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Beyond Academics: The Impact of Universal Design for Learning on the Subjective Well-Being of Children with Special Needs

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Abstract: Beyond Academics: The Impact of Universal Design for Learning on the Subjective Well-Being of Children with Special Needs. Equity is another key area in which inclusive education of children with special needs is of interest, aiming to enhance their quality of life, including subjective well-being, a significant aspect of child development. **Objectives:** This research aims to investigate the impact of the Universal Design for Learning approach on the subjective well-being of children with special needs. The proposed research examines how the subjective well-being of children with special needs is affected by the Universal Design for Learning (UDL) strategy. **Methods:** This study employed a quasi-experimental design. The UDL strategy acts as the independent variable, while subjective well-being is the dependent variable. This study involved a total of 36 children with special needs, of whom 24 were selected using purposive sampling. They were divided into two groups: an experimental group and a control group, each comprising 12 participants. The data obtained were evaluated using non-parametric and descriptive statistical methods. **Findings:** The result showed a significant increase in subjective well-being for the children in the experimental group compared to the control group, with a p-value of 0.002 ($p < 0.05$). Finally, it has been discussed that the application of the Universal Design for Learning approach has a substantial influence on the way children perceive themselves. **Conclusions:** The application of the UDL approach significantly improves the subjective well-being of children with special needs, demonstrating the importance of integrating UDL into the inclusive education curriculum. These findings encourage the development of more adaptive education policies and psychosocial interventions that support children's social-emotional development.

Keywords: children with special needs, educational approach, subjective well-being, treatment effect, universal design for learning

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INTRODUCTION

Education is the foundation for individual as well as communal growth, with special emphasis on inclusive education of Children with Special Needs (CSN). In Indonesia, where inequality in educational standards is still a reality, a system that meets the needs of the various learners, including those with disabilities, is much needed. The education system in this country aims to provide all children, regardless of their physical or cognitive disabilities, with equal learning opportunities. This is particularly crucial since the nation is struggling to address the educational needs of the 21st century, which involve not only academic success but also the acquisition of additional skills such as problem-solving, creativity, and social-emotional intelligence (Pratiwi, 2013).

Due to the rapid advancement of technology and societal demands, the educational world has evolved in various dimensions worldwide. Teachers, who were once considered the primary experts of knowledge, now become facilitators of learning, whose approach to learning evolves to develop the ability to think critically and collaborate as a team. This improvement has been attributed to the increased flexibility and accessibility of learning needs, alongside formulating a flexible and engaging learning environment due to the increasing use of Information and Communication Technology (ICT) in the educational process (Li et al., 2024; Lowrey, Hollingshead, Howery, & Bishop, 2017; Kavita Rao, 2021a). ICT tools have not only been utilized to ensure a student is in a favourable learning environment, but have also contributed to the inclusion of students in a favourable learning environment where all children can succeed.

This inclusivity has evolved and become more pronounced with the need to adopt models like Universal Design for Learning (UDL). UDL is an overarching instructional model that seeks to accommodate every learner, especially those with special needs, through multi-method representations, interaction, and identification (D. Rose, Meyer, & Gordon, 2013). According to the notion that education is based on a one-size-fits-all model, unlike the traditional model, UDL addresses issues that are based on the notion that the learning atmosphere must be adaptable to meet the interests of various learners. Such flexibility is in line with the principles of differentiated instruction, which posits the idea of individual learning trajectories, depending on personal strengths and limitations (Hallahan, Kauffman, & Pullen, 2014; Kauffman & Hallahan, 2011). Universal Design for Learning (UDL) is an educational framework designed to accommodate the diverse needs and abilities of students by providing multiple ways to present content, express understanding, and engage in the learning process. UDL is based on three key principles: Multiple Means of Representation, Multiple Means of Expression, and Multiple Means of Engagement, all designed to reduce barriers to learning and provide opportunities for all students to succeed, particularly students with special needs.

