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Sr. Dr. Christina Augustine
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EDITOR'S NOTE

Reimagining Teacher Education in a Transforming World.

Education has always been both a mirror and a moulder of society. In times of rapid social, technological, and cultural transformation, this dual role becomes even more pronounced. Teacher education, positioned at the very heart of educational systems, carries a profound responsibility: to prepare educators who are not only competent in pedagogy and content, but also ethically grounded, socially responsive, and future-ready. This issue of the Santhom Journal of Edu. RACE seeks to reaffirm that responsibility while encouraging critical reflection and scholarly dialogue.

The contemporary educational landscape is marked by unprecedented change. Digital technologies, artificial intelligence, inclusive education movements, global citizenship education, and post-pandemic learning realities have reshaped classrooms across the world. These developments demand a reorientation of Teacher Education programmes—from transmission-based models to transformative, learner-centred, and research-informed practices. Teachers today are expected to be facilitators of learning, reflective practitioners, curriculum designers, mentors, and lifelong learners. Preparing them for such multifaceted roles requires innovation, vision, and sustained academic engagement.

Teacher education institutions play a pivotal role in shaping this transformation. Beyond equipping student-teachers with methodological skills, these institutions must cultivate critical thinking, professional ethics, emotional intelligence, and a commitment to social justice. Research-driven teacher education fosters the ability to question assumptions, adapt to diverse learning needs, and respond creatively to emerging challenges. Santhom Journal of Edu. RACE contribute significantly to this endeavour by providing a platform for empirical research, theoretical insights, and best practices from varied educational contexts.

Wishing you an insightful reading

Dr.Shimna Paul
Editor in Chief
Santhom Journal of Edu. RACE

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Chief Editor
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Integrating Social Entrepreneurship in Teacher Education for Advancing Gender-Inclusive Social Transformation

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Abstract

The role of teacher education is evolving in response to the changing demands of contemporary society. Beyond preparing teachers for classroom instruction, Teacher Education now carries the responsibility of cultivating socially responsive, innovative, and transformative educators. Social Entrepreneurship, as an approach that emphasizes creativity, sustainability, and equity, holds significant potential in this context. This conceptual paper explores the integration of Social Entrepreneurship into Teacher Education, with a focus on advancing gender equality and promoting social transformation. It highlights the theoretical underpinnings of Social Entrepreneurship in education, examines its relevance to gender-sensitive teaching, and discusses the broader societal implications of preparing teachers as social entrepreneurs. The paper argues that equipping teachers with entrepreneurial skills and a gender-responsive outlook positions them as agents of change, capable of challenging stereotypes, designing inclusive practices, and catalyzing sustainable social progress.

Key Words : *Social Entrepreneurship, Teacher Education, Gender Inclusive, Social Transformation etc.*

Introduction

Education is universally recognized as a catalyst for social change, and teachers occupy a central role in this transformative process. The twenty-first century, marked by rapid globalization, digitalization, and growing

social inequalities, demands teachers who can navigate complexity while fostering inclusive development. Traditional teacher education, often focused on pedagogical techniques and content mastery, is increasingly insufficient to meet these demands.

Social Entrepreneurship has emerged as a powerful approach to addressing pressing social problems by applying entrepreneurial principles to create innovative and sustainable solutions (Pushpanadham & Shnaoli, 2021). Unlike traditional entrepreneurs social entrepreneurs aim to meet unmet social needs and bring about lasting change in their communities. The field of education, in particular, provides fertile ground for Social Entrepreneurship, as it directly influences human development, equity, and social progress.

As natural leaders within their communities, teachers possess a unique potential to influence individuals, set examples, and foster positive change (Satyadevi, 2016). Beyond classroom teaching, teachers are expected to act as Social Entrepreneurs by taking initiatives, designing innovative solutions, and addressing social issues in meaningful ways. Their professional identity inherently extends beyond educational activities to include adding value to the wider society. Teachers who are cultivated in terms of Social Entrepreneurship not only enhance their own leadership capacities but also inspire students to adopt entrepreneurial mindsets, thereby multiplying the number of social entrepreneurs in society (Çermik & Şahin, 2015; Satyadevi, 2016).

Rooted in innovation, collaboration, and sustainable problem-solving, Social Entrepreneurship equips individuals to address

pressing societal issues while promoting equity and justice. In Teacher Education, this approach allows prospective teachers to move beyond instructional roles and embrace responsibilities as community leaders and advocates for social change. Importantly, it aligns with the global agenda of the Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education) and Goal 5 (Gender Equality). When embedded into teacher preparation programs, Social Entrepreneurship can strengthen teachers' ability to challenge gender disparities, promote inclusivity, and foster social transformation.

When embedded in Teacher Education, Social Entrepreneurship thus becomes a catalyst for advancing gender equality and driving social transformation. Teachers prepared with the skills and mindset of social entrepreneurs can challenge existing inequalities, promote inclusivity, and contribute to the achievement of the SDGs. In this way, Teacher Education programs that integrate Social Entrepreneurship serve as key platforms for empowering educators as change agents who shape equitable and sustainable futures.

Social Entrepreneurship - Concept

Social Entrepreneurship (SE), first introduced to the literature in the 1960s, began to gain significant popularity among researchers and practitioners in the 1980s. Defined as non-profit and innovative practices that create social value, SE can be carried

out in the business world, the public sector, or at the intersection of both (Austin, Stevenson, & Wei-Skillern, 2006). It is often described as voluntary economic activity guided by social priorities and consists of key components such as innovative social enterprises, economic activities, income and employment generation, social innovation, alignment between economic and social needs, and the development of new business models (Zahra et al., 2008). The primary goal of social enterprises is to transform people's lives permanently by addressing social problems, shifting socio-economic equity in favor of marginalized groups, and benefiting society as a whole (Mair & Noboa, 2006; Ashoka, 2012; Martin & Osberg, 2015).

Because of these characteristics, SE is increasingly regarded as a crucial building block of sustainable development. It offers innovative approaches to addressing pressing issues in education, health, the environment, and human rights (Mair & Noboa, 2006; Zahra et al., 2008). Emerging within the context of social services, social enterprises often serve as catalysts for broader social change.

Social Entrepreneurship in Teacher Education

Many societies around the world consider teachers as individuals who can play an active role in transforming people's lives. They are viewed as natural leaders who can advise on various social issues and act as key agents of social change (Gregory &

Anderson, 2006; Bourn, 2016; Satyadevi, 2016). Teachers, therefore, need to be equipped with entrepreneurial skills, as they are increasingly expected to go beyond traditional instructional roles and contribute actively to addressing societal challenges.

Several studies have emphasized the importance of fostering social entrepreneurial behaviour, entrepreneurial intention, and entrepreneurial self-efficacy among young people (Hlady-Rispal & Servantie, 2018; Mair, Martí, & Ventresca, 2012; Weaver, 2018). Recognizing this, higher education institutions (HEIs) have introduced Social Entrepreneurship courses and modules across different programs to equip learners with the necessary skills and knowledge to engage in social entrepreneurial activities (Dean & McMullen, 2007; Douglas, 2015; García-González & Ramírez-Montoya, 2021; Hockerts, 2010; Howorth, Smith, & Parkinson, 2012).

The analysis of the characteristics of Social Entrepreneurship (SE) reveals that learning should not only aim at knowledge acquisition but also emphasize personal development and competence as its focal points (Pushpanadham & Acharya, 2021). To achieve this, active learning approaches are essential. Methods and techniques such as collaborative learning, teamwork, learning by doing, problem-based learning, peer and group learning, projects, and drama encourage interactive learning and critical thinking. Unlike traditional approaches, these strategies place

students at the center of the learning process, ensuring that they learn actively and meaningfully (Gibb, 2005).

Within this context, teachers themselves must embody these entrepreneurial characteristics, as their professional role inherently extends to promoting innovation, equity, and inclusivity in society. Teachers are not only facilitators of knowledge but also community leaders who can inspire innovation, inclusivity, and sustainable social change. Examining teacher experiences as Social Entrepreneurs becomes crucial, particularly in how they strive to improve conditions for disadvantaged students, enhance the quality of education, and take an active role in solving problems despite adverse circumstances.

Embedding Social Entrepreneurship into teacher preparation programs provides future educators with tools to address social problems, challenge inequalities, and promote the values of equity and justice, thereby positioning teachers as key agents in achieving broader societal transformation. By identifying social problems within their educational contexts and working toward sustainable solutions, teachers drive social change and strengthen the societies they serve.

Teacher Education and Gender Equality

Despite formally equal educational opportunities for women and men, significant gender differences persist in students'

academic motivation and achievement, which often extend into gender-typed educational and occupational aspirations (Kollmayer et al., 2018a). Women remain underrepresented in science, technology, engineering, and mathematics (STEM), while men are underrepresented in health and socially oriented sectors (Boniol et al., 2019; European Commission, 2019). This underrepresentation often begins at school, where girls report lower academic self-concepts in STEM subjects than boys, even after achievement is controlled for, while boys display similarly lower self-concepts in reading and languages (Wigfield et al., 2002; Meece et al., 2006).

In general, gender differences in motivation and achievement are relatively small in early childhood but become increasingly visible during adolescence (Evans et al., 2002; Hyde, 2005). These differences are not biologically fixed but vary according to cultural and social contexts (Hyde, 2005), suggesting that socialization practices including those in schools can either reinforce or minimize gender disparities. Research indicates that such differences are strongly shaped by gender stereotypes transmitted by parents and teachers (Jussim et al., 1996; Wang & Degol, 2013). These stereotypes reflect culturally shared assumptions that men embody achievement-oriented traits such as agency, competence, and instrumentality, while women are associated with service-oriented qualities

such as communion, warmth, and expressivity (Ashmore & Boca, 1979; Kite et al., 2008).

So teachers should represent a critical starting point for addressing gender inequalities. However, evidence shows that teachers' own gender-stereotyped beliefs and practices substantially shape students' outcomes. For instance, Tiedemann (2000) found that elementary teachers judged average-achieving girls as less talented than equally achieving boys. Similarly, teachers have been shown to attribute girls' unexpected failures to low ability rather than lack of effort, while making the opposite assumption for boys (Fennema et al., 1990). Boys tend to show weaker self-concepts in reading when teachers hold stereotypical expectations about literacy (Retelsdorf et al., 2015; Wolter et al., 2015; Muntoni & Retelsdorf, 2018). Such biases can even shape long-term educational trajectories through transitional recommendations, perpetuating inequality.

At the same time, teachers play a pivotal role in developing the concept of gender equality within the framework of Social Entrepreneurship, thereby shaping future generations toward more inclusive and equitable societies. By embedding gender-sensitive perspectives in Social Entrepreneurship activities such as community projects, classroom innovations, and problem-solving initiatives teachers not only empower students to recognize and address inequalities but also inspire them to become proactive change

agents. In this way, teachers act as catalysts who integrate the ideals of gender equality into the entrepreneurial spirit, ensuring that future generations grow with the skills, values, and vision needed to build a more just and sustainable world.

Nevertheless, teachers often lack effective strategies to counteract the subtle reinforcement of stereotypes in schools, partly because gender issues are rarely addressed systematically in teacher education programs (Gray & Leith, 2004). Equipping teachers with gender-responsive pedagogical knowledge and skills is therefore crucial. Practical strategies, include promoting autonomy and individualization, allowing students to choose tasks that align with their interests and abilities, and creating classroom climates that value diversity not only reduces gender differences but also resonates with the broader goals of Social Entrepreneurship by fostering inclusive, innovative, and equitable learning environments (Lubinski et al., 2000; Ziegler et al., 2006).

Teachers play a pivotal role in shaping attitudes and behaviours that influence how future generations perceive gender roles. To develop awareness and a positive attitude toward gender equality in prospective teachers, Teacher Education programs must embed both theoretical knowledge and practical strategies that prepare them as advocates of equity and social transformation. This not only addresses classroom inequalities

but also promotes the foundation of Social Entrepreneurship skills in future generations. To nurture awareness and positive attitudes towards gender equality, the following approaches can be emphasized:

- ♦ Inclusive Use of Language - Training prospective teachers to consistently use gender-neutral and inclusive language helps reduce unconscious bias in communication. By modelling fairness through equitable language, future teachers normalize equality in everyday interactions, which later translates into entrepreneurial leadership practices that are inclusive and free from gender prejudice
- ♦ Gender-Sensitive Curriculum Design - Teacher education should train teachers to adapt curriculum for gender representation. An inclusive curriculum motivates students, especially girls, to pursue technology, leadership, and innovation, fostering equal participation in Social Entrepreneurship.
- ♦ Equal Participation in Learning - Prospective teachers should be trained to ensure balanced participation of boys and girls in class activities and leadership. This fosters a lived practice of equality and prepares both genders to engage in entrepreneurial initiatives free from stereotypes.
- ♦ Reshaping Socialization Practices - Teacher education should prepare

teachers to avoid stereotyped tasks, giving both boys and girls diverse responsibilities. This fosters inclusivity and empowers students to embrace Social Entrepreneurship with shared responsibility.

- ♦ Critical Dialogue on Gender Bias - Including gender bias and equity sessions in Teacher Education helps future teachers reflect on stereotypes, lead discussions on gender roles, and acquire the skills to guide students toward awareness and critical thinking for entrepreneurial leadership that challenges inequities.
- ♦ Adopting Gender-Sensitive Pedagogy - Teacher Education should stress innovative methods like role plays, discussions, and case studies that ensure equal opportunities, helping future teachers internalize fairness and inclusion for classrooms and communities.

In conclusion, Teacher Education advances Gender Equality when it embraces Social Entrepreneurship as both mindset and practice. Teachers trained to challenge stereotypes, redesign classroom practices, and work with communities become agents of social transformation. Embedding gender-sensitive and entrepreneurial perspectives equips educators to dismantle inequalities and inspire future generations toward fairness and justice. Strengthening Teacher Education in this way is not just reform but a step toward equitable and sustainable societies.

Teachers as Catalysts of Social Transformation

The role of teachers extends far beyond classroom instruction; they are, in many ways, the architects of the future. Positioned as key agents of social change, educators have the unique ability to shape young minds, influence values, and nurture the leaders of tomorrow. Research shows that teachers, more than textbooks, often serve as the primary source of knowledge for students about global issues and education (Kirkwood-Tucker, 1990). Their influence is not confined to academic content; as role models, mentors, and guides, teachers help students navigate complex social realities while instilling values such as justice, democracy, and tolerance. When embedded early in education, these values contribute to building generations that are committed to positive societal transformation.

In this context, Social Entrepreneurship offers teachers a meaningful framework for action. By encouraging innovation, critical thinking, and community-focused problem solving, teachers can move beyond traditional instruction and actively address pressing societal challenges. Their role becomes not only that of educators but also of social leaders who can empower marginalized groups, challenge inequality, and inspire collective responsibility. Teachers who integrate entrepreneurial mindsets into their practice are thus able to link classroom

learning with broader community development, making education more relevant and transformative.

Steiner (1996) emphasizes that global teachers as agents of change must adopt methodologies that respect and integrate the personal experiences of both educators and learners while using diverse pedagogical strategies. Importantly, she/he notes that principles rooted in social justice and democracy must not remain abstract ideals but should be actively enacted within classroom practices. Teachers who embrace this vision design lessons that are inclusive, adaptable, and socially responsive, ensuring that education fosters both individual growth and collective well-being.

Ultimately, Teacher Education that embeds Social Entrepreneurship equips future educators to go beyond conventional roles. It prepares them to cultivate critical thinkers, encourage students to question societal injustices, and develop innovative solutions for real-world problems. In this way, teachers emerge not just as transmitters of knowledge but as catalysts of social transformation, shaping more equitable, democratic, and sustainable societies.

Teacher Education is not just about preparing educators for classrooms but also about shaping them as change-makers and social entrepreneurs who can address pressing social, cultural, and environmental challenges. To nurture awareness and positive

attitudes towards Social Entrepreneurship in prospective teachers, the following approaches can be emphasized:

♦ **Linking Education with Social Transformation**

Encourage prospective teachers to see education as a tool for breaking poverty, reducing inequality, and challenging gender stereotypes. Use case studies of Social Entrepreneurs to show how innovation and compassion drive community change.

♦ **Embedding Social Justice and Equity in Teacher Training**

Provide training in inclusive pedagogies addressing caste, gender, religion, and ability. Involve student-teachers in projects like literacy drives, anti-bullying, or digital literacy to build entrepreneurial problem-solving for social good.

♦ **Promoting Gender Equality Through Practice**

Sensitize teachers to gender issues and train them in inclusive practices such as equal leadership roles, girls in STEM, and tackling discrimination.

♦ **Community - Based Experiential Learning**

Engage teachers in community immersion to identify local issues such as waste, nutrition, digital divide etc. and design small entrepreneurial solutions. This fosters empathy, creativity, and leadership.

♦ **Cultivating Civic and Ethical Responsibility**

Teacher Education should integrate peace, human rights, and democratic values through activities such as model parliaments, debates, and community service to develop socially responsible educators.

