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# Creating Safer Learning Environments Through Universal Design for Learning Framework

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## ABSTRACT

Ensuring the safety and security (S&S) of learning environments remains a critical challenge, even in the Nordic countries such as Finland, ranked the world's happiest nation for the seventh consecutive year in 2024. Research identifies a poor psychosocial climate as a major factor contributing to unsafe school environments. This paper examines how the Universal Design for Learning (UDL) framework can enhance school S&S by improving the psychosocial environment. Drawing on existing literature with snowball approach, the study analyzes key risk factors—such as negative social atmosphere, inadequate physical space design, security deficiencies, and cognitive challenges—that compromise safety. Findings suggest that integrating UDL principles, including technology adoption, flexibility, accessibility, and thoughtful spatial design, can help create safer and more inclusive educational settings. By linking UDL to school S&S, this paper offers a novel perspective on how universal design strategies can address diverse student needs and foster more supportive, secure learning environments.

**Keywords:** Keywords-learning environment, Safety, Security, Universal design for learning

## INTRODUCTION

There is a constant need to make educational institutions safer. Even here in the Nordics, including in Finland, which, according to the UN World Happiness Report, is the happiest country in the world for the seventh time in a row (Tyystjärvi, 2024; Helliwell, Huang, Shiplett & Wang, 2024), educational institutions face their own safety and security (S&S) issues. Alongside rare extreme security issues (Happonen, 2024; Teivainen, 2014), schools face other S&S challenges, including unsafe building infrastructure, inadequate fire safety and emergency preparedness practices, traffic hazards, bullying, substance use, and other behaviors that contribute to an unsafe school environment (cf. Hurme, Jahnukainen & Hotulainen, 2019; Ervasti, 2012; Salmi & Kivivuori, 2013; Savolainen & Airo, 2020; Savolainen, Airo & Jylhä, 2024; DePaoli & McCombs, 2023). Unwanted incidents that endanger the safety and security of people in educational

 

institutions can often be triggered by factors such as stress and lack of S&S knowledge (Savolainen, 2023).

Savolainen, Airo, and Jylhä (2024) argue that a negative psychosocial atmosphere can have one of the biggest impacts on the overall safety of educational institutions. According to Brunstein Klomek, Barzilay, Apter, Carli, Hoven, Sarchiapone, and Wasserman (2019), there is a connection between bullying and depression, suicidal thoughts, and suicide attempts. They argue that physical, verbal, and social bullying can lead to depression and vice versa. If someone is bullied constantly, they are more likely to become depressed later compared to those who are not bullied or are bullied only occasionally. The physical form of bullying is especially dangerous and can lead to suicidal thoughts and attempts later in life.

How can school management then make educational institutions safer—where students, teachers, and staff can work, learn, and interact without fear of physical harm, harassment, discrimination, or other forms of harm? Several valid approaches exist, including implementing a comprehensive risk-based safety and security management system (Savolainen, 2023), preparing all school staff to support student well-being (DePaoli & McCombs, 2023), teaching positive behaviors to support learning (Ofei-Ferri, Collier, Lind, & Griffiths, 2023), and making the physical spaces more motivating—for example, by increasing natural light, improving ergonomics, and providing facilities for individual and group work, allowing students and employees control over their learning environment (Hedge, 2016; Veitch, 2011; Oldham & Brass, 1979; Knight & Haslam, 2010; Gifford, 2014; Savolainen & Airo, 2020).

Universal Design for Learning (UDL) provides tools and guidelines that support learner agency—empowering students to actively participate in making choices that align with their learning goals (CAST, 2022). One promising approach is the Universal Design for Learning (UDL) framework, which provides tools and guidelines for designing inclusive learning environments. UDL emphasizes accessibility, learner agency, and flexibility, ensuring that students—particularly those with cognitive disabilities—can actively engage with their learning environment in ways that suit their needs (CAST, 2022). While UDL has primarily been explored in relation to blended and online learning (Kumar & Wideman, 2014; Garrad & Nolan, 2023), there is a significant research gap regarding its impact on school safety and the psychosocial learning environment.

This paper argues that by improving psychosocial well-being through UDL, we can establish a strong foundation for safer educational institutions. However, there is a research gap regarding the impact of the UDL framework on improving the psychosocial learning environment and enhancing S&S in educational settings. The assumption is that by improving the quality of the psychosocial learning environment and the well-being of students, we can establish a solid foundation for comprehensively secure educational environments.

In the following sections, we first explore the concept of S&S learning environments before examining Universal Design for Learning (UDL) and its principles. Then we critically discuss how UDL can be applied to

enhance school safety, and the final section presents conclusions and recommendations.

