S-UDLCD™ Framework for Student Success™, S-UDLCD™ Model™ and Narinesingh Traffic Light Model™: A Data-Driven UDL Approach to Student Retention and Engagement in K-12 and Higher Education

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Abstract

Universal Design for Learning (UDL) is a framework aimed at enhancing learning experiences for diverse student populations by incorporating flexibility in instructional practices. The Strategic Universal Design for Learning Course Development Framework™ (S-UDLCD™), the Narinesingh Traffic Light Model™ and the S-UDLCD™ Framework for Student Success extend traditional UDL principles by integrating predictive analytics, real-time progress monitoring and institutional collaboration to drive student retention and success. This study examines the implementation of these models in K-12 and higher education institutions, particularly at Sunrise High School and Barry University. Empirical data, including a 56% increase in graduation rates at Sunrise High School, highlights improvements in student engagement, faculty training, and institutional support. This paper presents case studies, statistical evidence, and findings from previous research and presentations to illustrate how these frameworks modernize pedagogy and drive institutional effectiveness.

Keywords

Universal Design for Learning, US-UDLCD™, S-UDLCD™ Framework for Student Success™, Narinesingh Traffic Light Model™, Student Retention, Higher Education, K-12, Predictive Analytics, Student Engagement, Institutional Effectiveness

Introduction

Educational institutions are increasingly adopting Universal Design for Learning (UDL) as a strategy to enhance student success. While UDL provides a structured approach through multiple means of representation, engagement and expression (CAST, 2018), its impact is further amplified by integrating data-driven methodologies. The Strategic Universal Design for Learning Course Development Framework™ (S-UDLCD™), the Narinesingh Traffic Light Model™, and the S-UDLCD™ Framework for Student Success introduce structured, technology-enabled solutions to support institutional decision-making and improve learning outcomes. Case studies, particularly from Sunrise High School, where UDL strategies led to a 56% increase in graduation rates, further support the effectiveness of these frameworks.

Literature Review

The Universal Design for Learning (UDL) framework has been widely recognized for its potential to create inclusive educational environments by accommodating diverse learner needs. In higher education, UDL has been implemented to reduce learning barriers and improve academic achievement. Research indicates that UDL principles, when applied in course design and teaching practices, enhance educational outcomes (CAST, n.d.). Additionally, UDL has been successfully integrated into higher education settings, demonstrating its adaptability and

effectiveness (Tobin, 2018). During the COVID-19 pandemic, educational leaders faced unprecedented challenges that required rapid adaptation and innovation. School leaders and educators had to pivot to online instruction to minimize the disruption of student learning, often with little support or prior training (Harris & Jones, 2020).

The Narinesingh Traffic Light Model™ for MTSS/RTI in Higher Education

The Narinesingh Traffic Light Model™ for MTSS/RTI introduces a multi-tiered support system for student success, retention and engagement. This model is structured into three tiers:

Tier 1: Institutional Student Success & Engagement (Universal Campus-Wide Support). Tier 1 focuses on institution-wide support through academic advising, first-year experience programs, career services and faculty training on inclusive pedagogy.

Tier 2: Early Academic & Persistence Interventions (Data-Driven Student Support). Tier 2 targets students exhibiting early signs of academic struggle with interventions such as supplemental instruction, peer mentoring and structured academic coaching.

Tier 3: Personalized Retention & Success Coaching (Targeted Support for High-Risk Students). Tier 3 provides intensive one-on-one academic coaching, mental health support, financial aid guidance and case management to ensure student persistence.

Figure 1: The Narinesingh Traffic Light Model™ for MTSS/RTI in Higher Education

The Narinesingh Traffic Light Model for MTSS/RTI in Higher Education
A Multi-Tiered System of Support for Student Success, Retention & Engagement

Tier 1: Institutional Student Success & Engagement (Universal Campus-Wide Support)

Purpose:
Establish a strong institution-wide foundation that ensures all students receive academic and developmental support to foster success and retention.