Although the literature on the academic benefits of UDL continues to increase, a significant gap remains in the research on the psychosomatic promotion of the subjective well-being (SWB) of children with special needs. Subjective well-being, which implies life satisfaction, emotional stability, and a sense of achievement, is a very significant issue of overall development, especially in cases of children growing up with extra control problems in conventional schools (Ed Diener, Lucas, & Oishi, 2000; Ed Diener, Suh, Lucas, & Smith, 1999; Edward Diener, 2009). While numerous analysts have highlighted the role of UDL in advanced learning, few have recognized the opportunities for this education to foster affective fulfillment, which also contributes to the comprehensive development of a child. UDL meets the criteria for learning approaches for students with special needs because of its flexibility and adaptability in the learning process. For example, the principle of *Multiple Means of Representation* enables students to receive information in various formats (visual, auditory, or kinesthetic), which is essential for those who struggle with learning through a single form of representation. *Multiple Means of Expression* provides opportunities for students to demonstrate their understanding in different ways, such as through art or oral presentations, which can enhance their confidence. Additionally, *Multiple Means of Engagement* enables students to select activities that are most relevant and motivating to them, thereby increasing their engagement and participation in the learning process.

This approach meets the criteria for effective learning for students with special needs because it offers flexibility in the learning process. With

various options for representing learning materials, expressing understanding, and engaging with content, UDL ensures that students with disabilities are not left behind. It offers a personalized learning experience that adapts to the individual needs of each student, ensuring they have the tools to succeed. In this study, the Universal Design for Learning (UDL) principles were actively implemented in each step of the learning process. This involved creating flexible learning environments through various methods of representation, expression, and engagement that could be adapted to meet the needs of children with special needs

The proposed study aims to address this research gap by investigating how the UDL approach affects the subjective well-being of children with special needs. When having a closer look at academic and emotional outcomes, the given research will additionally seek to provide the capacity to look at the topic of inclusion-driven educational activity, such as UDL, in a more comprehensive view and provide a clear image of the prospect of its success in the enhancement of cognitive and emotional development in children with disabilities. The research is critical in that it should provide evidence-based information to teachers and policymakers on how learning conditions can be revised to facilitate and instill not only academic achievement but also emotional fortitude in children with special needs. This research intends to examine how the Universal Design for Learning approach affects the subjective well-being of children with special needs

METHOD

Research Design

The present paper bases its research approach on a quantitative research design that follows the principles of a quasi-experimental study examining the impact of the Universal Design for Learning (UDL) instructional approach on the subjective well-being (SWB) of children with special needs. This study aims to investigate whether the UDL approach can enhance the subjective well-being of children with special needs within the context of inclusive education. Quasi-experimental research is often used in educational contexts to evaluate interventions or changes in teaching methods without randomized treatment (Cohen, 2017).

The change in the subjective well-being of students from pre-intervention to post-intervention is best examined through an experimental design, as the investigator required a control group and an intervention arm (i.e., an experimental group). This kind of design can be generally considered in studies that cannot assign groups randomly, but the designated type of design provides trustworthy enough results on cause-and-effect relationships (Ogelman, 2018)

Research Strategy

The design of this study is quasi-experimental, aiming to investigate the impact of the Universal Design for Learning (UDL) approach on the subjective well-being of children with special needs. The research procedure is carried out through several stages:

a. Pre-Intervention Data Collection: Children's subjective well-being data were collected through a questionnaire before the intervention began.
b. Intervention, The experimental group received learning based on the principles of UDL, while the control group was taught using the traditional curriculum. During the intervention phase, the experimental group participated in a series of activities designed to engage their multiple senses (visual, auditory, and kinesthetic). Students with hearing impairments, for example, used visual aids and sign language in conjunction with video content to enhance their learning experience.

Meanwhile, children with intellectual disabilities engaged in tactile learning exercises to reinforce their understanding.

c. Post-Intervention Data Collection, The same data is recollected after the intervention to evaluate changes in subjective well-being. Each step of the UDL framework was implemented by designing multiple means of representation. For example, students with learning disabilities were provided with text-to-speech software, while others used interactive games for practicing the concepts. Activities were tailored to the individual needs of each child

d. Data Analysis, Data were analyzed using descriptive statistics and the Wilcoxon Signed-Rank Test to evaluate the differences between pre- and post-intervention data. This research was conducted over a period of one semester (6 months).