## SAFE AND SECURE LEARNING ENVIRONMENTS

This section explores learning environments and how they can be enhanced to ensure greater safety for all users. Wilson (1996, p. 3) offers a comprehensive definition: "A learning environment is a place where people can draw upon resources to make sense out of things and construct meaningful solutions to problems." In essence, a learning environment can be any 'space' or 'place' where learning occurs (Wilson, 1996, p. 4), such as an e-learning platform, a classroom, a library, or even a state of mind. Today, the concept typically refers to a combination of physical spaces and digital learning platforms.

From a physical safety and security perspective, facilities in educational institutions are generally well-managed, particularly in areas like fire safety and crime prevention (Savolainen, 2023). Savolainen (2023) highlights in his research that common challenges in physical spaces often involve clutter, such as laptop chargers that pose tripping hazards. Traditional facility management (FM) solutions, including fencing, gates, lighting, signage, and locks, enhance physical security (Roper & Payant, 2014). Operational security also requires training employees and managing contractors, visitors, and vendors. Technological solutions, such as surveillance systems, alarms, and building automation for lighting and fire alarms, are key components. A reliable internet connection and cognitively accessible information systems are also important factors in a safe learning environment (Savolainen, 2023).

According to Piispanen (2008a; 2008b), the psychological learning environment consists of the atmosphere and individual feelings, while the social environment involves interactions among teachers, students, and learning networks. Psychological safety is defined as the perception that one can take interpersonal risks, show vulnerability, and contribute ideas without fear of negative consequences (McClintock, Fainstad, & Jauregui, 2021). The psychosocial learning environment is influenced by the physical setting, the social atmosphere, and technological solutions supporting communication and learning. Savolainen (2023) highlights the crucial role of psychosocial factors in overall safety. Bullying, both in physical spaces and on digital platforms, poses a significant threat. Promoting diversity and preventing marginalization are key strategies, as exclusion can lead to radicalization and safety risks. A trusting relationship between educators and students is vital, especially for supporting students with special needs. Violence, including extreme cases like school shootings, also demands attention from risk treatment perspective. Savolainen (2023) stresses the importance of safety plans, clear instructions, and a strong safety culture to mitigate such risks.

Facility management solutions can also enhance the psychosocial atmosphere. Universities and colleges face specific ergonomic challenges across various environments, including offices, lecture halls, libraries, laboratories, and custodial areas. Tailored ergonomic solutions are necessary to promote comfort, safety, and productivity (Hedge, 2016). Ergonomics

plays a major role in both physical and psychosocial well-being, improving comfort and stimulating learning through thoughtful design of lecture halls and classrooms (Hedge, 2016, p. 231).

As learning spaces evolve from formal lecture rooms to informal settings like cafés and residence halls, maintaining sensory comfort becomes critical. Disruptions from noise, glare, and heat should be minimized. Faculty need flexible spaces that support both quiet individual work and collaborative activities (Hedge, 2016). The quality of lighting has been found to positively impact mood in office-like environments, including universities (Hedge, 2016; Veitch, 2011; Colenberg, Jylhä & Arkesteijn, 2011). However, open-plan offices and high noise levels can harm health and well-being (Colenberg et al., 2011; Oldham & Brass, 1979). Spaces encouraging movement, featuring greenery, and allowing environmental control (e.g., temperature and lighting) can reduce stress and enhance both physical and mental well-being (Colenberg et al., 2011; Gifford, 2014). Furthermore, smaller shared spaces support social well-being. Excessive open-plan layouts may lead to a loss of privacy, increased distractions, and reduced motivation (Oldham & Brass, 1979). Gifford (2014) emphasizes that proximity to nature, personalization of workspaces, and environmental control can reduce stress and improve workplace health. Similar findings have been reported for learning environments by Savolainen and Airo (2023) and Hedge (2016).

## UNIVERSAL DESIGN FOR LEARNING (UDL): FRAMEWORK AND PRINCIPLES

This section examines the concept of Universal Design (UD), which originated in the field of architecture to create accessible spaces and environments that accommodate all individuals (Almumen, 2020; Nelson, 2014). Mace et al. (1996), a pioneer of UD, emphasized that universal design entails crafting products and environments that serve people regardless of their age, ability, or life circumstances. This philosophy was later adapted to education by the Center for Applied Special Technology (CAST), a non-profit organization founded in 1983. The Universal Design for Learning (UDL) framework was developed to support diverse student needs in inclusive educational settings, thereby enhancing the learning experience for all (Almeqdad et al., 2023; CAST, 2022). Over time, the UDL framework has evolved, with the most recent version released in 2018 (Garrad & Nolan, 2023; CAST, 2022).

