conversion (ATC) system for the deaf and hard of hearing, and received more than 10 million views, and won the Silver Lion Award at the Cannes International Advertising Festival in France. In February 2020, Google's Loretta ad, which appeared in the US Super Bowl ad, was based on a true story and stirred people's emotions as an ordinary grandfather misses his wife who passed away, and with the help of Google's AI assistant system, Assistant, he reminisces and confesses his feelings [12]. In the music industry, short-form content has also had a huge impact on the music charts. The boom of artists releasing short-form challenges has attracted friendly fellow artists and fan bases to short-form content, which is then reproduced as new trending content in the name of challenges, creating a viral effect and effective marketing. Driven by this trend, Instagram Reels are emerging as a strong contender among the new short-form platforms. with same specifics.

4. Aspect Ratio of Content Screen

4.1. Consumption Behavior of Vertical Ratio Content

In order to watch traditional 16:9 landscape-oriented content in full screen on mobile devices, users had to rotate their smartphones 90 degrees horizontally. However, rotating the mobile device again by 90 degrees was perceived as an additional cumbersome step, causing inconvenience. Additionally, watching landscape content in portrait mode reduced spatial efficiency, limiting the view to about 1/3 of the screen size. Media

experts analyzed users' smartphone behavior and found that rotating the device to view landscape content in full screen was not common. Users found this orientation adjustment inconvenient and uncomfortable [13]. The emergence of vertical aspect ratio content in a landscape-dominated environment has influenced user experience. Video platforms that recognized this trend led to significant advancements in vertical content and a major shift in users' content consumption behavior. Before smartphones became popular, media devices mostly featured landscape-oriented content. But with the widespread use of smartphones, people now prefer vertical aspect ratio content for on-the-go video watching anytime and anywhere. Despite this preference, there is still a lack of comprehensive research on the screen composition, movement perspectives, and usability of vertical content, which sets it apart from landscape-oriented content. Therefore, there is a need for a design of visual information structure based on spatial understanding, screen composition, perspective research, and empirical usability studies to distinguish and optimize vertical aspect ratio content.

4.2. Enable the aspect ratio video platform

Smartphones have become essential in modern life, with content consumption predominantly happening through them. 'Generation Z' actively engages with content, creating and sharing their works, fostering interactive social activities. Platforms like 'TikTok,' 'Reels,' 'Shorts,' and Snapchat cater to vertical video content, accelerating one-person media activities and the consumption of vertical aspect ratio content [14]. According to a survey on the usage patterns of vertical video platform services, it has been observed that vertical aspect ratio content receives higher view counts compared to horizontal video content. Additionally, vertical video content has shown to be more effective in terms of advertising exposure. On the other hand, horizontal videos have higher viewer drop-off rates, indicating that users tend to stop watching them before the end.

5. The relationship between aspect ratio screens and eye movement

5.1. Units, Equations and Symbols

Visual perception is the process of identifying and processing information by discriminating between objects within a given visual acuity and field of view. In other words, visual perception focuses on the visual information that enters the visual sensory organs, recognizes the characteristics of the object such as shape, size, position, and color, and visually discriminates between similarities and differences based on visual memory to meaningfully interpret and recognize the features of the visual information elements to identify the exact form [15]. In this process, the eyeball secures the viewing angle, adjusts the perspective, discriminates the object, and sends the correct input information to the brain through the movement of the point of view to track the information. In the process of visual information processing, visual fixation allows you to immerse yourself in visual information, and good visual fixation allows you to maintain visual attention. In addition, the co-operation of both eyes in eye tracking is necessary to ensure that visual information is accurately transmitted to the brain [16].

5.2. Field of View and Viewpoint Transition

Viewers Professor Shinohara's research at the Tokyo Institute of Technology reveals that human vision has an effective field of view of 120 degrees vertically and 200 degrees horizontally. As Figure 2 shows, the central 30-degree range is crucial for accurate focus and color perception, while outside this range, focus blurs and colors resemble black and white images [17]. Viewers' eyes locate and react to information within the designed structure, seamlessly transitioning to other information while maintaining a sense of pace. When comparing horizontal and vertical aspect ratios, the horizontal viewing angle requires more eye movement due to the

wider screen width, whereas portrait content within 30 degrees minimizes eye movement, leading to a more focused and immersive viewing experience [18].



Figure 2. Effective field of view in horizontal frames.