♦ **Integrating Environmental Awareness**

Teacher Education should train teachers to promote eco-friendly practices like recycling, tree planting, and energy-saving by framing them as eco-social entrepreneurship projects that link education with sustainability.

Challenges in Implementing Social Entrepreneurship in Teacher Education

1. Lack of Conceptual Clarity

While Social Entrepreneurship has gained attention in business and development studies, its integration into Teacher Education remains underexplored. There is limited consensus on its definitions, scope, and pedagogical approaches, making it difficult for Teacher Education institutions to adopt consistent frameworks.

2. Traditional Curriculum Orientation

Teacher Education programs are still heavily focused on content mastery, pedagogy, and assessment. Embedding SE requires a shift toward innovation, equity, and community engagement, which clashes with existing exam-centric and rigid curricular structures.

3. Limited Faculty Expertise and Training

Many teacher educators are not trained in entrepreneurial approaches or community-based innovations. Without adequate faculty capacity-building, SE risks being reduced to theory rather than practice.

4. Resistance to Change

Introducing SE into Teacher Education challenges entrenched beliefs about teachers' roles as knowledge transmitters rather than change agents. This cultural and institutional resistance may slow adoption.

5. Assessment and Measurement Challenges

Unlike traditional academic competencies, evaluating SE-related skills such as creativity, inclusivity, and social impact is complex. Standardized tools and metrics for assessment are underdeveloped.

Conclusion

This conceptual paper highlights that embedding Social Entrepreneurship within Teacher Education is both timely and necessary in addressing the complex challenges of the twenty-first century. Teachers, as natural leaders and agents of change, must be equipped not only with pedagogical expertise but also with entrepreneurial mindsets that enable them to innovate, collaborate, and respond to pressing social issues. Integrating gender-sensitive

perspectives into this framework ensures that teachers can challenge stereotypes, dismantle inequalities, and model inclusivity in their classrooms and communities.

While the integration of Social Entrepreneurship in Teacher Education faces challenges such as conceptual ambiguity, rigid curricula, limited faculty expertise, and difficulties in assessment, these barriers also point to the urgent need for reform. By grounding teacher preparation in innovation, equity, sustainability, and social justice, teacher education programs can align with the Sustainable Development Goals-particularly Quality Education (SDG 4) and Gender Equality (SDG 5).

Ultimately, cultivating teachers as Social Entrepreneurs is not a peripheral reform but a transformative approach that redefines their professional identity. Such educators move beyond traditional instruction to become visionary leaders, community innovators, and catalysts of gender equality and social transformation. Strengthening teacher education with this dual focus is therefore a vital step toward building equitable, inclusive, and sustainable societies.

References

- ♦ Ashmore, R. D., and Boca, F. K. (1979). Sex stereotypes and implicit personality theory: toward a cognitive - social psychological conceptualization. *Sex Roles* 5, 219–248. doi: 10.1007/BF00287932

- ♦ Austin, J., Stevenson, H., & Wei-Skillern, J. (2006). Social and commercial entrepreneurship: same, different, or both?. *Entrepreneurship Theory and Practice*, 30(1), 1-22.
 - ♦ Boniol, M., Mclsaac, M., Xu, L., Wuliji, T., Diallo, K., and Campbell, J. (2019). *Gender Equity In The Health Workforce: Analysis of 104 Countries* (No. WHO/HIS/HWF/Gender/WP1/2019.1). Geneva: World Health Organization.
 - ♦ Bourn, D. (2016). Teachers as agents of social change. *International Journal of Development Education and Global Learning*, 7(3), 63-77. <https://discovery.ucl.ac.uk/id/eprint/1475774/>
 - ♦ Çermik, F., & Pahin, Ý. F. (2015). Investigation of Social Entrepreneurship characteristics of social studies teacher candidates in terms of various variables. *Current Research in Education*, 1(2), 76-88.
 - ♦ Dađ, Ý., & Göktürk, T. (2014). Sýnýf yönetiminde liderlik ve liderliđin sýnýf yönetimine katkıları. *International Journal of Social Science*, 27, 171-184. <http://dx.doi.org/10.9761/JASSS2429>
 - ♦ De Jorge Moreno, J., Laborda Castillo, L., & Sanz Triguero, M. (2012). The effect of business and economics education programs on students' entrepreneurial intention. *European Journal of Training and Development*, 36(4), 409-425.
 - ♦ European Commission (2019). *She Figures 2018: Gender Equality In Research And Innovation In The European Union*. Brussels: European Commission.
 - ♦ Evans, E. M., Schweingruber, H., and Stevenson, H. W. (2002). Gender differences in interest and knowledge acquisition: the United States, Taiwan and Japan. *Sex Roles* 47, 153-167. doi: 10.1023/A:1021047122532
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Enhancing Teaching Practices through the Eight Multiple Intelligences Framework

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Abstract

This article examines how Howard Gardner's Multiple Intelligences (MI) framework can enhance teaching practices in today's diverse classrooms. Building on the limitations of traditional one-size-fits-all instruction, the paper highlights the value of a strength-based approach that recognizes learners varied cognitive profiles. It discusses the eight intelligences, outlines classroom strategies aligned with each domain, and presents planning and assessment methods that support meaningful differentiation. The article also addresses challenges surrounding MI implementation and emphasizes the need for informed, flexible application. Overall, the MI framework offers teachers a practical pathway to improve engagement, inclusivity, and holistic student development.

Key Words : *Multiple Intelligences, differentiated instruction, inclusive education, teaching strategies, strength-based learning, holistic development etc.*

Introduction

Contemporary classrooms present increasing diversity in learners' abilities, backgrounds, and ways of understanding the world. Traditional one-size-fits-all instruction often fails to address this variation, leading to disengagement and limited learning outcomes. As Tomlinson (2014) notes, "today's classrooms are marked by a level of learner variance that requires teachers to rethink traditional notions of instruction" (p. 22).

Similarly, Gardner (1999) critiques standardized approaches, stating that "teaching all students in the same way ignores the reality of how human abilities actually function" (p. 45). These limitations call for more flexible, responsive, and inclusive pedagogical methods.

Howard Gardner's Multiple Intelligences (MI) theory offers a framework for meeting these diverse needs by recognizing multiple ways in which students learn and demonstrate understanding. Gardner (1983) asserts that

“human beings have a range of intelligences, not just a single general intelligence” (p. 5), highlighting the importance of teaching through varied strengths. The purpose of this article is to examine how the MI framework can enhance teaching practices and promote meaningful learning experiences. A strength-based instructional approach is central to this goal; as Armstrong (2018) emphasizes, “education should cultivate students’ strengths so they can use them as pathways to learning” (p. 14), ensuring that every learner is supported and valued.

Overview of the Multiple Intelligences Framework

Howard Gardner’s Multiple Intelligences (MI) framework challenges the traditional view that intelligence is a single, fixed, and measurable trait. In his landmark work, Gardner (1999) proposed that human cognitive ability is multifaceted. Although he initially introduced seven intelligences in 1983, he later expanded the model to eight, recognizing that individuals possess a unique combination of these intelligences. This blend shapes the ways in which people learn, solve problems, and interact with their environment. According to Gardner, each intelligence represents a distinct mode of processing information and engaging with the world.

These intelligences function together rather than separately, forming an individualized cognitive profile for each learner. Armstrong (2018) highlights this diversity by explaining that

“every student has all eight intelligences, but in varying degrees of strength” (p. 12). This means that while one learner may excel in linguistic tasks, another may show notable strengths in kinaesthetic or spatial activities. The plurality of intelligences provides teachers with numerous pathways to design instruction, ensuring that concepts can be taught and learned in ways that capitalize on each learner’s natural abilities.

Rationale for Using the MI Framework in Teaching

The Multiple Intelligences (MI) framework offers a strong foundation for inclusive and differentiated education, particularly in contemporary classrooms where learners vary widely in their abilities, interests, and ways of processing information. Unlike traditional instructional models that prioritize linguistic and logical–mathematical abilities, MI encourages teachers to recognize the full range of human potential. Gardner (1999) emphasizes the need for this shift when he states that “the educational system must broaden its approach so that it acknowledges and nurtures the spectrum of human intelligences” (p. 56). By focusing on individual strengths rather than deficits, MI-based teaching empowers learners to build confidence and engage more meaningfully with academic content.

Implementing MI principles has several documented benefits for teaching and learning. When instruction aligns with students’ strengths, it naturally leads to higher engagement and motivation, as learners feel supported and

understood. MI-based practices also foster creativity and critical thinking because students encounter concepts through multiple perspectives and modalities. Moreover, such practices support holistic development by addressing not only academic skills but also social, emotional, and reflective capacities. In the 21st-century classroom, where diversity is the norm, MI serves as a powerful tool for designing instruction that is flexible, inclusive, and learner-centred.

Classroom Strategies for Each Intelligence

The MI framework provides teachers with practical strategies that cater to different types of intelligences, ensuring that instruction reaches a wide range of learners. For students strong in Verbal–Linguistic intelligence, activities such as debates, storytelling, speeches, and reflective journaling help them articulate ideas and construct meaning through language. These tasks engage students who express themselves best through words and offer rich opportunities for communication and comprehension.

Learners who demonstrate Logical-Mathematical intelligence benefit from activities involving problem-solving, experiments, coding, and pattern recognition. Such tasks stimulate reasoning, inquiry, and analysis-skills central to subjects like mathematics and science. Gardner (1983) observes that these learners excel when lessons “challenge their ability to reason and recognize relationships among concepts” (p. 89), making analytical tasks ideal for deepening their understanding.

Students with strengths in Visual-Spatial intelligence learn effectively through visual tools such as mind maps, diagrams, charts, models, and infographics. These strategies help them organize information pictorially and visualize abstract concepts. Similarly, Bodily Kinaesthetic learners thrive when instruction incorporates movement, hands-on experiments, role-play, or dramatization. These activities allow them to “learn by doing,” engaging the body as a vehicle for understanding.

Those with Musical-Rhythmic intelligence responds well to rhythm-based memory techniques, lyrical summaries, background music, or songs integrated into lessons. Armstrong (2018) highlights that musical learner “recall information more effectively when rhythm and melody are part of the learning process” (p. 54), making musical strategies useful across subjects.

Students strong in Interpersonal intelligence benefit from group work, peer teaching, discussions, and collaborative projects. These social learning experiences help them understand and interact effectively with others. In contrast, Intrapersonal learners prefer reflective journals, independent projects, and personal goal-setting, as they excel in self awareness and internal thinking. Finally, students with Naturalistic intelligence engage deeply with activities involving nature observation, outdoor exploration, classification tasks, and environmental investigations.

By incorporating strategies for all eight intelligences, teachers create learning environments where each student can access the curriculum through their preferred mode of understanding. This approach ensures that instruction is flexible and responsive, allowing multiple strengths to be activated simultaneously within the same classroom. As Gardner (1999) asserts, “there is no single, universal way to teach or learn; rather, understanding is enriched through multiple pathways” (p. 112). The MI framework thus supports rich, engaging, and inclusive teaching practices that honour the diverse cognitive profiles of all learners.

Integrating MI into Daily Lesson Planning

Integrating the Multiple Intelligences (MI) framework into daily lesson planning encourages teachers to move beyond traditional, uniform methods of instruction and instead embrace a more flexible and learner-centred pedagogy. By recognizing that students process information differently, teachers can design lessons that incorporate multiple entry points, allowing every learner to connect with the material. This not only enhances comprehension but also creates a more inclusive learning environment where students feel valued for their unique abilities.

A practical strategy for incorporating MI is the use of an MI activity palette, which ensures that each lesson includes tasks representing several intelligences for example, verbal discussion, logical problem-solving, visual mapping, movement-based activities, cooperative work, reflective journaling, musical aids, or

nature-linked tasks. Teachers may also create learning stations aligned with different intelligences, allowing students to rotate through varied tasks that deepen understanding through multiple modes. Choice-based assignments represent another effective method, empowering students to demonstrate their understanding in ways that align with their strengths such as creating a model, writing a poem, developing a chart, or designing an experiment. Through these varied strategies, teachers can promote deeper engagement, foster creativity, and meet the needs of diverse learners, making MI an integral part of meaningful, effective classroom planning.

Assessment through the MI Lens

Assessing students through the lens of Multiple Intelligences (MI) acknowledges that learners demonstrate understanding in diverse ways. Traditional assessments often privilege verbal–linguistic and logical–mathematical abilities, which can disadvantage students whose strengths lie in other domains. The MI framework encourages teachers to broaden their assessment practices so that every learner has an opportunity to showcase their knowledge meaningfully. Armstrong (2018) reinforces this perspective, stating that “authentic assessment allows students to demonstrate understanding in ways that align with their intelligence strengths” (p. 89). This means that instead of relying solely on tests, assessments should reflect real-world, performance-based tasks that allow students to apply their skills creatively and practically.

MI-aligned assessments include a wide range of options that cater to different strengths. Portfolios allow students to gather evidence of their learning over time, appealing especially to intrapersonal and visual-spatial learners. Performance tasks, such as dramatizations or experiments, support bodily-kinesthetic and logical-mathematical intelligences. Presentations provide a platform for verbal-linguistic and interpersonal strengths, while illustrations, diagrams, or models cater to visual-spatial learners. Reflective journals encourage introspection, aligning with intrapersonal intelligence, and group projects foster interpersonal collaboration. These varied forms of assessment create multiple pathways for demonstrating mastery, improving fairness, and providing a more complete picture of student understanding. By using such diverse tools, teachers promote equity and honor the multifaceted nature of human intelligence.

Conclusion

Integrating the Multiple Intelligences framework into teaching practice enables educators to design learning environments that respond meaningfully to the diverse cognitive profiles present in contemporary classrooms. By intentionally planning lessons that activate different intelligences and adopting assessment methods that honour varied strengths, teachers can deepen conceptual understanding and promote equitable participation. The MI approach is especially valuable for competency-based and student-centred education, as it encourages learners to engage through

pathways that align with their natural abilities while also developing less dominant areas. As schools increasingly prioritize personalized learning, the MI framework stands as a robust tool for transforming instructional practices and fostering meaningful, sustained learning outcomes.

Reference

- ♦ Armstrong, T. (2018). *Multiple intelligences in the classroom* (4th ed.). ASCD.
- ♦ Darling-Hammond, L., Flook, L., Cook-Harvey, C., Barron, B., & Osher, D. (2020). Implications for educational practice of the science of learning and development. *Applied Developmental Science*, 24(2), 97–140. <https://doi.org/10.1080/10888691.2018.1537791>
- ♦ Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. Basic Books.
- ♦ Gardner, H. (1999). *Intelligence reframed: Multiple intelligences for the 21st century*. Basic Books.
- ♦ Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences* (30th anniversary ed.). Basic Books. (Original work published 1983)
- ♦ Sousa, D. A. (2016). *How the brain learns* (5th ed.). Corwin Press.
- ♦ Tomlinson, C. A. (2014). *The differentiated classroom: Responding to the needs of all learners* (2nd ed.). ASCD.





Effectiveness of Honey-Mumford Model on Achievement in Mathematics of Secondary School Students

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Abstract

There is no bound for place and time for education and it is a lifelong process. Mathematics today is the key to learning of science's physical, biological, technological, social and medical. It is a gateway and key to all sciences. Everybody needs some knowledge of Mathematics in one way or the other. Honey-Mumford Model is a way that helps students to understand their learning styles. The knowledge of Mathematics can be making practical through Honey-Mumford Model. Honey-Mumford Model identifies four different styles that people use to learn something new. Ther are Activist, Theorist, Pragmatist and Reflector. Students learnt better when they learn by understanding their preferred learning style. This study examines the effectiveness of Honey-Mumford Model on Achievement in Mathematics of Secondary School Students.

Key Words : Honey-Mumford Model, Achievement in Mathematics etc.

Prologue

In educational process, the traditional methods and techniques have been replaced by new techniques and strategies. Learners are much benefited from these new methods and techniques that we faithfully implement them in classroom communication. People are now conscious to educate their children in a way as to enable them to cope with the personal and social problems obvious in a modern complex society due to the influence

of scientific technologies and industrial progress. Peter Honey and Alan Mumford in 1986 published a new model known as Honey-Mumford model. It is based on Kolb's learning cycle. When we learn something new, our first concern is generally what we have learnt - very few people stop to actually consider how they learn.

Honey-Mumford Model is a way that helps students to understand their learning styles. The knowledge of Mathematics can

be making practical through Honey-Mumford Model. Honey-Mumford Model identifies four different styles that people use to learn something new. There are Activist, Theorist, Pragmatist and Reflector. Students learnt better when they learn by understanding their preferred learning style.

Need and Worth of the Study

Kothari Commission on National education (1964) recommended that every student should study mathematics compulsory for ten years. There is no difference of opinion on the need for teaching of mathematics as part of general education. Mathematics education is essential as it is of immense value in the student's individual life as also his life in society. In this era of science and technology, mathematics has permeated through the human life in such a way that, it has now become very important aspect of human life. Mathematics learning increases logical thinking and thus in turn helps for developing analysing skill. The mathematical study helps to provide accurate measurement.