Participants

This study involved children with special needs who were attending school in Pekanbaru, Indonesia. The total population in this study is 36 children, with a sample of 24 children selected using the purposive sampling technique. The justification for using purposive sampling is that the researcher requires a sample with specific characteristics relevant to the study's focus: children with special needs who can provide more in-depth information about the impact of the UDL approach on their subjective well-being. The inclusion criteria in this study were children aged 7 to 12 years who were enrolled in inclusive education schools and had types of disorders such as developmental disorders, autism spectrum disorders, and learning difficulties. The exclusion criteria included children who had severe mental disorders or who were receiving medical or psychological interventions that could affect their subjective well-being during the study period. The children were divided into two groups: the experimental group (12 children), who received the UDL approach, and the control group (12 children), who did not receive the treatment. These children were divided into two groups: the experimental group (12 children) and the control group (12 children). All participants were between the ages of 7 and 12 years old and had different types of disabilities, such as developmental disorders, autism spectrum disorders, and learning disabilities.

Instruments

The instrument used in this study is a questionnaire consisting of three subject scales from (Keyes, 1998) , namely: Subjective Well-Being Scale, which obtained Well-being scale – items 4 (reversed score), 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15. Physical Health and Well-being scale – items 1, 2, 3, 21, 22, 23, 24. Relationships scale – items 16, 17, 18, 19, 20. The total well-being score is calculated by adding up each sub-scale. The higher the score, indicates better the levels of well-being in each domain and for the total subjective well-being.

The instrument used in this study is the Subjective Well-Being Scale, which consists of three main sub-scales: physical well-being, emotional well-being, and social relationships. Each sub-scale consists of 8 to 10 items designed to measure the children's perceptions of their physical, emotional, and social well-being. This instrument was developed based on the subjective well-being theory, incorporating elements such as life satisfaction, emotional stability, and quality of relationships. To ensure content validity, the instrument was reviewed by experts in special education and psychology. Additionally, the reliability of the instrument was assessed using Cronbach's Alpha, yielding a reliability score of 0.85, which indicates that the instrument is highly reliable for use in this study.

This study was conducted in several stages, starting with pre-intervention data collection (pre-test), where both the experimental and control

groups were assessed on their subjective well-being. Data were collected using the Subjective Well-being Scale, which was administered to the children prior to the interventions commencement.

In the intervention phase, the experimental group received instruction based on the UDL principles for one semester. The UDL approach involved flexible and personalized teaching methods, using a variety of media and formats, including visual, auditory, and kinesthetic. During the intervention, the children were encouraged to express their learning through various forms of expression, allowing for greater autonomy and engagement. After the intervention, post-intervention data collection (post-test) was conducted using the same instrument to measure any changes in subjective well-being. Data collection was performed consistently for both groups, and the assessments were conducted at the same time to ensure accuracy

Data Analysis

The data obtained were analyzed using descriptive statistics to provide an overview of the changes in subjective well-being between the two groups. The Wilcoxon Signed-Rank test was used to analyze the difference in results between pre- and post-tests in the experimental group. This technique was chosen because it is suitable for paired data and does not require the assumption of normality, which is especially useful given the small sample size. The significance level is set at 0.05, and a significant result is considered valid if the p-value is less than 0.05.

RESULT AND DISCUSSION

The tables below present the mean scores and standard deviations of the subjective well-being (SWB) scores for the subjects in both the control and experimental groups before and after the intervention.

Table 1. Pre-test and post-test subjective well-being data for the control group

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
pre_test_kontrol	12	6	9	7.58	1.165
post_test_kontrol	12	15	18	16.17	1.115
Valid N (listwise)	12				

The control group experienced a statistically significant (p = .008) improvement in subjective well-being scores, with a mean of 7.58 in the pre-test and 16.17 in the post-test (see Table 1), resulting in an overall average of 8.59. Although such an improvement cannot be overlooked, it is not as large as the one witnessed in the experimental group. However, very significant anomalies in the control group need to be noticed and analyzed further. In the control group, although they did not receive the UDL intervention, there was a considerable improvement in the subjective well-being score from pre-test to post-test. This may be due to external factors, such as differences in class dynamics, social support, or uncontrolled mood swings, which were not accounted for in the study.

It is possible that these factors, although not directly involved in the intervention, may affect the subjective level of well-being of students, resulting in significant changes in the control group. For example, children in the control group may have gained additional emotional support from teachers or peers, or other psychological factors may be at play, such as increased expectations or motivation following the first test. In addition, these changes can also be influenced by positive bias in filling out questionnaires, where participants in the control group may feel more optimistic or affected by the state of the test, which

causes them to report improvements in their well-being. Therefore, although the observed changes in the control group are statistically significant, it is necessary to acknowledge that unmeasurable external influences may also contribute to these outcomes, and we cannot conclude that these changes are entirely due to factors associated with traditional learning alone.