5.3. Aspect Ratio and Focus

Horizontal wide ratios are preferred for showcasing vast landscapes or group shots, capturing the entire composition or fitting more people in the frame. For single subjects, like specific objects or individuals, a vertical aspect ratio within the effective viewing angle is recommended [19]. In a horizontal aspect ratio screen, information elements are displayed even outside the effective viewing angle of 30 degrees, causing eye movement. On the other hand, in a vertical aspect ratio screen, information is contained within the horizontal effective viewing angle, allowing information to be absorbed without the need for eye movement. As Figure 3 shows, according to Professor Shinohara of Tokyo Institute of Technology, watching videos with a portrait aspect ratio allows viewers to comfortably focus on the content without straining their muscles, leading to smoother content consumption and better comprehension. According to this study, vertical screens, unlike horizontal ones, showed a higher level of brain activation, even after momentary focus, indicating a higher level of immersion. [20].

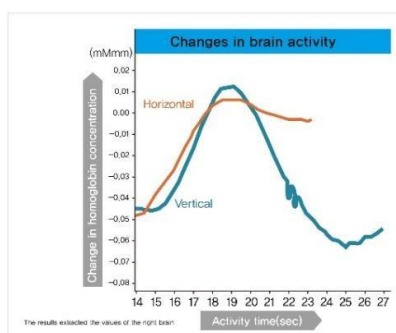


Figure 3. Effective Field of View in Humans

5.4. Focus Duration

The viewer's perception of information and viewpoint shift depend on the designed information structure, color, brightness, and saturation. Content creators must consider effective viewing angles and use visual elements to convey their production intention accurately. A Google study of 12,000 people across 10 countries found that short-form content consumption is growing across generations, with over 50% of Gen Z preferring it. Gen Z not only watches but also creates and distributes short-form content, thanks to its accessibility and simplicity. Professor Shinohara explains, A high level of concentration can increase fatigue, which may reduce the attention span for vertical content [21]. Vertical content is usually short-form, encouraging viewers to watch without abandoning it. The strategy is to reduce bounce rates by using automated features to seamlessly transition to the next piece of content before viewers leave. The auto-play feature boosts the turnover rate of content as it is presented to viewers before they have a chance to choose, contributing to trend formation. Short-form platforms offer everyone an opportunity to absorb trends

and support creator growth. In fact, the number of creators has increased since the platform's official launch, indicating a win-win relationship between the platform and users in growing their business together [22].

6. Exploring the Integration of Metaverse and Short-Form Content in Virtual Museums

6.1. Virtual Museum Features

With the rapid advancement of information and digital technology, people have grown accustomed to acquiring knowledge and information through SNS communication and engaging in non-face-to-face activities within virtual worlds. Consequently, various forms of virtual museums, offering untact (contactless) visits, have emerged. The content showcased in these virtual museums predominantly comprises digital content accessible through digital devices. Unlike offline museums, virtual museums grant creators the flexibility to design spaces without physical constraints, enabling unique and distinct exhibition planning. Digital museums evolved with diverse approaches, prioritizing user experience. Metaverse museums gain popularity, but limited personalized VR engagement; users prefer smartphones or PCs. Metaverse virtual museums vary based on platform characteristics. 'ZEPETO' and 'Spatial' enhance exhibition space, while standalone platforms like 'Hate', 'New Art City', and 'Artsteps' emerge for exhibitions. In particular, the National Museum of Korea held the 'Healing Garden' exhibition on ZEPETO and attracted more than 950,000 visitors in four days through game quests [23].

6.2. A Virtual Museum Converging Metaverse and Short-Form Content

Last November, the Korea Internet & Security Association presented on the growth and future prospects of short-form content. Researcher Yuk highlighted the potential of the metaverse for direct access to desired short-form content and suggested monetizing it with NFTs. This paper proposes a solution to experience short-form content in a virtual museum on the Metaverse platform. By considering the vertical orientation consumption behavior on smartphones, viewers can access the latest trend-oriented short-form content within the metaverse platform while maintaining an immersive experience. The business area can be expanded as individuals' experiences and satisfaction are linked to community formation through avatars within the metaverse [24]. An avatar is a virtual representation of a user in a metaverse, responsible for all interactions within the virtual world. Despite existing in a virtual space, avatars play a crucial role in enabling social connections, interest sharing, and community formation among users. This social aspect enhances user engagement and interaction, leading to significant investments by companies in metaverses [25].

7. Conclusion

This study investigates the convergence of Metaverse and short-form content, exploring their characteristics and development directions for potential integration. Short-form content is a powerful marketing tool with social impact, especially for marginalized groups, and integrating avatars could be a meaningful approach. The relationship between the vertical aspect ratio of short-form content and gaze was studied, showing its immersive potential when integrated into a virtual museum on a Metaverse platform. The proposed hybrid virtual museum offers an immersive visual experience, fostering fandoms and business opportunities. However, empirical research on quantitative metrics for content usability in the vertical aspect ratio is lacking, and further research is needed. The study emphasizes the importance of researching Metaverse and short-form content fusion, proposing the Metaverse Virtual Museum to enhance content creation and visual experiences, contributing to related industries.

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