Grounded in cognitive neuroscience, the UDL framework is based on three key principles designed to activate the brain's learning processes. According to Rose and Strangman (2007), these principles correspond to three distinct learning networks in the brain: Multiple Means of Engagement, Multiple Means of Representation, and Multiple Means of Action and Expression.

The first principle, engagement, addresses the question of why learning matters and seeks to stimulate learners' interest and motivation (CAST, 2022). It acknowledges that individual differences in motivation, influenced by factors such as neurology, culture, personal relevance, and prior knowledge, significantly impact learning (CAST, 2022). While some learners thrive on novelty and spontaneity, others prefer structured routines.

Providing multiple options for engagement is thus essential. Boothe et al. (2018) stress that both students and educators must actively promote participation. Studies by Garrad and Nolan (2023) and Kumar and Wideman (2014) show that integrating UDL elements increases student engagement and satisfaction while reducing attrition. Creating a safe learning environment is key, as threats and distractions—whether physical or emotional—can severely impede learning. CAST (2022) emphasizes the importance of addressing both obvious and subtle threats, recognizing that these vary among students.

The second principle, multiple means of representation, relates to the recognition network and focuses on how learners perceive and process information. It highlights the importance of presenting content in various formats to accommodate different learning styles (Almumen, 2020; Boothe et al., 2018). Educators can use diverse instructional strategies to ensure comprehension (Almumen, 2020). Boothe et al. (2018) further recommend enhancing cognitive accessibility by providing easier navigation, multiple content formats, timely feedback, and well-organized information.

The third principle, multiple means of action and expression, involves the strategic network and addresses how learners demonstrate their knowledge (Boothe et al., 2018; Rose & Strangman, 2007). Since learners vary in how they process and express information, it is crucial for educators to maintain a focus on learning objectives while offering flexible methods for students to communicate their understanding (Ralabate, 2016). Cognitive limitations can influence learners' ability to engage with content, making varied expression methods essential.

Overall, the UDL framework offers a comprehensive strategy for developing inclusive learning environments. By implementing its principles, educators can significantly enhance engagement, representation, and expression, promoting more equitable learning opportunities for all students. While UDL benefits all learners, it is particularly advantageous for students with cognitive disabilities, such as attention deficit disorders or specific learning difficulties (W3C, 2018; Pesonen & Nieminen, 2021).

In conclusion, the Universal Design for Learning (UDL) framework represents a transformative approach to education, focusing on inclusivity and accessibility. By addressing diverse learner needs through its core principles, UDL fosters environments where every student can thrive. Its emphasis on cognitive accessibility ensures that even students with learning disabilities have equitable opportunities to succeed.

## DISCUSSION

As discussed at the beginning of this paper, establishing a safe psychosocial learning environment is essential for enhancing the overall safety and security of schools. We argue that the Universal Design for Learning (UDL) framework is a valuable tool for achieving this goal. UDL principles have become increasingly relevant for online courses, guiding educators in applying these concepts effectively in virtual learning environments (Garrad & Nolan, 2023; Dell, 2015; Cinquin et al., 2020). Furthermore, UDL

can be leveraged to improve the psychosocial aspects of physical learning environments.

The first principle of UDL, Multiple Means of Engagement and Motivation (CAST, 2022), emphasizes the need for a variety of activities, tasks, and environments that cater to diverse student interests, motivations, and challenge levels. Numerous studies highlight the importance of this principle for fostering student engagement (Burgstahler, 2013; Davies, Schelly & Spooner, 2013; Kumar & Wideman, 2014). Educators should incorporate diverse methods, tools, and inputs to engage the affective dimension of each learner, promoting a more personalized and effective educational experience (Sewell, Kennett & Pugh, 2022). By implementing varied instructional strategies, teachers can reduce stress, thereby minimizing the likelihood of unwanted incidents on campuses. The Multiple Means of Engagement principle supports environments that reduce anxiety and build self-confidence (Burgstahler, 2013; Davies, Schelly & Spooner, 2013), which is critical for preventing bullying and social exclusion which are major safety concerns.

Similarly, the second principle, Multiple Means of Representation, addresses how information is presented to learners, ensuring diverse methods accommodate varying learning preferences and cognitive needs (CAST, 2022). This principle also significantly impacts the physical learning environment, a primary domain of Facility Management. FM professionals contribute by designing flexible, tech-enabled, and well-organized spaces that facilitate diverse sensory and cognitive requirements, promoting accessibility, comfort, and functionality.