Student's mathematical achievements have an influential effect on their performance in their future. Having a solid background in mathematics helps students develop sophisticated perspectives in their life. Therefore, the investigator tries to study the Effectiveness of Honey-Mumford Model on Achievement in Mathematics of Secondary School Students. This model can provide insights into students learning preferences. This model help the stu-

dents to understand their learning styles and increase personalized learning.

Statement of the Problem

Effectiveness of Honey-Mumford Model on Achievement in Mathematics of Secondary School Students.

Operational Definitions of Key Terms

Honey-Mumford Model: The Honey-Mumford model was published by Peter Honey and Alan Mumford in 1986. Honey-Mumford model identifies four different styles that people use to learn something new. They are:

- ♦ Activist
- ♦ Theorist
- ♦ Pragmatist
- ♦ Reflector

Achievement in Mathematics: According to Oxford Dictionary, Achievement is a thing that someone has done successfully, especially using their own effort and skill. In the present study, Achievement in Mathematics means the scores obtained by students in Achievement Test in Mathematics, which was prepared by the investigator.

Objectives of the Study

1. To study the effect of Honey-Mumford Model on Achievement in Mathematics of Secondary School Students.
2. To study the effect of Honey-Mumford Model on Achievement in Mathematics of Secondary School Boys.

3. To study the effect of Honey-Mumford Model on Achievement in Mathematics of Secondary School Girls.

Hypotheses of the Study

1. There is a significant difference between the Experimental group and Control group on the mean gain scores of Achievement in Mathematics.
2. There is a significant difference between the Experimental group and Control group boys on the mean gain scores of Achievement in Mathematics.
3. There is a significant difference between the Experimental group and Control group girls on the mean gain scores of Achievement in Mathematics.

Method Adopted for the Study

For the present study the investigator selected Quasi Experimental Method.

Variables of the Study

♦ Independent Variable

Honey-Mumford Model for Experimental group and Constructivist Method of Learning for Control group.

♦ Dependent Variable

Achievement in Mathematics

Sample of the study

Among the population, the investigator selected sixty students of standard Eight

who follows Kerala State Syllabus during the academic year 2023-2024 as sample.

Tools Used for the Study

1. Lesson transcripts based on Honey-Mumford Model.
2. Lesson transcripts based on the prevailing approach (constructivist approach of learning).
3. Achievement test in Mathematics.

Statistical Techniques Used

Mean, Standard Deviation, and t test.

Analysis and Interpretation

1. Objective One

The first objective of the study was to find out the effectiveness of Honey-Mumford Model on Achievement in Mathematics of Secondary School Students.

To analyse this objective, the investigator framed a hypothesis as, there is a significant difference between the Experimental group and Control group on the mean gain scores of Achievement in Mathematics.

To test the hypothesis inferentially, it was transformed to null form as there is no significant difference between the Experimental group and Control group on the mean gain scores of Achievement in Mathematics. The data were analysed with the help of independent sample t test and the results are given in Table 1.

Table 1

Number (N), Mean (M), Standard Deviation (SD) and t' value of Gain Scores on Achievement in Mathematics of Experimental and Control Group

Group	N	M	SD	t' value	Result
EG	30	6.466	2.388	5.184	Significant at 0.01 level
CG	30	3.700	1.684		

From the Table 1, the obtained t' value is 5.184, which is higher than the theoretical value 2.66 and it is significant at the 0.01 level with a degree of freedom 58. It means that the students in the Experimental group and Control group have significant difference in their mean gain scores on Achievement in Mathematics. As a result, the null hypothesis, there is no significant difference between the Experimental group and Control group on the mean gain scores of Achievement in Mathematics, was rejected and the research hypothesis, there is a significant difference between the Experimental group and Control group on the mean gain scores of Achievement in Mathematics was retained.

The investigation of objective one reveals that instructional material based on the Honey Mumford Model was a successful strategy for improving secondary school students Mathematics Achievement.

2. Objective Two

The second objective of the study was to find out the effectiveness of Honey-Mumford Model on Achievement in Mathematics of Secondary School Boys.

To analyse this objective, the investigator framed a hypothesis as, there is a significant difference between the Experimental group and Control group Boys on the mean gain scores of Achievement in Mathematics.

To test the hypothesis inferentially, it was transformed to null form as there is no significant difference between the Experimental group and Control group Boys on the mean gain scores of Achievement in Mathematics.

The data were analysed with the help of independent sample t test and the results are given in Table 2.

Table 2

Number (N), Mean (M), Standard Deviation (SD) and t' value of Gain Scores on Achievement in Mathematics of Experimental and Control Group Boys

Group	N	M	SD	t' value	Result
EG	15	6.466	2.416	3.428	Significant at 0.01 level
CG	15	3.933	1.533		

From the Table 2, the t' value is 3.428, which is higher than the theoretical value 2.763 and it is significant at the 0.01 level with a degree of freedom 28. It means that the Boys of the Experimental group and Control group have a significant difference on the mean scores of Achievement in Mathematics. As a result, the null hypothesis, there is no significant difference between the Experimental and Control group Boys on the mean gain scores of Achievement in Mathematics, was rejected and the research hypothesis, there is a significant difference between the Experimental and Control group Boys on the mean gain scores of Achievement in Mathematics, was retained.

The investigation of objective two reveals that instructional material based on the Honey Mumford Model was a successful strat-

egy for improving secondary school Boys Mathematics Achievement.

3. Objective Three

The third objective of the study was to find out the effectiveness of Honey-Mumford Model on Achievement in Mathematics of Secondary School Girls.

To analyse this objective, the investigator framed a hypothesis as, there is a significant difference between the Experimental group and Control group Girls on the mean gain scores of Achievement in Mathematics.

To test the hypothesis inferentially, it was transformed to null form as there is no significant difference between the Experimental group and Control group Girls on the mean gain scores of Achievement in Mathematics.

The data were analysed with the help of independent sample t test and the results are given in Table 3.

Table 3

Number (N), Mean (M), Standard Deviation (SD) and t' valve of Gain Scores on Achievement in Mathematics of Experimental and Control Group Girls

Group	N	M	SD	t' value	Result
EG	15	6.466	2.445	3.792	Significant at 0.01 level
CG	30	3.466	1.846		

From the Table 3, the t' value is 3.792, which is higher than the theoretical value 2.763 and it is significant at the 0.01 level with a degree of freedom 28. It means that the Girls of the Experimental group and Control group have a significant difference on the mean scores of Achievement in Mathematics. As a result, the null hypothesis:, there is no significant difference between the Experimental and Control group Girls on the mean gain scores of Achievement in Mathematics, was rejected and the research hypothesis:, there is a significant difference between the Experimental and Control group Girls on the mean gain scores of Achievement in Mathematics, was retained.

The investigation of objective three reveals that instructional material based on the Honey Mumford Model was a successful strategy for improving secondary school Girls Mathematics Achievement.

Educational Implications of the Study

The important implications are given below:

- ♦ The Honey-Mumford Model will provide teachers with a valid, reliable and effective means for improving Achievement in Mathematics of Secondary School students.
- ♦ The findings would help the teachers be acquainted with this approach that can be adopted in promoting holistic development of the children.

Epilogue

Honey-Mumford Model views that every student can learn better when they realize their preferable learning style. This model of teaching threw light to facilitate learning as well as Achievement in Mathematics. This method aided students in improving Achievement in Mathematics in a more meaningful way. This design will also support curriculum planners develop new curriculum. This study will also motivate researchers to conduct additional search in this area.

References

- ♦ Adamu, G.S. (2014). Mathematics Anxiety among Engineering students and its relationship with achievement in Calculus. *International Journal of Psychology and Counselling*, 6(1), 1013. Retrieved from <http://www.Academicjournals.Org/article/article1392973607>
 - ♦ Bernard et al., (2019). Effects of Felder-Silverman and Honey-Mumford Learning Model on Students in Technical College.
 - ♦ Best, J. W, & Khan, J. V. (2005). *Research in Education* (9th Edition). New Delhi. Prentice Hall of India Private Limited.
 - ♦ Bosman and Schulze. (2018). Learning style preferences and Mathematics achievement of secondary school learners. *South African Journal of Education*. Vol. 38, No. 1, <https://doi.org/10.15700/saje.v38nla1440>.
 - ♦ Heryani and Ramadani (2019). Analisis Kemampuan Pemecahan Masalah Matematis Peserta Didik Berdasarkan Gaya Belajar Model Honey-Mumford. 1(2).2019.
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Teachers' Perceptions and Professional Development Needs for Implementing Mathematical Modelling in Sustainable Development Education

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Abstract

Mathematical modelling serves as a powerful tool in advancing the Sustainable Development Goals (SDGs), offering structured and quantitative methods to understand and address multifaceted real-world issues. Integrating modelling with sustainability enables learners to meaningfully explore global challenges while fostering sustainable learning practices within mathematics education. Although many school textbooks now incorporate topics related to modelling and the SDGs, translating these concepts into effective classroom practice continues to be a significant challenge. To understand the causes of this gap, a survey was administered to school teachers to identify the barriers they face in implementing mathematical modelling. The results indicated several major obstacles, particularly limited time due to syllabus pressure and the exclusion of modelling tasks from exam-oriented content. A prominent insight from the study was the clear demand for professional development. Teachers expressed that they require training, workshops, demonstration lessons, and structured teaching resources to feel confident in teaching mathematical modelling. The study highlights that enhancing teacher preparedness through targeted professional development can significantly improve the integration of mathematical modelling into school mathematics and contribute to sustainable development education.

Key Words : *Mathematical modelling, sustainability, sustainable development etc.*

Introduction

Sustainability refers to fulfilling present needs without limiting the ability of future generations to meet theirs. It is grounded in

four key pillars: human, social, economic, and environmental well-being. Sustainable development aims to harmonise economic progress, environmental preservation, and

social equity for both current and future populations. It is essential because it supports efficient use of national resources, addresses societal needs, encourages responsible utilisation of natural resources, and safeguards these resources for the generations to come. The United Nations established the 17 Sustainable Development Goals (SDGs) as a framework to address pressing global issues, including climate change, resource management, social inequalities, and economic stability. The United Nation (UN) proclaimed 2005-2015 the 'Decade of Education for Sustainable Development', signalling the importance of ESD across fields and communities worldwide. Education can be a vehicle for actively promoting positive attitudes and patterns of behaviour that reflect the requirements of Sustainable Development (Widiati and Juandi, 2019). Mathematics is the key to other fields of science. Therefore, mathematics education plays an important role in realizing Education for Sustainable Development (ESD). The philosophy of Mathematics Education for Sustainable Development (MESD) highlights that all mathematical concepts can be leveraged to enhance societal, economic, and environmental well-being.

According to Natanael Karjanto (2023), Mathematical modelling is the process of using mathematics to represent, analyse, and solve real-world problems by creating a mathematical representation of a scenario to make predictions or gain insights. It plays a

crucial role in understanding and addressing sustainability challenges by providing a systematic approach to analysing complex systems, such as climate change, resource management, and pollution control. By creating models that simulate environmental, economic, and social interactions, researchers and policymakers can evaluate different scenarios, identify optimal strategies, and make data-driven decisions. The acquisition of principles and techniques in mathematical modelling is a powerful tool that can be utilized in various fields. Thus, teaching mathematical modelling to pupils at every level of education is essential for sustainable learning in education. As explained by Pollak (2011), the heart of mathematical modelling is problem finding before problem solving. Furthermore, Maab et al. (2018) also argued that offering applicable mathematics education in schools will not only convince and motivate students who wonder why they should study mathematics but also equip students with transferable skills that will be useful for them along the road, such as problem-solving, critical thinking, and analytical reasoning, making it suitable for promoting sustainable learning in mathematics education.

The National Council of Educational Research and Training (NCERT) in India has integrated sustainability-related content within school textbooks, particularly in mathematics and science subjects across various grades. Mathematical modelling has been introduced as an appendix in NCERT mathematics

textbooks of 9th and 10th grades. This will enable the students to represent, analyse and solve real-world problems mathematically. Even though teachers believe that mathematical modelling is useful for students and helps them develop problem-solving skills for sustainability challenges, its effective implementation remains limited due to several barriers, such as time constraints caused by syllabus completion, the exclusion of related content from exam-focused curricula, and a lack of student interest in studying mathematical modelling. This research aims to bridge the gap between curriculum and effective classroom implementation which is essential for enhancing students ability to apply mathematical reasoning to sustainability changes. The research also helps to make policy recommendations, organise professional development programs for teachers and developing skills like problem-solving, logical reasoning, and data interpretation-key competencies for 21st century learners.

Literature Review

Mathematical modelling is widely recognized as a fundamental component of mathematics education. According to Blum and Leib (2007), mathematical modelling bridges theoretical knowledge and practical application by allowing students to engage with real-world problems. Modelling activities foster critical thinking, problem-solving skills, and interdisciplinary learning (Borromeo Ferri, 2018). Despite these advantages, research

indicates that teachers often struggle with integrating mathematical modelling into their lessons due to a lack of resources, training, and time constraints (Kaiser and Sriraman, 2006). Greefrath and Vorhölter (2016) provided an overview of the German discussion on modelling and applications in schools, considering the development from the beginning of the 20th century to the present, and discussed the term “mathematical model” as well as different representations of the modelling process as modelling cycles. Similarly, Niss and Blum (2020), Leung et al. (2021), Saxena et al. (2016), Arseven (2015), Dunn and Marshman (2020), and Schukajlow et al. (2018) provide insights and perspectives on teaching and learning mathematical modelling in various educational contexts. With an emphasis on the secondary level, Niss and Blum (2020) included resources for teachers to acquire the knowledge and competencies that will allow them to successfully include modelling in their teaching. Leung et al. (2021) explored the teaching and learning of mathematical modelling and its applications, showcasing research and collaboration between colleagues from China and other parts of the world, offering new perspectives and resources for mathematical modelling education. Dunn and Marshman (2020) highlighted the importance of connecting mathematics with the real world through mathematical modelling using real data, emphasized the need to understand the

implications and differences between validating and estimating with data, and recommended an approach of mathematizing the context to promote students' perception of the real-world relevance of mathematics.

The United Nations Sustainable Development Goals (SDGs) emphasize the need for STEM education to support sustainability initiatives (UNESCO, 2017). Mathematical modelling serves as a powerful tool for addressing sustainability challenges such as climate change, resource management, and economic stability (Stillman et al., 2013). Several studies highlight how mathematical modelling can be used to analyse environmental systems, optimize resource allocation, and predict long-term trends (Gani et al., 2019). However, integrating sustainability concepts into mathematics curricula remains limited due to traditional teaching approaches focused on abstract problem-solving rather than applied learning (English, 2018). Despite its inclusion in national and international curricula, mathematical modelling is often not effectively implemented in classroom practice. According to Niss (2015). Many teachers lack adequate training in mathematical modelling and its applications to sustainable development (Geiger et al., 2022). Standardized testing and rigid curriculum structures often leave little room for inquiry-based and interdisciplinary learning (Blum et al., 2020).

Objectives of the Study

1. To explore school teachers' views on the importance of Mathematical Modelling within the framework of Sustainable Development.
2. To identify the challenges faced by school teachers in implementing Mathematical Modelling linked to the Sustainable Development Goals (SDGs) in their classrooms.
3. To identify the support, resources, and professional development teachers need to effectively teach and integrate Mathematical Modelling for Sustainable Development.

Methodology

Research Design :

Researchers used a mixed survey design-quantitative and qualitative-to examine the role of Mathematical Modelling in Sustainable Development and its integration into secondary education. The quantitative survey captured participants' attitudes and perceptions, while the qualitative data helped to identify teachers' needs for effectively implementing Mathematical Modelling for Sustainable Development.

Participants :

The target population for this study includes secondary school mathematics teachers who are directly involved in teaching Mathematical Modelling and Sustainable Development concepts. The researcher used

a convenient sampling technique, where 45 secondary school mathematics teachers, who were readily accessible and willing to participate were selected.

Data Collection Instrument:

A structured questionnaire was designed to collect both quantitative and qualitative data from teachers. It comprised 20 questions of different formats: Multiple-choice questions (MCQs): To assess teachers' knowledge and awareness. A self-constructed 5-point Likert scale: To measure attitudes and perceptions regarding the integration of mathematical modelling into sustainable development. Short-answer questions: To capture specific teaching experiences and opinions. Two open-ended questions: To gather deeper insights, challenges, and recommendations.

Data Collection Procedure:

The questionnaire was distributed through online mode to ensure wider accessibility. Responses were collected over a specified period to allow teachers sufficient

time to complete the survey. Quantitative data from MCQs and Likert scale items were analysed using descriptive statistics (percentage). Qualitative responses from short-answer and open-ended questions were examined using thematic analysis, identifying recurring themes and insights.

Results

The results of this survey provide insights into school teachers' perceptions, challenges, and needs regarding the implementation of mathematical modelling in the context of sustainable development. A majority of teachers were aware of the Mathematical Modelling unit in textbooks, but only a small portion of them had actually taught it. When asked if mathematical modelling helps students understand real-world sustainability challenges, most responses were positive.

Table 1 presents an overview of teachers' awareness, implementation, and interest in Mathematical Modelling, particularly in relation to sustainable development.