Institutional Strategies:
General Academic Advising, First-Year Experience Programs & Campus-Wide Tutoring. Career Services, Financial Literacy Workshops & Predictive Analytics. Faculty Training on Inclusive Pedagogy.

Goal:
Provide accessible proactive resources to help students stay engaged and succeed before intervention is needed.

Tier 2: Early Academic & Persistence Interventions (Data-Driven Student Support)

Purpose:
Provide focused support to students who are showing early signs of academic difficulty or disengagement to prevent escalation into greater challenges.

Targeted Support Services:
Supplemental Instruction, Peer Mentoring & Early Warning Systems. Structured Academic Coaching, Faculty & Advisor Collaboration. Mental Health Resources & Social Emotional Learning (SEL) Initiatives.

Goal:
Intervene early and connect students to appropriate resources before their challenges become barriers to success.

Tier 3: Personalized Retention & Success Coaching (Targeted Support for High-Risk Students)

Purpose:
Deliver high-touch individualized interventions for students at serious risk of dropping out to ensure academic persistence and holistic well-being.

Intensive Intervention Measures:
One-on-One Academic Coaching, Case Management & Learning Accommodations. Crisis Mental Health Support, Financial Aid Guidance & Career Coaching. Retention-Focused Faculty Engagement Plans.

Goal:
Provide personalized intervention strategies to ensure students persist and succeed despite academic, financial, or personal challenges.

Empirical Research on UDL Implementation

K-12 UDL Implementation in K-12

Research indicates that UDL-based instructional practices enhance student engagement and academic performance in K-12 settings. At Sunrise High School, the implementation of S-UDLCD™ principles, coupled with the Narinesingh Traffic Light Model™, resulted in a 56% increase in graduation rates compared to the previous year. This model introduced a visual, color-coded system for tracking student progress, enabling early intervention and increased student support. He and Waugh (2019) found a 12% increase in standardized test scores among students in S-UDLCD™-aligned classrooms. Similarly, Burgstahler (2020) highlighted how UDL strategies support English Language Learners (ELL) and students with disabilities, leading to a notable rise in retention and engagement.

Figure 2: K-12 UDL Implementation: Graduation & Retention Rates
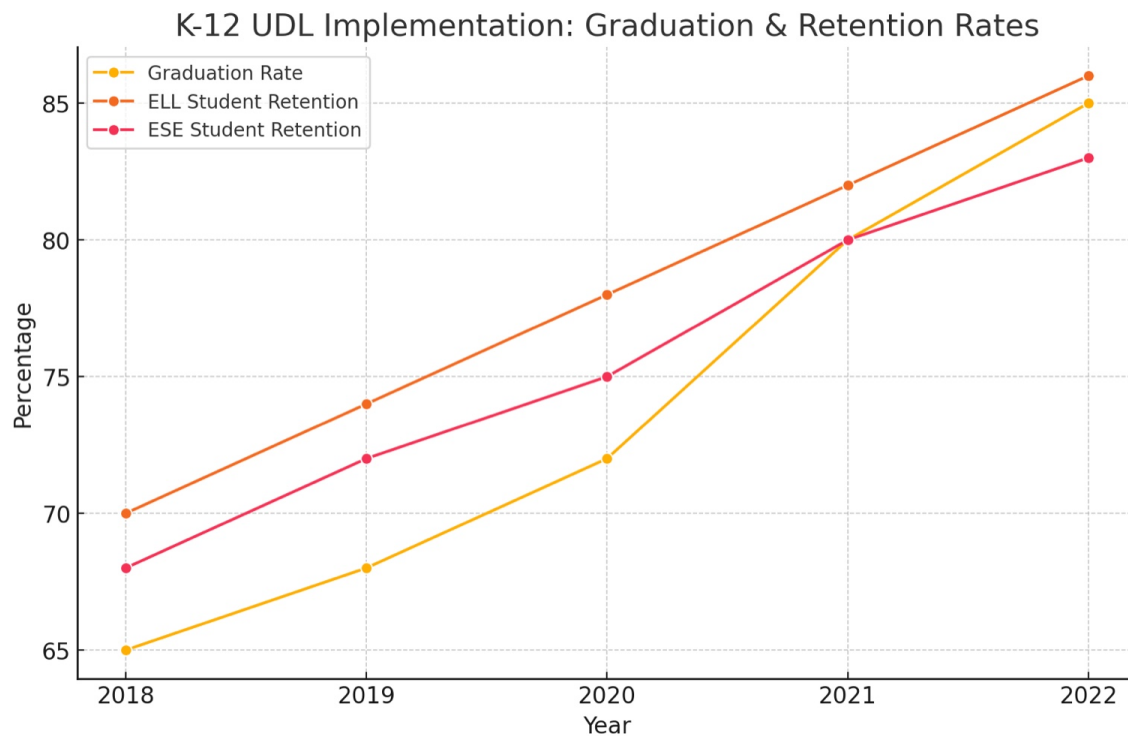
Higher Education UDL Implementation: Student & Faculty Impact

