

Title:

Implemented UD strategies and their effectiveness today: What works in higher education?

Abstract

Universal Design (UD) is a validated educational design framework that, by proactively planning and removing learning barriers, accommodates student variability. This systematic literature review (SLR) adhered to the PRISMA guidelines explores the implementation and effectiveness of UD strategies in fostering inclusive online and offline learning environments within higher education. Employing a search string, including 'universal design', 'inclusive learning environment', and various terms related to higher education, effectiveness, and non-traditional learning, the study scoured the databases Web of Science, ERIC, and Scopus. A narrative synthesis approach was utilized to concisely summarize findings, explore similarities and differences, and delve into the reported UD strategies and outcomes of empirical studies within the higher education context. This includes both traditional settings, characterized by offline classrooms, and non-traditional, fully online environments, as outlined by Pathak and Palvia (2021). This SLR included 14 studies with diverse methodologies. This SLR shows that despite reasonably comprehensive reporting, a prevalent abstraction and limited practical orientation, especially in qualitative studies, hinder measurability, leading to restricted conclusive findings on the effectiveness of UD in higher education. The research provides valuable insights into the effectiveness of UD in diverse learning environments and reveals implementation strategies, challenges, and success factors in both traditional and online contexts. These insights provide more practical guidance for future research and policy initiatives aimed at enhancing specific areas and increasing the practical effectiveness of UD in varied educational environments.

Keywords

Higher education - Inclusive education - Teaching/Instructional Strategies - Teaching Approaches

Background

"In learning environments, such as schools and universities, individual variability is the norm, not the exception" (CAST, 2011, p.4). As mentioned by several studies, Universal Design (UD) is an educational framework based on cognitive neuroscience research, and it is widely utilized to create an inclusive educational environment for a diverse range of learners (Alquraini & Rao, 2020; Chita-Tegmark et al., 2011). The Capp (2017) study shows that UD is a useful teaching strategy for enhancing the learning experience for all students. UD promotes teachers to design flexible learning environments with flexible goals, approaches, resources, and assessments that take into account the backgrounds, abilities, and motivations of a wide range of students (CAST, 2011).

When faced with challenges related to diversity, teachers still exhibit hesitancy to initiate actions, as outlined in the studies of Dursun et al. (2021) and Pulinx et al. (2021). After implementing strategies based on UD principles, teachers can feel more confident in designing learning environments that meet the diverse individual needs of students, as

suggested by Bishop and colleagues (2010). However, establishing an effective UD learning environment requires more training and professional development, and additionally, it necessitates resources such as technology and other materials, additional planning time, smaller class sizes, more staff, and clear, flexible policies and guidance (Alquraini & Rao, 2020; Reardon et al., 2022). Moreover, there is a need for further research on the implementation of UD principles within the context of higher education, as empirical research on the identification of effective practices based on the UD model is lacking (Edyburn, 2010; Roberts et al., 2011; Tai et al., 2021). This gap in research is noteworthy, especially considering the dominance of UD research in K–12 education, as indicated by (Rao et al., 2014).

Pathak and Palvia (2021) highlight the evolution of today's learning landscape, which spans from fully offline classrooms to entirely online education, encompassing a spectrum of traditional and non-traditional environments. The distinctions between these modes are becoming increasingly blurred, attributed to the integration of various hybrid models in today's dynamic learning environments. Hence, this SLR incorporates recent studies from this broad spectrum to enhance the accessibility of evidence for decision-makers and practitioners in the evolving traditional and nontraditional learning landscape.

The following research questions were addressed:

How is UD applied in inclusive learning environments in higher education?

- Which outcomes are linked to which strategies in a traditional learning environment in higher education where UD strategies are implemented?
- Which outcomes are linked to which strategy, specifically in a non-traditional, online learning environment in higher education where UD strategies are implemented?

This systematic literature review (SLR) followed the 'PRISMA' evidence-based minimum set of reporting items, as recommended by Page et al. (2021). The study included both empirical studies and reviews written in English, published between 2013 and 2023, focusing on implemented UD strategies in traditional and nontraditional online higher education environments and their measured effectiveness. 199 references were checked, and the full text of 41 papers was evaluated. Our inclusion criteria have been met by 14 studies: 4 SLR's with mixed studies, 1 study conducting both a meta-analysis and an SLR, 2 studies with mixed designs, 6 articles using qualitative research, and 1 article primarily employing qualitative methodology. This methodological diversity enables a comprehensive analysis of the literature in this domain. Key information, including citation details, research design, participant demographics, learning environment specifics, implemented UD strategies, measured outcomes, and discussion/conclusion elements, was extracted for each study. The Quality Assessment Tool for Studies with Diverse Designs (QATSDD) evaluated internal and external validity as well as reliability, rating studies as low, moderate, or high quality.

The purpose of this SLR is to provide an insightful exploration of UD in higher education. Preliminary findings encompass a thorough analysis of implemented UD strategies, evaluations of their impact on student achievement and engagement, identification of potential obstacles to implementation, a critical appraisal of the quality of existing literature, and educational implications for faculty development derived from these findings. This comprehensive research aims to meaningfully contribute to the comprehension and advancement of UD in diverse higher education settings. While reporting on the application

of UD is reasonably comprehensive, it often remains at an abstract level, lacking practical orientation. Particularly in qualitative studies, there is a deficiency in measurability, resulting in limited conclusive findings regarding the effectiveness of UD in higher education. Nevertheless, the insights derived from this research contribute to understanding the effectiveness of UD in diverse learning environments by providing insight into the variety of implementation strategies, challenges, and success factors. Specific analyses of both traditional and online contexts reveal nuances in the application of UD, identifying practical obstacles and solutions. The acquired insights not only offer an overview of the current landscape but also present exemplars of best practices and potential enhancements. Through this detailed analysis, future research and policy initiatives can pinpoint specific areas requiring improvement and leverage the gathered knowledge to enhance the practical effectiveness of UD. Thus, this research contributes not only to theoretical understanding but also provides concrete guidelines for the implementation of UD in diverse educational environments in higher education.

