



Developing Clinical Protocols for Integrating Virtual Reality Meditation Training in Adolescent Mental Health Settings



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Project Motivation

- Adolescents are disproportionately affected by mental illness
- **Meditation** offers benefits as a therapeutic adjunct
- However, adolescents face unique challenges in meditation skills training and practice:
 - E.g., biological, cognitive, and social challenges
- Meditation skills training in **Virtual Reality (VR)** has been beneficial for adults, and may yield similar benefits for adolescents
- However, creating developmentally appropriate designs and clinical protocols for integrating VR remains a challenge.



Research Questions (RQs)

- **RQ1:** What considerations should future clinical guidelines and protocols address to support the integration of VR-based meditation skills training tools for adolescents within mental health care settings?
- **RQ2:** What design features are necessary in a VR application to facilitate such clinical protocols?

Clinical Setting & Participants

- **Setting:** Colorado Children's Hospital
- **Participants:** Mental health clinicians
- **Programs:** Adolescent outpatient, partial hospitalization, inpatient
- **Common Diagnoses:** Anxiety, depression and mood disorders, disruptive behavior disorders, eating disorder, etc.

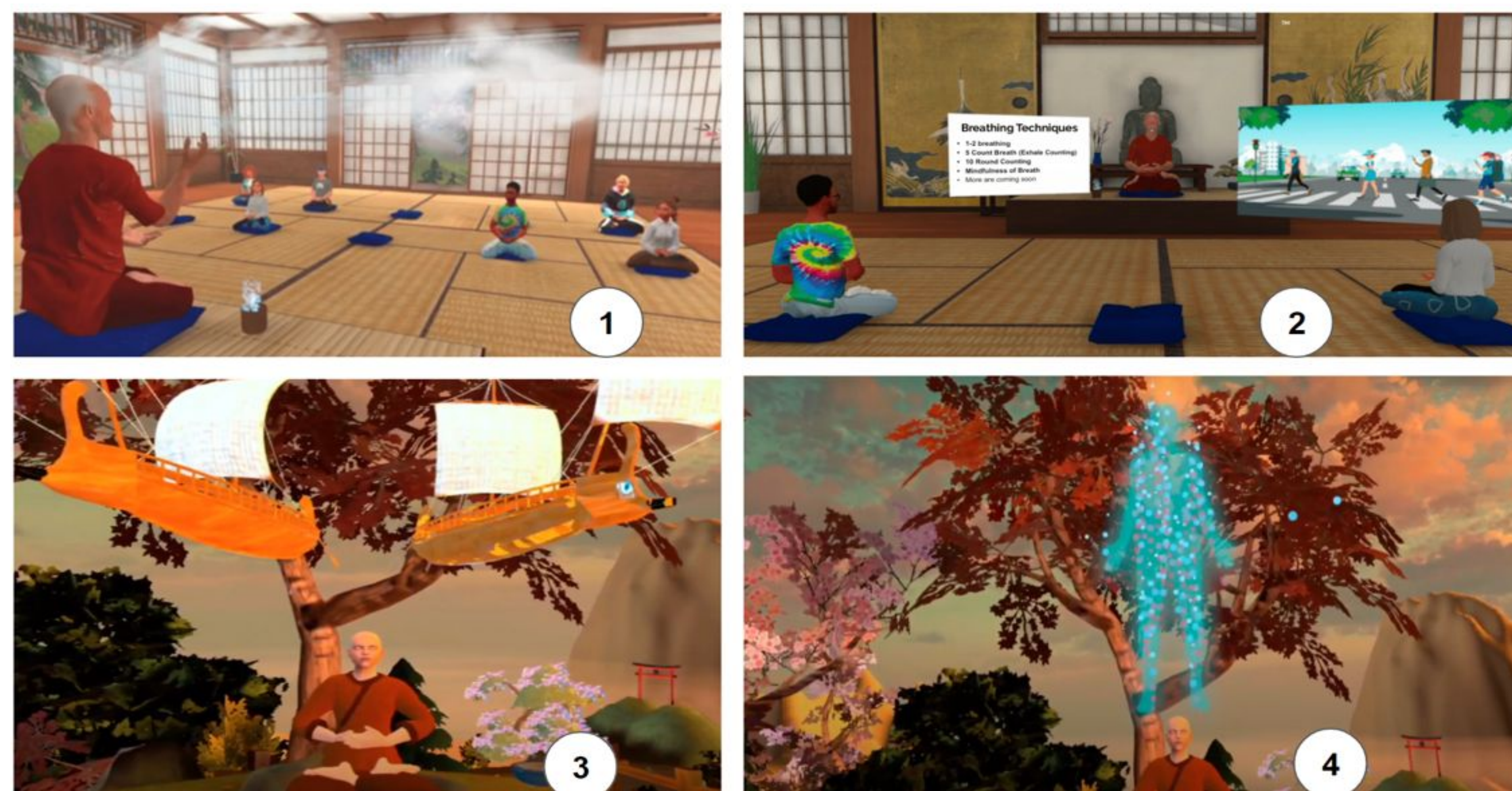
ID	Professional Title	Years	Program
P1	LPC/LCSW	6-10	Outpatient
P2	Licensed Psychologist	1-5	Outpatient
P3	LPC/LCSW	11+	Creative Arts Therapy (works across all units)
P4	Licensed Psychologist	1-5	C/L (Consult Liaison)
P5	LPC/LCSW	1-5	PHP (Partial Hospitalization Program)
P6	Intern/extern	<1	PHP
P7	LPC/LCSW	<1	PHP
P8	LPC/LCSW	<1	EDP (Eating Disorder Partial Hospitalization)