Higher education institutions have incorporated UDL to improve student persistence, course completion rates, and faculty preparedness. The Strategic Universal Design for Learning Course Development Framework™ (S-UDLCD™) supports these efforts by embedding predictive analytics and structured intervention planning into the course design process. Tobin (2018) found that faculty trained in UDL principles reported a 32% increase in student success rates. Rao and Meo (2016) demonstrated that online courses utilizing UDL strategies saw a 23% improvement in student retention rates. Barry University's integration of S-UDLCD™ in faculty training and course design aligns with these findings, reinforcing the importance of professional development in sustaining S-UDLCD™ implementation.

Figure 3: Higher Education UDL Implementation: Student & Faculty Impact
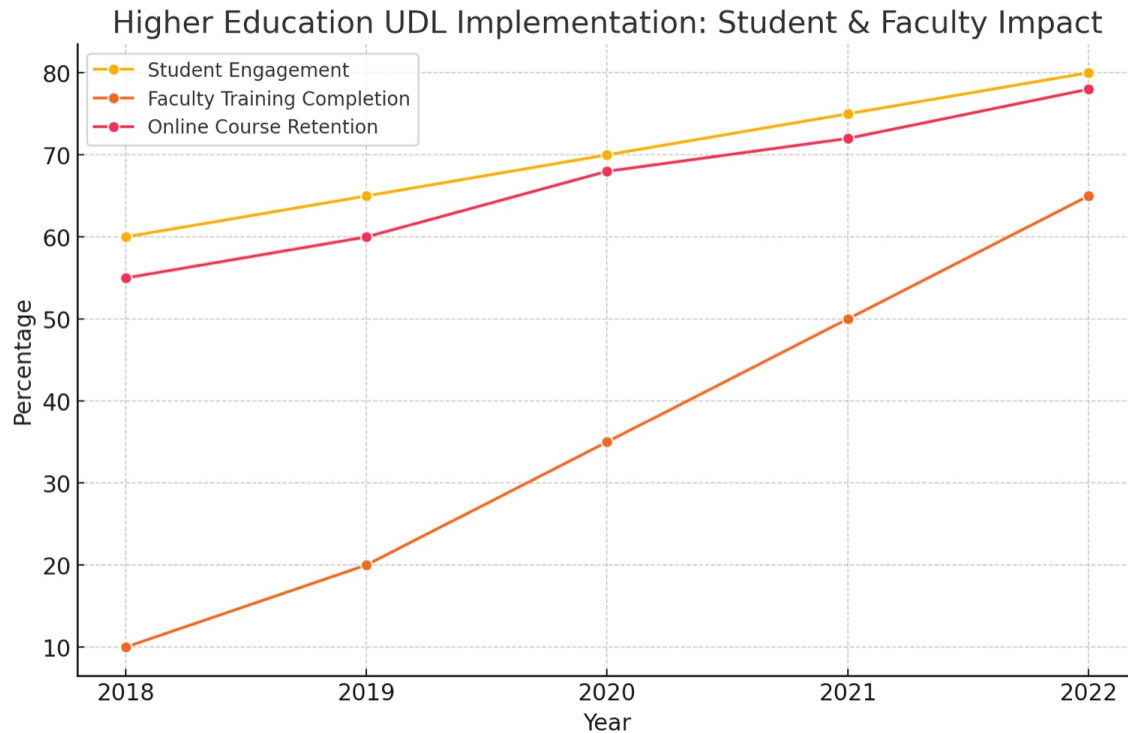
Feedback Mechanisms in S-UDLCD™ Course Development

