About Me



NAME

Ana D. Cleveland, PhD, AHIP, FMLA

TITLE

Regents Professor, Sarah Law Kennerly Endowed Professor, & Director, Health Informatics Programs

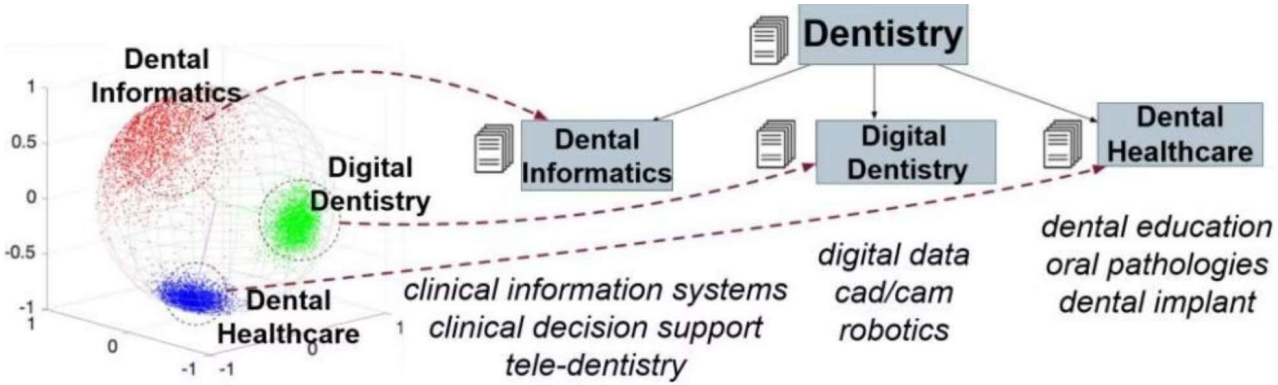
YEARS AT UNT

38

RESEARCH FOCUS AREAS

- Ontology-Guided AI Generation and Reliability Evaluation
- LLM-Enabled Data Fusion and Quality Enhancement
- AI-Enabled Information Seeking in Disaster Management
- Human–AI Knowledge Organization and Semantic Indexing
- Health Informatics Education and Curricular Innovation

A Hybrid Human–AI Framework for Dental Taxonomy Development



Embedding-based clustering of dental informatics publications

STUDY OBJECTIVE

To develop and evaluate a semi-automated, multi-level dental taxonomy through a hybrid AI–human framework.

AI **Human**

Data Collection and Preprocessing	Keyword Extraction	Taxonomy Construction	LLM Comparison	Human Experts Evaluation
Final records (n = 1252) PubMed, 2018–2025	Author generated keywords, YAKE and GPT 3.5	Clustered the keywords with BioBERT to form categories	GPT-4, Llama3-70B, and DeepSeek	Two human experts reviewed and refined the generated taxonomies

Managing Anxiety and Stress in College Students

PURPOSE

The purpose of this study is to examine college students' experiences with anxiety and stress, their perceptions of virtual reality as a mental health support tool, and whether a VR experience reduces self-reported and physiological indicators of anxiety and stress.

Objective

To identify and understand how college students manage anxiety and stress, including the strategies and resources they use.

Phase 1 · Survey

- What coping mechanisms do college students use to manage anxiety and stress?
- What are college students' perceptions and experiences with VR-based mental health interventions?
- What are the key barriers to the adoption of VR therapy for anxiety and stress?

Phase 2 · VR Pilot

- Does a VR-based relaxation experience help reduce students' self-reported anxiety and stress?
- Based on EEG frequency-band activity (including delta, theta, alpha, beta, and gamma) does estimated anxiety, and stress levels increase or decrease during the VR experience, and do these changes differ between the Calm and Neutral groups?

PHASE 1 · ONLINE SURVEY

118 students

Anxiety and stress levels, coping strategies, resources, and perceptions and experiences with VR technology

PHASE 2 · PILOT INTERVENTION

8 students

Calm or Neutral VR environment
Approximately 10 minutes
EEG, EMG, and EOG

BEFORE AND AFTER THE VR INTERVENTION (N = 8)

46.00 → 30.75

STAI-State (Anxiety Scale), mean

4.00 → 2.25

Stress Scale (0–10), mean

Medical and Medication Concept Normalization

Medical Concept Normalization

Informal medical terms → standardized concepts (UMLS, SNOMED-CT)

No energy by 3 p.m.

Sleep 8 hours but still tired

→ **Chronic fatigue syndrome, Sleep apnea**

Data quality evaluation

- Correctness
- Concept validity
- Coverage
- Semantic variety
- Class imbalance

Single-source datasets → **Data quality improvement** → **Data augmentation using LLM** → **Data fusion**

Medication Concept Normalization

Preserving drug identity, strength, and dosage form

Metformin → **Level 1: Ingredient**

Metformin 500 mg oral tablet → **Level 4: Clinical drug**

Select the most specific concept justified by the available information

LEVEL 1 Ingredient	**LEVEL 2** Ingredient + strength	**LEVEL 3** Ingredient + dosage form
LEVEL 4 Clinical drug	**BRAND** Brand-specific concept	**UNRESOLVED** Manual review

Tele-Mental-Health Use Among Anxious Young Adults

PURPOSE

To examine the use of tele-mental-health services among young adults experiencing anxiety and identify disparities in utilization by socioeconomic status, race/ethnicity, geographic location, and symptom severity.

RESEARCH QUESTIONS

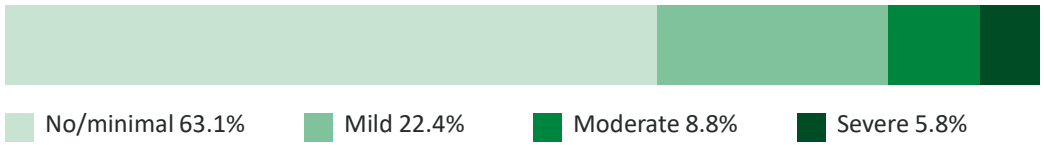
Among U.S. adults aged 18–25 with moderate or severe GAD-7 anxiety symptoms:

1. What proportion used tele-mental-health (phone/video) treatment in the past 12 months?
2. Does tele-mental-health use differ by poverty level, race/ethnicity, and rural/urban residence?
3. Among those who report an unmet need for mental health treatment, what are the most commonly cited barriers to receiving care?
4. Does tele-mental-health use differ between those with moderate versus severe symptoms?

2024 NATIONAL SURVEY ON DRUG USE AND HEALTH (NSDUH)



GAD-7 ANXIETY SEVERITY, AGES 18–25 (WEIGHTED)



Moderate-or-severe combined: **14.6%** (SAMHSA, 2025)