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RESEARCH PAPER

Impact of Universal Design for Learning (UDL) based Teaching Practices at Middle School Level on Students' Creativity Skill

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ABSTRACT

The objective of the study was to study the impact of teaching practices based on Universal Design for Learning (UDL) in regard to students' creativity skill. Given the need to examine the effectiveness of teaching methodologies in enhancing the learning outcomes of students, the researcher studied the effectiveness of teaching based on the theory of UDL. This research utilized a quantitative research approach to explore the impact of teaching methods. The research compared two similar groups wherein the experimental group contained 21 students while the control group had 24 students. Results revealed that there was statistically significant difference in the mean score of creativity of the experimental group from pre-test to post-test. On the other hand, the mean score from pre-test to post-test of creativity skill of the control group were not significantly different. Thus, UDL principles should be made part of national curriculum to effectively accomplish national educational goals.

Keywords: Universal Design for Learning, Creativity, Diversity, Equity, Inclusion

Introduction

Creativity is the capacity to generate novel ideas, including innovative solutions to problems or original artistic expressions (Kerr, 2023). Creativity involves the production of novel ideas or the recombination of existing elements into innovative forms, providing meaningful solutions to problems. Emerging technologies have profoundly transformed labour markets and workplaces, requiring students to possess soft skills along with cognitive abilities to address various challenges and issues in the future. Education 4.0 Framework by World Economic Forum mentions the necessity of developing creative thinking for nations to have a competitive edge in the "Fourth Industrial Revolution". There's an ever-increasing need for the future work force i.e., the students of today to have soft skills in addition to cognitive skills, enabling them to deal with diverse challenges and problems at work arising from constantly changing market demands and technological changes. Students must engage in creative thinking to design products and solutions that enhance their nation's future economy (Elhussein et al., 2020; Skovsgaard, 2018). Creativity in education involves pedagogical methods based on problem-solving, wherein students are encouraged to engage in innovative thinking and address real-world challenges. Studies indicate that creative coursework can enhance classroom engagement and equip students for diverse future workplaces (Bloom & Dole, 2018).

Education is crucial for improving economic and social conditions; nonetheless, inequities persist and are perpetuated by educational systems themselves (Grenfell, 2014; Nash, 2010; Weininger & Lareau, 2018). A study examining the achievement levels of early years education students from 1998 to 2010 indicated a persistent difference in learning

outcomes between children of lower-income and higher-income backgrounds. Although modern parents are investing more in their children and engaging more in early education and development, their efforts have only succeeded in preventing the widening of these achievement gaps (García & Weiss, 2017).

Diversity, Equity, and Inclusion (DEI) strategies seek to ensure equitable educational opportunities by diversifying course content, integrating diverse media and activities, demonstrating student learning through diverse means of communication, and using multiple assessment techniques (Dana, 2020; Diversity, Equity, and Inclusion at Uncommon Schools, 2021). Educators can use culturally responsive pedagogy that appreciates diversity in students' expression of ideas, promotes academic success, provides constructive instructional feedback, and anticipates excellence (Brown et al., 2011; Sasikala & Rafi, 2018). Universal Design for Learning (UDL) is an educational framework that aims to develop flexibility in teaching process, hence ensuring equity in education for all students. UDL focuses on engagement, representation, and action and expression so that an inclusive learning environment can be provided where all students can utilize their strengths while maintaining consistent learning objectives (Mudroch, 2003; Shlasko & Pachecho, 2024).

The problem under investigation links to the lack of literature regarding the effects of using UDL in classrooms in Pakistan. Peer-reviewed sources extensively cover the application of UDL; however, the research is lacking in addressing its impact on student learning outcomes. Further investigation is required to understand the relationship between UDL and student performance. Consequently, this invites further empirical research to look for teaching strategies to enable teachers to enhance creativity skill of students while reducing inequity and achievement gaps in regards to their creativity skill. The objective of the researcher was to develop teaching strategies rooted in Universal Design for Learning (UDL) to enhance the creativity skill in an equitable manner and to explore the effect of this framework on the learning outcomes of students from different backgrounds.

Literature Review

Universal Design for Learning (UDL) is a comprehensive, research-driven theory that prioritizes equity in educational instruction (Meyer et al., 2014). Centre for Applied Special Technology (CAST) has led the development of the framework and fundamental criteria for UDL (udlcenter.org, 2015). UDL is an educational framework that prioritizes the creation of materials in diverse formats, promotes alternative engagement strategies, and evaluates those that cater to diverse learners (Smith & Lowrey, 2017). UDL replaces the medical or deficit model of disability with a more inclusive framework, recognizing individuals with disabilities as integral members of a continuum of learners possessing diverse strengths and weaknesses (Orr & Hamming, 2009). Centre for Applied Special Technology (CAST) (2011) emphasizes the importance of including diverse methods of the three fundamental principles of UDL in their guidelines. UDL has been applied in general education classes, enabling all students to engage with learning through many methods. It is proactive, strategic, and anticipatory, taking into account differences between students from the start and doesn't need to be retrofitted (Navaitiene & Stasiunaitiene, 2021). Incorporating UDL into educational practices will help bridge the equity gap by establishing inclusive classrooms that facilitate opportunities for students with disabilities and those without (Street et al., 2012).

