Digital Dance Studio VR (DDS-VR)

An innovative user-focused immersive software application for digital choreographic composition, planning, teaching, learning, and rehearsal.

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ABSTRACT

The Digital Dance Studio VR (DDS-VR) is an innovative user-focused immersive software application for choreographic composition, planning, teaching, learning, and rehearsal. It offers a simple and intuitive immersive interface for creation and manipulation of choreographic sequences in virtual space, permitting exploration of spatial and temporal patterning, musical accompaniment, environment and design aesthetics, and allowing users to change the position, number, rhythm and orientation of dancers. It provides a suite of modular tools for choreographers, dancers, and anyone interested in exploring movement in a digital context – including Film and TV applications in blocking/storyboarding of fight and crowd sequences. The DDS-VR application can empower users to create, visualize, and share digital choreography outside of the physical studio, saving considerable time and money on studio and personnel hire, and bypassing the more professionalized use of real-time graphics software such as Unity and Unreal.

CCS CONCEPTS

• **Applied computing**; • **Arts and humanities**; • **Performing arts**;

KEYWORDS

Dance, Choreography, Virtual Reality, Embodiment, Animation, Motion Capture, Dance Analysis

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1 INTRODUCTION

Even before Covid-19's severe impact upon live performing arts, the industry was seeing a gradual increase in innovation in the use of creative digital tools in production. While access to low-cost but high-performing professional and consumer software has already revolutionized other creative industries (such as digital compositional tools for music creation and image editing software), the dance industry is falling behind with few dedicated digital platforms or tools to expand and enhance a choreographer's creative toolkit. Meanwhile, specialist skills are required to operate complex real-time graphics software such as Unity and Unreal Engine, and these skills are in desperate shortage in the UK (noted by Immerse UK's 2022 report as one of the main limitations for sector development), New, user-centred software is needed to address this issue.

The Digital Dance Studio VR (DDS-VR) is an innovative immersive software app for digital choreographic composition, planning, teaching, learning, and rehearsal. It offers a simple and intuitive immersive interface for creation and manipulation of choreographic sequences in virtual space, permitting exploration of spatial and temporal patterning, musical accompaniment, environment and design aesthetics, and allowing users to change the position, number, rhythm and orientation of dancers. It has evolved organically from a previous desktop app version [figure 1] into VR, giving users the experience to move in and through choreographed routines in three-dimensional space.

DDS-VR provides a suite of modular tools for choreographers, dancers, and other practices interested in the exploration of body movement in a digital context – including film and TV applications in the blocking or storyboarding of fight and crowd sequences. DDS-VR can empower users to create, visualize, and share digital choreography outside of the physical studio, saving considerable time and money on studio and personnel hire, and bypassing the more professionalized use of other graphics software.

2 DIGITAL DANCE STUDIO VR

Alexander Whitley's Digital Dance Studio VR (DDS-VR) offers a game-changing creative platform for professional artists, and a powerful tool to enhance the field of dance education. It provides a consumer-accessible immersive digital platform that bridges a gap in the current market, giving creators the opportunity to construct, remix and share choreographic sequences from their own homes and in their own time. It offers a multi-functioning digital space to work through complex spatial and temporal patterns, explore movement composition and set styles. Sequences can be manipulated, duplicated and shared in an immersive 3D environment, opening interesting avenues for remote collaboration, pre-visualization, and accessible and inclusive practice. Using VR to place users within the 'dance studio' and amongst the dancing figures has obvious

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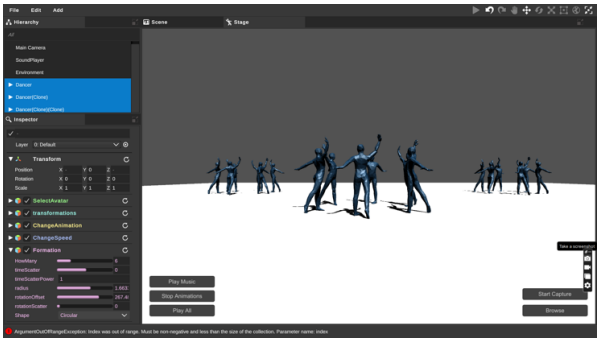

