

# Rediscovering Painting Art Performance and Mental Health through the Metaverse: Mediating Roles of Aesthetic Awareness and Social Connectedness

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## Abstract

Issues related to mental health are major concern for professionals of all industries throughout the world. Likewise in the sector of painting and arts, factors like stress, depression and loneliness affect the mental health of the individuals. Therefore, this study aimed to examine the relationship between Metaverse-based painting, social connectedness, aesthetic awareness and mental health. This research also aimed to investigate the mediating role of social connectedness and aesthetic awareness. A cross-sectional research design was used and the data was collected from 244 painters by using the convenience sampling technique. Usable response rate of the study was 70.90%. Further data was examined through using PLS-SEM by using smart PLS 3.3.9 as a tool. The findings of the study confirmed that social connectedness has a significant positive effect to improve the mental health of painters. Moreover, aesthetic awareness also had a significant effect on mental health. Additionally, metaverse technology is an important contributor to improving social connectedness and enhancing the aesthetic awareness of painters. Also, the mental health of the painters was improved through metaverse technology. Finally, the mediating role of aesthetic awareness and social connectedness was also supported in the study. The outcomes of this research assist the literature by providing valuable insight regarding the relationship between metaverse technology and mental health. This research also discusses practical and theoretical contributions.

**Keywords:** Mental health • Metaverse • Social connectedness • Aesthetic awareness • Painters

## Introduction

Internet Addiction In today's world, there is a swiftly expanding demand for digital goods and services, which are driving this need. As a result of this, academics have created a variety of concepts to improve the experience that consumers have. The most recent development in the realm of digital technology is an experience that consumers may have in three dimensions [1]. The phrase that is most often used for this purpose is "the Metaverse", which refers to the process of augmenting the virtual world. In 1992, a science fiction book titled "Explaining Futuristic Virtual Technology" was the first publication to make use of this word. Users are able to encounter several facets of the digital world that do not exist in the real world thanks to the assistance of virtual reality technology. Users will also be able to see a digital copy of their physical surroundings [2].

The Metaverse is an innovative form of web-based application that enables users to form social interactions with one another. It has a number of characteristics, including sociality, hyper spatiotemporally, and multi-technology, among others. It is essential to keep in mind that the concept of the Metaverse is not a recent one. Over the course of many decades, it has developed all over the globe with the expansion of the internet. In the area of research, applications of the Metaverse may be found in a wide variety of domains [3]. Because of this, research has been done on its effects in many fields, including education.

In the present era, it is found that work-related stress and anxiety are realized effecting mental health of the individuals. It is incumbent for working professionals such as painters and artists to take care of their mental health [4]. Because professionals need to be at the top of their game in order to survive, it is imperative that they maintain good mental health. As a consequence of this, there has been a significant and expanding outpouring of concern from researchers over issues related to mental health and the elements that contribute to it. Professionals in every conceivable

form of company, from the service industry to the industrial sector, grapple with problems that are associated with their mental health [5]. Therefore, according to studies by researchers, problems related to mental health are a global problem. Participating in social connections and using digital technologies are two factors that may help painters improve their mental health.

The study of aesthetics, often known as esthetics, is a subfield of philosophy that focuses on the nature of beauty and taste, in addition to the philosophy of art. "The study of aesthetics considers not just natural but also manmade sources of experience, as well as the criteria by which we evaluate such sources". It takes into account what goes on in our heads when we interact with things or settings, such as when we examine a piece of visual art, listen to music, read poetry, experience a play, watch a fashion show, a movie, or sports, or even explore different elements of nature. In the field of research, academicians have given increased attention to the factor of designing aesthetics. The process of aesthetics is implicit and rapid. It can create sensory delight or pressure. In the context of the cognitive process of the consumer, very little is known regarding aesthetic design, especially at the level of neuroscience. Aesthetics are linked to the appearance of the users. In recent years, users have become more concerned regarding the appearance of things they own. It also includes the appearance of the bodies of the users and the settings of the living space where they live and work. Aesthetic awareness of the user is dependent upon several factors, including the culture of the consumers. Aesthetic awareness is an important factor in the functionality of society [6]. It is because the culture's audience views aesthetic awareness as an important factor in everyday life. Aesthetic awareness among users has spread because of some factors, including the development of technology, such as the introduction of virtual or 3D worlds. Research on aesthetics has a long history. It has implications in several different fields as well, because artists, psychologists, and philosophers have conducted several studies on aesthetic awareness [7]. But there are very few studies that have studied aesthetic awareness in terms of

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Metaverse.

Social connectedness shows the internal sense of belonging of the individual. It is explained by the users as the perception of a person to be linked or associated with the social world. This social relationship or close relationship is developed with community, society, peers, family and friends. Since the last decade, researchers have paid attention to the concept of social connectedness in the context of health. Social connectedness plays a very important role in minimizing the stress among the people through the promotion of social integration [8]. Whereas, there is a very limited research regarding the social connectedness and its impact in the context of Metaverse technology, specifically in painting [9].

Social Connectedness is also developed with friends and family at the home. In other words, home is also a social space where the person can interact with family members. Additionally, home is also a technical space where a person can get emotional stability and feel comfortable. To develop social relationships, the home is considered a very vital space. Thus, people receive emotional and physical relaxation along with comfort in their homes with social support. On the other hand, it is reported that the mental health of the individuals is directly associated with their social connectedness. One of the new forms of social connectivity has emerged in the form of social media websites. The usage of these factors has increased in the last few years. Researchers have argued that meaningful relationship plays an important role to enhance the well-being of the individual [10].