Table 1

Teachers' awareness, implementation, and interest in mathematical modelling

#	Question	Yes (%)	No (%)
1	Are you aware of the Mathematical Modelling model unit in the textbook?	80	20
2	Have taught the unit?	57.1	42.9
3	Do you link it to sustainability topics?	54.3	45.7
4	Would you like additional training resources?	94.3	5.7
5	Interested in workshops in sustainability modelling?	94.3	5.7

Table 1 shows that although most teachers are aware of the Mathematical Modelling unit in the textbook, fewer have taught it or connected it to sustainability issues. However, there is a high level of interest among teachers in receiving more

training and participating in workshops on sustainability modelling.

Table 2 presents the key challenges faced by teachers in implementing Mathematical Modelling in their classrooms. It highlights the most common barriers in its implementation.

Table 2

Key barriers faced by teachers in implementing Mathematical Modelling

#	Barrier	%) of teachers reporting
1	Time constraints due to syllabus completion	51.4
2	Not included in exam-focused syllabus	48.6
3	Lack of awareness about the unit	2.9
4	Difficulty in understanding the concept	2.9
5	Lack of student interest	14.3

Table 2 indicates the difficulties faced by teachers in implementing Mathematical Modelling primarily because of syllabus limitations, exam focused syllabus and unawareness. Overcoming such obstacles can enhance its application and usefulness in learning.

The survey results indicate that while most teachers are aware of mathematical modelling, less than half have integrated it into their teaching, primarily due to time constraints and its limited relevance to exams. Despite this, teachers recognize its value in addressing sustainability challenges and express a strong need for training, real-world applications, and practical resources.

Support through workshops, hands-on learning, and better curriculum alignment could enhance its implementation in classrooms.

Discussion

The survey findings offer a clear view of teachers' awareness and use of mathematical modelling in schools. While 80% of respondents knew about the Mathematical Modelling unit in the textbook, only 57.1% had taught it, indicating practical barriers to classroom implementation. Among those who taught the unit, most considered it valuable, and nearly half felt that students found it interesting. This suggests that with stronger implementation strategies, student engagement could be improved. Confidence levels varied, with almost one-fourth of

teachers reporting low confidence, highlighting the need for further training and support.

A major result from the study is the clear demand for professional development. Teachers expressed that they understand the value of modelling for students, but they often feel underprepared to teach it confidently. Many teachers explained that moving from textbook explanations to an actual modelling activity requires additional skills—particularly in guiding students through real-life situations, helping them interpret data, and connecting classroom mathematics to everyday contexts. Without proper support, teachers find it challenging to manage the various stages of modelling within the constraints of a regular school period.

Teachers also shared specific areas where professional development would be most helpful. Training sessions and workshops were mentioned frequently, especially those that offer step-by-step demonstrations of how modelling lessons can be conducted. Teachers suggested that hands-on sessions, where they can work through sample modelling problems themselves, would greatly increase their confidence. Another need highlighted was access to real-life data and examples that could be used directly in class. Teachers felt that when relevant datasets or contextual problems are readily available, they can begin to design modelling tasks without spending extra time searching for or creating material.

Taken together, the responses show that the barriers to implementing mathematical modelling do not arise from a lack of interest or unwillingness on the part of teachers. Instead, they stem from the practical challenges of transforming modelling ideas into teachable and time-appropriate classroom tasks. The need for sustained professional development—through training programs, workshops, model lessons, real-life examples, and digital supports—is therefore central to improving the quality and frequency of mathematical modelling in school mathematics. Strengthening teacher preparedness in this way could bridge the gap between the curriculum's expectations and classroom realities, enabling students to experience modelling as an authentic part of learning mathematics.

Recommendations

The findings have significant implications for curriculum development, teacher training, and school policies. To bridge the gap between curriculum and classroom implementation, several measures are recommended. Targeted professional development programs should be designed. Resource development is essential, including structured lesson plans, real-world datasets, and digital teaching aids such as videos and interactive simulations.

Conclusion

This study explored school teachers' perceptions, challenges, and needs regarding the implementation of mathematical modelling

in the context of sustainable development. The findings indicate that while a majority of teachers recognize the importance of mathematical modelling, fewer than half have actively incorporated it into their teaching. Despite the challenges, teachers express a strong willingness to receive training and access better resources to improve their teaching of mathematical modelling.

References

- ♦ Ben-Eliahu, A. (2021). Sustainable learning in education. *Sustainability*, 13(8), 4250.
- ♦ Cevikbas, M., Kaiser, G., & Schukajlow, S. (2022). A systematic literature review of the current discussion on mathematical modelling competencies: State-of-the-art developments in conceptualizing, measuring, and fostering. *Educational Studies in Mathematics*, 109, 205–236.
- ♦ Dundar, S., Gokkurt, B., & Soylu, Y. (2012). Mathematical modelling at a glance: A theoretical study. *ProcediaSocial and Behavioral Sciences*, 46, 3465–3470.
- ♦ Greefrath, G., & Vorhölter, K. (2016). *Teaching and Learning Mathematical Modelling: Approaches and Developments from German Speaking Countries*. Springer Nature.
- ♦ Heinz, S. (2011). *Mathematical Modeling*. Berlin Heidelberg, Germany: Springer Verlag.
- ♦ Hersh, M. (2006). *Mathematical Modelling for Sustainable Development*. Cham, Switzerland: Springer Science & Business Media.
- ♦ Leung, F. K. S., Stillman, G. A., Kaiser, G., & Wong, K. L. (Eds.). (2021). *Mathematical Modelling Education in East and West*. Cham, Switzerland: Springer International Publishing.
- ♦ Meerschaert, M. M. (2013). *Mathematical Modeling, Fourth edition*. Waltham, Massachusetts, US: Academic Press.
- ♦ Mordeson, J. N., & Mathew, S. (2021). *Sustainable Development Goals: Analysis by Mathematics of Uncertainty*. Cham, Switzerland: Springer.
- ♦ Niss, M., & Blum, W. (2020). *The Learning and Teaching of Mathematical Modelling*. Oxfordshire, England, UK: Routle





Relationship between Interpersonal Intelligence and Learning Agility of Prospective Teachers at Secondary Level

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Abstract

The present study investigates the relationship between Interpersonal Intelligence and Learning Agility among prospective secondary school teachers. The sample consisted of prospective teachers whose Interpersonal Intelligence and Learning Agility were assessed using standardized tools. Correlation analysis was employed to determine the degree of association between the two variables. The findings revealed a strong and significant positive relationship between Interpersonal Intelligence and Learning Agility in the total sample, as well as among both male and female subgroups. These results indicate that prospective teachers with higher Interpersonal Intelligence are more likely to demonstrate greater Learning Agility, highlighting the interconnected nature of social understanding, adaptability, and professional growth. The study underscores the importance of integrating training modules that enhance interpersonal competence and adaptive learning skills in teacher education programs. Implications for curriculum development, teacher training, and future research are also discussed.

Key Words : *Interpersonal Intelligence, Learning Agility, Prospective Teachers, Secondary Education, Teacher Education.*

Introduction

Education is widely regarded as “the key to progress” because it equips individuals with knowledge, skills, values, and habits essential for personal and social development. Teachers play a central role in this process, as they guide learning and shape students’ experiences. Modern educators require more than subject expertise; they must also develop

interpersonal intelligence and learning agility to “connect, adapt, and create meaningful learning environments” in today’s dynamic educational landscape.

Interpersonal Intelligence, described by Gardner (2011) as the ability to “understand and interact effectively with others,” includes empathy, communication, and social awareness. Teachers who

demonstrate strong Interpersonal Intelligence can build positive relationships, support students' emotional needs, and create inclusive learning spaces where "students feel acknowledged and valued" (Pathak, 2018). Research shows that such interpersonal strengths significantly improve student engagement and academic success, making this intelligence essential to effective teaching (Sharma, 2020).

Learning Agility, the ability to learn from experience and apply that learning to new situations is similarly vital for educators. DeRue et al. (2012) emphasize that learning-agile individuals are open to feedback, adaptive, and capable of innovative thinking. Teachers with high Learning Agility can respond to diverse student needs, integrate new technologies, and adjust to rapidly changing educational contexts. As Kumar and Singh (2019) note, "agile teachers continuously refine their practice," strengthening both professional growth and classroom performance. This study investigates the relationship between Interpersonal Intelligence and Learning Agility among prospective secondary-level teachers, contributing insights that can enhance teacher education programs.

Need and Significance of the Study

The study of Interpersonal Intelligence and Learning Agility is particularly relevant in the context of teacher education. Teachers are not only conveyors of knowledge but also role models and facilitators of students' social and emotional development. Understanding the

relationship between Interpersonal Intelligence and Learning Agility can help teacher education programs cultivate these essential skills in future educators.

In today's rapidly changing educational environment, teachers must be adaptable and able to navigate diverse classroom dynamics. Interpersonal Intelligence helps teachers build strong relationships with students, colleagues, and parents, fostering a supportive learning environment. Learning Agility enables teachers to continuously improve their teaching practices, respond to new challenges, and implement innovative strategies.

By investigating the relationship between these constructs, this study aims to provide valuable insights into how teacher education programs can better prepare prospective teachers at secondary level for the multifaceted demands of the teaching profession. The findings could inform curriculum development, instructional strategies, and support services, ultimately enhancing the quality of education provided to students.

Statement of the Problem

The study is titled as "Relationship between Interpersonal Intelligence and Learning Agility of Prospective Teachers at Secondary Level".

Objectives of the Study

1. To study the relationship between Interpersonal Intelligence and Learning Agility of Prospective Teachers at Secondary Level.

2. To study the relationship between Interpersonal Intelligence and Learning Agility of Prospective Teachers at Secondary Level with respect to gender.

Hypotheses of the study

1. There is a significant relationship between interpersonal Interpersonal Intelligence and Learning Agility among Prospective Teachers at Secondary Level.
2. There is a significant relationship between Interpersonal Intelligence and Learning Agility of male prospective secondary level teachers.
3. There is a significant relationship between Interpersonal Intelligence and Learning Agility of female prospective secondary level teachers.

Methodology in Brief

Method adopted for the study

The study adopted a correlational research design to examine the relationship between Interpersonal Intelligence and Learning Agility of Prospective Teachers at Secondary Level.

Variables Involved in the Study

The variables involved in the present study are:

- a. Interpersonal Intelligence
- b. Learning Agility

Population and Sample

The sample consists of 300 prospective teachers at secondary level from various Teacher Education Institutions in the

Idukki and Ernakulam districts during the academic year 2024–2025 were included.

Tools Used in the Study

The following tools are used for data collection:

- ♦ Interpersonal Intelligence Scale: in order to measure the Interpersonal Intelligence of prospective teachers at secondary level, the investigator used a standardised tool by Sudhakar N.
- ♦ Learning Agility Scale: in order to measure the Learning Agility of prospective teachers at secondary level, the investigator used a self-prepared scale

Analysis and Interpretation of Data

Objective 1

To study the relationship between Interpersonal Intelligence and Learning Agility among prospective teachers at secondary level.

Hypothesis (Hypothesis 1) was framed based on the first objective as, there is a significant relationship between Interpersonal Intelligence and Learning Agility among prospective teachers at secondary level. To analyse the hypothesis, it was converted to null form as, there is no significant relationship between Interpersonal Intelligence and Learning Agility among prospective teachers at secondary level.

The data collected from the sample of 300 prospective teachers at secondary level was analysed with the help of Pearson product moment correlation. The results are given in the following table 1.

Table 1

Correlation Coefficient (r) between Interpersonal Intelligence and Learning Agility of prospective teachers at secondary level

N	Variables	r value	% of error	Significance
300	Interpersonal Intelligence Learning Agility	.890	<.1%	Correlation is significant at the 0.05 level (2-tailed).

From the table 1, it can be seen that the r value is 0.890, which is significant at the 0.05 level. The percentage of error (<0.1%) is much lower than the accepted limit of 5%. This indicates that there is a significant positive correlation between Interpersonal Intelligence and Learning Agility. The calculated r value (.890) is greater than the theoretical value (.113). Thus, the null hypothesis, "there is no significant relationship between Interpersonal Intelligence and Learning Agility of prospective teachers at secondary level," is rejected. It may, therefore, be said that Interpersonal Intelligence and Learning Agility were found to be significantly and positively related.

Objective 2

To study the relationship between Interpersonal Intelligence and Learning Agility

of prospective teachers at the secondary level with respect to gender.

Two Hypothesis were framed based on the second objective. The first one (Hypothesis 2) was, there is a significant relationship between Interpersonal Intelligence and Learning Agility of male prospective teachers at secondary level. To analyse the hypothesis, it was converted to null form as, there is no significant relationship between Interpersonal Intelligence and Learning Agility of male prospective teachers at secondary level.

The data collected from the sample of 300 prospective teachers at secondary level, 60 male students were analysed with the help of Pearson product moment correlation. The results are given in the following table 2.

Table 2

Correlation Coefficient (r) between Interpersonal Intelligence and Learning Agility of male prospective teachers at secondary level

N	Variables	r value	% of error	Significance
60	Interpersonal Intelligence Learning Agility	.868	<.1%	Correlation is significant at the 0.05 level (2-tailed).

From the table 2, it can be seen that the r value between Interpersonal Intelligence and Learning Agility for male prospective teachers is 0.868, indicating a strong positive correlation. The percentage of error is less than 0.1%, which is well below the threshold of 5%, meaning the data is highly reliable with very minimal error. The calculated r value (.868) is greater than the theoretical value (.250). The correlation is significant at the 0.05 level (2-tailed), suggesting that there is a statistically significant relationship between Interpersonal Intelligence and Learning Agility among male prospective teachers. Therefore, we can reject the null hypothesis.

The strong positive correlation ($r = 0.868$) and the very low error percentage confirm that there is a significant relationship between Interpersonal Intelligence and

Learning Agility among male prospective teachers. As Interpersonal Intelligence increases, Learning Agility also tends to increase, and this relationship is statistically significant.

Second hypothesis (Hypothesis 3) was framed based on the second objective as, there is a significant relationship between Interpersonal Intelligence and Learning Agility of female prospective teachers at secondary level. To analyse the hypothesis, it was converted to null form as, there is no significant relationship between Interpersonal Intelligence and Learning Agility of female prospective teachers at secondary level.

The data collected from the sample of 300 prospective teachers at secondary level 240 female students were analysed with the help of Pearson product moment correlation. The results are given in the following table 3.

Table 3

Correlation Coefficient (r) between Interpersonal Intelligence and Learning Agility of female prospective teachers at secondary level

N	Variables	r value	% of error	Significance
240	Interpersonal Intelligence Learning Agility	.895	<.1%	Correlation is significant at the 0.05 level (2-tailed).

From the table, the r value between Interpersonal Intelligence and Learning Agility for the sample of 240 female participants is 0.895, which indicates a very strong positive correlation. The percentage of error is less than 0.1%, which is much lower than the acceptable threshold of 5%, suggesting that

the results are highly reliable. The calculated r value (.895) is greater than the theoretical value (.138). The correlation is also significant at the 0.05 level (2-tailed), meaning that there is clear statistical evidence supporting the relationship between these two variables. Therefore, we can reject the null hypothesis,

which states that there is no significant correlation between Interpersonal Intelligence and Learning Agility.

The strong positive correlation ($r = 0.895$) and the extremely low percentage of error ($<0.1\%$) confirm a significant relationship between Interpersonal Intelligence and Learning Agility. This suggests that as Interpersonal Intelligence increases, Learning Agility also increases consistently and reliably.

Major Findings of the Study

1. The analysis revealed a strong and significant positive relationship between Interpersonal Intelligence and Learning Agility among prospective teachers at the secondary level. The study confirms that prospective teachers with higher interpersonal intelligence also demonstrate higher learning agility, indicating that these two constructs are closely and positively related.
2. The results showed a strong and significant positive relationship between Interpersonal Intelligence and Learning Agility among male prospective secondary school teachers. The study confirms that male prospective teachers with higher interpersonal intelligence tend to exhibit higher learning agility, indicating a meaningful and positive association between these two variables.
3. The analysis revealed a strong and significant positive relationship between Interpersonal Intelligence and Learning Agility among female prospective

secondary school teachers. The study confirms that female prospective teachers with higher interpersonal intelligence also exhibit higher learning agility, demonstrating a meaningful positive association between the two variables.

Educational Implications of the Study

The strong positive correlation suggests that teacher education programs should intentionally integrate modules that develop interpersonal skills-such as empathy, communication, conflict resolution, and collaborative learning-alongside components designed to enhance learning agility, including reflective practice, adaptability training, and problem-solving activities.

As teachers with higher Interpersonal Intelligence and Learning Agility are better equipped to handle diverse classroom situations, the study supports the incorporation of training that prepares teachers to respond effectively to varied student needs. This may improve classroom climate, student engagement, and overall learning outcomes.

Learning Agility is closely tied to a teacher's ability to reflect, adapt, and innovate. Teacher educators can emphasize reflective journals, portfolio development, peer feedback, and inquiry-based tasks that encourage prospective teachers to learn from experiences and refine their practices continuously.

