

# Developmental Review of Universal Design Educational Models in K-12 and Higher Education

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## Abstract

*This presentation addresses how researchers are using universally designed instructional strategies in academic areas and the subsequent developmental outcomes regarding learners' cognitive and social-emotional learning (SEL) in K-12 and in higher education. Based on the research-organizational scheme recently developed by the UDL-IRN Research Database (Rao, Smith, & Lowrey, 2016), our poster will address three review questions about UDL operationalization, UDL-based effective practices and the developmental outcomes of universally designed education research. This review advances UDL research base by underscoring the developmental contributions to this line of research.*

## Keywords

UD education models; Developmental review; Developmental outcomes

## INTRODUCTION

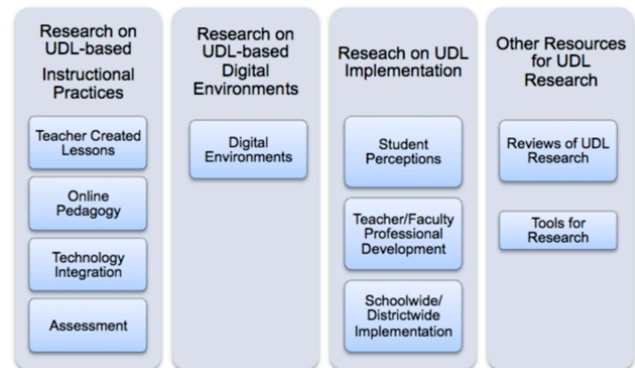
Recent advancements in the Universal Design for Learning (UDL) model (Rose & Meyer, 2002), delineate the emergence of various universally designed (UD) paradigms and a progression towards expanding the UD spectrum in numerous educational domains and learning mechanisms. These paradigms are Universal Design for Instruction (UDI) (Burgstahler, 2009) and Universal Instructional Design (UID) (Higbee & Goff, 2008). The aims of this presentation are to provide effective UD-based practices and strategies that researchers and practitioners are currently using to the summit audience. Additionally, to identify the subsequent developmental outcomes regarding learners' cognitive and SEL in K-12 and postsecondary education.

Given the growing number of UD-based educational research, it is critical to identify, analyze and recapitulate how the above mentioned UD educational paradigms are addressing learning barriers and learner variability within a unique set of principles. Current reviews provide information on how UD educational paradigms have been used in the research and call for explicitly operationalizing UDL principles (Crevecouer et al., 2014; Rao et al., 2014; Roberts et al., 2011). However, these reviews insufficiently describe specific UD-based strategies that practitioners are using and lack information on the developmental outcomes of students after experiencing a UD-based learning environment and instructions. Therefore, the present review

1) addresses the issues of operationalizing UD-based principles in research; 2) identifies the effective UD practices being used by researchers and; 3) explores the consequent impacts on students' cognitive and SEL.

## METHODOLOGY

To achieve the purpose of this review, a recently developed UDL-IRN research database was used (Rao, Smith, & Lowrey, 2016). This UDL research-organizational scheme includes peer-reviewed empirical qualitative and quantitative studies on UD educational models in K-12 and in higher education. Further, this database meets the review criteria that includes (a) previously and recently published articles (2005-2016) and (b) participants with and without disabilities.



**Figure 1. Representing research scheme reviewed for this study (UDL-IRN, 2016)**

All the twenty-eight studies that were included in this scheme were systematically reviewed; analyses of the review questions were compiled across these categories and presented in a comprehensive tabulated format. In this database, one study has been conducted in the pre-K setting; twenty studies in the K-12 setting; three studies in pre-K-3, K-12, and in post-secondary settings; and, four studies in postsecondary education. It was observed that twenty-two studies used UDL as a guiding framework.

22 Studies	2 Studies	2 Studies	1 Study	1 Study
<ul style="list-style-type: none"> <li>• UDL</li> </ul>	<ul style="list-style-type: none"> <li>• UDL</li> <li>• UDI</li> <li>• UID</li> </ul>	<ul style="list-style-type: none"> <li>• UDL</li> <li>• UID</li> </ul>	<ul style="list-style-type: none"> <li>• UDL</li> <li>• UDI</li> </ul>	<ul style="list-style-type: none"> <li>• UDI</li> </ul>

## ANALYSIS AND DISCUSSION

### Question 1

How have researchers been using UD educational model guidelines and principles in their studies, a trend over the last twelve years? For analyzing this question, five themes were identified based on how researchers have been operationalizing and using UD education models in their studies over the last twelve years. These studies were then categorized and placed under a specific theme. These themes are (a) mentioning UD-based education model principles; (b) no operational definitions of UD-based education model principles/checkpoints; (c) operationally defining UD-based education model and integrated in the study; (d) mentioning relationships between UD-based education model principles/checkpoints and the study outcomes; and (e) measuring relationships between UD-based education model principles/checkpoints and study outcomes.