LMS platforms such as Canvas and Blackboard have played a critical role in S-UDLCD™ implementation. Canvas Sandbox and Blackboard Development Shell provide structured environments for faculty to test S-UDLCD™-aligned assessments and instructional methods. These platforms facilitate continuous improvement through peer reviews, student feedback and iterative course enhancements.

Integrating the Strategic Universal Design for Learning Course Development

Framework™ (S-UDLCD™) in Course Development

The following framework outlines a structured approach to course development, incorporating S-UDLCD™ principles to enhance accessibility, student engagement, and instructional effectiveness. This framework was applied at both Sunrise High School and Barry University, tailored to meet the specific needs of students at each institution while maintaining a commitment to data-driven decision-making and inclusive pedagogy (Narinesingh, 2020).

1. Course Review and Decision Incorporating Student Data - The first step involved reviewing student performance data to assess instructional effectiveness. At Sunrise High School, this process identified gaps in curriculum alignment with state standards and accessibility issues for English Language Learners (ELL) and students with disabilities. At Barry University, the focus was on evaluating the effectiveness of online learning modules and competency-based assessments. Faculty and specialists analyze student performance data (test scores, completion rates and student engagement feedback) to determine course of action.

2. Course Agreement and Faculty-Driven Course Design - Once course development needs were identified, course agreements were established. At Sunrise High School, instructional coaches worked to integrate differentiation strategies and S-UDLCD™-aligned teaching methods. At Barry University, faculty collaborated to design courses to refine course learning objectives and instructional materials with real-world applications using case studies and

problem-based learning, and competency-based assessments.

3. Content Development and Assessment Design - The Strategic Universal Design for Learning Course Development Framework™ (S-UDLCD™) principles guided content creation, ensuring accessibility and multimodal instructional materials. At Sunrise High School, scaffolded resources were provided to teachers, while Barry University incorporated closed-captioned videos, adaptive assessments and diverse learning styles to enhance student engagement.

4. Technology Integration and Learning Management System (LMS) Adaptation - Faculty continuously reviewed and updated content using LMS sandbox and development shells. At Sunrise High School, educators participated in collaborative curriculum mapping, and at Barry University, faculty tested instructional strategies through LMS-based feedback loops.

5. Feedback-Driven Iteration and Faculty Reflection - Iterative course revisions were made based on student performance data and faculty feedback. At Sunrise High School, differentiation strategies were reinforced, while Barry University provided structured feedback using the LMS sandbox or development shells to ensure faculty integrated emerging educational technologies based on student engagement analytics.

6. Course Deployment and Faculty Incentives - The final step ensured instructional continuity and effectiveness in addition to compensation after final review. At Sunrise High School, professional development workshops prepared faculty for implementation, while Barry

University faculty engaged in ongoing Professional Learning Communities (PLCs) to refine best practices.

Conclusion

The Strategic Universal Design for Learning Course Development Framework™ (S-UDLCD™), Narinesingh Traffic Light Model™ and S-UDLCD™ Framework for Student Success represent a transformative evolution of Universal Design for Learning (UDL). By embedding predictive analytics, faculty collaboration and student-centered interventions, these frameworks enable institutions to enhance engagement, retention and academic achievement. Empirical findings demonstrate that integrating these models leads to improved institutional effectiveness, supporting differentiated learners across K-12 and higher education settings. Moreover, as Narinesingh (2020) emphasizes, structured evaluation frameworks play a critical role in sustaining student engagement and fostering long-term academic success. This reinforces the necessity of data-driven decision-making and evidence-based instructional strategies to optimize student outcomes. Future research should explore scalability strategies, ensuring these frameworks continue to evolve and adapt to the diverse needs of students across educational settings.

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