Institutions can design specialized workshops focusing on interpersonal communication, emotional intelligence, resilience, and adaptive teaching strategies.

Such programs would help prospective teachers strengthen the attributes demonstrated to be interrelated in this study.

Since both male and female prospective teachers showed strong relationships between Interpersonal Intelligence and Learning Agility, teacher education programs can ensure balanced opportunities for all trainees, while also addressing any specific developmental needs based on gender-related observations.

Conclusion

The present study successfully demonstrated a positive relationship between Interpersonal Intelligence and Learning Agility among prospective teachers at secondary level. The findings underscore the significant role that interpersonal intelligence plays in enhancing students' ability to adapt to various learning environments and challenges. By understanding social cues, collaborating effectively with peers, and managing emotional responses, students with high interpersonal intelligence are better equipped to navigate complex educational settings and perform with greater agility.

The implications of this study suggest that teacher education programs should incorporate training that develops both cognitive and social competencies. This would help future educators better manage classroom dynamics, build meaningful relationships with students, and foster environments conducive to learning. Given the positive impact of Interpersonal Intelligence on Learning Agility, integrating such training into

curriculum design can contribute to more adaptable and resilient educators. Overall, the study emphasizes the need for a holistic approach to teacher development, one that includes the cultivation of both intellectual and interpersonal skills.

Reference

- ♦ Abas, M., Solihatin, E., & Nadiroh. (2019). Effect of instructional models and interpersonal intelligence on the social studies learning outcomes. *International Journal of Instruction*, 12(4), 705–718. <https://doi.org/10.29333/iji.2019.12445a>
- ♦ DeRue, D. S., Ashford, S. J., & Myers, C. G. (2012). *Learning agility: In search of conceptual clarity and theoretical grounding*. *Industrial and Organizational Psychology*, 5(3), 258–279.
- ♦ Etikan, I., & Bala, K. (2017). Sampling methods in research methodology: How to choose a sampling technique for research. *International Journal of Economics, Commerce, and Management*, 5(6), 1–10.
- ♦ Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences* (3rd ed.). Basic Books.
- ♦ Kumar, R., & Singh, S. (2019). Learning agility and teacher effectiveness: A study in contemporary educational settings. *Journal of Educational Research and Practice*, 9(2), 45–53.





Relationship between Artificial Intelligence and Emotional Intelligence among Secondary School Students in Ernakulam District

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Abstract

This research explores the Relationship between Artificial Intelligence (AI) on Emotional Intelligence (EI) among Secondary School Students in Ernakulam District. With AI's growing presence in educational tools, this study investigates how AI tools impact the development of key human competencies-particularly Emotional Intelligence - among adolescents. A survey was conducted with 500 secondary school students. The findings highlights the relationship which offering insights for educators and policymakers on integrating AI in school curricula to support students' holistic development.

Key Words : Artificial Intelligence, Human Competencies, Emotional Intelligence, Secondary School Students etc.

Introduction

Artificial Intelligence (AI) has emerged as a powerful tool in modern education, providing personalized learning experiences and interactive platforms for students. The role of Artificial Intelligence (AI) in shaping modern education is a subject of increasing interest, particularly regarding its impact on cognitive and emotional development. As AI becomes more integrated into secondary school curricula through educational tools and applications, it is important to assess its influence on students' Emotional Intelligence (EI). Emotional Intelligence (EI) is essential

human competency that influence a student's academic performance, relationships, and overall personal development. EI refers to the ability to recognize, understand, and manage one's emotions. This competency is critical during adolescence, a time of significant emotional development.

In the context of secondary education, AI has been leveraged to enhance learning experiences through interactive simulations, personalized learning systems, and feedback mechanisms. While studies have explored the cognitive benefits of AI in education, its role in shaping Emotional Intelligence remains

underexplored. In Ernakulam District, like many other parts of India, AI has begun to make its way into secondary education through smart classrooms, AI tutors, and other technology-driven learning methods. However, limited research exists on how such technologies relates students' emotional development. This study aims to fill this gap by investigating the role of AI in shaping EI among secondary school students in Ernakulam.

Objectives

1. To find out the Emotional Intelligence of Secondary School Students.
2. To determine whether there is a significant relationship between the usage of AI and students' EI.

Hypothesis

There is a significant correlation exists between the usage of AI and Emotional Intelligence of Secondary School Students.

Methodology

Research Design

This study adopts a mixed-methods research design, using both quantitative and qualitative approaches. A survey questionnaire was administered to gather data from 500 secondary school students in Ernakulam District. The students were selected from a random sample of five schools, ensuring representation across urban and rural schools.

Sample

A total of 500 students (250 male, 250 female) from grades 9 to 12 participated

in the survey. The participants ranged in age from 14 to 18 years. All participants had used AI-based educational tools for at least one academic year.

Tool Used

Emotional Intelligence (EI) Assessment:

This section was adapted from the Emotional Quotient Inventory (EQ-i 2.0), which evaluates five key components of EI: self-awareness, self-regulation, motivation, empathy, and social skills.

Data Analysis

Data from the surveys were analysed using statistical software (SPSS). Descriptive statistics (mean, standard deviation) were used to summarize the survey results. Inferential statistics (correlation analysis) were used to explore the relationship between AI usage and EI. A significance level of $p < 0.05$ was set for all statistical tests.

Results

Table 1

Emotional Intelligence Scores of Participants

Emotional Intelligence Component	Mean	SD
Self-Awareness	4.3	0.56
Self-Regulation	4.2	0.61
Motivation	4.5	0.47
Empathy	4.6	0.52
Social Skills	4.4	0.53

Table 2
Correlation between AI Usage and Emotional Intelligence

Emotional Intelligence Component	r Value	p Value
Self-Awareness	0.45	0.002
Self-Regulation	0.38	0.005
Motivation	0.50	0.001
Empathy	0.52	0.000
Social Skills	0.44	0.003

Discussion

The results of this study suggest a significant positive correlation between the use of AI tools and improvements in both Emotional Intelligence among secondary school students. The most notable impact was observed in the areas of empathy and social skills, which are critical components of EI. AI tools appear to enhance students' ability to manage their emotions, understand the emotions of others, and navigate complex social environments. These findings are consistent with prior research suggesting that interactive, AI-based learning can foster emotional and social growth (Smedley, 2020; Novak, 2021).

While AI tools contribute positively to emotional development, the study also highlights some concerns. One potential downside is the risk of over-reliance on technology, which might hinder face-to-face

interactions that are crucial for developing interpersonal skills. It is important for educators to find a balance between AI-enhanced learning and traditional methods that emphasize human interaction.

Conclusion

This research indicates that AI has a significant role in enhancing emotional intelligence among secondary school students in Ernakulam District. The findings suggest that AI tools can be effectively integrated into educational curricula to support the development of key human competencies. However, it is essential for educators and policymakers to consider the potential drawbacks, such as reduced face-to-face interaction, and ensure that AI is used as a supplement rather than a replacement for traditional teaching methods.

Recommendations

- Balanced AI Integration:** Schools should integrate AI tools that complement, rather than replace, traditional face-to-face learning to maintain a balance between technology use and human interaction.
- Gender-Sensitive Approaches:** AI tools should be tailored to address gender-specific needs, ensuring that both male and female students can equally benefit from AI's emotional and social development potential.
- Teacher Training:** Teachers should receive training in how to incorporate AI into their teaching in ways that support

students' emotional growth fostering a more holistic educational experience.

- 4. Further Research:** Future studies should explore the long-term effects of AI on emotional intelligence, particularly in diverse cultural contexts.

References

- ♦ Novak, M. (2021). The impact of artificial intelligence on emotional intelligence development in adolescents. *Journal of Educational Technology*, 15(3), 45-62.
- ♦ Smedley, M. (2020). Emotional intelligence and the role of AI in modern education. *International Journal of Educational Research*, 38(2), 105-117.
- ♦ Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ*. Bantam Books.
- ♦ Mayer, J. D., Salovey, P., & Caruso, D. R. (2004). Emotional intelligence: Theory, findings, and implications. *Psychological Inquiry*, 15(3), 197-215.
- ♦ Helliwell, J. F., Layard, R., & Sachs, J. (2019). *World Happiness Report 2019*. Sustainable Development Solutions Network.
- ♦ Schutte, N. S., & Malouff, J. M. (2011). Emotional intelligence and interpersonal relations: A meta-analytic review. *Educational Psychology*, 31(6), 695-706.
- ♦ Salovey, P., & Mayer, J. D. (1990). Emotional intelligence. *Imagination, Cognition, and Personality*, 9(3), 185-211.
- ♦ Jain, R., & Gupta, A. (2020). Artificial intelligence in education: Impacts on cognitive and emotional development. *Journal of Educational Innovation*, 24(4), 323-335.





Effectiveness of Whole Brain Teaching Strategy on Self Efficacy and Achievement in Biology of Ninth Standard Students

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Abstract

This study was conducted to examine the effectiveness of the Whole Brain Teaching (WBT) strategy on Self Efficacy and Achievement in Biology of secondary school students in Ernakulam District. The study adopted quasi-experimental method with pre-test–post-test non-equivalent group design. A sample of 60 ninth standard students following the Kerala State syllabus was selected from a school in Ernakulam District. Among them, 30 students were assigned to the experimental group and 30 students to the control group. The Whole Brain Teaching strategy is an instructional approach that integrates neuroscience and direct instruction strategies and actively engages students by involving their visual, auditory, and kinesthetic senses. The findings of the study revealed that there was a significant increase in Self Efficacy and Achievement in Biology among secondary school students.

Key Words : Effectiveness, Whole Brain Teaching Strategy, Self-Efficacy, Achievement, Biology etc.

Introduction

Education aims to foster personal development, societal progress, and prepare individuals for active participation in their communities. It equips learners with cognitive tools necessary for critical thinking, problem-solving, and decision-making. Moreover, education nurtures social skills and awareness, contributing to the holistic development of individuals. Teaching is central to the educational process, involves skilled educators

who facilitate learning through various instructional methods and strategies.

Effective teaching goes beyond imparting information; it involves fostering curiosity, encouraging critical inquiry, and adapting to diverse learning styles and abilities.

Educational research constitutes a systematic inquiry into the process, outcomes, and contexts of learning and teaching. It involves systematic investigation and analysis of issues related to teaching, learning and

educational practices. The ultimate aim of educational research is to advance knowledge and understanding of teaching learning, and educational practices in order to improve educational outcomes and contributes to the overall development of individuals and societies.

Need and Significance of the Study

Child Self Efficacy has been associated with social behavior, academic achievement, good social interactions and effective peer relationships. Our current curriculum does not teach student how to manage themselves and to be self developed. Self Efficacy and student learning are linked. Researchers have revealed that student who has high Self Efficacy retain learning more easily. There are many instructional Models that can boost student Self Efficacy. Whole Brain Teaching Strategy is one of the strategies that can boost various skills of the learners.

From the study it was found that the integration of Whole Brain Teaching Strategy in Biology can significantly impact students' Self Efficacy and Achievement. By engaging multiple areas of the brain through interactive and multisensory approaches, such strategies cater to diverse learning styles and enhance student's understanding and retention of biological concepts. This active learning approach fosters a deeper connection with the subject matter, as students are encouraged to participate, collaborate, and apply their knowledge in practical context.

Through the use of whole Brain Teaching Strategy, students experience success through interactive learning activities,

such as simulations, experiments and group discussions. They develop confidence in their ability to comprehend and apply biological principles. This confidence translate into higher motivation to tackle challenging tasks and persists in their learning journey.

Students are more likely to achieve higher grades when they are actively engaged in learning and when their understanding of biological concepts is reinforced through various sensory modalities.

In summary, The investigator found that Whole Brain Teaching Strategy not only enhance the learning experience in Biology but also contribute to higher levels of Self Efficacy and achievement among students. By creating a dynamic and supportive learning environment, this strategy empowers students to become confident and proficient in their understanding and application of biological concepts

Scope of the Study

Whole Brain Teaching Strategy was developed by Chris Baffle through long time practice and research. So this strategy is definitely useful for improving efficacy of instruction. This strategy is very helpful in engaging students through out the teaching learning process and it keeps the student active throughout the learning process. It promotes independent learning in students and also make them capable of integrating new knowledge in their lives. In short Whole Brain Teaching strategy may improve student learning if implemented as a teaching strategy in Biology.

Research Questions

1. Whether Whole Brain Teaching Strategy is effective in enhancing Achievement in Biology of Ninth Standard Students?
2. Whether Whole Brain Teaching Strategy is effective in enhancing Self Efficacy of Ninth Standard Students?

Statement of the Problem

Effectiveness of Whole Brain Teaching Strategy on Self Efficacy and Achievement in Biology of Ninth Standard Students.

Operational Definition of key Terms

Effectiveness

According to Oxford Dictionary Effectiveness means the result or consequences of an action. Effectiveness refers to the degree to which something achieved successfully as its intended goals or objectives. In the context of education or any other field, effectiveness is a measure of how well a strategy, intervention program or process accomplishes its intended outcomes and desired results. In this study effectiveness is to describe the consequences of Whole Brain Teaching strategy on Self Efficiency measured in terms of points on Self Efficiency scale and Achievement in Biology as marks in achievement test.

Whole Brain Teaching Strategy

Whole Brain Teaching is an instructional approach used to activate students brains with the goal of maximizing engagement in the learning process. It

integrates the principles of social and emotional factors in learning into highly energetic learning environment. It involves five phases.

Phase I : Introduction or Engage phase

Phase II : Direct Instruction or Teach phase

Phase III : Guided Practice or Practice phase

Phase IV : Independent Practice or Apply phase

Phase V : Closure or Review phase.

Self Efficacy refers to the individual's capacity to produce important effects. People who are of being able to make a difference, feel good and therefore take initiatives.

Here Self Efficiency is a person's belief in their ability to accomplish a task or goal. It refers to a person's abilities to control their behavior and environment and to stay motivated in pursuit of their goal.

Achievement in Biology

According to Crow and Crow (1969). Academic Achievement means the extent to which the learner is profiting from instruction in the given area of learning. Achievement is reflected by the extent to which skill and knowledge has been acquired by a person through the training imparted to him.

In this study Academic Achievement in Biology, means the knowledge and understanding attained or skills developed through learning of Biology designated by test scores or marks assigned by the investigator.

Ninth Standard Students

Students who were studying in Ninth Standard following Kerala state syllabus during the academic year 2024-2025

Objectives of the Study

1. To find out Effectiveness of Whole Brain Teaching Strategy in improving Achievement in Biology of Ninth Standard Students.
2. To find out Effectiveness of Whole Brain Teaching Strategy in improving Self Efficacy of Ninth Standard Students.

Hypotheses of the Study

1. There is a significant difference between the gain scores of Achievement in Biology of control and experimental group of Ninth Standard Students.
2. There is a significant difference between the gain scores of Self Efficacy of Ninth Standard Students in the control and experimental groups.

Method Adopted for the Study

The investigator adopted Quasi Experimental method to carry out the study. Among the different Experimental designs the researcher carried out the study using pre-test post-test non-equivalent group design.

Variables of the Study

Independent Variables

Whole Brain Teaching Strategy as independent variable (for experimental group) and Activity method (for control group).

Dependent Variables

Dependent variables are the condition, or characteristics that appear, disappear or change due to the influence of independent variables. In the present study the dependent variables were Self Efficacy and Achievement in Biology.

Population and Sample of the study

In the present study all the Ninth Standard Students of in Ernakulam district who followed Kerala state syllabus during the academic year 2024-2025 was considered as the population.

From the population the investigator selected 60 students of standard Nine who followed Kerala state syllabus during the academic year 2024-2025 as sample.

Tools Used for the Study

- ♦ Lesson transcripts based on Whole Brain Teaching Strategy for teaching the experimental group.(Facilitative tool).
- ♦ Lesson transcripts based on Activity method for teaching control group. (Facilitative tool).
- ♦ Scale for measuring Self Efficacy. (Evaluative tool).
- ♦ Achievement test in Biology which was prepared by the investigator. (Evaluating tool)

Statistical Techniques Used

Descriptive Statistics

Mean, Median, Mode, Standard deviation and graphical representation.

Inferential statistics

t test and ANCOVA

Analysis and Interpretation of Data**Hypothesis 1**

The research hypothesis was stated as:

H1 : There is a significant difference between the gain scores of Achievement in Biology of control and experimental group of Ninth Standard Students.

In order to test this hypothesis inferentially, it was changed to null form.

H0 : There is no significant difference between the gain scores of Achievement in Biology of control and experimental group of Ninth Standard Students.

In order to verify whether the difference is significant, the investigator employed t test to test the null hypothesis at 0.01 level of significance. The result is given in the table 1.