As mental health is a major issue among professionals for the last few years and has spread globally, therefore there is a need to identify the factors that can help in improving the mental health of painters particularly in China. Therefore, this study is designed to examine the effect of metaverse-based painting performance on aesthetic awareness, social connectedness, and mental health. Also, this study tends to examine the mediating effect of social connectedness and aesthetic awareness. This proposed model is underpinned by the Stimulus Organism Response model (SOR model) by Ali Perumal and Shaari [11] as proposed by Mehrabian and Russell [12]. This research also aims to fill the gap of limited studies that have examined the role of metaverse as stimuli under the SOR model. The objectives of the present study are as follows. Firstly, this study aims to investigate the direct effect of aesthetic awareness on mental health. Secondly, exploring the effect of social connectedness on mental health. Thirdly, to examine the impact of metaverse-based technology painting on mental health, social connectedness, and aesthetic awareness. In the end, to explore the mediating role of aesthetic awareness and social connectedness. In order to achieve these mentioned objectives, present study has developed hypothesis at the end of literature review.

The present research has several theoretical and practical contributions. The present research adds valuable insight to the literature on metaverse technology and mental health. The practical implications of the research provide the valuable insight to the painters and artists regarding the use of technology. The formation of the present study is as follows: The purpose and objectives of the study are presented in the objective section, the literature review section consists of past studies related to the topic, underpinning of theory and hypothesis development, and the next section provides details about respondents of the study which leads towards the statistical findings of the study. In the end, this research discusses the theoretical and practical contribution, limitations, and conclusion.

## Literature review and hypotheses building

**SOR model:** The stimulus organism response model is also known as the SOR model and was developed by environmental scientists Mehrabian and Russell. According to the SOR model, the reaction of individuals is the product of different external factors, known as stimuli. This model is divided into three steps: external stimuli (S), emotional state or cognition (O), and reaction or behavioural response (R) [13]. A stimulus refers to the external environment which is the first phase. As a result of external stimuli, certain perceptions or emotions are developed within a person known as organisms. This organism creates a response that can be either

negative or positive. The positive response is called approach and the negative response is called avoidance [14]. This proposition is used in this study as an underpinning theory. This study proposes that the metaverse environment of the painters is the external stimuli (S) leads towards the development of aesthetic awareness and social connectedness in the form of the organism (O) and resultantly awareness and social connectivity are likely to spur positive outcome in the form of improved mental health by minimizing anxiety and stress (R).

**Mental health:** Researchers have defined mental health as the presence of emotional symptoms arises from the reaction of psychological strain due to the involvement of hormonal changes. It is also defined as emotional disturbance created by a situations linking with personal resources to meet certain demands [15]. There are three categories of mental health namely depression, anxiety, and stress. Past studies have defined stress as the response that is non-specific as a result of any stimulus that is related to an emotional arousal. It is also caused because of contradiction among resources and demands [16].

On the other hand, anxiety is considered as a psychiatric disorder having symptoms of extra fear and worry [17]. It is also claimed by researchers that anxiety can be perceived as an emotional state that may be pleasant to protect against perceived threats to the body. Anxiety can also be served as a poor emotional state tending to enhance the negative response of the body. Additionally, depression in literature is regarded as any kind of psychiatric disorder having emotional symptoms in a more severe state such as seeking of self-interest, loss of pleasure, self-worth, low level of energy, and negative mood [18].

**Aesthetic awareness:** In literature, aesthetic is described in terms of the being artful, positive, and pleasant of a thing or a person. Studies pointed out the art, aesthetic and self-care in terms of "subject's self-perfection and self-affirmation", through voluntary and rational practices. It also reflects certain rules and conducts relating to oneself through voluntary and rational practice. It is a complex function related to the aesthetic appearance and well incorporated into the lives of people through affections and subjectivity through the pleasure that is unconcerned [19]. The hedonic tendency has fulfils and strengthen the aesthetic preferences of an individual. Therefore, it has become a very important element in developing strategies related to aesthetic development within a person. The aesthetic preferences of the person have variation as they are dependent upon the culture from which a person belongs to. Therefore, organizations and companies need to understand the origin of a person so they can understand the aesthetic sense and preference of that a person has [20].

The aesthetic sense creates or stimulates demand within a person. It also develops enhancement to keep the aesthetic role that is traditionally formulated by the society. It is not easy to define aesthetics, as the concept of aesthetics is not fixed it is contextual. Researchers have noted that there is versatility in the concept of aesthetics because it has several disparate functions. In the views of researchers, aesthetics is dependent upon the interest of the person, along with connectedness with a certain group [21].

Awareness is defined by researchers as knowledge regarding something that exists and reflects understanding regarding a certain situation that is based on information or experience. One can also view awareness as the state when a person becomes familiar with a certain situation or information in the presence of particular information. In literature, awareness is explained in terms of self-perceptions. In few studies related to educational research, it is explained in terms of understanding knowledge in absence of direct teaching [22]. Whereas few authors have explained the concept of awareness as a person's ability dealing with a certain situation. If a person is aware of some information or object, he or she would have better social interaction. It is because awareness provides a framework for collaborative activities resultantly, sharing of ideas and information is positively influenced. In terms of research, awareness is very important for the researcher getting aware of different methods, approaches, and ideas. On the other hand, awareness has also implications related to relational,

personal, and social issues. It also affects the well-being and mental health of a person [23].

It is suggested by the scholars that the efficient work of the painter is mainly dependent upon the aesthetic sense and ability. In other words, if a painter is aware of aesthetic sense, he or she will be able to make attractive commodities more effectively. It is the nature of humans that he or she is always looking for new experiences, styles, or fashions. The working ability of the person is dependent upon the aesthetic experience and awareness of several different settings. It is pointed out by scholars that aesthetics are a new capitalist orientation regarding displaying desires. It is centred at the creation of illusion, atmosphere, and semblance. The aesthetic impulse within an individual is reflected in the form of personal identity and taste. It tends to affect the positive or negative outcomes within a person. In this regard, Shi Huo and Hou [24] pointed out that a positive response within an individual is created as a result of aesthetic awareness.