Universal Design for Learning (UDL) framework is based on three core principles: multiple means of representation, engagement, and action and expression. It involves 9 guidelines and 36 detailed checkpoints to aid in course design (CAST, 2024). However, a study found that only 4 of the 36 checkpoints were used, primarily focused on

representation concepts. There is significant potential for improvement in the application of UDL principles, particularly concerning action and expression (Scanlon et al., 2018).

Creativity is defined as the ability to generate something novel, involving the production of new ideas that benefit individuals and society (Kaufman & Sternberg, 2007; Simonton, 2013; Simonton, 2016). Creativity involves the recombination of existing elements into innovative forms, providing meaningful solutions to problems (Sefertzi, 2000). Creativity has three primary methodologies: originates from a source beyond humanity, acknowledges the individual as the source, and context-dependent (Craft, 2001; Sternberg & Lubart, 1995). Historically, creativity was seen as a form of inspiration and a mysterious phenomenon, with the term "genius" used to represent a creative individual (Craft, 2002; Sternberg & Lubart, 1995). Creativity has evolved from theoretical discussions to empirical studies within psychology, within four principal domains: psychoanalytic, cognitive, behaviourist, and humanistic (Runco & Albert, 2010). The modern interpretation of creativity as production, innovation, or reproduction has evolved from its association with divinity to the emergence of psychological exploration as the primary research methodology (Pope, 2005). Creativity has been recognized as a legitimate domain for expression in both the arts and sciences since the mid-20th century (Sternberg & Lubart, 1995). Creativity is crucial for economic growth, employment, and addressing complex challenges in the modern world (Sullivan, 2015).

Creativity is divided into mini-c, little-c, Pro-c, and Big-c as per the Four C Model of Creativity (Baer et al., 2015; Kaufman & Beghetto, 2009). Mini-c creativity emphasizes the creative process rather than the resultant output, emphasizing the individual's personal and meaningful development throughout the experience. Little-c creativity, unique to each individual, is manifested in daily life and requires creative self-efficacy and creative metacognition (Baer et al., 2015; Kaufman & Beghetto, 2009). Pro-C creativity refers to individuals who have not yet achieved significant impact but are recognized for their innovation. Big-C creativity involves individuals who significantly influence their respective domains, such as Leonardo Da Vinci and Agatha Christie (Helfand et al., 2017; Kaufman & Beghetto, 2009). Achieving world-class knowledge requires a decade of dedicated training in a specific topic (Kaufman & Beghetto, 2009). Creativity can be referred to as "big" or "small" and is influenced by an individual, a social system, and a cultural system (Csikszentmihalyi, 1998). In education, creativity is often linked to imagination and playfulness, with imagination being an essential component (Beetlestone, 1998; Craft et al., 2001).

Six decades of creativity research has shown that instruction can improve creative skills, leading to increased emphasis on evaluating students' creative capabilities (Fisher, 2004). This is essential as it revitalises students' enthusiasm for learning and motivates them to enhance their academic performance. Educators have integrated diverse elements of creative pedagogy across various academic disciplines to promote student creativity (Kaufman et al., 2008). Creativity in language instruction is crucial, as it enhances learners' comprehension, internalization of the target language, and engagement with reading materials (Pringle, 2006; Richards, 2013). Various materials, such as student-centred and interaction-based open-ended components, communicative teaching strategies, and reflective teaching cycles, stimulate creative thinking and enhance students' imaginative skills (Kaufman et al., 2008; Richards, 2013). Both writing and creative writing hold significance when viewed as personal and therapeutic processes (Freisinger, 1978). It serves several functions and advantages for the community, including entertainment, intellectual stimulation, and cultural capital. Creative writing is not only culturally valuable but also valuable in promoting personal expression and demonstrating the power of words (Bishop, 1994). It adheres to specific forms and structures, such as narrative and lyrical poetry, and can be used to reimagine structures like villanelle, sonnet, or pantoum (Light, 2002). Creativity is a unique cognitive process that can be considered an essential

component of any writing curriculum. Students often perceive their academic writing as valid or valuable, but creative writing is a complex process that involves various activities that ultimately provide a finished product (Sarbo & Moxley, 1994; Sullivan, 2015). In English as a Foreign Language (EFL), proficient academic writing is crucial for efficient communication and success across various contexts and occupations (Ajmal & Kumar, 2020; Al-Hammadi & Sidek, 2015; Chou, 2011).