Table 1

Number (N), Mean (M), Standard Deviation (SD) and 't' value of gain scores of Achievement in Biology of control and experimental group of Ninth Standard Students

Group	N	M	SD	t value	Result
Control Group	30	4.30	2.52	9.277	Significant at level 0.01
Experimental Group	30	8.77	4.13		

Interpretation

In table 1, it was observed that the gain scores of Achievement in Biology of control and experimental groups were 4.30 and 8.77 respectively. The calculated t value is (9.277) greater than theoretical t value (2.66) at 0.01 level of significance. Hence the null hypothesis was rejected and the research hypothesis was accepted. Therefore, it is possible to conclude that there is a significant difference between the gain scores of Achievement in Biology of control and experimental group of Ninth Standard Students. Hence it is evident that there was some increase in the Achievement in Biology of

experimental group of Ninth Standard Students after giving instruction through Whole Brain Teaching Strategy.

Hypothesis 2

Research hypothesis was started as:

H1: There is a significant difference between the gain scores of self Efficacy of Ninth Standard Students in control and experimental group.

In order to test this hypothesis inferentially, it was changed to null form.

H0 : There is no significant difference between the gain scores of self Efficacy of Ninth Standard Students in control and experimental group.

In order to verify whether the difference to test the null hypothesis at 0.01 level of is significant, the investigator employed t test significance. The result is given in table 2.

Table 2

Number (N), Mean (M), Standard Deviation (SD) and 't' value of gain scores of Self Efficacy of control and experimental group of Ninth Standard Students

Group	N	M	SD	t value	Result
Control Group	30	14.63	6.906	5.579	Significant at level 0.01
Experimental Group	30	25.60	8.261		

Interpretation

In the table 2, it was observed that the means of gain scores of Self Efficacy of Ninth Standard Students in control and experimental groups were 14.63 and 25.60 respectively.

The calculated value is (5.579) greater than theoretical t value (2.66) at 0.01 level of significance. Hence the null hypothesis was rejected and research hypothesis as accepted. Therefore it was possible to conclude that there is a significant difference between the gain scores of Self Efficacy of Ninth Standard Students in control and experimental groups. Hence it was evident that there was some

increase in gain scores of Self Efficacy of Ninth Standard Students in experimental group after giving instruction through Whole Brain Teaching Strategy.

Treatment wise adjusted Mean Scores of Achievement in Biology by considering their Pre test as covariate.

To compare adjusted mean scores of Post-test of Achievement in Biology among Experimental Group and Control Group by considering Pre-test scores as a covariate, the data were analyzed with the help of One-Way ANCOVA and the results are given in Table 3.

Table 3

Summary of One Way ANCOVA of Scores of Post test Self-efficacy of students by considering their Pre test Scores as covariate

Source of variance	df	SS_{y1x}	MSS_{y1x}	F_{yx}	Remark
Experimental Group Control Group	1	300.186	300.186	93.578	P<0.00
Error	57	182.85	3.21		

From the table that it can be seen that the adjusted F value for Group is 93.578 which is not significant at 0.01 level with df1/ 57. It indicates that the adjusted mean scores of Post test of Achievement in Biology of experimental and control group does not differ significantly when their Pre test scores were considered as covariate. Thus the null hypothesis that there is no significant difference in adjusted mean scores of post test of Achievement in Biology of Experimental Group and Control Group when considering Pretest scores as covariate is accepted. Even though the adjusted mean scores of Post test of Achievement in Biology of Experimental Group is 16.4 is higher than control group whose adjusted mean scores of Post Achievement in Biology is 11.86 when their Pre test scores of Achievement in Biology is considered as covariate, the F value shows the difference is not significant.

Therefore it can be concluded that Whole Brain Teaching Strategy did not make any difference on the Achievement in Biology of the students of both experimental and Control Group

Major Findings of the study

Following are the Major findings of the study

1. The following are the major findings of the study since the gain scores of Achievement Test of experimental group was significantly higher than that of control group it was found that Whole Brain Teaching Strategy was effective for

improving Achievement of Ninth standard students in Biology.

2. There was a significant difference between the gain scores of Self-efficacy of control and experimental groups. Hence it can be concluded that Whole Brain Teaching Strategy was more effective for improving Self-efficacy than Activity method

Implications

Study has wider implications in the teaching learning process. The study will be helpful to curriculum developers and policy makers. It will be of great help for the teaching community and researchers. Since the Whole Brain Teaching strategy is proved to be effective in teaching Biology it can be said as a boon for biology teachers.

Conclusion

It was found that the Whole Brain Teaching strategy was more effective than Activity method in improving Achievement in Biology and Self Efficacy among Ninth Standard Students. So in the light of the results of the study, teachers can make use of WBTS as a best means to improve Achievement in Biology and Self Efficacy of students at secondary level.

References

- ♦ Best, J.W. & Khan, J.V. (2005). Research in Education. (9th Edition). New Delhi. Prentice Hall of India Private Limited.
- ♦ Piaget, J. (1952). The origins of intelligence in children. International Universities Press.

- ♦ Garret, H. E. (2004). Statistics in Psychology and Education. New Delhi. Paragon International Publishers
- ♦ Agarwal, J.C. (1992). Essentials of Educational Psychology. New Delhi. Vikas Publications House, Private Limited.
- ♦ Ahmad Saki Emyus (2020) The Influence of Whole Brain Teaching (WBT) to the Motoric and Linguistic Skills of Preschoolers. International Journal of Instruction, Vol.13, No.4 p-ISSN: 1694-609X pp. www.e-iji.net
- ♦ Ames, C. (1992). Classroom goals, structure, and student motivation. *Journal of Educational Psychology*, 84(3), 261–271. <https://doi.org/10.1037/0022-0663.84.3.261>
- ♦ Ames, C. (1992).Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84(3), 261–271.Retrieved from <https://psycnet.apa.org/>
- ♦ Anna. (2017). Interest, attitudes, and self-efficacy beliefs explaining upper secondary school students' orientation towards biology-related careers. *Journal of Education and Career Development*, 14(2), 203-218. <https://doi.org/10.1016/j.jed.2017.02.010>





Relationship Between Perceived Parenting and Social Alienation of Secondary School Students

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Abstract

In the grand tapestry of human existence, the early years of a child's life hold the promise of boundless potential and blossoming of their unique personality. The basic attitude established in the home during the early years will dominate later attitudes and personality development of a child. The home is the basic and fundamental unit of human society and it is regarded as the primary agent of education. The basic purpose of the family is to provide a loving safe environment for the child. Among the various factors which make favorable or unfavorable home environment, the nature of parenting is one of the most influential components. Parenting is both a biological and social process. Various research studies have shown that poor parenting may profoundly impact on various aspects of child's development, including their emotional and social well-being and social alienation. The present study is an attempt to assess the relationship between Perceived Parenting and Social Alienation of secondary school students. The study was concluded that there is a significant negative relationship between Perceived Parenting and Social Alienation of secondary school students.

Key Words : Unique personality, Impressionable, Perceived parenting, Social alienation etc.

Introduction

Education according to National Education Policy, 2020 (NEP, 2020) is fundamental for achieving full human potential, developing an equitable and just society and promoting national development. According to Vivekananda "Education is not the amount of information that we put into our brain and riot there undigested all our life. We must

have life-building, man-making assimilation of ideas. If you have assimilated five ideas and made then your life and character, you have more education than any man who has got by heart a whole library". In the grand tapestry of human existence, the early years of a child's life hold the promise of boundless potential and blossoming of their unique personality. These formative years are like

fertile soil, where the seeds of character, intellect and individuality are so on. In his journey of growth and self-discovery education emerges as the guiding light, molding not just the intellect but also playing a pivotal role in the intricate process of personality development of children. It is the total of our experiences, interactions and the knowledge we accumulate. However, the foundation for this intricate mosaic is often laid during childhood, when young minds are impressionable and open to learning.

Role of Home in Educating a Child

The basic attitude established in the home during the early years will dominate later attitudes and personality development of a child. The home is the basic and fundamental unit of human society and it is regarded as the primary agent of education. The basic purpose of the family is to provide a loving safe environment for the child. Only when children feel a certain degree of comfort at home they can learn effectively. Home is the most influential informal but active agency of education. Actually, the education of an individual begins at home. Being a center of love and affection, family is the best place for the education of a child. The National Curriculum Framework, 2022 (NCF-2022) has emphasized the first eight years of a child. It has mentioned that the first eight years of a child's life are critical and lay foundation for life long well-being and overall growth and development across all dimensions - physical,

cognitive and socio emotional. Family develops moral and ethical values in the child, which forms the backbones of her character in the adult life. The home provides early experiences and present role models for acceptable moral behavior of the child. The child imbibes moral values like honesty, obedient, mercy, benevolence, righteousness etc., exhibit by other family members. In a secure home setting, a child will also learn how to be comfortable with who they are and to feel free to express themselves without judgment. When parents and family members provide a safe and open environment, a child feels secure and develops in a physically and emotionally healthy manner.

Just like the favorable home environment leads to the development of good habits and positive attitudes in the child, unfavorable environment leads to the formation of unhealthy habits and poor character formation. Children's who grow up in less ideal emotional environment tend struggle in the future and unable to form meaningful relationships as they grow up and, in extreme cases, get involved in crime. Studies have also linked poor emotional environments to later mental health issues such as anxiety and alienation. Various research studies have shown that poor family environment during a child's early years has been related to various issues such as development of poor mental health and other developmental delays.

Need and Significance of the Study

Numerous studies have shown that home environment has a powerful effect on what children learn and how they behave in future. Among the various factors which make favorable or unfavorable home environment, the nature of parenting is one of the most influential components. Parenting is both a biological and social process. The way of parenting determines how the child will adjust the society emotionally. Neuroscientist have discovered that positive parenting contribute to better functioning in the brain regions associated with emotion and cognition during, the teen years. Harvard Scientists found that positive parenting has long-term benefits, including better relationships, mental health, and well-being during adulthood. At the same time bad parenting negatively affect children's mental health. Such practices have been linked to an increased risk of mental health issues, including anxiety, depression, and aggression. They may also been associated with poorer academic performance, lower self-esteem, and impaired social skills. Various research studies have shown that poor parenting may profoundly impact on various aspects of child's development, including their emotional and social well-being and social alienation.

The facts and findings disclosed above made the investigator to think about 'the how of parenting' affects various aspects of social development of children especially on their

alienating behavior. Hence the investigator decided to realize the relationship of parenting practices with Social Alienation habit of secondary school students.

Research Questions

- ♦ What will be the relationship between Perceived Parenting and Social Alienation of secondary school students?
- ♦ What will be the relationship between Perceived Parenting and Social Alienation of secondary school students with respect to gender?

Statement of the Problem

The present study is an attempt to assess the relationship between Perceived Parenting and Social Alienation of secondary school students. The study is entitled, "Relationship between Perceived Parenting and Social Alienation of Secondary School Students".

Operational Definition of Key Terms

The key terms are defined below.

Perceived Parenting

Perceived Parenting means the views of adolescents or children about the parental behaviors during their childhood.

Social Alienation

Social Alienation is the feeling of being segregated from one's community. It is a personal feeling of disconnection from a group - whether friends, family, wider society - to which the individual has an affinity.

Secondary School Students

The secondary school students are those studying in standard VIII, IX and X. In the present study, students from standard VIII to X in Idukki District in the year 2024-2025 following Kerala state syllabus, are included.

Objectives of the Study

- ♦ To find out the relationship between Perceived Parenting and Social Alienation of Secondary School Students
- ♦ To find out the relationship between Perceived Parenting and Social Alienation of Secondary School Students with respect to gender

Hypotheses of the Study

- ♦ There is a significant relationship between Perceived Parenting and Social Alienation of Secondary School Students
- ♦ There is a significant relationship between Perceived Parenting and Social Alienation of boys of Secondary Schools
- ♦ There is a significant relationship between Perceived Parenting and Social Alienation of girls of Secondary Schools

Method Used for the Study

In the present study survey method of research has been used. The sample was selected through stratified random sampling method from Idukki district. Sample consisted of 300 secondary school students.

Variables of the Study

Perceived Parenting and Social Alienation are the variables used for the study.

Population and Sample

All the secondary school students of Idukki district following Kerala State syllabus during the academic year 2024-2025 is considered as the population. From the population investigator selected 300 secondary school students as the sample.

Tools Used for the Study

The tools used for the study are:

- ♦ To assess the Perceived Parenting of secondary school students, a tool titled Perceived Parenting Scale for secondary school students prepared by the investigator was used
- ♦ To assess the Social Alienation of secondary school students a tool titled Social Alienation Scale for secondary school students prepared by the investigator was used

Statistical Tools Used

The statistical tools used for the analysis were:

- ♦ Arithmetic Mean
- ♦ Standard Deviation
- ♦ Coefficient of correlation

Analysis and Interpretation based on Objectives

In this section analysis of data were done based on objectives.

Analysis and Interpretation of Data based on Objective 1

The first objective was to find out the relationship between Perceived Parenting and Social Alienation of Secondary school students.

Based on this objective the researcher framed a research hypothesis as:

H1: There is a significant relationship between Perceived Parenting and Social Alienation of secondary school students.

In order to test this, it was converted to a null hypothesis as:

H0: There is no significant relationship between Perceived Parenting and Social Alienation of secondary school students.

The null hypothesis was tested using the r value calculated. Its details are presented in table 1.

Table 1.

Karl Pearson's product moment correlation of Perceived Parenting and Social Alienation of secondary school students

Variable	N	'r' Value	Result
Perceived Parenting	300	-0.234	Sig.at 0.01 level
Social Alienation			

As the calculated r value (0.234) is greater than the theoretical value (0.148), at 0.01 level of significance with degrees of freedom 298, the null hypothesis that "there

is no significant relationship between Perceived Parenting and Social Alienation of secondary school students is rejected. It means that there is a significant negative relationship exists between Perceived Parenting and Social Alienation of secondary school students. That means increase in the scores of Perceived Parenting shows a decrease in the scores of Social Alienation.

Analysis and Interpretation of Data based on Objective 2

The second objective was to find out the relationship between Perceived Parenting and Social Alienation of secondary school students with respect to gender.

Based on the second objective, the correlation between:

- A. Perceived Parenting and Social Alienation of boys (N=154) and
- B. Perceived Parenting and Social Alienation of girls (N=146) were calculated separately

A. Based on this objective, the researcher framed a research hypothesis as:

H1: There is a significant relationship between Perceived Parenting and Social Alienation of boys of secondary schools.

In order to test the hypothesis, it was converted into null hypothesis as:

H0: There is no significant relationship between Perceived Parenting and Social Alienation of boys of secondary schools.

The null hypothesis was tested using the r value calculated. Its details are presented in table 2.

Table 2

Karl Pearson's product moment correlation of Perceived Parenting and Social Alienation of boys of secondary school students

Variable	N	'r' Value	Result
Perceived Parenting	154	-0.216	Sig.at 0.01 level
Social Alienation			

As the calculated r value (-0.216) is greater than the theoretical value (0.208), at 0.01 level of significance with degrees of freedom 152; the null hypothesis that, there is no significant relationship between perceived parenting and social alienation of boys of secondary schools' was rejected. It means that there is a significant negative correlation exists between Perceived Parenting and Social Alienation of boys of secondary school. So the increase in the scores of Perceived Parenting shows a decrease in the scores of Social Alienation of boys of Secondary School.

B. Based on the second objective the researcher framed a research hypothesis as:

H1: There is a significant relationship between Perceived Parenting and Social Alienation of girls of secondary school.

In order to test the hypothesis, it was converted into null hypothesis as:

H0: There is no significant relationship between Perceived Parenting and Social Alienation of girls of secondary school.

The null hypothesis was tested using the r value calculated. Its details are presented in table 3.

Table 3

Karl Pearson's Product Moment Correlation of Perceived Parenting and Social Alienation of girls of secondary school students

Variable	N	'r' Value	Result
Perceived Parenting	146	-0.241	Sig.at 0.01 level
Social Alienation			

As the calculated r value (-0.241) is greater than the theoretical value (0.208), at 0.01 level of significance with degrees of freedom 152, the null hypothesis that "there is no significant relationship between perceived parenting and social alienation of girls of secondary school" is rejected. It means that there exist a significant negative correlation between Perceived Parenting and Social Alienation of girls of secondary schools. So the increase in the scores of Perceived Parenting shows a decrease in the scores of Social Alienation of girls of Secondary School.

Major Findings of the Study

- ♦ The study found that calculated r value (-0.234) is greater than the theoretical value (0.148). So it is concluded that there is a significant negative relationship exists between Perceived Parenting and Social Alienation of secondary school students.

- ♦ The study found that calculated r value for boys (-0.216) is greater than the theoretical value (0.208). So it is concluded that there is a negative significant relationship exists between Perceived Parenting and Social Alienation of boys of secondary school students
- ♦ The study found that calculated r value for girls (-0.241) is greater than the theoretical value (0.208). So it is concluded that there is a significant negative relationship exists between Perceived Parenting and Social Alienation of girls of secondary school students.

Educational Implications of the Study

The findings of the present study may be utilized in various ways. The study revealed a negative relationship between Perceived Parenting and Social Alienation of secondary school students.

The study shows that the Perceived Parenting has a significant role in the social alienation of students. Based on this finding it is suggested that parents should take maximum care for providing their children a favorable and congenial atmosphere at home. It is also suggested that teachers should try to make the parents aware about the need and importance of providing the children a healthy atmosphere which will help the children to formulate a good perceived parenting.