Scientists have defined aesthetic elements in terms of basic principles that are linked to human vision. It is accepted generally by the researchers that novelty and appropriateness are important features of products and same is true for a painting. Through the combination of attraction and beauty, the elements are connected through aesthetics. So, it is possible to measure aesthetics through designed elements [25]. Additionally, through an enriched aesthetic mix, the painters can easily perform well while painting. Therefore, in the context of arts and paintings, aesthetics are an important part creating awareness and developing certain positive outcomes.

There are several benefits of aesthetics awareness to the users. The painter who has aesthetics awareness it leads him or her to the development of new patterns and designs. This concept is known as aesthetic awareness display. Metaphors are used while making new designs that are based on the encoding data elements in the form of an aesthetically pleasing way. Several studies have focused on the development and enhancement of aesthetic awareness among users. In this regard, the usage of technology is encouraged [26]. The user who has aesthetics awareness is likely to remain happy and keeps others happy as well. This is achieved by displaying natural objects in a beautiful way that is desired and liked by other people. The aesthetic attitude of the person influences the aesthetic behaviour which itself is impacted through aesthetic awareness driven by the culture where he or she belongs to. According to the researcher the taste, as well as style of the person, is affected by aesthetics awareness [27].

Diversity in the context of arts enhances the emotional experience of an individual due to his aesthetics awareness. This ability also enables the effective and cognitive experience of the individual. The processing of aesthetic ability plays important role in developing positive emotions among users. The positive emotions include pleasure negatively affects demark as stress. According to scholars, esthetic experience creates positivity state of mind. This experience opposes negative activities, perceptions, and experiences on daily basis. Therefore, a deeper understanding and awareness of artwork create an aesthetic experience that is useful to develop positivity in mental health [28]. As per this discussion, we hypothesized that H1: Aesthetic Awareness is significantly related to Mental Health.

**Social connectedness:** In literature, Lee and Robbins [29] have defined social connectedness as “an aspect of the self that reflects a subjective awareness of interpersonal closeness with the social world”. It is also explained as a sense of an individual to endure closeness in the society. Moreover, social connectedness is the level of intimacy and sense of belongings that a person perceives regarding the people at home. Strong social connectedness within a person can provide the basis for behaviour that is goal-directed; hence this sense can direct the individual to achieve goals in life. On the other hand, the person who has a low level of social connectedness possesses interpersonal problems, anxiety, and loneliness [30]. Some of the authors have defined social connectedness in terms of the subjective and structural component. Social connectedness is considered as a very important indicator of mental health therefore this concept is under study since early 1990s.

The social connectedness is considered as an evaluation of level being positive and subjective to which one has a constructive, close and meaningful relationship with society, groups and individuals. These relationships are indicated by feelings of care such as affection, companionship, love and feelings of belonging to a community and group. A person can develop goal-directed behaviour that can develop the possibility to achieve great goals in life [31]. A number of past studies are conducted to examine the factors that can promote social connectedness among individuals. Past studies have revealed that digital technologies including internet can contribute positively toward social connectedness because it creates meaningful social interaction. This digital technology plays a very important role in the development of social relationships and helps to mitigate the issue of loneliness. Where loneliness is related to the quality of social interaction rather than the quantity of social interactions. It is very important to solve the issue of loneliness as it leads towards the development of social isolation. Theoretically, the term social connectedness is drawn from the concept of social capital that deals with the issues of social ties in terms of emotional support. Therefore, social connectedness tends to mobilize the quality relationship [32]. More specifically, social connectedness plays a very important role to minimize the effect of stress on a person. It is because social connectedness develops well-being and health among individuals. Moreover, the social connections of the person protect him or her from negative health consequences and minimize stress. The social communities that have a high level of embeddedness and interconnectedness are referred as socially connected [33].

A lot of people in the society can afford the services of the internet. Therefore, the internet has the potential to be a good option for social connectedness. On the other hand, the internet provides the opportunity for connectivity, and it is convenient to use where social cues are provided with diverse opportunities to interact. Because of this, mostly a person gets the opportunity to remain connected with his or her friends, family, and others having the same interest. Whereas it is interesting to note that older people feel less connected with people other than their bloodline so they prefer using internet to remain connected with family and friends [34].

Evidence from past studies suggests that social relationships play an important role to improve the mental health of the individuals. Thus, there is a strong association between social connectedness and the psychological health. The social relationships of the individuals act as a psychological resource to protect the mental health among persons in times of adversity [35]. Therefore, social connectedness is very important for mental health. The individuals having limited social connectedness display poor physical and mental health. Such people are exposed to have increased chances of depression and early death inclination than those who have very strong social connections. There are several benefits of having good mental health and social connections. It is proven through past studies that social connections help in lowering depression and anxiety. Furthermore, it also helps in enhancing cooperative relationships, developing trust, greater empathy, and self-esteem. Past studies have indicated that people having strong social connectedness also enjoy better mental health [36]. On the contrary, the person who is socially disconnected often feels loneliness and having problems related to mental health [37]. In this discussion, we hypothesized that H2: Social Connectedness is significantly related to Mental Health.

**Meta-verse based painting:** Most of the past studies have associated the term metaverse with cyberpunk 1992. Most recently, the inspiration for this term is narrated from “ready player one” written by Ernest Cline. Whereas the application of metaverse technology is much beyond science fiction. The metaverse is defined by Almarzouqi, Aburayya and Salloum [38] as a virtual and 3D space that makes interaction possible among users. This interaction is irrespective of time and place. In the settings of arts like painting, the metaverse is a very unique tool because of its important features like corporeity, interactivity, and persistence. In the interactivity feature of the metaverse, the art performers can interact with others. This interaction allows painters to synchronize their skills with the real world on a real-time basis. This interaction of the painters is continuous without leaving

the real world. With the help of metaverse technology, the virtual world is experienced by unlimited users through the individual's sense of presence. It has been made possible through the corporeity feature [39]. Whereas the persistence factor of the metaverse is also very important because of the data continuity assurance through it. Continuity of data includes entitlements, objects, history, identity, payments and community. This persistence feature of the metaverse is very critical because it is possible to save data even if the user has to depart from the virtual world [38].