We acknowledge the concern raised by the reviewer regarding the significant improvement in the control group (from 7.58 to 16.17, $p = 0.008$) even without the UDL intervention. This indeed raises questions about the potential influence of external factors on both groups. In light of this, we propose identifying the external factors that may have influenced both the experimental and control groups. As a first step, we will include a discussion on the possible external factors that may have impacted both groups. Some factors that we have identified include:

a. Social and family support: Did the children in the control group receive additional significant support from their families or caregivers during the study period? For instance, parental or caregiver support may have contributed to their improved well-being.
b. Learning environment factors: Were there any changes in teaching styles or classroom environments during the study period? These factors may have influenced the outcomes observed in the control group.
c. Other concurrent programs or activities: For example, were there any extracurricular activities or external programs (such as counseling or workshops) that could have influenced the children's well-being?

To address this concern, we recommend conducting additional analysis in future research that could involve surveys or interviews to investigate whether the external factors mentioned above played a role in the improvements observed in both groups. This will enrich the analysis and provide a more comprehensive understanding of the factors affecting the results.

Table 2. Statistical tests for control groups

Test	Z-value	p-value
Wilcoxon Signed-Rank Test	-2.675	0.008

The control group experienced a statistically significant improvement in subjective well-being scores, with a pre-test average of 7.58 and a post-test average of 16.17 (see Table 1), resulting in an overall average of 8.59. Although this increase was significant ($p = 0.008$), it should be noted that this change was smaller compared to the increase seen in the experimental group. Significant improvements in the control group, despite not receiving the UDL intervention, require a more in-depth explanation. Several factors can influence this outcome. One of them is external factors that are not controlled, such as social support from teachers and peers, or changes in the classroom context that improve students' mood or motivation. For example, during the period between the pre-test and post-test, changes in social interaction or class dynamics may occur, which can affect participants' emotional well-being. Another factor that may contribute is the Hawthorne effect, where participants may feel cared for or more aware of their well-being because they are aware of their participation in a study. In other words, the awareness that they are participating in a research study can influence their perception of personal well-being, even in the absence of substantial changes in the learning environment.

Although the control group showed a significant improvement in subjective well-being ($p = 0.008$), we recognize that this improvement could also have been influenced by external factors that were not controlled for in this study. Factors such as the social support received by

the children in the control group, changes in the learning environment that may have occurred during the study, and other untracked activities may have contributed to the observed results. Therefore, we recommend that future research focus on controlling external variables that could affect both the experimental and control groups, providing a clearer understanding of the impact of the UDL intervention.

As shown in Table 3, the experimental group, comprising 12 children, also had a mean pre-test score of 7.83; however, this group

Table 3. Pre-test and post-test subjective well-being data for the experimental group

Descriptive Statistics					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Pre-test experiment	12	6	10	7.83	1.467
Post-test exsperimen	12	21	24	22.42	1.165
Valid N (listwise)	12				

experienced a significant increase in the final score, reaching 29.25 in the post-test. This high value demonstrates the significant impact of the Universal Design for Learning (UDL) approach on children's subjective well-being, with an average score of 14.59. As can be seen by comparing the two tables, the average score of the experimental group improved a lot compared to the control group. The use of this difference highlights the importance of the methodology employed in this study.

Based on Figure 1, all points are above the red diagonal line, which indicates the treatment was highly effective for all participants. None of