Conclusion

The investigator is pleased to conclude the study on Perceived Parenting and Social Alienation of Secondary School Students. Her curiosity to determine whether a significant

relationship exists between perceived parenting and social alienation among secondary school students inspired her to undertake this research. The results revealed a negative correlation between perceived parenting and social alienation in secondary school students. Based on these findings, the investigator has suggested several recommendations for all stakeholders involved in secondary education.

References

- ♦ Alam, S. (2021). Social Alienation and depression among Bangladeshi Migrant workers. *Journal of immigrant and minority studies*, 39(5), 821-835
- ♦ Chacko, A. & Rency, A. A. (2018). The Relationship between Perceived Parenting Styles and Emotional Intelligence in young adults. *Journal of adolescent research*, 33(2), 147-168
- ♦ Dan, A. (2019). Social alienation and depression among young adults. A systematic review. *Journal of affective disorder*, 249, 858-866
- ♦ Dhillon, P. K. & Kanwar, S. (2020). The Relationship between Perceived Parenting styles and self esteem in young adults. *Journal of adolescent research*, 35(2), 147-168
- ♦ Feng, Y. (2022). Social alienation and depression among Chinese migrant workers. *Journal of immigrant and minority studies*, 40(2), 347-362.





Transversal Competencies in Sustainable Education: Key Competencies to 21st Century Learning

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Abstract

Transversal abilities-like critical thinking, creativity, teamwork, communication, adaptability, and self-regulation-embody vital 21st-century skills that go beyond subject areas and equip learners for the intricacies of contemporary life. These abilities are progressively acknowledged as essential to Education for Sustainable Development (ESD). As conventional, content-focused educational frameworks prove inadequate for meeting fast-changing societal and technological needs, transversal skills offer the cognitive, social, and emotional abilities essential for comprehensive growth, global citizenship, and continuous learning. Transversal skills connect formal and informal education, promoting genuine involvement with actual ecological and social challenges. Incorporating transversal skills into sustainable education empowers learners to face new global challenges while enhancing their ability to engage in environmental stewardship, social justice, and sustainable economic growth. This article highlights the importance of transversal skills as an educational basis for developing resilient, informed, and ethically accountable citizens in a connected world.

Key Words : *Transversal Competencies, Sustainable Education etc. etc.*

Introduction

Transversal skills include a broad spectrum of knowledge, competencies, work habits, and character traits that are essential for success in the modern world. These skills, often referred to as 21st-century skills, are applicable across all disciplines, career paths,

and civic responsibilities, making them essential for lifelong learning and adaptability. However, defining 21st-century skills remains a challenge due to their broad and evolving nature, leading to varied interpretations across educational contexts. Various terms-such as applied skills, cross-curricular skills,

interdisciplinary skills, transferable skills, soft skills, and non-cognitive skills - are often used interchangeably with Transversal skills, further contributing to the complexity of their classification (Voogt & Roblin, 2012).

Education for Sustainable Development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their Sustainable behaviour and take action for sustainable development. Education for Sustainable Development consequently promotes competencies like critical thinking, imagining future scenarios and making decisions in a collaborative way (UNESCO, 2005). In sustainable educational context, transversal skills play an important role in bridging traditional educational frameworks with the demands of a rapidly building a digitally advanced world. So conventional education models, which emphasize rote memorization and subject-specific knowledge, are increasingly insufficient in preparing learners for real-world challenges. Instead, sustainable education blended transversal skills, enabling learners to think critically, solve problems creatively, communicate effectively, collaborate with diverse stakeholders, and adapt to evolving societal and technological landscapes (Voogt & Roblin, 2012).

The harmony between Transversal Skills and Sustainable Education fosters a

synergistic and mutually reinforcing pedagogical approach that extends beyond conventional classroom boundaries. Sustainable Education promotes collaborative, real-world learning experiences, incorporating families, communities, industry professionals, and policymakers into the educational process. Through meaningful, community-driven projects, students actively engage in addressing real-world challenges, thereby internalizing and applying Transversal Skills in authentic contexts (B Sofia et al., 2023). The burgeoning importance of Transversal Skills is further underscored by their alignment with the United Nations Sustainable Development Goals (SDGs), which highlight the need for education systems to equip individuals with the necessary competencies to contribute to sustainable societies [UNESCO, 2014]. As such, Transversal Skills are vital not only for individual success but also for addressing global challenges related to a sustainable environment, economy, and society, making their development (Sotomayor, C.K.R, 2021). Transversal skills and competencies, also called “generic”, “21st-century”, or “key” competencies (Harju, Niemi, 2017), constitute the focus of a global trend in education in shifting towards competence-based curriculums and tackling Sustainable Development Goals (SDGs). As stated by UNESCO (2017), Transversal skills and competencies constitute “an interplay of knowledge, capacities and skills, motives and affective dispositions”, as they cannot be

taught by somebody and can rather be acquired in practice.

Transversal skills makes transdisciplinary particularly supported by the UNESCO (2017), which sees it as a key approach in enhancing transversal skills and Education for Sustainable Development results schools are preparing students for careers that do not yet exist. While this may hold true in terms of career titles and the hard skills necessary for successful engagement in a career, the transversal skills needed have largely remained the same for the past 30 years. The term “transversal skills” reflects the understanding that certain skills are universally applicable and essential for success in various aspects of life, including work, education, and personal development. In education, we are always giving things titles, and in this case, it is no different. Transversal skills grew out of the transferable skills movement during the mid- and late 20th century, when the national economy was undergoing significant changes and industries were evolving. The nature of work shifted, and the need for workers to adapt and apply their skills across different jobs and sectors became more apparent, bringing about the concept of transfer skills. The term transversal skills was developed to emphasize the importance of skills that are not confined to a specific job or sector, or one country. Organizations such as UNESCO and the OECD have promoted the development of transversal skills to address the challenges

of a rapidly changing world. These and other global organizations use these skills as part of many educational frameworks.

Significance of Transversal Skills in Sustainable Education

i. Promoting Holistic Development

Transversal competencies-such as critical thinking, creativity, collaboration, communication, and self-regulation-support the overall development of learners beyond academic knowledge, helping them grow intellectually, socially, and emotionally. Transversal competencies are essential for fostering holistic development-an all-encompassing educational approach that supports every aspect of a learner's progress. In contrast to conventional academic teaching that typically prioritizes cognitive results, holistic education highlights the integrated growth of intellectual, emotional, social, ethical, and physical aspects. Critical thinking prompts learners to assess information impartially, scrutinize arguments, and reach informed conclusions-vital competencies for grasping complex sustainability challenges. Creativity enables students to devise original solutions to social and environmental problems, fostering an attitude that appreciates experimentation and creativity. Cooperation and dialogue are crucial for efficient functioning in varied groups, participating in collective decision-making, and promoting mutual respect. These abilities are essential in both local and international

settings, where collaboration is required to achieve sustainability objectives.

ii. Fostering Global Citizenship

Transversal skills are fundamental in promoting global citizenship, a crucial component of sustainable education in the 21st century. In a world that is becoming more interconnected, students need to transcend national limits to grasp global challenges and participate as accountable, compassionate members of the international community. These skills foster essential values like:

Empathy - the capacity to comprehend and resonate with the emotions of others, fostering compassion and driving people to tackle global inequalities and injustices.

Valuing diversity - acknowledging and honoring cultural, social, religious, and linguistic distinctions. This facilitates the creation of inclusive communities while decreasing bias and discrimination.

Global responsibility - motivating students to reflect critically on how their actions affect others and the environment, fostering sustainable decisions in their everyday lives.

iii. Enhancing Problem-Solving and Critical Thinking

In sustainability, learners must evaluate complex environmental, social, and economic issues. Transversal skills empower

them to think critically and solve problems innovatively. In sustainable education, students are progressively confronted with intricate, real-world issues that encompass environmental, social, and economic areas-including climate change, resource depletion, poverty, inequality, and sustainable development. These challenges are interdisciplinary and necessitate not only knowledge but also the capacity for critical thinking, creative problem-solving, and collaboration.

Critical thinking empowers students to challenge assumptions, evaluate data, consider various viewpoints, and make informed choices based on evidence. It deters memorization and promotes a more profound interaction with material, cultivating a mindset that is inquisitive, doubtful of straightforward solutions, and receptive to ongoing education. Addressing a problem requires recognizing the underlying cause of a challenge, investigating creative solutions, and implementing them efficiently.

iv. Encouraging Continuous Education

In the 21st century, the capacity for lifelong learning is increasingly crucial. The world is evolving quickly because of technological progress, globalization, and changing social and environmental factors. To stay pertinent and efficient, people need to adjust to evolving challenges, responsibilities, and fields of knowledge as time goes by. This is where cross-functional skills are essential.

Transversal skills - like learning how to learn, flexibility, taking initiative, and self-regulation - are not limited to a specific subject or occupation. Rather, they can be applied in different areas and life circumstances, rendering them vital resources for continuous education.

Essential methods through which Transversal Competencies bolster lifelong learning comprise:

Flexibility and adaptability:

As professions develop and new industries arise, people need to embrace change and be prepared to learn new abilities. Transversal skills enable learners to react positively to unpredictability and change.

Self-directed learning:

Skills like self-regulation, curiosity, and goal-setting enable learners to take charge of their own growth. They are capable of recognizing their educational requirements, finding resources, and assessing their progress on their own.

Interdisciplinary use:

In areas such as education, the workplace, or everyday activities, transversal abilities like problem-solving, teamwork, and communication are relevant in various situations, enhancing the adaptability and resourcefulness of learners.

Digital and information literacy:

In an era of excessive information, cross-disciplinary skills enable students to assess digital materials, interact with online learning systems, and contribute effectively in digital spaces-abilities essential for continuous learning in today's world.

By integrating Transversal Competencies into education, we prepare learners with a mindset and abilities for ongoing development. This guarantees that they are ready not just for the challenges of today but also equipped to adapt to future changes, allowing them to be engaged contributors to sustainable development and personal satisfaction throughout their lives

v. Strengthening Collaboration and Communication

Addressing sustainability requires teamwork and dialogue. These skills enable learners to work effectively with others, respect multiple viewpoints, and engage in constructive communication. Enhancing Cooperation and Dialogue Sustainability issues are fundamentally intricate and interrelated, frequently necessitating various groups to unite in order to discover effective and enduring solutions. Whether tackling climate change, advancing social equity, or executing community-driven environmental initiatives, successful collaboration and communication are crucial. These are essential Transversal skills that enable learners to collaborate effectively in group

environments and interact significantly with individuals from diverse cultures, fields, and industries. Cooperation Collaboration encompasses cooperative education, group effort, and the capability to reach agreement. In sustainable education, it involves learning to listen, share duties, and aid in achieving collective objectives. It aids students in grasping how to honour and appreciate varied viewpoints, acknowledge the abilities of others, and operate successfully within multicultural, interdisciplinary groups.

vi. Bridging Formal and Informal Learning

Sustainable Education involves more than merely acquiring knowledge or grasping environmental, social, or economic topics it advances by inspiring students to engage in significant, responsible actions informed by that understanding. The primary aim is to enable individuals to transform into proactive catalysts for change within their communities and on the globe. This is where cross-functional skills are essential. These skills and mindsets span various fields and are crucial for continuous learning and active participation in society. Essential cross-cutting skills encompass: Analytical thinking and issue resolution allow students to assess intricate problems, consider options, and reach well-founded conclusions. Self-awareness and emotional intelligence aid students in recognizing their values, strengths, and duties, fostering ethical conduct. Empathy and cross-cultural awareness foster respect

for individuals and value various viewpoints, essential for social unity. Teamwork and interaction—crucial for successfully cooperating with others to achieve shared objectives. Moral and civic duty—cultivating a commitment to positively impact society and the environment.

Essentially, Transversal Competencies turn learners into accountable persons who not only grasp sustainability issues but are also prepared and inspired to undertake considerate, ethical, and significant actions in their personal lives, communities, and careers A primary advantage of transversal competencies is their capacity to link classroom learning (formal education) with real-world experiences (informal learning). This link enhances education by making it more relevant, purposeful, and captivating for students. The Importance of This in Sustainable Education: Sustainable education seeks to equip students to tackle practical challenges, including climate change, inequality, and the management of resources. These challenges demand practical expertise, abilities, and ethics that cannot be cultivated solely through formal education. By connecting structured and unstructured learning, Education evolves to be more comprehensive, emphasizing not only exams but also preparedness for life. Students recognize the importance of their education, grasping how teachings relate to their lives and surroundings. Students remain more

engaged when they relate classroom subjects to real-life challenges and their own experiences. A lesson on environmental science (formal learning) is more effective when students are motivated to conduct a community clean-up or decrease plastic consumption at home (informal learning)

Conclusion

Moreover, Transversal Competencies help students to manage complex, interdisciplinary issues, which is a core aspect of schooling and sustainable education in the modern world. As scientific and technological advancements continue to reshape global landscapes, preparing students with critical thinking, problem-solving, communication, and adaptability assures their readiness for emerging challenges. By fostering transversal skills within sustainable education frameworks, learners develop the competencies required to contribute actively to social, economic, and environmental sustainability, reinforcing the holistic development essential for a knowledge-based, interconnected society (B Sofia et al., 2023).

Reference

- ♦ Cochran-Smith, M., & Zeichner, K. (2009). Studying teacher education: The report of the AERA panel on research and teacher education. Routledge.
- ♦ Darling-Hammond, L. (2006). Powerful teacher education: Lessons from exemplary programs. Jossey-Bass.
- ♦ Education for Sustainable Development Goals: Learning Objectives. (2017). UNESCO. Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000247444>
- ♦ Future of Education and Skills 2030 Conceptual Learning Framework. (2019). OECD. Retrieved from <https://www.oecd.org/education/2030-project/>
- ♦ Hattie, J. (2009). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. Routledge.
- ♦ Prensky, M. (2001). Digital natives, digital immigrants part 1. On the Horizon, 9(5), 1-6. <https://doi.org/10.1108/10748120110424816>
- ♦ Sustainability in Higher Education: What is Happening? (2015). In Barth, M., Michelsen, G., Rieckmann, M., & Thomas, I. (Eds.), Handbook of Higher Education for Sustainable Development (pp. 1-16). Routledge. <https://doi.org/10.4324/9781315852249>
- ♦ Tilbury, D., & Stevenson, R. B. (Eds.). (2009). Education and sustainability: Responding to the global challenge. IUCN.
- ♦ Transversal Competences in Education for Sustainable Development. (2020). UNESCO. Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000372978>





Effectiveness of Computer Education in Promoting Digital Literacy among Secondary School Students

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Abstract

Computer education has emerged as a fundamental component of modern education systems across the world. With the rapid growth of information and communication technology (ICT), the role of computers in teaching and learning has expanded significantly. This research-based study examines the role of computer education at the secondary school level, focusing on its impact on students' learning outcomes, digital competence, and academic engagement. The study adopts a descriptive survey method using questionnaires and interviews as tools for data collection. The findings reveal that computer education positively influences students' motivation, understanding of concepts, and readiness for future careers, while infrastructural limitations and lack of teacher training remain major challenges. The study suggests strategic measures for effective integration of computer education in schools.

Key Words : *Computer Education, ICT in Education, Digital Literacy etc.*

Introduction

Education in the twenty-first century is deeply influenced by technological advancements. Computers and digital technologies have transformed traditional classroom practices into interactive and learner-centered experiences. Computer education equips students with essential knowledge and skills required to function effectively in a technology-driven society. It enhances problem-solving abilities, critical thinking, creativity, and communication skills.

In the context of globalization and digital transformation, computer education is no longer optional but a necessity in school education.

The integration of computers in education supports innovative teaching strategies such as multimedia instruction, online learning, virtual simulations, and collaborative learning platforms. These methods contribute to improved academic performance and learner autonomy. Therefore, a systematic study of computer education

and its impact on students is essential to understand its educational value and challenges.

Review of Related Literature

Several studies have highlighted the importance of computer education in enhancing the quality of education. Mishra and Koehler (2006) emphasized the role of technological pedagogical content knowledge (TPACK) in effective teaching. UNESCO (2019) reported that ICT integration improves access to education and promotes inclusive learning. Studies conducted at the school level indicate that students exposed to computer-based instruction show higher motivation and better conceptual understanding compared to those taught through traditional methods.

However, research also points out challenges such as lack of infrastructure, inadequate teacher training, and unequal access to technology. These findings indicate the need for systematic planning and policy support for effective implementation of computer education.

Need and Significance of the Study

The increasing use of digital technology in everyday life necessitates the inclusion of computer education in school curricula. This study is significant because it:

- ♦ Highlights the educational importance of computer education.

- ♦ Examines its impact on students' learning outcomes
- ♦ Identifies challenges faced by schools in implementing computer education
- ♦ Provides suggestions for improving ICT integration in education

The study is useful for teachers, students, curriculum developers, and educational administrators.

Objectives of the Study

The objectives of the study are:

- ♦ To study the role of computer education at the secondary school level.
- ♦ To analyze the impact of computer education on students' learning outcomes.
- ♦ To identify challenges in the implementation of computer education.
- ♦ To suggest measures for the effective integration of computer education in schools.