Thus, the term metaverse is the combination of two words namely Meta and Universe. Few scholars have defined the metaverse as the virtual 3D world that is shared. It is also defined in terms of multiple cross-platform worlds that can provide experience through interaction with friends, families and collaborative actors. Furthermore, many other activities are possible in the virtual world such as the exchanging of digital goods, sharing user identities etc. More interestingly, it is possible to reflect it in the real world as well. The metaverse technology has expanded massively in the last few years, especially in the form of 3D painting and games that are fuelled through hardware improvement and software optimization in computer vision, language processing, and communication networking. Because of these improvements the virtual world has become more interesting and creative. In 2021, Facebook has also rebranded itself as Meta. Therefore, this term has gained a lot of attention on social media and became a hot topic receiving discussion regarding this topic among different communities including industry and academia. As a result, big tech companies are interested in investing in this technology to expand their business [40].

The platform of metaverse must possess several predetermined features. These features include interoperability, security, decentralization, financial allowance, synchronicity, scalability, persistence, and a virtual world. Scholars have reported different layers of metaverse platforms including infrastructure, decentralization, human interaction, discovery and spatial computing experience [41]. The layers of infrastructure include GPUs, CPU, data centers and the cloud. Whereas human interaction includes voice, gestures, display, wearable devices, smart glasses, smart watches and mobile. Decentralization is based upon microservices, blockchain and AI agents. Further, creator economy is based upon workflow, e-commerce, asset markets, and design tools. Spatial computing is dependent upon multitasking, geospatial mapping, VR and 3D engines; and discovery depends on Chabot, avatar, ratings, virtual stores, and advertising networks. Finally, experience layer is formed as working, learning, events, festival, shopping and E-sports [42].

Metaverse today consists of some different interlinked apps contributed by different providers. Several different apps are mentioned by researchers in their studies that are based on the aesthetics of the users. Aesthetic awareness plays a very important role to understand the difference amongst different factors in virtual reality. Aesthetic awareness also leads to a high level of information for the user as well. Aesthetics in the digital world are linked with the design of the digital world. Researchers have examined the effect of the environment of the digital world on the behaviour of the users. They have revealed that the metaverse environment plays a very important role in creating awareness related to aesthetics among the painter [43].

By using a virtual environment, a painter can have a creative process based on aesthetics awareness. In the context of the 3D world, the digital world plays a very important role in the development of aesthetics related to painting. In the context of the virtual environment, the 3D model is considered as a stimulus factor of the SOR model [44] based on natural, symbolic, social and physical dimensions. It is assumed that the behavior of the painter is affected by the 3D environment in the form of the creation of aesthetics awareness [45]. Therefore, we assume that H3: Meta-verse-based Painting has a positive effect on developing aesthetic awareness.

A metaverse is based on the network of the virtual 3D world. The focus of this virtual world is to develop social connections. For this purpose, a virtual space is created where individuals can explore and interact with other people by sharing same physical space [46]. In the context of the

internet and social media, the Meta vision of the Metaverse is new and next step. It is a new way to maintain and establish social connections. An important factor is that metaverse Meta verse is "Immersive". The users of metaverse will feel as if they are talking to each other as in the real world. Therefore, social connectivity is enabled through the metaverse. Users can interact with each other through virtual reality by developing and using their avatars representing themselves [47]. By using the shared space of the virtual world, users can find partners, hold meetings, conduct businesses and even build homes [48].

The demand for metaverse is increasing day by day. Therefore, there is a need to improve its performance specifically in the detection of objects in the metaverse environment. Many different professionals are using metaverse to communicate with their clients, employees and other stakeholders in the virtual environment. On the other hand, many commercial organizations are also using a metaverse environment to communicate with their customers and representing graphical objects in the environment of metaverse [49]. Thus, it is hypothesized that H4: Meta-verse-based Painting has a positive effect on developing social connectedness.

The virtual reality plays a very important role to improve mental health and healing. Users can have virtual reality for therapy to control aerophobia, social phobia, and social anxiety. Several situations can cause stress among individuals. One of the situations in the recent past that have caused stress among the individuals is COVID-19. In this situation, virtual reality can heal the stress caused by COVID-19. In the context of painting as well, virtual reality can play a very important role to minimize stress and anxiety among the painters. Individuals can use different kinds of technologies like drones and VR cameras for the development of beautiful sceneries. It will lead to an enjoyable experience for the painters. Moreover, virtual reality can also play an enjoyable experience for the painter by using auditory and visual elements. The virtual reality can make painters feel relaxed and stress-free [50].

The painters who want to socialize can use a virtual platform to get different training sessions. It allows painters to acquire skills related to their profession and got engaged with other professionals. As a result, the self-esteem of the painters is boosted. Moreover, different kinds of phobias can easily be treated by using a virtual environment. Virtual reality can also help to control different kinds of pain, fatigue, depression, and anxiety. Furthermore, painters can replicate the real-world environments in the virtual world, by doing so they can mitigate the risk element in reality and improve their mental health [51]. The painters can get relief and escape from the anxiety and stress of life by using the digital world. Usage of the digital world can also lead to the creation of temporary pleasure in the painters as well. On the other hand, painters can use the virtual world to seek professional help from other painters and professionals as well [52]. Thus, the metaverse provides the opportunity for the painter to excel professionally, leading to a positive effect on mental health.