Methods: Survey, VR Demo, & Interviews

- **Preliminary Survey:** Cross-departmental clinicians ($n = 35$)
 - 82% viewed VR-based training important for adolescents
 - 88% interested in VR adoption
- **Interviews:** Cross-departmental clinicians ($n = 8$)
 - **Design Probe:** ZenVR (zenvrapp.com), VR-based meditation app focused on instructional training rather than experiential practice [1]
 - **Demo:** Participants invited for a 20-min. demo before interview

[1] Rachel R. Feinberg, Udaya Lakshmi, Matthew J. Golino, and Rosa I. Arriaga. 2022. ZenVR: Design Evaluation of a Virtual Reality Learning System for Meditation. In CHI Conference on Human Factors in Computing Systems. ACM, New Orleans LA USA, 1–15. doi:10.1145/3491102.3502035



ZenVR Sample Screenshots: 1) Floating clouds to symbolize transient thoughts; 2) Breathing techniques; 3) Thought experiment (Ship of Theseus); 4) Interconnectedness visualization.

RQ1 Results: Clinical Guidelines & VR Protocols

- **Screening:** assessing patients for VR suitability, excluding at risk patients
- **Placing VR Intervention Within Care Pathways:**
 - Timing VR interventions within the care continuum
- **Prescription and Dose:** E.g., duration and frequency of VR interventions

RQ2 Results: Design Features for VR Protocols

- **Countering Distracting Hospital Environments:** Nature-based experiences to transport patients away
- **Clinical and Parental Supervisory Control Mechanisms:**
 - A navigation mechanism that allows clinicians/parents to view and track the patient's experience
- **Group Therapy Facilitation:** Group meditation sessions with multiple VR users, using a multi-modal approach (e.g., VR + other screens)

Discussion & Future Research

Protocol Scaffold:

- Based on participant insights, we provide a clinical protocol scaffold that can be referenced collaboratively by clinicians and intervention designers when planning VR deployments

Clinical protocol scaffold for VR intervention in adolescent behavioral health settings

- Screening and eligibility**
 - Who is appropriate now?
 - What are contraindications and triggers?
 - What are the goals for this patient today?
- Placement in care pathway**
 - When does ZenVR occur in the program flow?
 - Intake / early stabilization
 - Between groups
 - In-session with staff
 - Pre-procedure or pre-difficult moment
 - Where does it happen (room, staffing, equipment)?
- Prescription and dosage plan**
 - Session length (starter dose, max dose)
 - Frequency (per day or per week)
 - Modality (solo, small group, staff-led)
 - Progression rules (when to advance content)
- Monitoring and supervision**
 - Who supervises and how closely?
 - What should be tracked?
 - Engagement and completion
 - Self-reported affect and stress
 - Adverse effects and dropout reasons
 - How are data reviewed and by whom?
- Escalation and safety response**
 - What happens if distress spikes or symptoms worsen?
 - Stop rules (pause, remove headset, grounding steps)
 - When to involve clinician, nurse, or parent/guardian
 - Documentation and follow-up

Design Recommendations:

- Embed impact **assessment metrics** into a VR-based meditation app: mechanisms for tracking usage and assessing the impact
- Integration into **treatment plans** with structured VR tasks to practice and reinforce therapeutic skills
- **Supervision and clinician-patient collaboration** inside the VR: enable real-time supervision of patients' VR experiences.

Link to Abstract & Poster PDF

<https://estellesmithphd.com/2026/04/05/zenvr/>

