SCIENCE AS A SECOND LANGUAGE:

STRATEGIC FRAMEWORKS FOR

CONTENT AND LANGUAGE INTEGRATION

BY DR. MARINA DEWEES

PROFESSIONAL EXPERIENCE AND IMPACT

- **EXPERIENCE:** TAUGHT SHELTERED AND CONTENT-BASED ESL FOR OVER 20 YEARS (DC PUBLIC SCHOOLS AND FCPS).
- **SCOPE:** HIGH, MIDDLE, AND ELEMENTARY LEVELS ACROSS BIOLOGY, ENVIRONMENTAL/EARTH SCIENCE, ACTIVE PHYSICS, MATH, HISTORY, AND GOVERNMENT.
- **MEASURABLE SUCCESS:** 85-95% PASSING RATE ON STATE TESTS FOR EL LEVELS 1-3 THROUGH ESL STRATEGY IMPLEMENTATION.
- **CURRICULA EXPERTISE:** PARTICIPATED IN CREATING SEVEN SCIENCE CURRICULA FOR FCPS AND DCPS.
- **CREDENTIALS:** PH.D, NATIONAL BOARD CERTIFIED, FULBRIGHT FELLOW, TWICE FUND FOR TEACHERS AWARDEE.

LEARNING GOALS

- UNDERSTAND THE ALIGNMENT BETWEEN VIRGINIA (VA) SCIENCE GRADUATION REQUIREMENTS AND WIDA PROFICIENCY GROWTH.
- IDENTIFY PROVEN FRAMEWORKS (SIOP, CALLA, UDL) FOR DUAL-PURPOSE SCIENCE AND LANGUAGE INSTRUCTION.
- ANALYZE IMPLEMENTATION SUCCESSES AND CHALLENGES IN HIGH-STAKES SHELTERED SCIENCE ENVIRONMENTS.
- ACQUIRE PRACTICAL RECOMMENDATIONS FOR DATA-INFORMED INSTRUCTION AND MULTIMODAL PROCESSING.

POLICIES AND LIEP CONTEXT

- **FAIRFAX COUNTY PUBLIC SCHOOLS (FCPS) AND VA SCIENCE REQUIREMENTS:** THREE STANDARD CREDITS; ONE VERIFIED CREDIT (PASSING STANDARDS OF LEARNING STATE EXAM).
- **WIDA GROWTH TARGETS:** * LEVELS 1.0–2.9: 0.5 TO 1.0 PROFICIENCY LEVEL GROWTH PER YEAR (SHELTERED INSTRUCTION).
  - LEVELS 3.0–4.4: 0.3 TO 0.5 GROWTH PER YEAR ("THE PLATEAU").
- **EXIT CRITERIA:** OVERALL COMPOSITE SCORE OF 4.4 OR HIGHER.
- **DUAL IDENTIFIED ENTITLEMENT:** MANAGING SERVICES FOR BOTH THE INDIVIDUALIZED EDUCATION PROGRAM AND THE EL PLAN.
- **SLIFE POPULATIONS:** FOUNDATIONAL LITERACY VIA FAST (FOUNDATIONS IN ACADEMIC SCIENCE AND TECH) OR INTRODUCTORY SCIENCE COURSES.

PROVEN INSTRUCTION DELIVERY FRAMEWORKS

- **SIOP:** INTEGRATION OF DUAL SCIENCE AND LANGUAGE DEVELOPMENT GOALS. *SIMULTANEOUS CONTENT AND LANGUAGE MASTERY.*
- **5 TS:** TARGETED CONTENT, TASK, TEXT, TALK, AND TIME. *OPTIMIZING ACADEMIC RIGOR AND ENGAGEMENT*
- **CALLA:** COGNITIVE ACADEMIC LANGUAGE LEARNING APPROACH. *EXPLICIT INSTRUCTION IN LEARNING STRATEGIES.*
- **UDL:** UNIVERSAL DESIGN FOR LEARNING. *REMOVING BARRIERS THROUGH FLEXIBLE PATHWAYS.*
- **5E MODEL:** ENGAGE, EXPLORE, EXPLAIN, ELABORATE, EVALUATE. INQUIRY-BASED SCIENCE SENSE-MAKING CYCLE.