In past, several authors have studied the mediating role of aesthetic awareness and social connectedness. The study conducted by Olasupo, Idemudia, and Kareem [53] examined the mediating role of social connectedness between emotional intelligence and satisfaction. They reported the significant mediating role of social connectedness. Also, the study conducted by Alzubi Farea and Al-Dubai [54] examined the role of awareness in the banking sector of Yemen. The study findings supported the mediating role of awareness (Figure 1). Based on the above discussion it is hypothesized that,

- H5: Meta-verse-based Painting has a positive effect on the mental health of the painters.
- H6: Aesthetic awareness mediates the relationship between metaverse-based technology painting and mental health.
- H7: social connectedness mediates the relationship between metaverse-based technology painting and mental health.

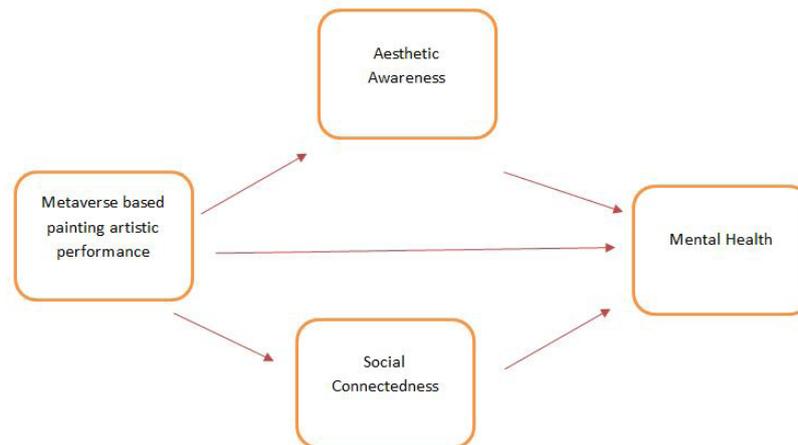


Figure 1. Research Framework.

## Materials and Methods

A quantitative research design was used in this research as well as cross-sectional research design was employed. Through cross-sectional research design, the data is measured and gathered at a single point in time. Moreover, the data was gathered through self-administered questionnaires. This technique allows the scholars to gather broader insight and opinions of the respondents [55]. This study gathered data from professional painters from China through questionnaires. The questionnaires were developed from the literature review of the past studies through 7 points Likert scale. This scale ranges from 1 to 7 in which 1 reflects the strongly disagree opinion of the respondents and 7 reflects the strongly agreed opinion of respondents. Whereas, 4 shows the neutral response. The data was gathered using a convenient sampling technique. In this study items of mental health were adapted from Emerson et al. [56] such as "I felt calm and peaceful" etc.; items of social connectedness were adapted from Sultan, Hussain, and Fatima [57] such as "I feel related to everyone in the group" etc.; the items of metaverse technology were adapted from Barrett Pack and Quaid [58] such as "I feel fully engaged while painting in metaverse environment" and the questionnaire of aesthetic awareness was adapted from Hutter et al. [59] such as "I have no difficulty to remember about painting".

The questionnaire was divided into two portions. The first portion was designed to collect information regarding the demographic characteristics of the respondents. Whereas, the second portion was designed to gather the opinion of respondents regarding the variables of the study. This developed questionnaire was distributed among 244 respondents. Researchers received back 197 questionnaires. Among these, 24 questionnaires were not usable as they were not properly filled by the respondents so they were omitted. The remaining 173 questionnaires were used for further analysis showing a usable response rate of 70.90%.

This data was prepared through data screening by using SPSS version 25. This file was converted into CSV format for the suitability of SPSS. Initially, missing values were examined and it was observed that there was no missing value in the data. Later, the Mahalanobis distance test (D2) was performed to find out extreme values in the data known as outliers. The researchers observed that there were no extreme points or outliers in the data as chi-square probability values were more than 0.001 [60]. Moreover, based on data gathered from SPSS output, the maximum value of skewness is 1.357 and that of Kurtosis is 1.982. This indicates that the data is normally distributed because of the values of skewness and kurtosis range between -3 and +3 [61].

Later, this data was analyzed using Partial Least Squares (PLS) path modeling as the statistical approach for the evaluation of the proposed hypothesis. This technique is also known as PLS-SEM, partial least square, and structural equation modeling. The evaluation criteria and steps for the assessment of the research model are indicated by [62]. PLS-SEM is the approach based on statistical analysis and used in the quantitative research

method [63]. The purpose is to explain and analyze complex and multiple relationships simultaneously. The model is predicted based on empirical evidence. This model is capable to deal with formative and reflective constructs [64]. However, this study used Smart PLS-SEM as the model used is complex involving two mediators.

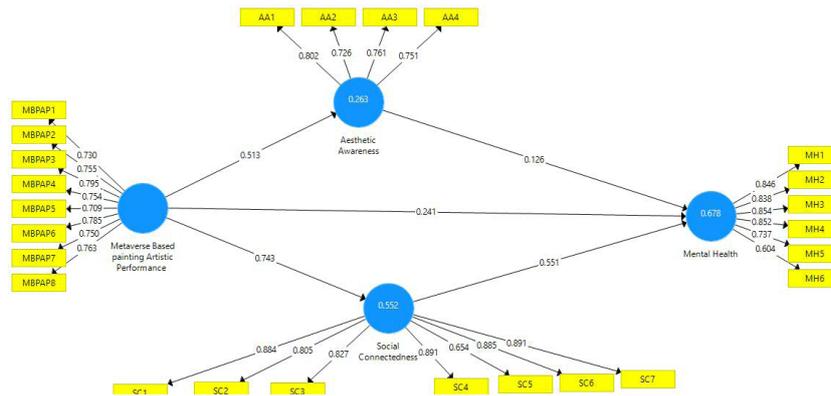
## Results

The analysis of the study began with the analysis of the demographic profile of the respondents. Among the respondents of the study, 69.3% of the respondents were male whereas 30.7% were females. The age classification of the respondents reveals that 27.4% of the respondents had the age between 18 to 30 years, 32.6% of the respondents had the age between 31-40 years, and 11.3% of the respondents belonged to the age group between 41- 50 years whereas remaining had the age more than 51 years. The information regarding the marital status of the respondents reveals that 47% of the respondents were married whereas 53% of the respondents were not married (Figure 2).