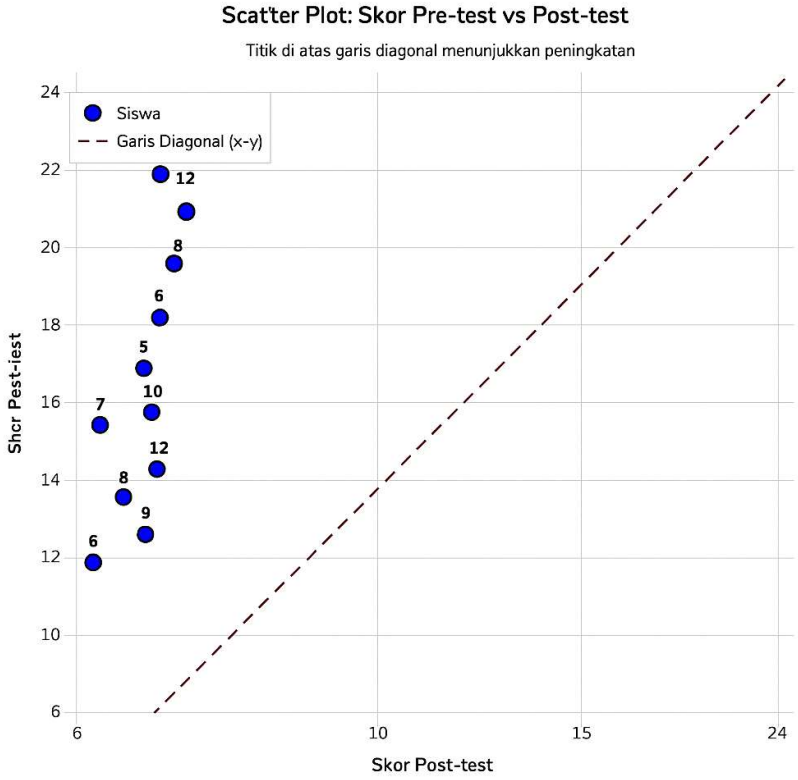

Figure 1. Scatter plot comparison of experimental pretest and postest group scores

the students experienced decline or stagnation. The average increase is very significant (11.02 points). To further investigate the impact of the UDL approach, a Wilcoxon signed-rank test was conducted on the pre-test and post-test results of the experimental group. The set of significance values (2-tailed Sig.) used as an indicator of a statistically significant difference is the value below which the difference is statistically significant. Through such a test, we could have obtained a more definitive picture of the changes that had occurred in the experimental group during the post-intervention period.

The Wilcoxon test of the experimental group has produced the results in Table 3 with a Z-score of -3.075 and with an asymptotic value

Table 4. Wilcoxon signed-rank test results for the experimental group

Test Statistics	
	post_test_exsperimen - pre_test_exsperimen
Z	-3.075[b]
Asymp. Sig. (2-tailed)	.002
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

(2-tailed) of 0.002. Since the value falls below the alpha value of 0.05, we can conclude that the difference in the Subjective Well-being of the children in the experimental group at the beginning and after the UDL intervention is statistically significant.

Using the experimental group results in Table 3, the Wilcoxon signed-rank test yielded a Z score of -3.075 and an asymptotic significance value (two-tailed) of 0.002. As this value is below the alpha level of 0.05, it can be concluded that the difference in Subjective Well-being of children in the experimental group before and after the UDL intervention is statistically significant. This suggests that their subjective well-being was significantly influenced by the intervention. The level of positive change in the scores of the Subjective Well-Being (SWB) of children with special needs in the experimental group (between the groups in 7.83 to 22.42) in comparison with that of the control group (between the groups in 7.58 to 16.17) remained highly significant. The significance of the Universal Design for Learning (UDL) approach on the emotional and psychological well-being of children is broadly reflected in the difference in the mean change of the scores. This means that UDL can make a significant contribution to the overall well-being of students.

One of the most striking results was the improvement in the engagement and emotional well-being of the students, particularly those with autism spectrum disorder. The use of interactive videos and tactile materials significantly boosted their self-expression and confidence, as illustrated by their participation in group activities that encouraged social interaction and emotional expression. Figure 2-5 illustrate the various activities carried out during the UDL intervention. Figure 2 shows a deaf student engaging with visual learning tools, while Picture 3 highlights a student with intellectual disabilities participating in tactile learning tasks.

UDL is so effective because it minimizes obstacles to learning through offering more than is possible to representation, expression, and engagement. Special consideration should be given to the application of these strategies by children with special needs who, in most cases, are restricted in their traditional learning environments and fail to recognize different learning styles. This way, UDL offers more intense and accommodating learning to all kinds of learners. The multiplicity of Means of

Figure 2. Implementation of UDL for deaf students

Figure 3. Implementation of UDL for students with intellectual disabilities

Figure 4. Implementation of UDL for mentally disabled students

Figure 5. Implementation of UDL for down syndrome student

Representation enables children to access learning materials in a format that feels most supportive of their capabilities, thereby minimizing frustration and confusion. UDL provides everyone with the opportunity to use visual, auditory, and tactile aids to ensure the learning material meets the increased developmental needs of all individuals.

