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INTEGRATING COGNITIVE LOAD THEORY AND UNIVERSAL DESIGN FOR LEARNING IN EDUCATING CHILDREN WITH AUTISM SPECTRUM DISORDER: A SOCIO-PEDAGOGICAL FRAMEWORK FOR CRISIS-AFFECTED EDUCATIONAL SYSTEMS

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Introduction The global educational landscape is increasingly defined by its response to macro-systemic disruptions. In contemporary Ukraine, the ongoing crisis has forced an abrupt transition to distance and hybrid digital learning models, driven by the mass displacement of students and educators. This shift is further complicated by severe infrastructure challenges, such as power outages and restricted digital access, which greatly aggravate educational losses. For learners with Autism Spectrum Disorder (ASD), these disruptions threaten the progress achieved during the New Ukrainian School reforms, which actively aimed to replace segregative models with inclusive, rights-based pedagogical practices (Lisenko, 2024). In crisis contexts, maintaining learning continuity for autistic students requires highly specialized, neurocognitively grounded strategies. While general inclusive frameworks focus on systemic accessibility, they often fail to address the unique cognitive challenges faced by neurodivergent learners in unstable environments (Mitchell, 2023). Autistic individuals exhibit marked executive functioning deficits and restricted working memory capacity, which make them highly vulnerable to cognitive and sensory overload (Le Cunff et al., 2024). Poorly structured digital interfaces and sudden transitions can lead to acute distress and educational abandonment. Therefore, educators must employ evidence-based visual support systems to manage these sensory barriers and effectively protect individual learning routes.

To resolve these ongoing challenges, this study proposes a theoretical synthesis of Cognitive Load Theory (CLT) and Universal Design for Learning (UDL) as a robust socio-pedagogical framework. While UDL provides the flexible pedagogical architecture necessary for multiple means of representation, engagement, and expression, CLT serves as a regulatory filter to manage mental effort and prevent sensory overload (Wang & Mutalib,

2026). By using CLT to structure UDL options, educators can deliver instruction that is both flexible and highly predictable (Tīģere et al., 2025).

Materials and Methods. This study employs a qualitative retrospective historical-pedagogical analysis combined with a conceptual desk-research framework synthesis. The research design evaluates the long-term trajectory of socio-pedagogical support for learners with Autism Spectrum Disorder (ASD), tracing the paradigm shift from historical segregative models toward contemporary inclusive educational systems. The analytical framework is anchored in a systematic literature review and document analysis of legislative acts and pedagogical publications spanning from 1990 to 2026. The data collection process involved a systematic exploration of major international academic databases, including Google Scholar, Scopus, Web of Science, and national repositories. Search terms focused on the intersection of autism, inclusive education, and instructional design within crisis contexts. To ensure academic rigor, strict inclusion and exclusion criteria were established for the data baseline. The inclusion criteria required peer-reviewed academic articles investigating the socio-pedagogical inclusion of children with ASD in Ukraine (Lisenko, 2024). Additionally, theoretical literature detailing the neurocognitive profiles of autistic students was selected to analyze working memory and sensory gating limitations (Le Cunff et al., 2024; Mitchell, 2023). Finally, the review prioritized recent instructional design research evaluating the integration of Cognitive Load Theory (CLT) and Universal Design for Learning (UDL) in diverse settings (Tīģere et al., 2025; Wang & Mutalib, 2026). Studies focusing on pharmacological treatments or non-pedagogical interventions were excluded. The extracted literature was qualitatively synthesized through the dual conceptual lenses of CLT and UDL. Sweller's cognitive load taxonomy–comprising intrinsic, extraneous, and germane loads–was applied to assess the visual and spatial structures used to reduce extraneous noise (Sweller & Leppink, 2023; Murodova, 2025). These practices were evaluated against the three core pillars of UDL: multiple means of engagement, representation, and action. This analytical synthesis systematically identified "overload points" where excessive pedagogical flexibility conflicts with neurocognitive constraints, leading to a calibrated, crisis-resistant instructional framework integrating virtual technologies (Norboyeva, 2025).

Results. The qualitative synthesis of historical and empirical evidence reveals a clear developmental trajectory of socio-pedagogical support for children with Autism Spectrum Disorder (ASD). The analytical findings demonstrate a critical socio-pedagogical transition from segregative, high-load medical models to integrated, cognitively calibrated inclusive frameworks. During the late twentieth century, the post-Soviet defectology paradigm isolated children with ASD within restrictive special boarding

institutions (Lisenko, 2024). This historical system generated extreme extraneous cognitive load for vulnerable learners. Classrooms lacked standardized visual schedules, spatial zoning, or non-verbal communication tools, forcing students to process instruction through verbal channels that were perceived as chaotic sensory noise (Murodova, 2025). Because the medical model focused on correcting deficits rather than environmental adaptation, the instructional design was static and non-individualized. This total lack of environmental structure blocked germane schema construction, exhausting the students' finite working memory and restricting learning to their zone of actual development (Tīġere et al., 2025). The progressive transition to inclusive education under the New Ukrainian School reforms introduced evidence-based technologies designed to manage cognitive load. First, evidence-based Applied Behavior Analysis was implemented to manage intrinsic load by breaking complex academic and behavioral tasks into scaffolded units (Lisenko, 2024). Second, the TEACCH approach for spatial zoning and the Picture Exchange Communication System were integrated to reduce extraneous load, establishing environmental predictability, structured routines, and visual clarity (Murodova, 2025). Third, Social Stories optimized germane load by providing clear social scripts to help learners build necessary interaction schemas (Lisenko, 2024). Additionally, virtual reality and innovative digital technologies provided sensory-controlled environments that supported highly individualized learning pathways (Norboyeva, 2025). However, current crisis contexts highlight the limitations of open-ended inclusion. While Universal Design for Learning (UDL) provides valuable instructional flexibility, its emphasis on providing multiple options can cause choice overload and sensory hyper-stimulation for autistic learners (Le Cunff et al., 2024; Mitchell, 2023). Under severe systemic stress, presenting an autistic student with too many options worsens executive dysfunction and causes cognitive fatigue (Le Cunff et al., 2024; Wang & Mutalib, 2026). To resolve this paradox, results indicate that Cognitive Load Theory (CLT) must serve as a regulatory cap over UDL's flexibility (Wang & Mutalib, 2026). Managing extraneous load, such as redundant digital interfaces, ensures that UDL's flexibility remains instructional rather than distracting (Le Cunff et al., 2024; Sweller & Leppink, 2023). Using CLT to structure UDL options ensures instruction remains flexible, predictable, and cognitively accessible during crises (Tīġere et al., 2025).

Conclusions. In this study, I have conceptualized a novel socio-pedagogical framework that reconciles the inherent tension between pedagogical flexibility and neurocognitive constraints. By critically synthesizing Universal Design for Learning with the regulatory mechanisms of Cognitive Load Theory, I offer a resilient instructional pathway tailored specifically for autistic learners navigating macro-systemic crises. My

formulation demonstrates that unstructured educational choices under systemic stress do not automatically guarantee successful inclusion; rather, they threaten cognitive abandonment. Therefore, I propose that the open-ended adaptability of universal design must be systematically calibrated through a cognitive filter to safeguard the finite working memory of neurodivergent students. Ultimately, this integrated model transcends traditional rights-based discourse, establishing a neurocognitively optimized paradigm capable of preserving developmental routes and securing learning continuity. Through this theoretical synthesis, I provide educators and policymakers with a precise, crisis-resistant methodology to sustain educational equity and active social integration amidst profound societal upheaval in emergency contexts.

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