The analysis through PLS began with the analysis of the measurement model. The assessment of the measurement model consists of reliability, discriminant validity, and convergent validity. The reliability is assessed through Cronbach Alpha and composite reliability [65]. Whereas, convergent validity is examined through average variance extracted and outer loading. In the end, the HTMT criterion and Fornell and Larcker's [66] criterion are used for the assessment of discriminant validity. The reliability of the data is considered satisfactory if the value of Cronbach alpha and composite reliability is more than 0.70. Hair Ringle and Sarstedt [67] mentioned that internal consistency is considered to be higher if it is near one. The values in the table below reveal that Cronbach alpha range from 0.757 to 0.927, and that of composite reliability range from 0.846 to 0.942 (Table 1). Researchers also suggested that AVE values must be more than 0.50 for the assessment of convergent validity [68].

The next phase of the assessment of the measurement model is the assessment of outer loading. The acceptable value of outer loading is more than 0.50 [69]. The values of Table 2 below show that this criterion is fulfilled in the present study. The items that are retained have values of outer loading of more than 0.50 and range from 0.604 to 0.891 (Table 2). Thus outer loading of the retained items is satisfactory.

On the contrary, two criteria are used for the assessment of discriminant validity. These two criteria include HTMT as proposed by Fornell and Larcker [66] criteria. Starting from the Fornell and Larcker [66] criteria, the values of the square root of AVE and correlation of inter-construct demonstrated that all values at diagonal are more than the correlation values of the variables (Table 3). This implies that discriminant validity is acceptable. Additionally, the maximum acceptable value as per HTMT criteria is supposed to be less than 0.90. Values in Table 4 indicate that discriminant validity is established because all values of the HTMT matrix are less than 0.90.



**Figure 2.** Measurement Model, **Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

**Table 1.** Reliability and Validity.

	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
AA	0.757	0.763	0.846	0.578
MBPAP	0.892	0.894	0.914	0.571
MH	0.879	0.892	0.910	0.630
SC	0.927	0.934	0.942	0.702

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

**Table 2.** Factor Loading.

	AA	MBPAP	MH	SC
AA1	0.802			
AA2	0.726			
AA3	0.761			
AA4	0.751			
MBPAP1		0.730		
MBPAP2		0.755		
MBPAP3		0.795		
MBPAP4		0.754		
MBPAP5		0.709		
MBPAP6		0.785		
MBPAP7		0.750		
MBPAP8		0.763		
MH1			0.846	
MH2			0.838	
MH3			0.854	
MH4			0.852	
MH5			0.737	
MH6			0.604	
SC1				0.884
SC2				0.805
SC3				0.827
SC4				0.891
SC5				0.654
SC6				0.885
SC7				0.891

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

**Table 3.** Assessment of Discriminant Validity HTMT Value

	AA	MBPAP	MH	SC
AA	0.761			
MBPAP	0.513	0.756		
MH	0.532	0.716	0.794	
SC	0.512	0.743	0.795	0.838

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance, MH: Mental Health, AA: Aesthetic Awareness.

**Table 4.** Discriminant Validity Assessment of HTMT Matrix.

	AA	MBPAP	MH	SC
AA				
MBPAP	0.620			
MH	0.644	0.806		
SC	0.606	0.814	0.880	

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

After the assessment of the measurement model, the next phase is the assessment of the structural model. The structural model is used for the examination of VIF, R square, and assessment of the proposed hypothesis. The assessment of the measurement model began with the examination of the Variance Inflation Factor (VIF) through smart PLS. In this regard [64] proposed the acceptable value of VIF is supposed to be less than 5 [60]. The results of Table 5 below indicate that values of VIF in the present study are less than 5 showing there is no issue of multi-collinearity in the data of the present study.

Later, this study examined the proposed hypothesis based on t-values, Beta values, and T-value. For this process, bootstrapping of Smart PLS was used. The significance of the relationship is established if the t value is more than 1.645, and the P value is less than 0.005. The strength of the relationship is established through the regression coefficient (Beta), shown in Table 6.

The values of the above table show that H1 of the present study is supported as the P value is 0.002,  $t=2.831$ , and  $\text{Beta}=0.126$ . This shows that aesthetic awareness positively affects the mental health of individuals. Hypothesis 2 of the present study is also statistically supported showing social connectedness has a positive significant effect on the mental health of the painters ( $\text{Beta}=0.551$ ,  $t=9.245$ ,  $p=0.000$ ). Later, H3 of the present study is supported as well showing MBPAP has a significant relationship with aesthetic awareness with  $\text{Beta}=0.513$ ,  $t=11.172$ , and  $P=0.000$ . Additionally, the statistical results reveal that MBPAP has a positive significant effect on social connectedness having  $\text{Beta}=0.743$ ,  $t=27.622$ , and  $P=0.000$  accepting H4. In the end, H5 is accepted as well with  $\text{Beta}=0.241$ ,  $t=4.214$ , and  $P=0.000$  (Table 7).