This study is more inferential, which means we suggest that UDL may contribute to an increase in SWB, based on the evidence obtained, but it cannot be concluded that UDL is the only factor causing such changes. The changes observed in the experimental group, although significant, may be influenced by various other factors not addressed in the study, such as external factors, individual differences, or social dynamics beyond the UDL intervention itself. For example, the significant changes observed in the experimental group, with the average score increasing from 7.83 to 22.42, provided evidence of a positive impact from a more flexible and inclusive approach to learning. However, to establish that UDL directly causes such an increase, further research is needed with a more robust experimental design, such as a longitudinal design or stricter control of variables. Thus, this discussion should be emphasized as a suggestion based on theory and inference from existing data, rather than as direct evidence that proves a causal relationship between UDL and increased SWB in children with special needs.

Multiple Means of Action and Expression enables children to express their knowledge using a variety of formats, which is particularly important for those who may have difficulty with writing assessments. When allowed to express themselves in art, words, or any other creative form, they feel more autonomous and competent (two important elements of SWB). Multiple

Means of Engagement provides children with the opportunity to become motivated and engaged in their own learning. Active students, in turn, are more likely to be emotionally predisposed to the learning environment, which is likely to impact their well-being positively. Being flexible in the selection of learning activities and challenges is also an advantage, as it helps them feel like they have achieved and succeeded.

Such aspects lead to significant positive shifts in subjective well-being, as children experience increased motivation, empowerment, and confidence during the learning process. If acceptance of children is provided on an individual basis, it has a direct impact on their self-esteem and emotional well-being, which are closely linked to the key premises of SWB. The findings of this study align with the existing literature on the impact of inclusive education practices on the psychological and emotional growth of children. In earlier research conducted by the researchers, (Hallahan et al., 2014; Rosenthal, 2006) have suggested that UDL has the capability of offering greater student engagement and results, tailored to divergent student learning styles, thereby resulting in improved student learning and emotional outcomes. Besides, the findings are aligned with the research conducted by (Hope & Dewar, 2015), which found that students enrolled in supportive and inclusive environments report higher levels of life satisfaction and emotional well-being. Such results contribute to the SWB increases revealed in the present research, implying that UDL is a comprehensive pedagogical approach that transcends academic success to encompass the holistic well-being of students.

USL UDL introduction is significant in improving instruction, not only to support teaching to the individual needs of pupils, but also to include students with disability. UDL also provides various forms of instructional media, including videos, images, and project-based learning experiences, which enable all students to become more successful learners, regardless of their physical and cognitive disabilities. Such a framework replaces the unified procedure of a one-size-fits-all model with an approach that is comprehensive enough to accommodate every student, including those with disabilities (Chen, Evans, & Luu, 2023; Lin, Chen, & Liu, 2017; Zhang & Shi, 2022). Nevertheless, to make UDL an effective implementation, educators should receive mentorship training to study its principles meticulously (Casebolt & Humphrey, 2023; Ray, 2022). The interesting results of this study can serve as a solid model to encourage policymakers to incorporate UDL into the policies of inclusive education (Seok, DaCosta, & Hodges, 2018). The introduction of UDL principles into educational institutions has been proven not only to impact the academic performance of children with disabilities positively but also to significantly contribute to the better social and emotional well-being of children with toddler issues (Basham, Gardner, & Smith, 2020; K. Rao, 2003). The UDL framework can be implemented in special and inclusive schools to deliver outcomes that enable all students to contribute to and engage meaningfully. It is possible to sustain respect in relation to students with special needs in such practice, and vice versa can bring better outcomes to the learning process, and, in turn, the quality of life (Vitelli, 2015).

The results of this study are a solid complement to the stance that the UDL paradigm has a tremendously beneficial effect on the SWB of children with special needs. It can be seen that the experimental group has significantly improved their emotional and psychological state, as evidenced by the substantial difference in improvement between the pre-test and post-test. These results highlight the role and importance of UDL, not only in enhancing academic achievement but also in addressing the emotional needs of learners with disabilities in a positive manner.

Such a feature of UDL (the method of interaction, presentation, and expression) reveals one of the possible reasons for its effectiveness in this investigation. UDL also encourages competence and self-efficacy, as students have a choice in how they learn and how they demonstrate their learning. The other key beliefs of self-determination theory are these competence and autonomy beliefs, which help to raise the subjective well-being (Jahanbakhsh Ganjeh et al., 2010; Han, 2021; Ryan & Deci, 2000). When children with special needs experience the feeling of marginalization or exclusion within the regular learning setting by not being able to engage in learning in a manner that is meaningful to them with respect to their strengths, then engaging in learning processes that carry meaning to them can be of immense value to children with special needs in terms of emotional well-being.

