








Digital Arts and Health

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Abstract. Digital arts refer to artworks that use digital technology as part of the creative or presentation process. Different components of art activities are known to be health-promoting. These components can trigger psychological, physiological, social, and behavioral responses that are linked with health and well-being. The emerging forms of digital arts and new ways of interacting with these arts enable a new area of research and practice in promoting health and well-being. This workshop is intended to bring together researchers, designers, artists, and practitioners involved in the design and use of systems combining digital arts and health to build on an understanding of emerging digital art interventions in health and well-being.

Keywords: Digital arts · Health · Well-being

1 Arts and Health

Art activities are considered as interventions that combine components that are known to be health promoting [7]. For instance, art activities can involve social interaction, physical activity, cognitive stimulation, emotion evocation, and engagement with themes of health [15]. These components can trigger psychological, physiological, social and behavioral responses linked with health and well-being [9–11, 40]. Numerous disciplines attempt to apply arts for health and well-being. **Arts in health** is a multidisciplinary field dedicated to transforming health and healthcare experiences through the arts [30]. This discipline advocates the participation of arts in maintaining and promoting health in healthcare and community context. **Creative arts therapy** is defined as “the use of art modalities and creative processes for the purpose of ameliorating disability and illness and optimizing health and wellness” [1], which has been applied for a variety of life-threatening illnesses [18, 20, 33]. The therapists specialize in one of

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the six creative modalities: visual art, dance, music, poetry, drama, and group psychotherapy and psychodrama [35]. **Expressive arts therapy** applies one or several expressive modalities to “foster deep personal growth and community development” [12,26].

2 Digital Arts and Health

Digital arts refer to artworks that use digital technology as part of the creative or presentation process. They take forms of digital imaging, digital music, digital animation, digital installation, virtual reality, NFT (Non-Fungible Token), and so on [19]. Digital art is a multidisciplinary intersection where art and technology are highly integrated. Technologies bring new possibilities to arts, which are recognized as a “vast expansion of the creative sphere” [4].

Following the therapeutic nature of arts, incorporating the ubiquitous digital technologies, an emerging number of studies implement **Digital art therapy** [3] in clinical sessions [5,27]. For instance, visual arts-based therapy can improve communication for people with social and emotional difficulties [14]. Darewych et al. explored digital technology as a new art medium and clinical intervention in art therapy for adults with developmental disabilities. They found their participants favored creating arts on the “compact and mess-free” touchscreen devices over the traditional messy art materials in the therapeutic environment [8]. However, Choe et al. considered the lack of tactility, smell, and messiness in art making process as a disadvantage in using digital media in art therapy [6]. Other modalities such as digital music had been claimed by scholars and therapists as beneficial for clients’ **music therapy** sessions [32]. **Animation therapy** uses visually and verbally within the process of recording and editing over a period of the therapeutic process [2,22]. **Virtual reality therapy** provides clients with a computer-generated virtual environment with fear-provoking stimuli that mimic their real-life experiences, which had been practiced in cognitive therapy and psychological disorders [31]. A growing number of works demonstrate the use of **digital technology in art therapy**. Zubala et al. structured current practices in this field and captured art therapeutic practices from the perspective of both therapists and clients [48].

Other than the potential to be a promising clinical intervention tool, digital arts in health have been applied to wider scenarios. Emerging modalities of digital arts brought opportunities and challenges in terms of interactivity and health-promoting impacts. As mentioned above, these modalities have been practiced not only for illness prevention but also commonly applied in health promotion in the context of health and well-being. The most popular digital modality used in health is digital visual arts. A subbranch of **health data visualization** uses diverse health data coming from various sources and transforms them into artistic visual content. Unlike bar graphs, tables, and pie charts that are often used in **health informatics** [42], health data visualization helps people to view simplified information at a glance, resulting in a better understanding and higher engagement [34]. For example, Yao et al. designed an aesthetic arousal-awareness

tool using light media to discuss the possibilities to interact with arts using fashion wearables [45]. Tao et al. design situated-based affective communication art to express emotion [36]. Yu et al. implement ambient lighting as an intervention to inform people about their stress levels to assist in relaxation training [46]. Similarly, stress-related health data visualization using digital artworks has scaled up for a larger group of users [44] on a larger scale [47] in order to explore social interactions in health improvement. Digital music is interdisciplinary by nature that weaved acoustics, psychoacoustic, electronics, noise, environmental sound, and so on [25]. Previous research found that musical activities can enhance the emotional competence of children to promote class performances [37].