Ho1 There is no significant difference between in creativity mean scores of boys from school A of experimental group from pre-test to post-test

Ho2 There is no significant difference between in creativity mean scores of boys from school A of control group from pre-test to post-test

Material and Methods

For this research, non-equivalent control group design was used in which two similar groups were compared wherein one group was the experimental group while the other was the control group. During the research, both the groups were pre-tested, the experimental group received the treatment and then both the groups were post-tested. The treatment i.e., teaching practices based on UDL, was administered to the experimental group for a period of 4 weeks. The population of the research study consisted of all the students enrolled in middle schools of private sector in the district of Faisalabad. For this study, multistage sampling technique was used to select the sample. Through this, 2 intact classes of boys were selected. Amongst these selected classes, 1 randomly selected class of boys received the treatment of teaching practices based on UDL and was designated as the "Experimental Group" while the other was taught through traditional teaching methods and was designated as the "Control Group". Two English language based academic tests were developed to be used at pre-test and post-test stages. These tests comprised of sections. The initial section consisted of questions regarding the demographic characteristics of the research participants including name, roll no / school ID, class and gender. Other section consisted of two different creative writing topics. This section was used to assess the creativity skills of the participants. The maximum time for each test (pre-test and post-test) was 90 minutes. The research questions of the study were as follows; How does Universal Design for Learning (UDL) based teaching practices impact education equity at middle-school level in relation to creativity skill? What is the impact of Universal Design for Learning (UDL) based teaching practices on middle-school level students' creativity? How does the impact of UDL based teaching practices compare among students from different demographics in regards to creativity skill?

Results and Discussion

Comparison between in creativity mean scores of boys from school A of experimental group

The compression difference in creativity mean scores of boys from school A of experimental group from pre-test to post-test was used to test the following null hypothesis.

Ho1 There is no significant difference between in creativity mean scores of boys from school A of experimental group from pre-test to post-test

The null hypothesis was tested using 'paired sampled-t' test about difference between in creativity mean scores of boys from school A of experimental group from pre-test to post-test. The summary is presented in table no 1.

Table 1
Comparison of difference in creativity mean scores of boys from school A of experimental group from pre-test to post-test

Creativity	N	Mean	SD	df	t-value	Sig
Pre-test	21	19.04	8.76	20	3.08	.006
Post-test	21	28.19	9.54			

As per table 1, there was statistically significant difference between mean scores of boys from school A of experimental group from pre-test to post- test. The value of t (20) = 3.08, p = .006 is significant at 5% level of significance. This p-value is not greater than significance level of 0.05, indicating that we fail to accept the null hypothesis that there is no significant difference between in creativity mean scores of boys from school A of experimental group from pre-test to post-test. It means that mean scores in creativity of boys from school A of experimental group from pre-test to post-test were different.

Comparison between in creativity mean scores of boys from school A of control group

The compression difference in creativity mean scores of boys from school A of control group from pre-test to post-test was used to test the following null hypothesis**.**

Ho2 There is no significant difference between in creativity mean scores of boys from school A of control group from pre-test to post-test

The null hypothesis was tested using 'paired sampled-t' test about difference between in creativity mean scores of boys from school A of control group from pre-test to post-test. The summary is presented in table no 2.

Table 2
Comparison of difference in creativity mean scores of boys from school A of control group from pre-test to post-test

Creativity	N	Mean	SD	df	t-value	Sig
Pre-test	24	21.21	6.03	23	1.89	.071
Post-test	24	25.66	12.71			

Table 2 indicates that there was not statistically significant difference between mean scores of boys from school A of control group from pre-test to post-test. The value of t (23) = 1.89, p = .071 is not significant at 5% level of significance. This p-value is greater than significance level of 0.05, indicating that we fail to reject the null hypothesis that there is no significant difference between in creativity mean scores of boys from school A of control group from pre-test to post-test. It means that mean scores in creativity of boys from school A of control group from pre-test to post-test were not different.

Conclusion

To conclude, it was found that those students whose teachers used teaching practices based on Universal Design for Learning (UDL) scored significantly better on the post-test as compared to students in whose class traditional teaching methods were used. Teaching rooted in UDL significantly enhanced the learning outcomes for all experimental group students. As a result, this study demonstrated the positive role that the teaching practices based on Universal Design for Learning (UDL) can play in enhancing the learning outcomes for students from diverse backgrounds leading to more equitable classrooms. Thus, UDL should be adopted as an educational framework to reduce the systemic inequities found within schools. Through UDL, an inclusive learning environment can be developed in which all students can utilize their strengths irrespective of their abilities.

Recommendations

For the purpose of use of Universal Design for Learning (UDL) principles in teaching, guidelines and checkpoints from Center for Applied Special Technology (CAST) website may be utilized to adopt and develop lesson plans. Alongside classroom teaching, assessment methods used in the schools also need to be revamped to support the use of UDL principles. Additionally, training sessions may be conducted to familiarize school administration and principals regarding the use of UDL principles in the classrooms and the provision of support to teachers to adopt these principles. Teachers would need extensive activity-based training sessions to be able to develop and adapt their lesson plans as per the UDL principles. These sessions may be conducted at central locations or in their respective schools. Furthermore, teacher training and preparation programs should also incorporate UDL principles in their curriculum. This in turn will help public and private sector schools to hire educators and teachers with greater level of understanding of UDL principles and with the right skills and abilities to deal with increased diversity in their future classrooms. To effectively accomplish national educational goals, Universal Design for Learning (UDL) principles should be adopted and made part of national curriculum. Lastly, it is recommended that future researchers may use the UDL framework to assess its impact on the learning outcomes of students in relation to other subjects and skills in order to further enhance the empirical evidence in regards to the Universal Design for Learning (UDL).

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