In addition, UDL flexibility promotes a more accommodating learning environment, a factor that is critical in improving the social well-being of the learners. The findings show that children with exposure to the experiment indicated more opportunities to be socially active and absorb emotion, which are pillars of SWB. The possibility of working on cooperative, practical projects, as well as the opportunity to demonstrate the learning process through creative forms of expression, presumably contributed to the development of positive interpersonal relationships and a sense of belonging in the classroom.

The findings align with existing sources on the role of UDL and inclusive education in promoting emotional well-being (Basham et al., 2020; Lowrey et al., 2017; Kavita Rao, 2021b). Previous studies have found that students in inclusive classrooms experience higher levels of contentment with life and better emotional well-being compared to those in segregated classrooms (Chen, 2023; Chen et al., 2023). This paper is also beneficial in the debate that UDL can greatly enhance the academic and emotional well-being of children with special needs.

All in all, given the supporting evidence provided in this paper, it can be said that the UDL approach not only improves academic outcomes but also has a profound impact on the subjective well-being of children with special needs. These outcomes show that the concept of UDL should be included in the educational and instructional policy, i.e., inclusive schools. Research on inclusion should be directed at studies of the long-term effects of UDL on academic and emotional achievement, as well as to additional implications of using inclusive education.

UDL is an idea that assumes the principles of access and inclusiveness. UTL is a model that (Pekaar, 2019) developed to provide learning environments that vary, catering to the needs of different students, particularly those with special needs. UDL is founded on three principles: Multiple Means of Representation, Multiple Means of Expression, and Multiple Means of Engagement. Such principles aim to reduce impediments to learning and generate diversity of choices for learners to make in terms of how they handle and articulate knowledge. In the UDL approach, learners access information through multiple media, including visual, auditory, and tactile. It follows that all forms of learning and steps will be undertaken to accommodate learners with different needs and learning capacities (Rose & Meyer, 2006; Rosenthal, 2006). Similarly, the Multiple Means of Expression permits students to demonstrate their learning through a variety of means, such as oral presentations, written responses, or any other creative approach a student can devise, thereby affording a sense of autonomy and ability.

The valuable impact of UDL on the academic achievements of students with special needs has become the point of interest for researchers in numerous studies. Surveys researched by (Hallahan et al., 2014; Kauffman & Hallahan, 2011) have shown that UDL has positive impacts on academic performance, offering various learning opportunities that accommodate the diverse needs of academic

students. UDL has been particularly helpful in reducing obstacles to learning and providing greater engagement to students with disabilities, as a result of which lies the cognitive achievement of later participants with disabilities. Specifically, the use of the UDL principles resulted in positive outcomes of the standard testing-based and classroom assessment type of testing, which is the case (or has been shown in other studies by (Basham et al., 2020) with the students with learning disabilities.

Another advantage of UDL is that, in addition to improving academic performance, it can also enhance the social-emotional well-being of students (SEWB). According to Diener (2009), subjective well-being is a complex process, and the definition of well-being entails satisfaction in life, stress-free feelings, and a pleasant experience of the surrounding environment. Whereas recent literature on the topic contributes more in terms of emotion outcomes, there is a growing body of evidence that suggests the role of UDL in the emotional development of children with special needs (Kusumastuti, 2019; Wahyuni, Putri, & Reswita, 2021). Studies have indicated the presence of low-level subjective well-being among disabled children because the emotional and cognitive needs of these children cannot be fulfilled within the conventional learning environment (Hallahan et al., 2014). UDL, due to its more inclusive and flexible learning environment, can help enhance students' emotional well-being by fostering a sense of competence, autonomy, and social inclusion.

Self-determination theory (Deci & Ryan, 2000) can be used to explain the relationship between UDL and subjective well-being. According to this theory, the well-being of individuals would improve as they feel competent, have autonomy, and feel connected. Considering UDL, where students are free to select their desired learning progressions and modalities to express themselves, UDL develops a feeling of autonomy. Additionally, the learners' sense of competence is improved because of the various ways they can utilize the material and express what they have learned. In children with special needs, this assurance of their control over the learning process is essential; it counters the helplessness and frustration many of them experience in interchangeably designed educational environments.