Origin from net art, which is made using the internet and presented on the internet, **NFT digital art** stands out to solve authenticity, ownership, and transferability problems existing in the digital art field, which brings a revolutionary change to digital artworks in terms of interactivity and privacy. NFT is a type of cryptocurrency, encoded within smart contracts in Ethereum [41]. Unlike traditional digital arts, NFT arts find a way to confirm the copyright of digital artworks that were originally reproducible and difficult to trace. By using NFT, creators can easily prove the existence and ownership of specific digital assets, such as artworks [17]. With the burgeoning amount of electronic health data, it becomes significant to manage a large amount of data innovatively and effectively [39]. With blockchain technology, health data can be visualized into digital artworks and transformed into unique, verifiable, and tradable digital assets. A team from the University of California, Berkeley created an NFT digital artwork based on Nobel laureate Jennifer Doudna's gene-editing work as a revolutionary mechanism for memorializing these breakthrough discoveries¹. George Church, a professor of Genetics at Harvard Medical School, will be auctioning off his full genome as an NFT². Similarly, Sinso technology³ launched the world's first medical data NFT project. Sinso creates a unique NFT for each user, which can be used as a personal biometric ID card. It allows users to transfer specific data parts to NFT, such as fingerprints and medical images. On one hand, as data producers, patients and doctors can get permanent benefits from the data trade in the future. On the other hand, the huge amount of shared health data can be used in countless research, which can be pivotal in science and human history [17]. Although trading personal health assets got practiced in the industry, there are remaining ethical concerns. As demonstrated in [24], whether any individual truly owns their genome, given that it is shared with family members.

Overall, technology is influencing the way art therapy practices in a variety of aspects. The emerging modalities of digital arts not only open up possibilities in handling personal health data, but also provide broader potentials to promote health [21], prevent diseases [28], manage mental [43] and physical illness [29], and facilitate end-of-life care [38].

¹ <https://news.berkeley.edu/2021/05/27/uc-berkeley-will-auction-nfts-of-nobel-prize-winning-inventions-to-fund-research/>.

² <https://nebula.org/genomic-nft/#about>.

³ <https://www.sinso.io/index.html>.

3 Opportunities and Challenges

Previous research has demonstrated the benefits digital arts bring to health and well-being. However, digital art-based interventions are complex and challenging, since they operate simultaneously on the individual and social, as well as mental and physical levels [16]. It is essential to understand the possibilities, challenges, and limitations of digital arts bring to health and well-being.

The benefits digital arts brought to health and well-being are lack of structured exploration in this field. Summarized from previous cases in digital arts for health, the benefits of digital arts brought to health can be structured from the following aspects: the digital art per se, digital art activities [23], and interactions with the digital art media [13]. Future research can explore further how digital arts affect health and well-being from these aspects and how to evaluate the effects in therapeutic or non-therapeutic contexts respectively.

Limitations and concerns have been brought up in the field of digital art therapy, which affords us lessons that merit attention in the field of digital arts for health in general. For instance, equipment cost, study efforts for the practitioners, lack of tactile stimuli, and technical breakdowns are unavoidable barriers in digital art making or presenting [48]. Moreover, a large amount of work in the field of digital arts for health demonstrates positive findings over negative effects. The potential harm that digital arts might bring to health is also essential for us to reduce the risks of overusing such technologies. Last but not least, different cultures devote differently to arts for health domain. To assure the good effects of art interventions be replicated across cultures challenges scholars and therapists in this field.

4 Workshop Goals

For implementing previous approaches and maximizing the potential value digital arts bring to health and well-being worldwide, research papers on (but are not limited to) the following topics are of mutual interest to this workshop:

- Explore the mechanisms on how digital art interventions affect health;
- Sharing cases of digital arts and health in practice;
- Explain where the digital arts can and where they cannot facilitate health;
- Sharing knowledge on scaling up the applications of successful digital art interventions.

5 Summary

This paper presents a systematic elaboration of digital arts bring to health and well-being from the current state of research, which our workshop is built upon. One keynote speaker whose expertise is in the digital arts and health domain will be invited to give a speech at the workshop and join a panel discussion. The workshop is intended to bring together researchers, designers, artists, and

practitioners involved in the design and use of systems combining digital arts and health to build upon an understanding of emerging digital art interventions in health and well-being. The desired outcome of this workshop is to gather people in this field through the academic event, as a starting point to make efforts in one place. This could set the stage for designing digital arts for health, and transfer knowledge for practitioners in scaffolding their experiences.

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