The third principle, Multiple Means of Action and Expression, is closely linked to physical space as well (CAST, 2022). The design and layout of learning environments profoundly influence how students interact with learning processes and demonstrate their knowledge. UDL encourages the creation of varied pathways for students to express understanding, which is particularly important for those with cognitive and learning disabilities.

All UDL principles share elements that contribute to a safer physical environment. A critical component is technology integration. Tools such as interactive whiteboards, speech-to-text applications, and integrated e-learning platforms provide additional means of representation, reducing cognitive barriers and enhancing accessibility. For instance, visual learners benefit from images and videos on smart boards, while others may prefer interactive features on tablets.

Flexibility and choice are essential features that enhance safety in learning environments. UDL differs from traditional classroom differentiation by promoting student-directed learning, where teachers provide various options and clear expectations (Novak, 2014). This approach reduces unintended barriers, promoting a safer and more inclusive atmosphere (Doolittle Wilson, 2017). Savolainen and Airo (2020) emphasize that flexible classroom designs, which can transform into silent or private spaces, are crucial for safety in inclusive schools. Dedicated spaces for specific tasks are particularly beneficial for students on the autism spectrum, improving overall safety. Accessibility in materials and learning spaces is fundamental, ensuring

students with disabilities can participate fully. A structured, predictable environment is especially important for students with autism (Savolainen & Airo, 2020). Moreover, allowing students to choose how and where they demonstrate learning enhances their sense of agency, reduces anxiety, and fosters a more inclusive environment.

A flexible physical environment boosts engagement by empowering students to control how they interact with their surroundings. Classrooms with distinct zones—such as quiet areas for focused work, collaborative spaces for group activities, and tech hubs for multimedia tasks—support individual learning preferences (Tomlinson, 2014; Meyer et al., 2014). Autonomy fosters motivation and creates a sense of comfort and ownership.

Spaces should allow movement and interaction with hands-on materials, while also providing quiet zones with adequate lighting and comfortable seating for traditional study. Collaborative spaces are equally essential for project-based learning, promoting interaction and teamwork.

Accessibility must be prioritized in the physical learning environment to ensure that all students, also those with cognitive or physical disabilities, can fully engage. The learning environment should provide adjustable furniture, accessible pathways, and sensory-friendly spaces that accommodate diverse needs. Incorporating assistive technologies, such as speech-to-text tools, can further align with UDL principles, particularly Multiple Means of Representation (CAST, 2022; Savolainen & Airo, 2020) by offering students additional ways to access and process information.

Finally, the classroom layout significantly impacts how information is presented and understood. Moveable furniture and flexible seating arrangements, such as circular or U-shaped configurations, promote a more collaborative and inclusive learning environment (Cole et al., 2021). This flexibility enables educators to adapt the space to various teaching methods and student needs, enhancing both engagement and the overall learning experience.

A well-designed physical learning environment supports not only the principle of engagement but also all UDL principles by offering flexible and adaptable spaces. Classrooms should incorporate large, clear visual displays, such as projectors or interactive whiteboards, and be equipped with sound systems or individual headsets to ensure students can hear instructions clearly. These technologies facilitate the presentation of information in diverse formats—such as diagrams, videos, and other visual aids—aligning with the UDL principle of Multiple Means of Representation (CAST, 2022).

## CONCLUSION

In conclusion, enhancing the safety of learning environments is an ongoing necessity, even in high-performing educational contexts like Finland. This paper highlights that a poor psychosocial climate significantly contributes to aggression and unsafe conditions in schools and campuses. By examining various negative factors affecting learning environments through the lens of the Universal Design for Learning (UDL) framework, we identified key areas for improvement, including social atmosphere, physical space,

security, and cognitive issues. The application of UDL principles that includes technology integration, flexibility, accessibility, and thoughtful spatial design—can significantly enhance safety, security and support diverse student needs. Ultimately, this paper offers a novel perspective on linking UDL to psychosocial safety in educational settings, demonstrating that implementing these principles can lead to more inclusive and secure "anxiety free" school environments.

## LIMITATIONS AND FURTHER RESEARCH

This study is not designed to provide the same level of empirical evidence as traditional research papers. However, as a literature review, it offers new practical insights into improving the psychosocial learning environment through UDL principles. We encourage further empirical research to test this approach from a safety and security perspective.

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## DECLARATION OF INTEREST

This study has no known financial or personal interests that could influence its objectivity. It was conducted outside of working hours and without any external funding.

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