Recent studies also emphasize the importance of inclusive education in promoting subjective well-being. According to (Sulaiman & Tahar, 2024)Improving social connectedness and sense of belonging, which are components of SWB, is facilitated by having inclusive measures such as UDL integrated into the curriculum. In this respect, a study by (Repetto, Bruschi, & Talarico, 2022) emphasized that emotional well-being is higher among students in inclusive settings than in segregated classroom settings, in most cases, due to their ability to be more supportive and accommodating to individual differences. Thus, the use of UDL principles in inclusive classrooms is not only likely to promote better academic performance but also can positively affect the psychological and emotional health of students with special needs.

This research has several methodological limitations that need to be considered. One is a quasi-experimental design that is not longitudinal, so it cannot be concluded whether the improvement in children's SWB is permanent or only a temporary impact of the UDL intervention. SWB measurements, which were only taken before and after the intervention over a short period, also limited the understanding of the duration of the UDL effect. In addition, the limited number of samples (12 participants per group) limited the generalization of the research results to a larger and more diverse population. The study also did not fully control for external variables that could affect outcomes, such as social factors, family support, or class dynamics, that could play a role in changes in SWB in the experimental and control groups. Therefore, the observed

differences may be influenced by other factors that are not measurable. Another limitation is the potential bias in SWB measurement that relies on participants' subjective reports. The use of instruments that rely on children's personal perceptions can result in positive biases or responses influenced by expectations after the intervention. The use of more objective measurement methods and stronger research designs, including long-term measurement and stricter control of variables, will provide a more accurate picture of the impact of UDL on the emotional well-being of children with special needs.

Nevertheless, despite the strong theoretical basis and empirical evidence supporting the academic progress facilitated by UDL, there is currently a scarcity of literature on its effect on subjective well-being. This literature gap highlights the necessity for research that investigates the potential beneficial outcomes of applying the principles of UDL to emotional results, as this area has been widely underexplored in previous UDL research. This gap will be bridged by highlighting the importance of this research in estimating the benefits of UDL for children with special needs.

■ LIMITATION

This study has several limitations that should be considered when interpreting the results. First, the research design employed was quasi-experimental, with measurements taken only at the pre-test and post-test stages, without follow-up measurements or long-term observation. This limits the ability to assess whether the changes observed in the post-test are temporary or continuous. Research with longitudinal designs that involve repeated measurements at multiple time points will provide a more comprehensive understanding of the long-term impact of UDL interventions. Second, the relatively small sample size (12 participants per group) limits the generalization of these findings to a larger, more diverse population. Larger sample sizes will provide more representative data and reinforce findings about the effects of UDL on SWB of children with special needs. Third, although this study focused on experimental groups that received UDL interventions, external factors such as social support from families or classroom social dynamics, which were not controlled in this study, may also have influenced the observed outcomes. Further control of these factors will help in distinguishing the direct influence of UDL.

To better understand the role of external factors, future studies should consider methods to control for these variables. This will provide a clearer picture of the impact of UDL on subjective well-being without being influenced by uncontrolled external factors.

■ CONCLUSION

This study shows that the Universal Design for Learning (UDL) model not only improves academic outcomes but also has a significant impact on improving the subjective well-being (SWB) of children with special needs. These findings are important because they fill a gap in existing research, which primarily focuses on objective academic outcomes and pays less attention to learners' emotional and psychological experiences. Quantitative analysis revealed a significant improvement in SWB scores for the experimental group compared to the control group, as confirmed by the Wilcoxon signed-rank test ($p = 0.002$). These findings suggest that the UDL approach has a clear, positive impact on children's emotional and psychological well-being, making it a highly relevant method in inclusive education. The impact of this education research is enormous, especially in directing teaching policies and practices towards a more responsive and inclusive direction. The application of UDL principles in the education system should be a priority, especially in an inclusive education environment, to create a more engaging learning environment and support students' emotional well-

being. However, this study also has limitations that need to be considered. The quasi-experimental design employed does not permit long-term measurements of the UDL impact, and the limited sample size restricts the generalizability of the findings.

In the conclusion, we will clarify that while the UDL intervention had a significant impact on the subjective well-being of the experimental group, external factors also contributed to the improvement in both groups. Therefore, the conclusion regarding the UDL's impact should not solely attribute the changes to the intervention without acknowledging the role of external variables. We will also acknowledge this limitation in the current study and suggest that future studies control for such external factors.

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