Figure 1: Primary desktop interface of the Digital Dance Studio (image authors' own)

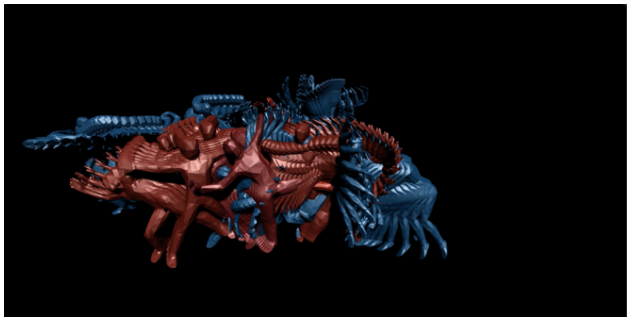

Figure 2: Screen capture that shows the exploratory aesthetic capacity of Digital Dance Studio beyond its primary choreographic function (image authors' own).

advantages for the learning of movement sequences as well as experiencing their impact across a range of possible settings.

The DDS-VR offers solutions for:

- *Remote collaborative practice* - giving movement artists the capability to pre-visualize and share work in immersive 3D before, or instead of, entering the studio. It could be used as proof of concept for new work, helping to secure funds before going into production.
- *Education* - for teachers with limited face-to-face studio time with students, the DDS-VR allows them to set sequences and exercises to support asynchronous learning. Enabling students to visualize movement sequences in a 3D space with full 360 degree viewing capabilities, provides a unique opportunity for them to familiarize themselves with content, analyze movement at their own pace and use temporal and spatial manipulation to aid their own personal learning.
- *Accessibility* - users can engage with the DDS regardless of mobility or travel needs, reducing obstacles to access at different stages of the creative process. Based on feedback from workshops, a neurodivergent participant also explained that they appreciated being able to change avatars and environments to reduce 'noise', that and they were able to arrange the interface to suit their needs.
- *Archiving* - The DDS-VR has potential to become a repository or database of choreographic works, available for people to learn from, and be inspired by. There is huge value to building a database of genres and styles, with an significance for the legacy of certain cultural dance practices. In the future we are aiming for representation of as many dance forms as possible including underground emerging dance styles.
- *Distribution* -The DDS-VR offers users the opportunity to generate unique choreographic sequences, and through the articulation of an in-built 3D camera allowing the creation of high-resolution video exports for sharing and distribution of content in advance of physical co-location.
- *Performance* - It can also function as a live performance system, outputting images in real-time from motion capture input. This means that images can be rendered in real-time and displayed either on a screen or stage projection space, indeed ultimately in-headset for remote VR audiences. The live performance functionality can then be easily used for more abstracted aesthetic expressions of dance movement beyond primary choreography, generating new expressions of dance previously only possible through more complex games-engines [figure 2].

The DDS-VR experience enables users to quickly and easily manipulate motion-captured dance sequences in headset, feeling the immediate impact and affect of their creative decision making as well as being able to move in and through the emergent patterns of motion. The process of constructing these sequences will be guided within the headset through an embedded, simple-to-use interface. This experience will be of crossover interest to anyone interested in movement-based embodied expression in metaverse-type spaces.

3 DEVELOPMENT AND DESIGN

The DDS-VR is an entirely new proprietary technology that has been developed as research by Alexander Whitley Dance Company (AWDC) in partnership with developer Luca Biada (Fenyce), INVR.SPACE, and Dr. Dan Strutt of Goldsmiths, University of London. The original BETA mode desktop app titled Digital Dance Studio (DDS) was created by AWDC with Luca Biada. The project emerged through rigorous consultation processes with dance teachers and students across the UK, exploring the opportunities for digital technology to support the practical challenges and barriers to access encountered across the sector. We then carried out industry and network research and iteration to ensure it serves the needs of the identified client base (choreographers, dance educators, film & games industry both nationally & internationally). The DDS-VR iteration has been created in collaboration with INVR.SPACE to take the original DDS functionality and extend the scope to a virtual environment with an immersive interface accessible via a VR headset.

ACKNOWLEDGMENTS

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