IMPLEMENTATION INSIGHTS

- **SUCCESSES:**
  - FOSTER HIGH INTRINSIC MOTIVATION THROUGH RICH CONTENT AND AUTHENTIC LEARNING GOALS
  - PROVIDE CONTEXT FOR HANDS-ON LEARNING, LABS, MODELS AND REAL-LIFE CONNECTIONS.
  - APPLY TOTAL PHYSICAL RESPONSE (TPR) AND MULTIPLE INTELLIGENCES FOR LANGUAGE AND CONTENT ACQUISITION.
  - ENHANCE TIER 2/3 VOCABULARY ACQUISITION (TECHNICAL TERMS/COGNATES OFTEN PRESENT NO DIFFERENCE IN DIFFICULTY).
- **CHALLENGES:**
  - LACK OF ANTICIPATED BACKGROUND KNOWLEDGE.
  - REQUIREMENT FOR EXTRA PROCESSING TIME.
  - STANDARDIZED TEST FOCUS: CRITICAL NEED FOR READING COMPREHENSION AND USE OF CHARTS AND GRAPHS.
  - NEED FOR SCHEMA BUILDING: ELS ARE NAVIGATING UNFAMILIAR INSTITUTIONAL NORMS AND ACADEMIC EXPECTATIONS.

PRACTICAL RECOMMENDATIONS

- **DATA USAGE:** USE WIDA DISAGGREGATED DATA TO INFORM INSTRUCTION; "KNOW THY STUDENTS."
- **ASSESSMENT**: SHORTEN FEEDBACK LOOP THROUGH FREQUENT FORMATIVE ASSESSMENTS.
- **INTEGRATION:** USE SIOP OR SIMILAR FRAMEWORKS TO INTEGRATE LANGUAGE AND CONTENT GOALS.
- **PACING**: LIMIT INTAKE TO 10/15 MINUTES FOLLOWED BY IMMEDIATE PRACTICE.
- **RETENTION:** EMPLOY MULTIPLE MODALITIES/INTELLIGENCES TO FACILITATE PROCESSING AND EASE COGNITIVE OVERLOAD.
- **EXAM PREP:** EXPLICIT, INTENSE TEACHING OF GRAPHIC ORGANIZERS, CHARTS, GRAPHS AS WELL AS READING STRATEGIES FOR STANDARDIZED TESTS.

CURATED RESOURCES

- **CENTER FOR APPLIED LINGUISTICS (CAL):** USING SHELTERED INSTRUCTION TO SUPPORT ELS. HTTPS://WWW.CAL.ORG/WP-CONTENT/UPLOADS/2022/05/USINGSHELTEREDINSTRUCTIONSTOSUPPORTENGLISHLEARNERS.PDF
- **FRED DOBB: ESSENTIAL ELEMENTS FOR EFFECTIVE SCIENCE INSTRUCTION FOR ELS.** HTTPS://CALIFORNIASCIENCEPROJECT.UCR.EDU/SITES/DEFAULT/FILES/2021-03/EFFECTIVE%20SCIENCE%20INSTRUCTION%20FOR%20ENGLISH%20LEARNERS%20-%20DOBB%20CSP%202004.PDF
- **NCELA:** INTEGRATING LANGUAGE WITH TEACHING STEM. HTTPS://NCELA.ED.GOV/SITES/DEFAULT/FILES/2022-09/NCELA%20TEACHING%20PRACTICE%20BRIEF%20%E2%80%93%20EFFECTIVE%20INSTRUCTIONAL%20PRACTICES%2C%20EXAMPLES%2C%20AND%20PRACTICE%20SHIFTS%20FOR%20SCIENCE%20AND%20ENGINEERING%20TEACHERS_0.PDF
- **EXPLORE LEARNING/GIZMOS.** ADAPTIVE DIGITAL LABS AND SIMULATIONS