Moving toward the indirect results of the study, the findings reveal that aesthetic awareness mediates the relationship between MBPAP and mental health ( $\text{Beta}=0.410$ ,  $t=9.431$ ,  $P=0.000$ ). Moreover, social connectedness also mediates the relationship between MBPAP and mental health ( $\text{Beta}=0.065$ ,  $t=2.783$ ,  $P=0.003$ ). Assessment of analytical power of the structural model in the analysis of PLS is examined through the determination of coefficient also known as R square [70]. The minimum acceptable value of R square is more than 0.10. In this regard, the value of 0.02 is weak, 0.13 is considered moderate and 0.26 is substantial [71]. It is shown in the table below that R square values are acceptable and moderate (Table 8) (Figure 3).

At the end of the analysis, the blindfolding technique was adopted for the assessment of predictive relevance (Q square). The predictive relevance is established when the value of the Q square is non-zero. The

values of Q square shown in Table 9 reveal that predictive relevance is established (Figure 4).

## Discussion

The present study used PLS-SEM for analyzing the proposed model for which Smart PLS-3.3.9 was used as a tool. This examined the relationship between social connectedness; metaverse-based painting artistic performance; mental health and aesthetic awareness. The findings of the study showed that aesthetic awareness had a positive significant effect on the mental health of the painters. The painters had the feeling of self-esteem when they realized that their professional aesthetics were very important in the field of arts and paintings. In that situation, negative feelings like loneliness and anxiety were not produced within painters. This finding of the study is in line with the results of [28].

The findings of the research also supported the claim that social connectedness had a positive role in improving the mental health of the painters. The painters who were engaged socially, with their friends and family had a feeling of belongingness. Whenever the painters went through any tough situation, their friends and families supported them. As a result, the feelings like anxiety and depression were not developed within. The results of McLoughlin et al. [36] are similar to the findings of the present study. Additionally, the statistical results also supported that metaverse technology was very important to improve the mental health of painters. The performance of painters was improved by using metaverse technology. These findings show similarity with the results of Usmani Sharath and Mehendale [51].

Furthermore, the metaverse technology also helps in improving and creating awareness regarding the aesthetic ability of the painters. In the field of arts and painting, aesthetics are very important for the success of a painter. The results indicate that metaverse technology may help the painters in enhancing their aesthetic ability as their exposure would increase [45]. Also, through the usage of Metaverse technology, the painters can easily improve social needs. They can remain connected to their friends and family members. Their need for belongingness can easily be fulfilled through metaverse technology. This technological advancement can be used by painters to show their professional work to other professionals as well. Similar findings were also reported by Veeraiah et al. [49]. In the end, the mediating role of social connectedness and aesthetic awareness was also confirmed by the findings of the study by Olasupo Idemudia, and Kareem [53] and Alzubi Farea, and Al-Dubai [54].

**Table 5.** Variance Inflation Factor (VIF).

	AA	MBPAP	MH	SC
AA			1.431	
MBPAP	1.000		2.357	1.000
MH				
SC			2.355	

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

**Table 6.** Direct Results.

HYP	Relationship	Beta	SD	T Statistics	P Values	Decision
H1	AA -> MH	0.126	0.043	2.931	0.002	Accepted
H2	SC -> MH	0.551	0.060	9.245	0.000	Accepted
H3	MBPAP -> AA	0.513	0.046	11.172	0.000	Accepted
H4	MBPAP -> SC	0.743	0.027	27.622	0.000	Accepted
H5	MBPAP -> MH	0.241	0.057	4.214	0.000	Accepted

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

**Table 7.** Mediating Results.

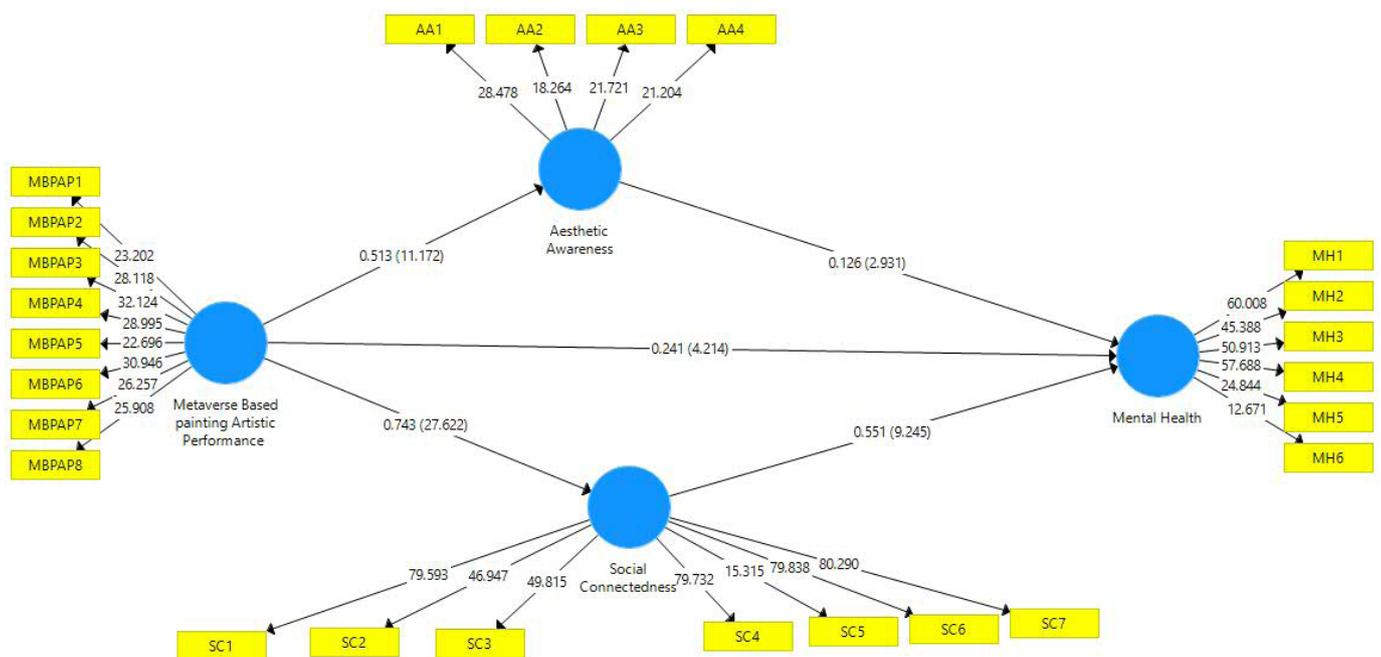
		Beta	SD	T Statistics	P Values	Decision
H6	MBPAP -> SC -> MH	0.410	0.043	9.431	0.000	Accepted
H7	MBPAP -> AA -> MH	0.065	0.023	2.783	0.003	Accepted