It appears that the trend of explicitly describing UD education-based principles has changed over the last decade. The

	Mentioning UD-based education model principles	No operational definitions of UD-based education model principles/c...	Operationally defining UD-based education model principles/c...	Mentioning relationships between UD-based education model...	Measuring relationships between UD-based education model...
■ 2014-2016	10	2	4	5	3
■ 2011-2013	8	2	5	7	1
■ 2008-2010	7	2	4	6	0
■ 2005-2007	3	2	2	3	1

**Table 1. Representing a trend of operationalizing UD-education models in research over the twelve years**

increasing number of quantitative inquiries endorsing the relationships between study outcomes and UDL principles highlights a positive trend over the last three years. Moreover, the trend represents a gradual increase in the reporting and operationalization of UDL principles at a conceptual level in multiple ways that reflect the flexibility of the UDL paradigm in serving the needs of learners and supporting their variability within a standard set of instructions.

### Question 2

What are the effective practices and strategies being used in UD educational paradigms considering learners variability and barriers in learning? To answer this question, we used the four research categories identified by UDL-IRN database that are UDL-based instructional practice, UDL-based digital environment, UDL implementation and other resources. Across these categories, we identified five groups of strategies that practitioners have been using over the last decade. These groups are based on effective practices, instructional strategies, learning tools, UDL scan tools, instructional tools and assessment tools. This identification will benefit practitioners, educators, and teachers to advance their UD-based knowledge and to bridge research and practice. Some examples of the practices are synchronous and asynchronized learning, electronic logs, faded contextual support and podcasts. The identified strategies will be presented in the summit.

### Question 3

What are the developmental outcomes of UD-based education research, specifically cognitive and social-emotional learning in K-12 and postsecondary students? Based on the previously mentioned five research categories described by UDL-IRN, the review analyzes studies that report students' cognitive growth in terms of academic achievement and SEL in terms of their affective impressions either explicitly or implicitly in relation to being exposed to the UD-based learning environment. Some studies numerically measured the cognitive outcomes such as reading skills, vocabulary, and content knowledge; other studies provided descriptive details on comprehension, metacognition and learning satisfaction. Academic engagement was the most frequently reported cognitive outcome. However, only a few studies measured the relationship between UD-based instructions and academic and social engagement (i.e., Katz, 2013). Observation-based descriptive analyses were noted in the literature for SEL outcomes that appeared as secondary products of UD-based research. This practice indicates a need to explicitly identify and measure the relationships of SE outcomes and UD-based learning environment for future research. SEL outcomes include positive peer relationships, improved social and interpersonal relationships, collaborative environments, class ownership, personalization, time management, and self-regulation skills.

This review also suggests that UD-based studies include a range of individuals with multiple disabilities including physical, behavioral, cognitive, and speech and language deficiencies. However, developmental disabilities appeared frequently in this line of research, and thus underscores the need to expand on the variability of disabilities represented in research (i.e., intellectual impairment).

Finally, our review is a call to researchers to provide explicit information about resources, interventions, software, programs, and cognitive tools to allow for replication and for practical guidance for educators.

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### REFERENCES

- Burgstahler, S. (2009). Universal design of instruction (UDI): Definition, Principles, guidelines, and examples [website]. Seattle: DO-IT, University of Washington.
- Crevecouer, Y., Sorenson, S. E., Mayorga, V., & Gonzalez, A. P. (2014). Universal design for learning in K-12 educational settings: A review of group comparison and single-subject intervention studies. *The Journal of Special Education Apprenticeship*, 3(2), 1-23.
- Higbee, J. L., & Goff, E. (2008). Pedagogy and Student Services for Institutional Transformation: Implementing Universal Design in Higher Education. *Center for Research on Developmental Education and Urban Literacy*.

Katz, J. (2013). The three-block model of universal design for learning (UDL): Engaging students in inclusive education. *Canadian Journal of Education*, 36(1), 153-194.

Rao, Smith, & Lowrey, (2016) UDL-IRN Research Database. Retrieved from <http://udl-irn.org/udl-research>.

Roberts, K. D., Park, H. J., Brown, S., & Cook, B. (2011). Universal Design for Instruction in Postsecondary Education: A Systematic Review of Empirically Based Articles. *Journal of Postsecondary Education and Disability*, 24(1), 5-15.

Rose, D. H., & Meyer, A. (2002). *Teaching Every Student in the Digital Age: Universal Design for Learning*: Association for Supervision and Curriculum Development, 1703 N. Beauregard St., Alexandria, VA 22311-1714 (Product no. 101042: \$22.95 ASCD members; \$26.95 nonmembers).