Research Methodology

Method

The study adopted a descriptive survey method.

Sample

The sample consisted of 100 secondary school students and 20 teachers selected using random sampling technique from selected schools.

Tools Used

- ♦ Questionnaire for students
- ♦ Interview schedule for teachers

Statistical Techniques

Percentage analysis was used for data analysis.

Analysis and Interpretation of Data

The analysis of data revealed that a majority of students showed a positive attitude towards computer education. Students reported that computer-based learning helped them understand concepts better and increased their interest in learning. Teachers expressed that the use of computers enhanced classroom interaction and made teaching more effective.

However, the study also revealed challenges such as insufficient computer facilities, limited internet access, and lack of adequate training for teachers. These factors hinder the effective implementation of computer education.

Major Findings of the Study

- ♦ Computer education improves students' motivation and engagement in learning.
- ♦ Students develop better digital literacy and problem-solving skills.
- ♦ Teachers perceive computer education as an effective instructional tool.
- ♦ Infrastructure and training-related issues remain significant challenges.

Educational Implications

The findings of the study have important educational implications:

- ♦ Computer education should be integrated across all subjects.
- ♦ Continuous professional development programs should be organized for teachers.
- ♦ Schools should be provided with adequate ICT infrastructure.
- ♦ Curriculum planners should emphasize practical and application-based computer learning.

Suggestions

- ♦ Government initiatives should focus on strengthening digital infrastructure in schools.
- ♦ Computer education should be made compulsory at the secondary level.
- ♦ Regular training programs should be conducted for teachers.
- ♦ Public-private partnerships can support technological advancement in education.

Conclusion

Computer education plays a crucial role in enhancing the quality of education and preparing students for future challenges. The study concludes that effective integration of computer education leads to improved learning outcomes, increased student

engagement, and better digital competence. Addressing infrastructural and training challenges will ensure the successful implementation of computer education in schools.

References

- ♦ Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher

knowledge. *Teachers College Record*, 108(6), 1017–1054.

- ♦ NCERT. (2020). *ICT in school education*. New Delhi: NCERT.
- ♦ UNESCO. (2019). *Information and communication technology in education*. Paris: UNESCO





Artificial Intelligence as a Threat to Creativity Among Children

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Abstract

The emergence of Artificial Intelligence (AI) has transformed the educational, social, and creative landscapes of contemporary childhood. While AI offers new opportunities for learning and exploration, it simultaneously presents a profound challenge to the cultivation of Creativity - one of the most defining human faculties. This paper examines the ways in which AI influences children's imaginative and creative capacities, analyzes the psychological and pedagogical implications of excessive reliance on AI-driven tools, and explores strategies to preserve creativity in the digital age. It argues that although AI can serve as an enabler of creative expression, uncritical dependence on it risks diminishing the intrinsic motivation, originality, and cognitive engagement that underlie true creativity.

Key Words : Artificial Intelligence, Creativity, AI Platform, imaginative Play etc.

Introduction

Artificial Intelligence (AI) has rapidly become an inseparable part of modern childhood.

From AI-enabled educational platforms and adaptive learning apps to voice-activated toys and entertainment algorithms, children today interact with intelligent systems almost from infancy. These technologies promise efficiency, engagement, and personalized growth. However, beneath these benefits lies a critical concern: Is AI undermining the development of creativity among children?

Creativity is not merely a desirable skill but a fundamental cognitive and emotional capacity that fuels innovation, empathy, and problem-solving. It is through imaginative play, experimentation, and independent exploration that children learn to think divergently and develop their sense of individuality. The increasing use of AI in creative and educational domains threatens to replace these formative experiences with algorithmic convenience and instant gratification. This article seeks to explore the complex relationship between AI and Creativity among

children, focusing on how AI may inhibit - or in some cases, reshape - the human creative process.

The Ubiquity of AI in Children's Lives

AI technologies have permeated nearly every aspect of childhood experience. Educational software uses machine learning algorithms to customize lessons; entertainment platforms suggest content tailored to individual preferences; and creative tools such as ChatGPT, DALL-E, or Soundraw allow children to produce art, stories, and music with minimal effort. While such technologies democratize access to knowledge and creative expression, they also externalize the processes of imagination and invention. The traditional creative journey - characterized by exploration, trial, and error - is being replaced by automated generation.

The Nature of Creativity

Psychologists define creativity as the ability to generate ideas, solutions, or products that are both novel and valuable. It involves cognitive flexibility, imagination, and emotional investment. According to Torrance's (1974) model of creative thinking, the process depends on fluency, flexibility, originality, and elaboration - capacities that flourish through open-ended play, curiosity, and persistent experimentation. AI-driven tools, by contrast, prioritize efficiency and precision. They provide outputs that mimic creativity but lack the human experience of uncertainty, struggle, and emotional depth.

The Allure of Effortless Creation

AI's appeal lies in its ability to deliver instant results. A prompt such as 'draw a dragon in space' can generate a sophisticated image within seconds. For children, this is thrilling - but also deceptive. The sense of accomplishment that arises from creative effort is replaced by fleeting satisfaction derived from technological output.

The Decline of Imaginative Play

Unstructured play is the foundation of creative development. Through imaginative games - building castles from sand, pretending to be explorers, or inventing stories - children learn to synthesize ideas, negotiate meaning, and express emotion. AI-mediated entertainment, however, increasingly replaces imaginative play with passive interaction. Algorithmic storytelling apps and AI-driven toys provide pre-designed narratives that limit children's agency.

Educational Implications: Efficiency Versus Imagination

AI's integration into education presents a paradox. Adaptive learning systems can identify weaknesses, personalize lessons, and enhance academic performance. However, these very systems may also narrow the scope of intellectual curiosity by guiding students toward predetermined outcomes.

Psychological Dimensions: The Erosion of Creative Identity

Creativity is closely linked to one's sense of identity. When children produce something - a poem, a sketch, or a story -

they see themselves reflected in their work. AI-generated products, however, lack this emotional connection. When a machine produces a child's 'art,' the child may admire the result but feel little ownership of it.

Cultural and Societal Implications

The widespread use of AI among children also raises broader cultural concerns. AI systems are trained on existing datasets - reproductions of human creativity filtered through algorithmic logic. Consequently, they generate outputs that reflect existing cultural patterns rather than inventing new ones.

Counterargument: AI as a Catalyst for Creativity

It is essential to acknowledge that AI is not inherently detrimental to Creativity. When used judiciously, it can augment human imagination rather than suppress it. AI can function as a collaborator, providing inspiration, resources, or technical assistance that broaden creative possibilities.

The Role of Parents and Educators

Safeguarding creativity in the AI era demands conscious intervention. Parents and teachers must help children develop a balanced relationship with technology, one that values effort, imagination, and reflection.

Ethical Considerations

Beyond individual development, the issue has moral and social dimensions. AI models trained on massive datasets often

reflect biases embedded in their source material. When children use these systems uncritically, they may internalize these biases, limiting the diversity of their creative perspectives.

Reclaiming Human Creativity

Throughout history, creativity has been the driving force of human progress - from prehistoric cave paintings to digital innovation. What distinguishes human creativity from machine generation is intentionality - the capacity to imagine something that does not yet exist and to imbue it with meaning.

Conclusion

Artificial Intelligence stands as both a marvel of human ingenuity and a mirror reflecting our vulnerabilities. As AI becomes integral to children's learning and play, its influence on creativity cannot be ignored. While it offers immense potential to support exploration and access to knowledge, its uncritical or excessive use threatens to erode the very capacities that define human intelligence - imagination, originality, and emotional depth.





Effectiveness of Accelerated Learning Strategy on Achievement in Chemistry of Secondary School Students

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Abstract

This study examines the Effectiveness of Accelerated Learning Strategy (ALS) on Chemistry Achievement among secondary school students. Using a quasi-experimental design, learners exposed to ALS were compared with peers taught via conventional methods. The study specifically incorporated Lozanov's Suggestopedia lesson plan, including preparatory relaxation, music-assisted learning, role-play, visualization, multisensory engagement, and active participation. Results indicated significant improvements in conceptual understanding, problemsolving skills, retention, and overall Chemistry Achievement. Findings confirm that ALS, combined with Lozanov's structured lesson plan, enhances engagement, comprehension, and long term learning in complex scientific subjects.

Key Words : Accelerated Learning Strategy, Achievement in Chemistry, Secondary School Students etc.

Introduction

Chemistry often poses challenges due to abstract concepts, complex problem-solving, and practical applications. Traditional lecture-based methods frequently result in rote memorization, misconceptions, and limited analytical skill development. To address these challenges, innovative strategies are needed to promote active, multisensory, and structured learning.

ALS provides a holistic approach that combines brain-based methods, multisensory instruction, collaborative learning, reflective practice, hands-on experiments, and visualization techniques. Importantly, this study incorporates Lozanov's Suggestopedia lesson plan, which includes preparatory relaxation, music-assisted sessions, role-play, guided visualization, and interactive participation. These elements reduce anxiety, enhance memory retention, stimulate cognitive and emotional

engagement, and provide a supportive learning environment.

Secondary School Students face many challenges while learning chemistry. ALS, integrated with Suggestopedia, scaffolds learning experiences, enhances comprehension, and promotes retention. Collaborative and experiential tasks improve problem-solving, analytical reasoning, and peer assisted learning, while reflective exercises support self-evaluation and conceptual clarity.

This research evaluates the effectiveness of ALS on Chemistry Achievement. The study provides empirical evidence on how innovative, learner centred strategies improve engagement, facilitate understanding, and enhance long-term performance in science education.

Need and Significance of the Study

This study demonstrates how ALS combined with Lozanov's Suggestopedia lesson plan can significantly improve secondary school students' achievement in Chemistry. Traditional methods often fail to address diverse learning styles or make abstract concepts accessible. ALS with Suggestopedia creates a structured, engaging, and emotionally supportive environment that fosters comprehension, retention, and application.

The lesson plan includes relaxation, music, visualization, role-play, active participation, and reflection. These techniques reduce cognitive load, lower stress, increase motivation, and promote deep learning. Col-

laborative and experiential activities develop problem-solving, analytical thinking, and critical evaluation skills. By using ALS, students actively participate in learning, retain knowledge effectively, and enhance conceptual understanding.

The study provides practical guidance for educators, curriculum planners, and instructional designers seeking effective teaching strategies in Chemistry. It also informs professional development programs to train teachers in ALS and Suggestopedia techniques. Broader implications include preparing students for higher education, STEM careers, and competitive examinations. By promoting engagement, retention, and autonomous learning, ALS with Suggestopedia fosters academic excellence and lifelong learning in scientific education.

Literature Review

Brown (2017) examined multisensory teaching in science classrooms. Students exposed to visual, auditory, and kinesthetic activities showed improved comprehension, problem-solving, and retention in Chemistry. Interactive, sensory-rich methods reduced misconceptions and increased engagement, demonstrating the effectiveness of ALS in enhancing learning outcomes in complex subjects.

Santos and Lee (2019) explored accelerated instructional models in Chemistry. Structured, multisensory, and collaborative approaches improved understanding, application, and retention of abstract concepts. ALS strat-

egies facilitated cognitive engagement and problem-solving, confirming their relevance for effective science education.

Mathew (2020) studied collaborative learning in ALS for Chemistry. Group-based tasks enhanced reasoning, peer-assisted learning, and conceptual understanding. Reflective activities enabled students to assess understanding and adjust strategies, improving problem-solving skills and academic achievement.

Fernandez (2021) examined structured learning cycles, including preparation, active participation, and reflection. ALS learners demonstrated higher retention, fewer misconceptions, and stronger conceptual clarity. Reflective exercises allowed independent assessment and adjustment of learning strategies, enhancing academic performance.

Khan and Joseph (2022) focused on visualization-based ALS strategies. Diagrams, models, and simulations clarified abstract chemical processes, reduced cognitive overload, and improved problem-solving ability. Visual techniques enhanced comprehension and long-term retention in Chemistry.

Ritika and Sharma (2023) studied active learning strategies in ALS, including hands-on experiments and interactive demonstrations. Experiential learning improved analytical thinking, conceptual understanding, and motivation. ALS fostered autonomy, engagement, and mastery of complex Chemistry topics.

Objectives of the Study

To study the effect of Accelerated Learning Strategy on Achievement in Chemistry of ninth standard male students.

Hypotheses of the Study

There is a Significant difference between Experimental Group and Control Group on their mean of the gain scores of Achievement in Chemistry.

Method Adopted for the Study

In the present study, the investigator used Accelerated Learning Strategy for teaching in the experimental group and prevailing Constructivist approach for teaching in control group. A pre test and post test were conducted before and after the treatment. The difference in the scores (gain scores) will help to conclude that the special treatment was effective for achievement in Chemistry among ninth standard students.

Variables Used for the Study

- ♦ *Dependent Variable - Achievement in Chemistry.*
- ♦ Independent Variable - Accelerated Learning Strategy

Population and Sample of the Study:

In the present study, all Ninth Standard students studying in the English-medium Kerala State syllabus during the academic year 2025–2026 in Kottayam district were considered as the population. From this population, the investigator selected a sample of

eighty male students studying in Standard Nine under the English-medium Kerala State syllabus. These eighty students were divided into two groups: forty students in the experimental group and forty students in the control group.

Tools and Techniques Used

- Lesson transcripts based on Accelerated Learning Strategy prepared by the investigator.
- Lesson transcript based on the prevailing approach (Constructivist approach of learning) prepared by the investigator.

- Achievement test in Chemistry prepared by the investigator.

Statistical Techniques Used

- Descriptive Statistics
Mean, Median, Standard Deviation
- Inferential Statistics
t test

Analysis and Interpretation

H1 : "There is a significant difference between Experimental Group and Control Group on their mean of the gain scores of Achievement in Chemistry ".

Table

Number (N), Mean (M), Standard Deviation (SD) and t value of Mean of the Gain Scores on Achievement in Chemistry among Experimental and Control Group

Group	df	N	M	SD	t Value	Result
Experimental Group	78	40	10.05	2.36	26.89	Significant at 0.01 level
Control Group		40	6.15	2.22		

From the Table, the t value is 26.891, Which is greater than the theoretical value 2.64 and it is significant at 0.01 level with a degree of freedom 78. It means that the Experimental group and Control group have significant difference on the Mean of the Gain Scores of Achievement in Chemistry.

As a result, the null hypothesis: "There is no significant difference between the Experimental and Control group on the mean of the gain scores of Achievement in Chem-

istry, was rejected and the research hypothesis: " There is a Significant difference between the Experimental and Control group on the mean of the gain scores of Achievement in Chemistry", was retained.

Major Findings of the Study

There was a significant difference between the Experimental group and Control group on the mean of the gain scores of Achievement in Chemistry. It is clear that experimental group gained scores of Achieve-

ment in Chemistry than control group. Hence it can be concluded that Accelerated Learning Strategy was effective in improving Achievement in Chemistry of Ninth standard Boys.

Educational Implications of the Study

The present study was basically intended to find out the effectiveness Accelerated Learning Strategy on Achievement in Chemistry for Ninth Standard Students. The findings of the study have wider implications in the teaching learning process, which are expected to help the curriculum developers and teacher concerned in the field of education to realize the need and significance of incorporating Achievement in Chemistry in teaching learning process. The investigator also expects that the teaching community in whole and researchers would be benefitted from the present study. It is recommended, that curriculum developers should incorporate ALS in the curriculum of Secondary School Students.

Conclusion

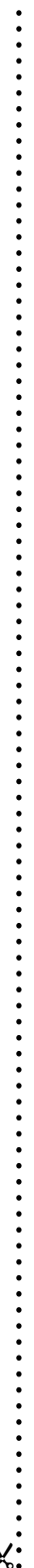
Accelerated Learning Strategy, the views that every student can learn better when they realize their preferable learning style. This model of teaching threw light to facilitate learning as well as Achievement in Chemistry. This method aimed Students in improving Achievement in Chemistry in a more meaningful way. This design will also support curriculum planners develop new curriculum. This study will

also motivate researchers to conduct additional search in this area.

Reference

- ♦ Brown, L. (2017). Multisensory instructional strategies in science learning: Effects on chemistry comprehension. *Science Education Perspectives*, 18(2), 67–82.
- ♦ Santos, R., & Lee, M. (2019). Accelerated learning approaches in chemistry: A study on cognitive engagement and retention. *Journal of Chemical Education Research*, 26(1), 41–55.
- ♦ Mathew, T. (2020). Collaborative learning strategies for enhanced achievement in chemistry. *International Journal of Science Pedagogy*, 13(4), 201–218.
- ♦ Fernandez, J. (2021). Structured learning cycles and conceptual clarity in chemistry classrooms. *Journal of Teaching and Learning Sciences*, 9(3), 144–160.
- ♦ Khan, A., & Joseph, S. (2022). Visualization-supported accelerated learning methods in secondary chemistry education. *Chemistry Education Innovations*, 14(2), 77–93.
- ♦ Ritika, P., & Sharma, N. (2023). Experiential and active learning strategies for improving achievement in chemistry. *Journal of Modern Science Education*, 21(1), 33–49.





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