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

**Table 8.** R square Value.

	Original Sample (O)
AA	0.263
MH	0.678
SC	0.552

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

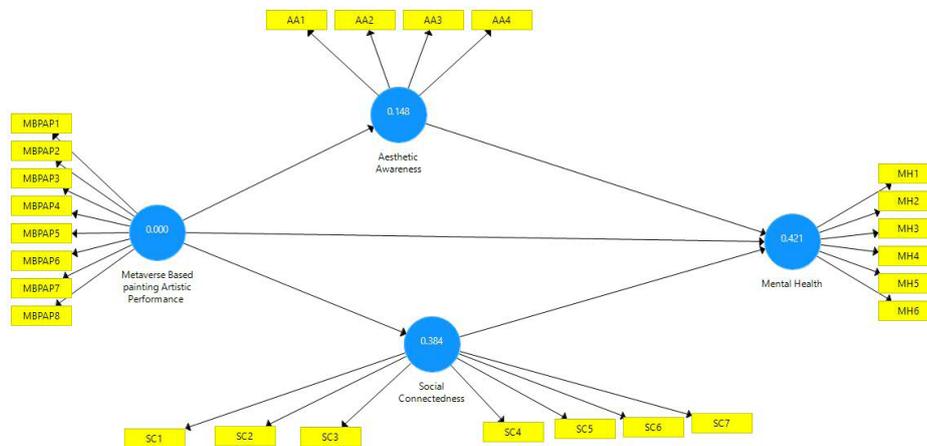


**Figure 3.** Structural Model, **Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

**Table 9.** Q square Value.

	Q <sup>2</sup>
AA	0.148
MH	0.421
SC	0.384

**Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.



**Figure 4.** Blind folding, **Note:** SC: Social Connectedness; MBPAP: Metaverse Based Painting Artistic Performance; MH: Mental Health; AA: Aesthetic Awareness.

## Conclusion

Issues related to mental health are important and needed an attention by the researchers. The professionals like painters around the globe often face mental health problems like loneliness, depression, and stress. Painters often remain busy; therefore the social life of these professionals is affected. Moreover, aesthetics are the key to the painters being competitive in advanced digital technological world. One such advancement is Metaverse which provides several opportunities to the professionals.

Based on SOR Model, this research aims to examine the effect of metaverse-based painting performance on aesthetic awareness, social connectedness, and mental health. For empirical findings, this research proposed seven hypotheses. According to the first hypothesis, aesthetic awareness has a positive relationship with the mental health of the painters. Second hypothesis supported that the social connectedness helped the painters minimize their stress and improve their mental health. The third hypothesis stated that metaverse-based technology painting helped painters to improve their aesthetic ability and awareness. The fourth hypothesis of the present research revealed that metaverse-based painting improved social connectedness. The fifth direct hypothesis supported that mental health is improved by metaverse-based technology. The present study also confirmed the mediating role of social connectedness and aesthetic awareness. This study contributed the literature by providing empirical evidence on metaverse-based technology. Also, this research shed light on the role of metaverse-based technology to improve social networking and improve the mental health. This study also revealed that aesthetic awareness of the painters was improved by the metaverse-based technology.

## Limitations and Future Research

Several limitations must be highlighted regarding this research. First, the research design adopted in this study was cross-sectional, and data were collected at a single time. Whereas, to generalize the findings of a similar study in the future, the researchers should employ a longitudinal research design. Second, the present research used a convenience sampling approach in this study. Future scientists can adopt any probability sampling approach to reach their respondents. Third, this study used a

survey questionnaire to gather data from respondents. It will be interesting to adopt the mixed methodological approach in future similar studies. In the end, the underpinning theory used in this research is SOR Model by Mehrabian and Russell. Whereas, the TAM model can also provide a different insight from a similar research model.

## Contribution

### Practical contribution

This study has both theoretical and practical contributions. In terms of practical contribution, this study provides a mechanism for the artists and painters by which they can improve their mental health. This study provides the way forward to the usage of metaverse technology and its benefits. The virtual world can help painters to improve their aesthetic awareness. Aesthetic awareness is very important as the painters and artists create a point of difference in their aesthetic abilities. Also, the virtual world can help artists to improve their social life. They can remain connected to their clients and family members through the virtual world. In the presence of improved social life and aesthetic awareness, the mental health of the painters will be improved. Mental health is an issue of concern in almost every industry. Therefore, it is very important to study the factors that can help in improving the mental health of the painters. The findings of the study help make policies and strategies to improve the mental health of almost every professional.

### Theoretical contribution

The main objective of the present study was to examine the effect of metaverse-based painting performance on mental health, social connectedness, and aesthetic awareness. This research also examined the mediating role of aesthetic awareness and social connectedness. This study bridges the gap of limited studies that examined the role of the virtual world in quest to improve the mental health. Also, there is a dearth of knowledge that can explain the role of metaverse technology to improve the social networking and aesthetic awareness of painters. This study has provided new insight regarding the role of metaverse-based technology in this scenario. Also, in terms of the SOR model Mehrabian and Russell, this study has examined the Metaverse-based technology as Stimulus (S) first time in literature till date.

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